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

Date:	**November 27, 2017**
Prepared by:	**Dave Wham** **Standards and Technical Services**
Facility:	**Jordanelle Special Service District, Keetley Water Treatment Plant** **UPDES No. UT0022403**
Receiving water:	**Jordanelle Reservoir (1C, 2A, 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

Discharge 001, 12.0 MGD design flow

Receiving Water

The receiving water for Outfall 001 is Jordanelle Reservoir.

Per UAC R317-2-13.12(y), the designated beneficial uses of Jordanelle Reservoir are 1C, 2A, 3A, 4.

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

- *Class 2A - Protected for frequent primary contact recreation where there is a high likelihood of ingestion of water or a high degree of bodily contact with the water. Examples include, but are not limited to, swimming, rafting, kayaking, diving, and water skiing.*

- *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.*

Ambient water quality for the receiving water for discharge was characterized using data from DWQ Monitoring Station # 5914030, JORDANELLE RES NORTH ARM 03 from the period 2006-2016.

TMDL

According to the Utah's 2016 303(d) Water Quality Assessment, the assessment unit for Jordanelle Reservoir (UT-L-16020203-003_00) was listed as impaired for pH (Class 3A use). As a result, effluent limits for pH revert to end of pipe criteria (6.5-9).

Mixing Zone

As per R317-2-5, the size of the chronic mixing zone in lakes and reservoirs shall not exceed 200 feet and the size of an acute mixing zone shall not exceed 35 feet. Mixing zone calculations were performed using the Utah Lake Mixing Zone Model.

Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water were TSS, copper, mercury, lead, zinc, aluminum and pH, 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 limits. The LC_{50} (lethal concentration, 50%) percent effluent for acute toxicity and the IC_{25} (inhibition concentration, 25%) percent effluent for chronic toxicity, as determined by the WET test, needs to be below the WET limits, as determined by the WLA. The WET limit for LC_{50} is typically 100% effluent and does not need to be determined by the WLA.

IC25 WET limits for Outfalls 001 should be based on 5% effluent.

Wasteload Allocation Methods

Effluent limits were determined for conservative constituents using a simple mass balance mixing analysis (UDWQ 2012). The mass balance analysis is summarized in the Wasteload Addendums.

The water quality standard for chronic ammonia toxicity is dependent on temperature and pH, and the water quality standard for acute ammonia toxicity is dependent on pH. The AMMTOX Model developed by University of Colorado and adapted by Utah DWQ and EPA Region VIII was used to determine ammonia effluent limits (Lewis et al. 2002). The analysis is summarized in the Wasteload Addendum.

Models and supporting documentation are available for review upon request.

Antidegradation Level I Review

The objective of the Level I ADR is to ensure the protection of existing uses, defined as the beneficial uses attained in the receiving water on or after November 28, 1975. No evidence is known that the existing uses deviate from the designated beneficial uses for the receiving water. Therefore, the beneficial uses will be protected if the discharge remains below the WQBELs presented in this wasteload.

A Level II Antidegradation Review (ADR) is required for this facility as it discharges to a Class 1C Drinking Water Source. 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: *JSSD_DWPlant_WLADoc_11-27-17.docx*
Wasteload Analysis and Addendums: *JSSD_DWPlant_WLA_11-27-17.xlsm*

References:

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

WASTELOAD ANALYSIS [WLA]
Addendum: Statement of Basis
SUMMARY

Discharging Facility:	**JSSD Water Treatment Plant**		
UPDES No:	0022403		
Current Flow:	12.00	MGD	Design Flow
Design Flow	12.00	MGD	

Receiving Water:	**Jordanelle Reservoir**	
Lake Classification:	1C, 2A, 3A, 4	
TDS (mg/l)	117.00	Average
Hardness (mg/l)	300.00	Average
pH	8.00	Average
Temp (C)	9.93	Average

Selected Effluent Limit Summary:				**WQ Standard:**
Flow, MGD:	12.00	MGD	Design Flow	
BOD, mg/l:	25.0	All Season	5	Indicator
Dissolved Oxygen, mg/l:	5.00	All Season	6.50	30 Day Average
TNH3, Chronic, mg/l:	57.33	All Season	Varies	Function of pH and Temperature
TDS, mg/l:	3681.27	All Season	1200	
Zinc, ug/l	500.07	All Season	Varies	Function of Hardness
Copper, ug/l	56.28	All Season	Varies	Function of Hardness

Modeling Parameters:

Acute Dilution Ratio	3.29 to 1
Chronic Dilution Ratio:	18.81 to 1

Level 1 Antidegradation Level Completed: Level II Review required - Class 1C drinking water source.

Date: 11/27/2017

Wasteload Analysis - Total Maximum Daily Load (Lake TMDL)

1/31/2018 16:27

Facility: **JSSD Water Treatment Plant** **UPDES No: UT- 0022403**
Discharging to: **Jordanelle Reservoir**

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 lake water quality. The wasteload analysis does not take 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 100 100
may include metals (as a function of hardness), total dissolved solids (TDS), total residual chlorine (TRC), unionized 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 water quality response to point source discharges. Models aid in the effort of anticipating water quality at future effluent flows at critical environmental conditions (e.g., high temperature, high pH, etc).

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

II. Receiving Water and Lake / Reservoir Classification

Jordanelle Reservoir 1C, 2A, 3A, 4

III. Numeric Water Quality Standards for Protection of Aquatic Wildlife

		pH	Temp
Total Ammonia (TNH3)	Function of Temperature and pH		
	3.04 mg/l as N (4 Day Average)	7.79	11.2
	7.60 mg/l as N (1 Hour Average	7.84	10.9
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 [Class 4 Ag]	1200 mg/l		
Maximum Boron [Class 4 Ag]	750 mg/l		

Acute and Chronic Heavy Metals (Dissolved)

Parameter	4 Day Average (Chronic) Standard Concentration	1 Hour Average (Acute) Standard Concentration	
Aluminum	87.000 ug/l	750	ug/l
Antimony	ug/l		ug/l
Arsenic	190.000 ug/l	360.00	ug/l

Asbestos		ug/l		ug/l
Barium		ug/l	1000.00	ug/l
Beryllium		ug/l		ug/l
Cadmium	0.273	ug/l	3.30	ug/l
Chromium III	87.002	ug/l	1820.25	ug/l
ChromiumVI	11.000	ug/l	16.00	ug/l
Copper	9.422	ug/l	14.15	ug/l
Cyanide		ug/l		ug/l
Iron		ug/l	1000.00	ug/l
Lead	3.229	ug/l	82.86	ug/l
Mercury	0.012	ug/l	2.40	ug/l
Nickel	89.10	ug/l	473.80	ug/l
Selenium	5.000	ug/l	20.00	ug/l
Silver		ug/l	3.86	ug/l
Thallium				
Zinc	120.999	ug/l	121.00	ug/l
Based upon a Hardness of 101.17 mg/l as CaCO3			Based upon 153.81 mg/l as CaCO3	

Organics [Pesticides]

Parameter	4 Day Average (Chronic) Standard Concentration		1 Hour Average (Acute) Standard Concentration	
Aldrin			1.500	ug/l
Chlordane	0.0043	ug/l	1.200	ug/l
DDT, DDE	0.001	ug/l	0.550	ug/l
Dieldrin	0.0056	ug/l	0.240	ug/l
Endosulfan, a & b	0.056	ug/l	0.110	ug/l
Endrin	0.036	ug/l	0.086	ug/l
Guthion				
Heptachlor & H. epoxide	0.0038	ug/l	0.260	ug/l
Lindane	0.08	ug/l	1.000	ug/l
Methoxychlor			0.030	ug/l
Mirex			0.001	ug/l
Parathion	0.0130	ug/l	0.066	ug/l
PCB's	0.014	ug/l		
Pentachlorophenol	15.00	ug/l	19.000	ug/l
Toxephene	0.0002	ug/l	0.730	ug/l

IV. Numeric Water Quality Standards for Protection of Agriculture

	1 Hour Average (Acute) Standard Concentration	
TDS	1200	mg/l
Arsenic	100	ug/l
Boron	750	ug/l
Cadmium	10	ug/l
Chromium	100	ug/l
Copper	200	ug/l
Lead	100	ug/l
Selenium	50	ug/l
TDS	1200	mg/l

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

Metals	1 Hour Average (Acute) Standard Concentration	
Arsenic	10	ug/l
Barium	1000	ug/l

Cadmium	10	ug/l
Chromium	50	ug/l
Lead	50	ug/l
Mercury	2	ug/l
Selenium	50	ug/l
Silver	50	ug/l
Fluoride (3)	1.4	ug/l
to	2.4	ug/l
Nitrates as N	10	ug/l
Chlorophenoxy Herbicides		
2,4-D	100	ug/l
2,4,5-TP	10	ug/l
Methoxychlor	100	ug/l

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

	Maximum Conc., ug/l - Acute Standards	
	Class 1C	**Class 3A, 3B, 3C, 3D**
	[2 Liters/Day for 70 Kg Person over 70 Yr.	[6.5 g for 70 Kg Person over 70 Y
Antimony	5.6 ug/l	640 ug/l
Arsenic	A	A
Beryllium	C	C
Cadmium	C	C
Chromium III	C	C
Chromium VI	C	C
Copper	1,300 ug/l	
Lead	C	C
Mercury	A	A
Nickel	100 ug/l	4,600 ug/l
Selenium	A	4,200 ug/l
Silver		
Thallium	0.24 ug/l	6.3 ug/l
Zinc	7400 ug/l	26,000 ug/l
Cyanide	140 ug/l	220,000 ug/l
Asbestos	7.00E+06 Fibers/L	
2,3,7,8-TCDD Dioxin	5.0 E-9 ug/l	5.1 E-9 ug/l
Acrolein	190 ug/l	290 ug/l
Acrylonitrile	0.051 ug/l	0.25 ug/l
Alachlor	2 ug/l	
Benzene	2.2 ug/l	51 B ug/l
Bromoform	4.3 ug/l	140.00 ug/l
Carbofuran	40	
Carbon Tetrachloride	0.23 ug/l	1.60 ug/l
Chlorobenzene	100 ug/l	21,000 ug/l
Chlorodibromomethane	0.4 ug/l	13.00 ug/l
Chloroethane		
2-Chloroethylvinyl Ether		
Chloroform	5.7 ug/l	470.00 ug/l
Dalapon	200 ug/l	
Di(2ethylhexl)adipate	400 ug/l	
Dichlorobromopropane	0.2	

Dichlorobromomethane	0.55 ug/l		17.00 ug/l
1,1-Dichloroethane			
1,2-Dichloroethane	0.38 ug/l		37.00 ug/l
1,1-Dichloroethylene	7 ug/l		3.20 ug/l
Dichloroethylene (cis-1,2)	70		
Dinoseb	7		
Diquat	20		
1,2-Dichloropropane	0.5 ug/l		15.00 ug/l
1,3-Dichloropropene	0.34 ug/l		1,700 ug/l
Endothall	100		
Ethylbenzene	530 ug/l		29,000 ug/l
Ethyldibromide	0.05 ug/l		
Glyphosate	700 ug/l		
Haloacetic acids	60 ug/l E		
Methyl Bromide	47 ug/l		1,500 ug/l
Methyl Chloride	F		F
Methylene Chloride	4.6 ug/l		590.00 ug/l
Ocamyl (vidate)	200 ug/l		
Picloram	500 ug/l		
Simazine	4 ug/l		
Styrene	100 ug/l		
1,1,2,2-Tetrachloroethane	0.17 ug/l		4.00 ug/l
Tetrachloroethylene	0.69 ug/l		3.30 ug/l
Toluene	1000 ug/l		200,000 ug/l
1,2 -Trans-Dichloroethylene	100 ug/l		140,000 ug/l
1,1,1-Trichloroethane	200 ug/l		F
1,1,2-Trichloroethane	0.59 ug/l		16.00 ug/l
Trichloroethylene	2.5 ug/l		30.00 ug/l
Vinyl Chloride	0.025 ug/l		530.00 ug/l
Xylenes	10000 ug/l		
2-Chlorophenol	81 ug/l		150 ug/l
2,4-Dichlorophenol	77 ug/l		290 ug/l
2,4-Dimethylphenol	380 ug/l		850 ug/l
2-Methyl-4,6-Dinitrophenol	13 ug/l		280 ug/l
2,4-Dinitrophenol	69 ug/l		5,300 ug/l
2-Nitrophenol			
4-Nitrophenol			
3-Methyl-4-Chlorophenol			
Penetachlorophenol	0.27 ug/l		3.00 ug/l
Phenol	21000 ug/l		1,700,000 ug/l
2,4,6-Trichlorophenol	1.4 ug/l		2.40 ug/l
Acenaphthene	670 ug/l		990 ug/l
Acenaphthylene	ug/l		ug/l
Anthracene	8300 ug/l		40,000 ug/l
Benzidine	0.000086 ug/l	B	0.00 ug/l
BenzoaAnthracene	0.0038 ug/l		0.02 ug/l
BenzoaPyrene	0.0038 ug/l		0.02 ug/l
BenzobFluoranthene	0.0038 ug/l		0.02 ug/l
BenzoghiPerylene	ug/l		
BenzokFluoranthene	0.0038 ug/l		0.02 ug/l
Bis2-ChloroethoxyMethane	ug/l		
Bis2-ChloroethylEther	0.03 ug/l		0.53 ug/l
Bis2-Chloroisopropy1Ether	1400 ug/l		65,000 ug/l
Bis2-EthylbexylPhthalate	1.2 ug/l		2.20 ug/l

4-Bromophenyl Phenyl Ether	ug/l		
Butylbenzyl Phthalate	1500 ug/l		1,900 ug/l
2-Chloronaphthalene	1000 ug/l		1,600 ug/l
4-Chlorophenyl Phenyl Ether	ug/l		
Chrysene	0.0038 ug/l		0.02 ug/l
Dibenzoa, hAnthracene	0.0038 ug/l		0.02 ug/l
1,2-Dichlorobenzene	420 ug/l		17,000 ug/l
1,3-Dichlorobenzene	320 ug/l		960 ug/l
1,4-Dichlorobenzene	63 ug/l		2,600 ug/l
3,3-Dichlorobenzidine	0.021 ug/l		0.03 ug/l
Diethyl Phthalate	17000 ug/l		44,000 ug/l
Dimethyl Phthalate	270000 ug/l		1,100,000 ug/l
Di-n-Butyl Phthalate	2000 ug/l		4,500 ug/l
2,4-Dinitrotoluene	0.11 ug/l		3.40 ug/l
2,6-Dinitrotoluene	ug/l		
Di-n-Octyl Phthalate	ug/l		
1,2-Diphenylhydrazine	0.036 ug/l		0.20 ug/l
Fluoranthene	130 ug/l		140.00 ug/l
Fluorene	1100 ug/l		5,300 ug/l
Hexachlorobenzene	0.00028 ug/l		0.00029 B ug/l
Hexachlorobutedine	0.44 ug/l		18.00 ug/l
Hexachloroethane	1.4 ug/l		3.30 ug/l
Hexachlorocyclopentadiene	40 ug/l		17,000 ug/l
Ideno 1,2,3-cdPyrene	0.0038 ug/l		0.02 ug/l
Isophorone	35 ug/l	B	960.00 ug/l
Naphthalene			
Nitrobenzene	17 ug/l		690 ug/l
N-Nitrosodimethylamine	0.00069 ug/l		3.00 ug/l
N-Nitrosodi-n-Propylamine	0.005 ug/l		0.51 ug/l
N-Nitrosodiphenylamine	3.3 ug/l		6.00 ug/l
Phenanthrene			
Pyrene	830 ug/l		4,000 ug/l
1,2,4-Trichlorobenzene	260 ug/l		940 ug/l
Aldrin	0.000049 ug/l		0.000050 ug/l
alpha-BHC	0.0026 ug/l		0.00 ug/l
beta-BHC	0.0091 ug/l		0.02 ug/l
gamma-BHC (Lindane)	0.2 ug/l		0.06 ug/l
delta-BHC			
Chlordane	0.0008 ug/l		0.00 ug/l
4,4-DDT	0.00022 ug/l		0.00 ug/l
4,4-DDE	0.00022 ug/l		0.00 ug/l
4,4-DDD	0.00031 ug/l		0.00 ug/l
Dieldrin	0.000052 ug/l	B	0.000054 ug/l
alpha-Endosulfan	62 ug/l		89 ug/l
beta-Endosulfan	62 ug/l		89 ug/l
Endosulfan Sulfate	62 ug/l		89 ug/l
Endrin	0.059 ug/l		0.81 ug/l
Endrin Aldehyde	0.29 ug/l		0.30 ug/l
Heptachlor	0.000079 ug/l	B	0.000079 ug/l
Heptachlor Epoxide	0.000039 ug/l	B	0.000039 ug/l
Polychlorinated Biphenyls	0.000064 ug/l	B,D	0.000064 ug/l
Toxaphene	0.00028 ug/l		0.00028 ug/l

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 Water Quality 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) 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.

The Utah Reservoir and Lake Model is a simple round jet model which was received from EPA Region 8. It assumes a discharge expands into the receiving water as a 1/2 cone from the point of discharge with the appropriate dilution.

The dilution ratios for this wasteload analysis are as follows:

Acute Dilution Ratio:	**3.3 to 1**
Chronic Dilution Ration:	**18.8 to 1**

VIII. Modeling Information

The required information for the model may include the following information for both the lake and effluent conditions:

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

D.O. mg/l

Other Conditions

In addition to the lake 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

Lake Information	Temp. Deg. C	pH	T-NH3 mg/l as N	BOD mg/l	DO mg/l	TRC mg/l	TDS mg/l	Metals ug/l
	11.3	7.8	0.00	N/A	N/A	0.00	117.0	0.0

	Season	Flow,	Temp.
Discharge Information	All Seasons	12.0	9.9

IX. Effluent Limitations based upon Water Quality Standards

Effluent Limitation for Flow

All Seasons		
Not to Exceed:	12.00 MGD	Daily Average
	18.56 cfs	Daily Average
WET Requirements	As determined by Permits & Compliance Branch	

Effluent Limitation for Biological Oxygen Demand (BOD)

	Concentration
30 Day Average	25.0 mg/l as BOD5
30 Day Average	20.0 mg/l as CBOD5

Effluent Limitation for Dissolved Oxygen (DO)

	Concentration 1 Day Average (Acute)
30 Day Average	5.00 mg/l

Effluent Limitation for Total Ammonia

	4 Day Average [Chronic] Concentration	**Load**

All Seasons	57.33 mg/l as N	5736.3 lbs/day

	1 Hour Average [Acute] Concentration	Load
	25.0 mg/l as N	2504.6 lbs/day

Effluent Limitation for Total Residual Chlorine

	4 Day Average [Chronic] Concentration	Load
All Seasons	0.207 mg/l	20.7 lbs/day

	1 Hour Average [Acute] Concentration	Load
	0.063 mg/l	6.3 lbs/day

Effluent Limitations for Metals

	4 Day Average (Chronic)		1 Hour Average (Acute)	
	Concentration	Load	Concentration	Load
Aluminum	1368.34 ug/l*	136.9 lbs/day	2433.87 ug/l	243.5 lbs/day
Arsenic	2772.87 ug/l	277.5 lbs/day	1112.79 ug/l*	111.3 lbs/day
Barium			3291.11 ug/l	329.3 lbs/day
Cadmium	0.03 ug/l*	0.0 lbs/day	9.48 ug/l	0.9 lbs/day
Chromium III	1334.12 ug/l*	133.5 lbs/day	2658.53 ug/l	266.0 lbs/day
ChromiumVI	133.86 ug/l	13.4 lbs/day	43.26 ug/l*	4.3 lbs/day
Copper	91.75 ug/l	9.2 lbs/day	56.28 ug/l*	5.6 lbs/day
Iron			2940.57 ug/l	294.2 lbs/day
Lead	12.17 ug/l*	1.2 lbs/day	334.40 ug/l	33.5 lbs/day
Mercury	0.17 ug/l*	0.017 lbs/day	7.89 ug/l	0.8 lbs/day
Nickel	693.89 ug/l*	69.4 lbs/day	2180.35 ug/l	218.2 lbs/day
Selenium	44.13 ug/l*	4.4 lbs/day	55.10 ug/l	5.5 lbs/day
Silver			19.47 ug/l	1.9 lbs/day
Zinc	30660.96 ug/l	3,067.9 lbs/day	500.07 ug/l*	50.0 lbs/day

* Most stringent between Chronic & Acute Effluent Limitations

Effluent Limitations for Organics [Pesticides]

	4 Day Average		1 Hour Average	
Pesticide	Concentration	Load	Concentration	Load
Aldrin			4.9367 ug/l	0.319 lbs/day
Chlordane	0.0809 ug/l*	0.005 lbs/day	3.9493 ug/l	0.255 lbs/day
DDT, DDE	0.0188 ug/l*	0.001 lbs/day	1.8101 ug/l	0.117 lbs/day
Dieldrin	0.1053 ug/l*	0.007 lbs/day	0.7899 ug/l	0.051 lbs/day
Endosulfan	1.0532 ug/l	0.068 lbs/day	0.3620 ug/l*	0.023 lbs/day
Endrin	0.6770 ug/l	0.044 lbs/day	0.2830 ug/l*	0.018 lbs/day

Guthion			0.0000 ug/l	0.000 lbs/day
Heptachlor	0.0715 ug/l*	0.005 lbs/day	0.8557 ug/l	0.055 lbs/day
Lindane	1.5045 ug/l*	0.097 lbs/day	3.2911 ug/l	0.213 lbs/day
Methoxychlor			0.0987 ug/l	0.006 lbs/day
Mirex			0.0033 ug/l	0.000 lbs/day
Parathion			0.2172 ug/l	0.014 lbs/day
PCB's	0.2633 ug/l	0.017 lbs/day	0.0000 ug/l*	0.000 lbs/day
Pentachlorophenol	282.0948 ug/l	18.246 lbs/day	62.5310 ug/l*	4.045 lbs/day
Toxephene	0.0038 ug/l*	0.000 lbs/day	2.4025 ug/l	0.155 lbs/day

Effluent Limitations for Protection of Human Health (Class 1C Waters)

	1 Hour Average (Acute) Standard	
Metals	**Concentration**	**Load**
Arsenic	32.91 ug/l	2.13 lbs/day
Barium	3291.11 ug/l	212.87 lbs/day
Cadmium	32.91 ug/l	2.13 lbs/day
Chromium	164.56 ug/l	10.64 lbs/day
Lead	164.56 ug/l	10.64 lbs/day
Mercury	6.58 ug/l	0.43 lbs/day
Selenium	164.56 ug/l	10.64 lbs/day
Silver	164.56 ug/l	10.64 lbs/day
Fluoride	4.61 ug/l	0.30 lbs/day
to	7.90 ug/l	0.51 lbs/day
Nitrates as N	32.91 ug/l	2.13 lbs/day
Pesticides		
2,4-D	329.11 ug/l	21.29 lbs/day
2,4,5-TP	32.91 ug/l	2.13 lbs/day
Methoxychlor	329.11 ug/l	21.29 lbs/day

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

	Maximum Conc., ug/l - Acute Standards			
	Class 1C		Class 3A, 3B	
Toxics Rule Parameters	[2 Liters/Day for 70 Kg Person over 70 Yr.		[6.5 g for 70 Kg Person over 70 Yr. Period]	
Antimony	18.43 ug/l	1.19 lbs/day	18.43 ug/l	1.2 lbs/day
Arsenic				
Beryllium				
Cadmium				
Chromium III				
Chromium VI				
Copper	4278.44 ug/l	276.73 lbs/day	4278.44 ug/l	276.7 lbs/day
Lead				
Mercury		lbs/day	329.11 ug/l	21.3 lbs/day
Nickel	329.11 ug/l	21.29 lbs/day		
Selenium			24354.18 ug/l	1575.2 lbs/day
Silver			460.75 ug/l	29.8 lbs/day
Thallium	0.79 ug/l	0.05 lbs/day		
Zinc	24354.18 ug/l	1575.23 lbs/day	625.31 ug/l	40.4 lbs/day

Cyanide	460.75 ug/l	29.80 lbs/day	0.17 ug/l	0.0 lbs/day
Asbestos	23037741.33 ug/l	1.49E+06 lbs/day	14.15 ug/l	0.9 lbs/day
0	0.00 ug/l	0.00 lbs/day		
2,3,7,8-TCDD Dioxin	0.00 ug/l	0.00 lbs/day	329.11 ug/l	21.3 lbs/day
Acrolein	625.31 ug/l	40.45 lbs/day	1.32 ug/l	0.1 lbs/day
Acrylonitrile	0.17 ug/l	0.01 lbs/day		
Benzene	7.24 ug/l	0.47 lbs/day		
Bromoform	14.15 ug/l	0.92 lbs/day	18.76 ug/l	1.2 lbs/day
Carbon Tetrachloride	0.00 ug/l	0.00 lbs/day		
Chlorobenzene	329.11 ug/l	21.29 lbs/day		
Chlorodibromomethane	1.32 ug/l	0.09 lbs/day	1.25 ug/l	0.1 lbs/day
Chloroethane	0.00 ug/l	0.00 lbs/day	23.04 ug/l	1.5 lbs/day
2-Chloroethylvinyl Ether	0.00 ug/l	0.00 lbs/day	1.65 ug/l	0.1 lbs/day
Chloroform	18.76 ug/l	1.21 lbs/day	1.12 ug/l	0.1 lbs/day
Dichlorobromomethane	1.81 ug/l	0.12 lbs/day	154.68 ug/l	10.0 lbs/day
1,1-Dichloroethane	0.00 ug/l	0.00 lbs/day		
1,2-Dichloroethane	1.25 ug/l	0.08 lbs/day	15.14 ug/l	1.0 lbs/day
1,1-Dichloroethylene	23.04 ug/l	1.49 lbs/day	0.56 ug/l	0.0 lbs/day
1,2-Dichloropropane	1.65 ug/l	0.11 lbs/day	3291.11 ug/l	212.9 lbs/day
1,3-Dichloropropene	1.12 ug/l	0.07 lbs/day	1.94 ug/l	0.1 lbs/day
Ethylbenzene	1744.29 ug/l	112.82 lbs/day	8.23 ug/l	0.5 lbs/day
Methyl Bromide	154.68 ug/l	10.00 lbs/day	0.08 ug/l	0.0 lbs/day
Methyl Chloride	0.00 ug/l	0.00 lbs/day	266.58 ug/l	17.2 lbs/day
Methylene Chloride	15.14 ug/l	0.98 lbs/day	253.42 ug/l	16.4 lbs/day
1,1,2,2-Tetrachloroethane	0.56 ug/l	0.04 lbs/day	1250.62 ug/l	80.9 lbs/day
Tetrachloroethylene	2.27 ug/l	0.15 lbs/day	42.78 ug/l	2.8 lbs/day
Toluene	3291.11 ug/l	212.87 lbs/day		
1,2 -Trans-Dichloroethylene	329.11 ug/l	21.29 lbs/day		
1,1,1-Trichloroethane	0.00 ug/l	0.00 lbs/day	0.89 ug/l	0.1 lbs/day
1,1,2-Trichloroethane	1.94 ug/l	0.13 lbs/day	69113.22 ug/l	4470.2 lbs/day
Trichloroethylene	8.23 ug/l	0.53 lbs/day	4.61 ug/l	0.3 lbs/day
Vinyl Chloride	0.08 ug/l	0.01 lbs/day	2205.04 ug/l	142.6 lbs/day
2-Chlorophenol	266.58 ug/l	17.24 lbs/day		
2,4-Dichlorophenol	253.42 ug/l	16.39 lbs/day	27316.18 ug/l	1766.8 lbs/day
2,4-Dimethylphenol	1250.62 ug/l	80.89 lbs/day		
2-Methyl-4,6-Dinitrophenol	42.78 ug/l	2.77 lbs/day	0.01 ug/l	0.0 lbs/day
2,4-Dinitrophenol	227.09 ug/l	14.69 lbs/day	0.01 ug/l	0.0 lbs/day
2-Nitrophenol	0.00 ug/l	0.00 lbs/day	0.01 ug/l	0.0 lbs/day
4-Nitrophenol	0.0000 ug/l	0.0000 lbs/day		
3-Methyl-4-Chlorophenol	0.0000 ug/l	0.0000 lbs/day	0.01 ug/l	0.001 lbs/day
Penetachlorophenol	0.8886 ug/l	0.0575 lbs/day		
Phenol	69113.2240 ug/l	4.47E+03 lbs/day	0.10 ug/l	0.006 lbs/day
2,4,6-Trichlorophenol	4.6075 ug/l	0.2980 lbs/day	4607.55 ug/l	298.016 lbs/day
Acenaphthene	2205.04 ug/l	142.62 lbs/day		
Acenaphthylene	0.00 ug/l	0.00 lbs/day	4936.66 ug/l	319.3 lbs/day
Anthracene	27316.18 ug/l	1766.81 lbs/day	3291.11 ug/l	212.9 lbs/day
Benzidine	0.00 ug/l	0.00 lbs/day		
BenzoaAnthracene	0.01 ug/l	0.00 lbs/day	0.01 ug/l	0.0 lbs/day
BenzoaPyrene	0.01 ug/l	0.00 lbs/day	0.0 ug/l	0.0 lbs/day
BenzobFluoranthene	0.01 ug/l	0.00 lbs/day	1382.26 ug/l	89.4 lbs/day
BenzoghiPerylene	0.00 ug/l	0.00 lbs/day	1053.15 ug/l	68.1 lbs/day
BenzokFluoranthene				
Bis2-ChloroethoxyMethane				
Bis2-ChloroethylEther	0.0987 ug/l	0.00639 lbs/day	5.59E+04 ug/l	3.62E+03 lbs/day

Bis2-Chloroisopropy1Ether	4607.5483 ug/l	2.98E+02 lbs/day	8.89E+05 ug/l	5.75E+04 lbs/day
Bis2-EthylbexylPhthalate	3.9493 ug/l	0.25544 lbs/day	######### ug/l	425.73746 lbs/day
4-Bromophenyl Phenyl Ether	0.0000 ug/l	0.00000 lbs/day	0.36202 ug/l	0.02342 lbs/day
Butylbenzyl Phthalate	4936.6589 ug/l	3.19E+02 lbs/day		
2-Chloronaphthalene	3291.1059 ug/l	212.86873 lbs/day		
4-Chlorophenyl Phenyl Ether	0.0000 ug/l	0.00000 lbs/day	0.11848 ug/l	0.00766 lbs/day
Chrysene	0.0125 ug/l	0.00081 lbs/day	427.84377 ug/l	27.67293 lbs/day
Dibenzoa, hAnthracene	0.0125 ug/l	0.00081 lbs/day	######### ug/l	234.15560 lbs/day
1,2-Dichlorobenzene	1382.2645 ug/l	89.40487 lbs/day	0.00092 ug/l	0.00006 lbs/day
1,3-Dichlorobenzene	1053.1539 ug/l	68.11799 lbs/day	1.44809 ug/l	0.09366 lbs/day
1,4-Dichlorobenzene	207.3397 ug/l	13.41073 lbs/day	4.60755 ug/l	0.29802 lbs/day
3,3-Dichlorobenzidine				
Diethyl Phthalate				
Dimethyl Phthalate				
Di-n-Butyl Phthalate	6582.21181 ug/l	425.73746 lbs/day		
2,4-Dinitrotoluene	0.36202 ug/l	0.02342 lbs/day	55.948800 ug/l	3.618768 lbs/day
2,6-Dinitrotoluene	0.00000 ug/l	0.00000 lbs/day	0.002271 ug/l	0.000147 lbs/day
Di-n-Octyl Phthalate	0.00000 ug/l	0.00000 lbs/day	0.016456 ug/l	0.001064 lbs/day
1,2-Diphenylhydrazine	0.11848 ug/l	0.00766 lbs/day	10.860649 ug/l	0.702467 lbs/day
Fluoranthene	427.84377 ug/l	27.67293 lbs/day		
Fluorene	3620.21649 ug/l	234.15560 lbs/day	2.73E+03 ug/l	1.77E+02 lbs/day
Hexachlorobenzene				
Hexachlorobutedine				
Hexachloroethane	4.61 ug/l	0.30 lbs/day		
Hexachlorocyclopentadiene				
Ideno 1,2,3-cdPyrene				
Isophorone	115.19 ug/l	7.45 lbs/day		
Naphthalene				
Nitrobenzene				
N-Nitrosodimethylamine	0.00 ug/l	0.00 lbs/day		
N-Nitrosodi-n-Propylamine	0.02 ug/l	0.00 lbs/day	0.00 ug/l	0.0 lbs/day
N-Nitrosodiphenylamine	1.09E+01 ug/l	7.02E-01 lbs/day		
Phenanthrene	0.00 ug/l	0.00 lbs/day	204.05 ug/l	13.2 lbs/day
Pyrene	2731.62 ug/l	176.68 lbs/day		
1,2,4-Trichlorobenzene			204.05 ug/l	13.2 lbs/day
Aldrin			0.19 ug/l	0.0 lbs/day
alpha-BHC	0.00855688 ug/l	0.000553 lbs/day		
beta-BHC	0.02994906 ug/l	0.001937 lbs/day		
gamma-BHC (Lindane)	0.65822118 ug/l	0.042574 lbs/day		
delta-BHC		0.000000 lbs/day		
Chlordane	0.00263288 ug/l	0.000170 lbs/day		
4,4-DDT	0.00072404 ug/l	0.000047 lbs/day		
4,4-DDE	0.00072404 ug/l	0.000047 lbs/day		
4,4-DDD	0.00102024 ug/l	0.000066 lbs/day		
Dieldrin		0.000000 lbs/day		
alpha-Endosulfan	204.05 ug/l	13.198 lbs/day		
beta-Endosulfan	204.05 ug/l	13.198 lbs/day		
Endosulfan Sulfate	204.05 ug/l	13.198 lbs/day		
Endrin	0.19417525 ug/l	0.013 lbs/day		

Endrin Aldehyde	0.95442071 ug/l	0.062 lbs/day			
Heptachlor		lbs/day			
Heptachlor Epoxide		lbs/day			
Polychlorinated Biphenyls		lbs/day			
0	0.00000000 ug/l	0.000000 lbs/day			
Toxaphene	0.00092151 ug/l	0.000060 lbs/day			
Specific Parameter: TDS	0 ug/l	0.000000 lbs/day	3681.27 mg/l	238.1 tons / day	

Effluent Limitations for the Protection of Agriculture

	1 Hour Average (Acute) Standard Concentration	Load
Arsenic	329.11 ug/l	21.29 lbs / day
Boron	2468.33 ug/l	159.65 lbs / day
Cadmium	32.91 ug/l	2.13 lbs / day
Chromium	329.11 ug/l	21.29 lbs / day
Copper	658.22 ug/l	42.57 lbs / day
Lead	329.11 ug/l	21.29 lbs / day
Selenium	164.56 ug/l	10.64 lbs / day

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

	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		2433.87				2433.87	1368.34
Antimony			18.43			18.43	
Arsenic	329.11	1112.79			32.91	32.91	2772.87
Asbestos							
Barium		3291.11			3291.11	3291.11	
Cadmium	32.91	9.48			32.91	9.48	0.03
Chromium (III)		2658.5			164.56	164.56	1334.12
Chromium (VI)	329.11	43.26				43.26	133.86
Copper	658.22	56.28				56.28	91.75
Cyanide				460.75		460.75	
Iron		2940.57				2940.57	
Lead	329.11	334.40			164.56	164.56	12.17
Mercury		7.8918			6.58	6.58	0.1723
Nickel		2180.35		329.11		329.11	693.89
Selenium	164.56	55.10			164.56	55.10	44.13
Silver		19.47			164.56	19.47	
Thallium				0.79		0.79	
Zinc		500.07				500.07	30660.96

Summary Effluent Limitations for Metals [Wasteload Allocation, TMDL]

	Acute		Chronic	
	ug/l	lbs/day	ug/l	lbs/day
Aluminum	2433.87	243.5	1368.34	136.9
Antimony	18.43	1.8		
Arsenic	32.91	3.3	2772.87	277.5
Asbestos				
Cadmium	9.48	0.9	0.03	0.0
Chromium (III)	164.56	16.5	1334.12	133.5
Chromium (VI)	43.26	4.3	133.86	13.4
Copper	56.28	5.6	91.75	9.2
Cyanide	460.75	46.1		
Iron	2940.57	294.2		
Lead	164.56	16.5	12.17	1.2
Mercury	6.58	0.7	0.17	0.0
Nickel	329.11	32.9	693.89	69.4
Selenium	55.10	5.5	44.13	4.4
Silver	19.47	1.9		
Zinc	500.07	50.0	30660.96	3067.9

daily max

NO AVG

40 CFR .002 daily max

Effluent Indicators / Targets for Pollution Indicators

Water quality targets for pollution Indicators will be met with an effluent limit as follows:

	Indicator / Target	Target	
	mg/l	mg/l	lbs/day
Gross Beta (pCi/l)	50.0 pCi/L		
BOD	5.0	16.46	1668.03
Nitrates as N	4.0	13.16	1334.43
Total Phosphorus as P	0.05	0.16	16.68
Total Suspended Solids	90.0	296.20	30024.58

Other Effluent Limitations are based upon R317-1.

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 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 interfer with existing water users.

Category III waters fall under special rules for the determination of effluent limits. These rules allow more stringent effluent limitations based upon additional factors, including: "blue-ribbon" fisheries, special recreation areas, and drinking water sources.

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 shown that this is not attainable. Refer to the Forum's Guidelines for additional information.

The permit writers may utilize other information to adjust these limits and/or to determine other limits based upon best available technology and other considerations.

XII. Summary Comments

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

The permit writers may utilize other information to adjust these limits or to determine other limite based upon best available technology and other considerations. Under no circumstances however, may those alterations allow for the violation of water quality standards by the permitee.

XIII. Notice of UPDES Requirement

This Addendum to the Statement of Basis does not authorize any entity or party to discharge to the waters of the State of Utah. That authority is granted through a UPDES permit issued by the Utah Division of Water Quality. The numbers presented here may be changed as a function of other factors. Dischargers are strongly urged to contact the Permits Section for further information.

XIV. Notice of Availability of Information

All model numerical inputs, intermediate calculations, outputs and graphs are available for discussion, inspection and copy at the Division of Water Quality.

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JSSD_Water_WLA_11-27-17

40 CFR 440.102 - Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology (BPT).

§ 440.102 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology (BPT). Except as provided in subpart L of this part and 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

(a) The concentration of pollutants discharged in mine drainage from mines operated to obtain copper bearing ores, lead bearing ores, zinc bearing ores, gold bearing ores, or silver bearing ores, or any combination of these ores open-pit or underground operations other than placer deposits shall not exceed:

Effluent characteristic	Effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Milligrams per liter	
TSS	30	20 ✓
Cu	.30	.15 X WLA
Zn	1.5	.75 X WLA
Pb	.6	.3 X WLA
Hg	.002	.001 X WLA
pH	([1])	([1])

[1] Within the range 6.0 to 9.0.

(b) The concentration of pollutants discharged from mills which employ the froth flotation process alone or in conjunction with other processes, for the beneficiation of copper ores, lead ores, zinc ores, gold ores, or silver ores, or any combination of these ores shall not exceed: