Utah Division of Water Quality
Salt Lake City, Utah

WASTELOAD ANALYSIS [WLA]
Addendum: Statement of Basis

12-Jul-22
4:00 PM

Facilities: **Canyon Fuel Company; SUFCO Mine** **UPDES No: UT-0022918**
Discharging to: **SUFCO_002_WLA_2022**

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

Quitchupah Creek :	2B, 3A, 4
Antidegradation Review:	Level I review completed. Level II review 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)	6.50 mg/l (30 Day Average) 9.50 mg/l (7Day Average) 8.00 mg/l (1 Day Average
Maximum Total Dissolved Solids	1200.0 mg/l

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Acute and Chronic Heavy Metals (Dissolved)

Parameter	4 Day Average (Chronic) Standard Concentration		Load*		1 Hour Average (Acute) Standard Concentration		Load*	
Aluminum	87.00	ug/l**	0.363	lbs/day	750.00	ug/l	3.127	lbs/day
Arsenic	190.00	ug/l	0.792	lbs/day	340.00	ug/l	1.418	lbs/day
Cadmium	0.89	ug/l	0.004	lbs/day	10.90	ug/l	0.045	lbs/day
Chromium III	320.81	ug/l	1.338	lbs/day	6711.93	ug/l	27.983	lbs/day
ChromiumVI	11.00	ug/l	0.046	lbs/day	16.00	ug/l	0.067	lbs/day
Copper	36.76	ug/l	0.153	lbs/day	63.51	ug/l	0.265	lbs/day
Iron					1000.00	ug/l	4.169	lbs/day
Lead	24.54	ug/l	0.102	lbs/day	629.81	ug/l	2.626	lbs/day
Mercury	0.0120	ug/l	0.000	lbs/day	2.40	ug/l	0.010	lbs/day
Nickel	202.78	ug/l	0.845	lbs/day	1823.87	ug/l	7.604	lbs/day
Selenium	4.60	ug/l	0.019	lbs/day	20.00	ug/l	0.083	lbs/day
Silver	N/A	ug/l	N/A	lbs/day	59.82	ug/l	0.249	lbs/day
Zinc	466.75	ug/l	1.946	lbs/day	466.75	ug/l	1.946	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 497.74 mg/l as CaCO3

Organics [Pesticides]

Parameter	4 Day Average (Chronic) Standard Concentration		Load*		1 Hour Average (Acute) Standard Concentration		Load*	
Aldrin					1.500	ug/l	0.006	lbs/day
Chlordane	0.004	ug/l	0.018	lbs/day	1.200	ug/l	0.005	lbs/day
DDT, DDE	0.001	ug/l	0.004	lbs/day	0.550	ug/l	0.002	lbs/day
Dieldrin	0.002	ug/l	0.008	lbs/day	1.250	ug/l	0.005	lbs/day
Endosulfan	0.056	ug/l	0.236	lbs/day	0.110	ug/l	0.000	lbs/day
Endrin	0.002	ug/l	0.010	lbs/day	0.090	ug/l	0.000	lbs/day
Guthion					0.010	ug/l	0.000	lbs/day
Heptachlor	0.004	ug/l	0.016	lbs/day	0.260	ug/l	0.001	lbs/day
Lindane	0.080	ug/l	0.338	lbs/day	1.000	ug/l	0.004	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	0.059	lbs/day	2.000	ug/l	0.008	lbs/day
ɛntachlorophenol	13.00	ug/l	54.900	lbs/day	20.000	ug/l	0.083	lbs/day
Toxephene	0.0002	ug/l	0.001	lbs/day	0.7300	ug/l	0.003	lbs/day

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IV. Numeric Stream Standards for Protection of Agriculture

	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
	Concentration	**Load***	**Concentration**	**Load***
Arsenic			100.0 ug/l	lbs/day
Boron			750.0 ug/l	1.56 lbs/day
Cadmium			10.0 ug/l	0.02 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	2.50 tons/day

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

	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
Metals	**Concentration**	**Load***	**Concentration**	**Load***
Arsenic			50.0 ug/l	0.211 lbs/day
Barium			1000.0 ug/l	4.223 lbs/day
Cadmium			10.0 ug/l	0.042 lbs/day
Chromium			50.0 ug/l	0.211 lbs/day
Lead			50.0 ug/l	0.211 lbs/day
Mercury			2.0 ug/l	0.008 lbs/day
Selenium			10.0 ug/l	0.042 lbs/day
Silver			50.0 ug/l	0.211 lbs/day
Fluoride (3)			1.4 ug/l	0.006 lbs/day
to			2.4 ug/l	0.010 lbs/day
Nitrates as N			10.0 ug/l	0.042 lbs/day
Chlorophenoxy Herbicides				
2,4-D			100.0 ug/l	0.422 lbs/day
2,4,5-TP			10.0 ug/l	0.042 lbs/day
Endrin			0.2 ug/l	0.001 lbs/day
ıexane (Lindane)			4.0 ug/l	0.017 lbs/day
Methoxychlor			100.0 ug/l	0.422 lbs/day
Toxaphene			5.0 ug/l	0.021 lbs/day

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

	Maximum Conc., ug/l - Acute Standards			
	Class 1C		**Class 3A, 3B**	
Toxic Organics	[2 Liters/Day for 70 Kg Person over 70 Yr.]		[6.5 g for 70 Kg Person over 70 Yr.]	
Acenaphthene	1200.00 ug/l	5.07 lbs/day	2700.0 ug/l	11.40 lbs/day
Acrolein	320.00 ug/l	1.35 lbs/day	780.0 ug/l	3.29 lbs/day
Acrylonitrile	0.06 ug/l	0.00 lbs/day	0.7 ug/l	0.00 lbs/day
Benzene	1.20 ug/l	0.01 lbs/day	71.0 ug/l	0.30 lbs/day
Benzidine	0.00012 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Carbon tetrachlo	0.25 ug/l	0.00 lbs/day	4.4 ug/l	0.02 lbs/day
Chlorobenzene	680.00 ug/l	2.87 lbs/day	21000.0 ug/l	88.68 lbs/day
1,2,4-Trichlorobenzene				
Hexachlorobenze	0.00075 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
1,2-Dichloroetha	0.38 ug/l	0.00 lbs/day	99.0 ug/l	0.42 lbs/day
1,1,1-Trichloroethane				
Hexachloroethan	1.90 ug/l	0.01 lbs/day	8.9 ug/l	0.04 lbs/day
1,1-Dichloroethane				
1,1,2-Trichloroetl	0.61 ug/l	0.00 lbs/day	42.0 ug/l	0.18 lbs/day
1,1,2,2-Tetrachlo	0.17 ug/l	0.00 lbs/day	11.0 ug/l	0.05 lbs/day
Chloroethane			0.0 ug/l	0.00 lbs/day
Bis(2-chloroethyl	0.03 ug/l	0.00 lbs/day	1.4 ug/l	0.01 lbs/day
2-Chloroethyl vin	0.00 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
2-Chloronaphtha	1700.00 ug/l	7.18 lbs/day	4300.0 ug/l	18.16 lbs/day
2,4,6-Trichloroph	2.10 ug/l	0.01 lbs/day	6.5 ug/l	0.03 lbs/day
p-Chloro-m-cresol			0.0 ug/l	0.00 lbs/day
Chloroform (HM)	5.70 ug/l	0.02 lbs/day	470.0 ug/l	1.98 lbs/day
2-Chlorophenol	120.00 ug/l	0.51 lbs/day	400.0 ug/l	1.69 lbs/day
1,2-Dichlorobenz	2700.00 ug/l	11.40 lbs/day	17000.0 ug/l	71.79 lbs/day
1,3-Dichlorobenz	400.00 ug/l	1.69 lbs/day	2600.0 ug/l	10.98 lbs/day
1,4-Dichlorobenz	400.00 ug/l	1.69 lbs/day	2600.0 ug/l	10.98 lbs/day
3,3'-Dichlorobenz	0.04 ug/l	0.00 lbs/day	0.1 ug/l	0.00 lbs/day
1,1-Dichloroethyl	0.06 ug/l	0.00 lbs/day	3.2 ug/l	0.01 lbs/day
1,2-trans-Dichlor	700.00 ug/l	2.96 lbs/day	0.0 ug/l	0.00 lbs/day

2,4-Dichlorophen	93.00	ug/l	0.39	lbs/day	790.0	ug/l	3.34 lbs/day
1,2-Dichloroprop	0.52	ug/l	0.00	lbs/day	39.0	ug/l	0.16 lbs/day
1,3-Dichloroprop	10.00	ug/l	0.04	lbs/day	1700.0	ug/l	7.18 lbs/day
2,4-Dimethylphe	540.00	ug/l	2.28	lbs/day	2300.0	ug/l	9.71 lbs/day
2,4-Dinitrotoluen	0.11	ug/l	0.00	lbs/day	9.1	ug/l	0.04 lbs/day
2,6-Dinitrotoluen	0.00	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
1,2-Diphenylhydr	0.04	ug/l	0.00	lbs/day	0.5	ug/l	0.00 lbs/day
Ethylbenzene	3100.00	ug/l	13.09	lbs/day	29000.0	ug/l	122.47 lbs/day
Fluoranthene	300.00	ug/l	1.27	lbs/day	370.0	ug/l	1.56 lbs/day
4-Chlorophenyl phenyl ether							
4-Bromophenyl phenyl ether							
Bis(2-chloroisopr	1400.00	ug/l	5.91	lbs/day	170000.0	ug/l	7.18E+02 lbs/day
Bis(2-chloroetho	0.00	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
Methylene chlori	4.70	ug/l	0.02	lbs/day	1600.0	ug/l	6.76 lbs/day
Methyl chloride (I	0.00	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
Methyl bromide (	0.00	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
Bromoform (HM)	4.30	ug/l	0.02	lbs/day	360.0	ug/l	1.52 lbs/day
Dichlorobromom	0.27	ug/l	0.00	lbs/day	22.0	ug/l	0.09 lbs/day
Chlorodibromom	0.41	ug/l	0.00	lbs/day	34.0	ug/l	0.14 lbs/day
Hexachlorobutad	0.44	ug/l	0.00	lbs/day	50.0	ug/l	0.21 lbs/day
Hexachlorocyclo	240.00	ug/l	1.01	lbs/day	17000.0	ug/l	71.79 lbs/day
Isophorone	8.40	ug/l	0.04	lbs/day	600.0	ug/l	2.53 lbs/day
Naphthalene							
Nitrobenzene	17.00	ug/l	0.07	lbs/day	1900.0	ug/l	8.02 lbs/day
2-Nitrophenol	0.00	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
4-Nitrophenol	0.00	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
2,4-Dinitropheno	70.00	ug/l	0.30	lbs/day	14000.0	ug/l	59.12 lbs/day
4,6-Dinitro-o-cres	13.00	ug/l	0.05	lbs/day	765.0	ug/l	3.23 lbs/day
N-Nitrosodimethy	0.00069	ug/l	0.00	lbs/day	8.1	ug/l	0.03 lbs/day
N-Nitrosodipheny	5.00	ug/l	0.02	lbs/day	16.0	ug/l	0.07 lbs/day
N-Nitrosodi-n-pro	0.01	ug/l	0.00	lbs/day	1.4	ug/l	0.01 lbs/day
Pentachlorophen	0.28	ug/l	0.00	lbs/day	8.2	ug/l	0.03 lbs/day
Phenol	2.10E+04	ug/l	8.87E+01	lbs/day	4.6E+06	ug/l	1.94E+04 lbs/day
Bis(2-ethylhexyl)p	1.80	ug/l	0.01	lbs/day	5.9	ug/l	0.02 lbs/day
Butyl benzyl phth	3000.00	ug/l	12.67	lbs/day	5200.0	ug/l	21.96 lbs/day
Di-n-butyl phthala	2700.00	ug/l	11.40	lbs/day	12000.0	ug/l	50.68 lbs/day
Di-n-octyl phthlate							
Diethyl phthalate	23000.00	ug/l	97.13	lbs/day	120000.0	ug/l	506.77 lbs/day
Dimethyl phthlate	3.13E+05	ug/l	1.32E+03	lbs/day	2.9E+06	ug/l	1.22E+04 lbs/day
Benzo(a)anthrac	0.0028	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
Benzo(a)pyrene (	0.0028	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
Benzo(b)fluorant	0.0028	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
Benzo(k)fluoranth	0.0028	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
Chrysene (PAH)	0.0028	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
Acenaphthylene (PAH)							
Anthracene (PAH	9600.00	ug/l	40.54	lbs/day	0.0	ug/l	0.00 lbs/day
Dibenzo(a,h)anth	0.0028	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
Indeno(1,2,3-cd)p	0.0028	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
Pyrene (PAH)	960.00	ug/l	4.05	lbs/day	11000.0	ug/l	46.45 lbs/day
Tetrachloroethyle	0.80	ug/l	0.00	lbs/day	8.9	ug/l	0.04 lbs/day
Toluene	6800.00	ug/l	28.72	lbs/day	200000	ug/l	844.61 lbs/day
Trichloroethylene	2.70	ug/l	0.01	lbs/day	81.0	ug/l	0.34 lbs/day
Vinyl chloride	2.00	ug/l	0.01	lbs/day	525.0	ug/l	2.22 lbs/day
					0.0		0.00 lbs/day
Pesticides					0.0		0.00 lbs/day
Aldrin	0.0001	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
Dieldrin	0.0001	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
Chlordane	0.0006	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
4,4'-DDT	0.0006	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
4,4'-DDE	0.0006	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
4,4'-DDD	0.0008	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
alpha-Endosulfar	0.9300	ug/l	0.00	lbs/day	2.0	ug/l	0.01 lbs/day
beta-Endosulfan	0.9300	ug/l	0.00	lbs/day	2.0	ug/l	0.01 lbs/day
Endosulfan sulfa	0.9300	ug/l	0.00	lbs/day	2.0	ug/l	0.01 lbs/day
Endrin	0.7600	ug/l	0.00	lbs/day	0.8	ug/l	0.00 lbs/day
Endrin aldehyde	0.7600	ug/l	0.00	lbs/day	0.8	ug/l	0.00 lbs/day
Heptachlor	0.0002	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
Heptachlor epoxide							

PCB's							
PCB 1242 (Aroc	0.000044	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1254 (Aroc	0.000044	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1221 (Aroc	0.000044	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1232 (Aroc	0.000044	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1248 (Aroc	0.000044	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1260 (Aroc	0.000044	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
PCB-1016 (Aroc	0.000044	ug/l	0.00	lbs/day	0.0	ug/l	0.00 lbs/day
Pesticide							
Toxaphene	0.000750	ug/l	0.00		0.0	ug/l	0.00 lbs/day
Dioxin							
Dioxin (2,3,7,8-T	1.30E-08	ug/l	0.00	lbs/day	1.40E-08		0.00
Metals							
Antimony	14.0	ug/l	0.06	lbs/day			
Arsenic	50.0	ug/l	0.21	lbs/day	4300.00	ug/l	18.16 lbs/day
Asbestos	7.00E+06	ug/l	2.96E+04	lbs/day			
Beryllium							
Cadmium							
Chromium (III)							
Chromium (VI)							
Copper							
Cyanide	1.30E+03	ug/l	5.49	lbs/day	2.2E+05	ug/l	929.07 lbs/day
Lead	700.0	ug/l	2.96	lbs/day			
Mercury					0.15	ug/l	0.00 lbs/day
Nickel					4600.00	ug/l	19.43 lbs/day
Selenium	0.1	ug/l	0.00	lbs/day			
Silver	610.0	ug/l	2.58	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**
er (Irrig. Season)	0.01	15.4	8.3	0.01	0.05	---	0.00	669.6
Fall	0.01	4.9	8.3	0.01	0.05	---	0.00	856.4
Winter	0.01	4.9	8.3	0.01	0.05	---	0.00	856.4
Spring	0.01	17.6	8.2	0.01	0.05	9.52	0.00	771.5

	Al	As	Cd	CrIII	CrVI	Copper	Fe	Pb
Dissolved Metals	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
All Seasons	2.385*	0.795*	0.0795*	0.795*	3.975*	0.8*	1.25*	0.795*

	Hg	Ni	Se	Ag	Zn	Boron	
Dissolved Metals	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	
All Seasons	0.0795*	0.795*	1.59*	0.15*	0.0795*	1.59*	* ~80% MDL

Projected Discharge Information

Season	Flow, MGD	Temp.
Summer	0.50000	15.8
Fall	0.50000	8.5
Winter	0.50000	8.0
Spring	0.50000	12.7

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	0.500 MGD	0.774 cfs
Fall	0.500 MGD	0.774 cfs
Winter	0.500 MGD	0.774 cfs
Spring	0.500 MGD	0.774 cfs

Flow Requirement or Loading Requirement

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 0.5 MGD. If the discharger is allowed to have a flow greater than 0.5 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 >	100.0%	Effluent	[Acute]
	IC25 >	98.7%	Effluent	[Chronic]

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:

Season		Concentration		Load	
Summer	4 Day Avg. - Chronic	2.47	mg/l as N	10.3	lbs/day
	1 Hour Avg. - Acute	5.9	mg/l as N	24.7	lbs/day
Fall	4 Day Avg. - Chronic	2.4	mg/l as N	10.1	lbs/day
	1 Hour Avg. - Acute	4.5	mg/l as N	18.6	lbs/day
Winter	4 Day Avg. - Chronic	2.8	mg/l as N	11.6	lbs/day
	1 Hour Avg. - Acute	5.0	mg/l as N	20.7	lbs/day
Spring	4 Day Avg. - Chronic	2.9	mg/l as N	12.2	lbs/day
	1 Hour Avg. - Acute	5.2	mg/l as N	21.8	lbs/day

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

Effluent Limitations for Total Dissolved Solids based upon Water Quality Standards

Season		Concentration		Load	
Summer	Maximum, Acute	1206.9	mg/l	2.52	tons/day
Fall	Maximum, Acute	1204.4	mg/l	2.51	tons/day
Winter	Maximum, Acute	1204.4	mg/l	2.51	tons/day
Spring	Maximum, Acute	1205.5	mg/l	2.51	tons/day

Colorado Salinity Forum Limits — Determined by Permitting Section

Effluent Limitations for Total Recoverable Metals based upon Water Quality Standards

In-stream criteria of downstream segments for Dissolved Metals will be met with an effluent limitation as follows (based upon a hardness of 497.74 mg/l):

	4 Day Average Concentration		Load		1 Hour Average Concentration		Load	
Aluminum*	N/A		N/A		759.7	ug/l	3.2	lbs/day
Arsenic*	192.45	ug/l	0.5	lbs/day	344.4	ug/l	1.4	lbs/day
Cadmium	0.90	ug/l	0.0	lbs/day	11.0	ug/l	0.0	lbs/day
Chromium III	324.95	ug/l	0.9	lbs/day	6,798.7	ug/l	28.3	lbs/day
Chromium VI*	11.09	ug/l	0.0	lbs/day	16.2	ug/l	0.1	lbs/day
Copper	37.23	ug/l	0.1	lbs/day	64.3	ug/l	0.3	lbs/day
Iron*	N/A		N/A		783.5	ug/l	3.3	lbs/day
Lead	24.85	ug/l	0.1	lbs/day	637.9	ug/l	2.7	lbs/day
Mercury*	0.01	ug/l	0.0	lbs/day	2.4	ug/l	0.0	lbs/day
Nickel	205.39	ug/l	0.6	lbs/day	1,847.4	ug/l	7.7	lbs/day
Selenium*	4.64	ug/l	0.0	lbs/day	20.2	ug/l	0.1	lbs/day
Silver	N/A	ug/l	N/A	lbs/day	60.6	ug/l	0.3	lbs/day
Zinc	472.78	ug/l	1.3	lbs/day	472.8	ug/l	2.0	lbs/day
Cyanide*	5.27	ug/l	0.0	lbs/day	22.3	ug/l	0.1	lbs/day

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

Effluent Limitations for Heat/Temperature based upon Water Quality Standards

Summer	17.5	Deg. C.	63.4	Deg. F
Fall	6.9	Deg. C.	44.5	Deg. F
Winter	6.9	Deg. C.	44.5	Deg. F
Spring	19.6	Deg. C.	67.3	Deg. F

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

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

	4 Day Average				1 Hour Average			
	Concentration		Load		Concentration		Load	
Aldrin					1.5E+00	ug/l	9.67E-03	lbs/day
Chlordane	4.30E-03	ug/l	1.79E-02	lbs/day	1.2E+00	ug/l	7.74E-03	lbs/day
DDT, DDE	1.00E-03	ug/l	4.17E-03	lbs/day	5.5E-01	ug/l	3.55E-03	lbs/day
Dieldrin	1.90E-03	ug/l	7.92E-03	lbs/day	1.3E+00	ug/l	8.06E-03	lbs/day
Endosulfan	5.60E-02	ug/l	2.33E-01	lbs/day	1.1E-01	ug/l	7.09E-04	lbs/day
Endrin	2.30E-03	ug/l	9.59E-03	lbs/day	9.0E-02	ug/l	5.80E-04	lbs/day
Guthion	0.00E+00	ug/l	0.00E+00	lbs/day	1.0E-02	ug/l	6.45E-05	lbs/day
Heptachlor	3.80E-03	ug/l	1.58E-02	lbs/day	2.6E-01	ug/l	1.68E-03	lbs/day
Lindane	8.00E-02	ug/l	3.34E-01	lbs/day	1.0E+00	ug/l	6.45E-03	lbs/day
Methoxychlor	0.00E+00	ug/l	0.00E+00	lbs/day	3.0E-02	ug/l	1.93E-04	lbs/day
Mirex	0.00E+00	ug/l	0.00E+00	lbs/day	1.0E-02	ug/l	6.45E-05	lbs/day
Parathion	0.00E+00	ug/l	0.00E+00	lbs/day	4.0E-02	ug/l	2.58E-04	lbs/day
PCB's	1.40E-02	ug/l	5.84E-02	lbs/day	2.0E+00	ug/l	1.29E-02	lbs/day
ɛntachlorophenol	1.30E+01	ug/l	5.42E+01	lbs/day	2.0E+01	ug/l	1.29E-01	lbs/day
Toxephene	2.00E-04	ug/l	8.34E-04	lbs/day	7.3E-01	ug/l	4.71E-03	lbs/day

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Effluent Targets for Pollution Indicators
Based upon Water Quality Standards

In-stream criteria of downstream segments for Pollution Indicators
will be met with an effluent limit as follows:

	Concentration		1 Hour Average Loading	
Gross Beta (pCi/l)	50.0	pCi/L		
BOD (mg/l)	5.0	mg/l	20.8	lbs/day
Nitrates as N	4.0	mg/l	16.7	lbs/day
Total Phosphorus as P	0.05	mg/l	0.2	lbs/day
Total Suspended Solids	90.0	mg/l	375.2	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	1.22E+03	ug/l	5.07E+00	lbs/day
Acrolein	3.24E+02	ug/l	1.35E+00	lbs/day
Acrylonitrile	5.98E-02	ug/l	2.49E-04	lbs/day
Benzene	1.22E+00	ug/l	5.07E-03	lbs/day
Benzidine		ug/l		lbs/day
Carbon tetrachloride	2.53E-01	ug/l	1.06E-03	lbs/day
Chlorobenzene	6.89E+02	ug/l	2.87E+00	lbs/day
1,2,4-Trichlorobenzene				
Hexachlorobenzene	7.60E-04	ug/l	3.17E-06	lbs/day
1,2-Dichloroethane	3.85E-01	ug/l	1.60E-03	lbs/day
1,1,1-Trichloroethane				
Hexachloroethane	1.92E+00	ug/l	8.02E-03	lbs/day
1,1-Dichloroethane				
1,1,2-Trichloroethane	6.18E-01	ug/l	2.58E-03	lbs/day
1,1,2,2-Tetrachloroethane	1.72E-01	ug/l	7.18E-04	lbs/day
Chloroethane				
Bis(2-chloroethyl) ether	3.14E-02	ug/l	1.31E-04	lbs/day
2-Chloroethyl vinyl ether				
2-Chloronaphthalene	1.72E+03	ug/l	7.18E+00	lbs/day
2,4,6-Trichlorophenol	2.13E+00	ug/l	8.87E-03	lbs/day
p-Chloro-m-cresol				
Chloroform (HM)	5.77E+00	ug/l	2.41E-02	lbs/day
2-Chlorophenol	1.22E+02	ug/l	5.07E-01	lbs/day
1,2-Dichlorobenzene	2.73E+03	ug/l	1.14E+01	lbs/day
1,3-Dichlorobenzene	4.05E+02	ug/l	1.69E+00	lbs/day
1,4-Dichlorobenzene	4.05E+02	ug/l	1.69E+00	lbs/day
3,3'-Dichlorobenzidine	4.05E-02	ug/l	1.69E-04	lbs/day
1,1-Dichloroethylene	5.77E-02	ug/l	2.41E-04	lbs/day
1,2-trans-Dichloroethylene1				
2,4-Dichlorophenol	9.42E+01	ug/l	3.93E-01	lbs/day
1,2-Dichloropropane	5.27E-01	ug/l	2.20E-03	lbs/day
1,3-Dichloropropylene	1.01E+01	ug/l	4.22E-02	lbs/day
2,4-Dimethylphenol	5.47E+02	ug/l	2.28E+00	lbs/day
2,4-Dinitrotoluene	1.11E-01	ug/l	4.65E-04	lbs/day
2,6-Dinitrotoluene				
1,2-Diphenylhydrazine	4.05E-02	ug/l	1.69E-04	lbs/day
Ethylbenzene	3.14E+03	ug/l	1.31E+01	lbs/day
Fluoranthene	3.04E+02	ug/l	1.27E+00	lbs/day
4-Chlorophenyl phenyl ether				
4-Bromophenyl phenyl ether				
Bis(2-chloroisopropyl) ether	1.42E+03	ug/l	5.91E+00	lbs/day
Bis(2-chloroethoxy) methane				
Methylene chloride (HM)	4.76E+00	ug/l	1.98E-02	lbs/day
Methyl chloride (HM)				

Methyl bromide (HM)				
Bromoform (HM)	4.36E+00	ug/l	1.82E-02	lbs/day
Dichlorobromomethane(HM)	2.73E-01	ug/l	1.14E-03	lbs/day
Chlorodibromomethane (HM)	4.15E-01	ug/l	1.73E-03	lbs/day
Hexachlorocyclopentadiene	2.43E+02	ug/l	1.01E+00	lbs/day
Isophorone	8.51E+00	ug/l	3.55E-02	lbs/day
Naphthalene				
Nitrobenzene	1.72E+01	ug/l	7.18E-02	lbs/day
2-Nitrophenol				
4-Nitrophenol				
2,4-Dinitrophenol	7.09E+01	ug/l	2.96E-01	lbs/day
4,6-Dinitro-o-cresol	1.32E+01	ug/l	5.49E-02	lbs/day
N-Nitrosodimethylamine	6.99E-04	ug/l	2.91E-06	lbs/day
N-Nitrosodiphenylamine	5.06E+00	ug/l	2.11E-02	lbs/day
N-Nitrosodi-n-propylamine	5.06E-03	ug/l	2.11E-05	lbs/day
Pentachlorophenol	2.84E-01	ug/l	1.18E-03	lbs/day
Phenol	2.13E+04	ug/l	8.87E+01	lbs/day
Bis(2-ethylhexyl)phthalate	1.82E+00	ug/l	7.60E-03	lbs/day
Butyl benzyl phthalate	3.04E+03	ug/l	1.27E+01	lbs/day
Di-n-butyl phthalate	2.73E+03	ug/l	1.14E+01	lbs/day
Di-n-octyl phthlate				
Diethyl phthalate	2.33E+04	ug/l	9.71E+01	lbs/day
Dimethyl phthlate	3.17E+05	ug/l	1.32E+03	lbs/day
Benzo(a)anthracene (PAH)	2.84E-03	ug/l	1.18E-05	lbs/day
Benzo(a)pyrene (PAH)	2.84E-03	ug/l	1.18E-05	lbs/day
Benzo(b)fluoranthene (PAH)	2.84E-03	ug/l	1.18E-05	lbs/day
Benzo(k)fluoranthene (PAH)	2.84E-03	ug/l	1.18E-05	lbs/day
Chrysene (PAH)	2.84E-03	ug/l	1.18E-05	lbs/day
Acenaphthylene (PAH)				
Anthracene (PAH)				
Dibenzo(a,h)anthracene (PAH)	2.84E-03	ug/l	1.18E-05	lbs/day
Indeno(1,2,3-cd)pyrene (PAH)	2.84E-03	ug/l	1.18E-05	lbs/day
Pyrene (PAH)	9.72E+02	ug/l	4.05E+00	lbs/day
Tetrachloroethylene	8.10E-01	ug/l	3.38E-03	lbs/day
Toluene	6.89E+03	ug/l	2.87E+01	lbs/day
Trichloroethylene	2.73E+00	ug/l	1.14E-02	lbs/day
Vinyl chloride	2.03E+00	ug/l	8.45E-03	lbs/day
Pesticides				
Aldrin	1.32E-04	ug/l	5.49E-07	lbs/day
Dieldrin	1.42E-04	ug/l	5.91E-07	lbs/day
Chlordane	5.77E-04	ug/l	2.41E-06	lbs/day
4,4'-DDT	5.98E-04	ug/l	2.49E-06	lbs/day
4,4'-DDE	5.98E-04	ug/l	2.49E-06	lbs/day
4,4'-DDD	8.41E-04	ug/l	3.51E-06	lbs/day
alpha-Endosulfan	9.42E-01	ug/l	3.93E-03	lbs/day
beta-Endosulfan	9.42E-01	ug/l	3.93E-03	lbs/day
Endosulfan sulfate	9.42E-01	ug/l	3.93E-03	lbs/day
Endrin	7.70E-01	ug/l	3.21E-03	lbs/day
Endrin aldehyde	7.70E-01	ug/l	3.21E-03	lbs/day
Heptachlor	2.13E-04	ug/l	8.87E-07	lbs/day
Heptachlor epoxide				
PCB's				
PCB 1242 (Arochlor 1242)	4.46E-05	ug/l	1.86E-07	lbs/day
PCB-1254 (Arochlor 1254)	4.46E-05	ug/l	1.86E-07	lbs/day
PCB-1221 (Arochlor 1221)	4.46E-05	ug/l	1.86E-07	lbs/day
PCB-1232 (Arochlor 1232)	4.46E-05	ug/l	1.86E-07	lbs/day
PCB-1248 (Arochlor 1248)	4.46E-05	ug/l	1.86E-07	lbs/day
PCB-1260 (Arochlor 1260)	4.46E-05	ug/l	1.86E-07	lbs/day
PCB-1016 (Arochlor 1016)	4.46E-05	ug/l	1.86E-07	lbs/day
Pesticide				
Toxaphene	7.39E-04	ug/l	3.08E-06	lbs/day

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Metals				
Antimony	14.18	ug/l	0.06	lbs/day
Arsenic	50.64	ug/l	0.21	lbs/day
Asbestos	7.09E+06	ug/l	2.96E+04	lbs/day
Beryllium				
Cadmium				
Chromium (III)				
Chromium (VI)				
Copper	1316.81	ug/l	5.49	lbs/day
Cyanide	709.05	ug/l	2.96	lbs/day
Lead	0.00		0.00	
Mercury	0.14	ug/l	0.00	lbs/day
Nickel	617.89	ug/l	2.58	lbs/day
Selenium	0.00		0.00	
Silver	0.00		0.00	
Thallium	1.72	ug/l	0.01	lbs/day
Zinc				
Dioxin				
Dioxin (2,3,7,8-TCDD)	1.32E-08	ug/l	5.49E-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		759.7				759.7	N/A
Antimony			14.2	4355.6		14.2	
Arsenic	101.3	344.4	50.6			50.6	192.4
Barium					1012.9	1012.9	
Beryllium						0.0	
Cadmium	10.1	11.0				10.1	0.9
Chromium (III)		6798.7				6798.7	324.9
Chromium (VI)	101.3	16.2				16.16	11.09
Copper	202.6	64.3	1316.8			64.3	37.2
Cyanide		22.3	222844.2			22.3	5.3
Iron		783.5				783.5	
Lead	101.3	637.9				101.3	24.8
Mercury		2.43	0.1	0.15		0.14	0.011
Nickel		1847.4	617.9	4659.5		617.9	205.4
Selenium	50.6	20.2				20.2	4.6
Silver		60.6				60.6	
Thallium			1.7	6.4		1.7	
Zinc		472.8				472.8	472.8
Boron	759.7					759.7	
Sulfate	2025.9					2025.9	

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	759.7	N/A	
Antimony	14.18		
Arsenic	50.6	192.4	Acute Controls
Asbestos	7.09E+06		
Barium			
Beryllium			
Cadmium	10.1	0.9	
Chromium (III)	6798.7	325	
Chromium (VI)	16.2	11.1	
Copper	64.3	37.2	
Cyanide	22.3	5.3	
Iron	783.5		
Lead	101.3	24.8	
Mercury	0.141	0.011	
Nickel	617.9	205	
Selenium	20.2	4.6	
Silver	60.6	N/A	
Thallium	1.7		
Zinc	472.8	472.8	
Boron	759.70		
Sulfate	2025.9		N/A at this Waterbody

Other Effluent Limitations are based upon R317-1.
E. coli 126.0 organisms per 100 ml

X. Antidegradation Considerations

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

An Antidegradation Level I Review was conducted on this discharge and its effect on the receiving water. Based upon that review, it has been determined that an Antidegradation Level II Review is required. The proposed permit is an increase in flow or concentration over that which was approved in the previous permit.

XI. Colorado River Salinity Forum Considerations

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