

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

**Date:** November 17, 2020

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

**Facility:** Sand Hollow Groundwater Treatment Plant  
UPDES No. UT0026131

**Receiving water:** Sand Hollow Reservoir (1C, 2A, 3B, 4)

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

Discharge

The design flow of the facility is 0.0036 MGD.

Receiving Water

Per UAC R317-2-13.12(z), the designated beneficial uses of the Sand Hollow Reservoir are 1C, 2A, 3B and 4.

- *Class 1C - Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water*
- *Class 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 3B - Protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain.*
- *Class 4 - Protected for agricultural uses including irrigation of crops and stock watering.*

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Flow

Typically, the critical flow for the wasteload analysis is considered the lowest stream flow for seven consecutive days with a ten year return frequency (7Q10). The proposed new plant will be discharging to Sand Hollow Reservoir, therefore seasonal critical values were not calculated for this waste load analysis and the design flow was used instead.

Ambient receiving water quality was characterized using DWQ monitoring station #5951000 (Sand Hollow Reservoir 001) for the period 2000-2020.

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

Total Maximum Daily Load (TMDL)

According to the Utah's 2016 303(d) Water Quality Assessment Report, the receiving water for the discharge, Sand Hollow Reservoir (UT-L-15010008-025\_00) supports all assessed uses.

Mixing Zone

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

Based on the results of the mixing zone modeling, plume width was 100 % of the river at 2500 feet. 100 % of the seasonal critical low flow was used to calculate chronic limits. Acute limits were calculated using 50% of the seasonal critical low flow.

Parameters of Concern

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

WET Limits

The percent of effluent in the receiving water in a fully mixed condition, and acute and chronic dilution in a not fully mixed condition are calculated in the WLA in order to generate WET limits. The LC<sub>50</sub> (lethal concentration, 50%) percent effluent for acute toxicity and the IC<sub>25</sub> (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<sub>50</sub> is typically 100% effluent and does not need to be determined by the WLA.

IC25 WET limits for Outfall 001 should be based on 1.18% effluent (Table 1).

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Table 1. WET Limits for IC25

<b>Outfall</b>	<b>Percent Effluent</b>
Outfall 001	1.18%

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) was submitted and is not required.

Documents:

WLA Document: *Sand Hollow Groundwater Treatment Plant\_WLA\_11-17-2020.docx*

Wasteload Analysis and Addendums: *Sand Hollow GWTP\_WLA\_11-17-2020.xlsm*

References:

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

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

# WASTELOAD ANALYSIS [WLA]

## Addendum: Statement of Basis

### SUMMARY

**Discharging Facility:** Sand Hollow Groundwater Treatment Plant  
 UPDES No: 0026131  
 Current Flow: 0.0036 MGD Design Flow  
 Design Flow 0.0036 MGD

**Receiving Water:** Sand Hollow Reservoir  
 Lake Classification: 1C, 2A, 3B, 4

TDS (mg/l)	521.75	Average
Hardness (mg/l)	283.00	Average
pH	8.20	Average
Temp (C)	16.67	Average

#### Selected Effluent Limit Summary:

Flow, MGD:	0.0036 MGD	Design Flow
BOD, mg/l:	25.0 All Season	5 Indicator
Dissolved Oxygen, mg/l:	5.00 All Season	5.50 30 Day Average
TNH <sub>3</sub> , Acute, mg/l:	14.90 All Season	Varies Function of pH and Temperature
TDS, mg/l:	1200.00 All Season	1200 Receiving water is impaired for TDS
Zinc, ug/l	3853.52 All Season	Varies Function of Hardness
Copper, ug/l	458.03 All Season	Varies Function of Hardness

#### WQ Standard:

#### Modeling Parameters:

Acute Dilution Ratio	14.74 to 1
Chronic Dilution Ratio:	84.21 to 1

#### Wasteload Analysis - Total Maximum Daily Load (Lake TMDL)

11/23/2020 15:27

**Facility:** Sand Hollow Groundwater Treatment Plant  
**Discharging to:** Sand Hollow Reservoir

UPDES No: UT- 0026131

#### 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 procedures are also considered. The primary water quality parameters of concern 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 in terms 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).



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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**

	<b>1 Hour Average (Acute) Standard Concentration</b>	
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

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

	<b>1 Hour Average (Acute) Standard Concentration</b>	
<b>Metals</b>		
Arsenic	10	ug/l
Barium	1000	ug/l
Cadmium	10	ug/l
Chromium	50	ug/l
Lead	15	ug/l
Mercury	2	ug/l
Selenium	50	ug/l
Silver	50	ug/l
Fluoride (3)	1400	ug/l
to	2400	ug/l
Nitrates as N	10000	ug/l
<b>Chlorophenoxy Herbicides</b>		
2,4-D	0	ug/l
2,4,5-TP	0	ug/l
Methoxychlor	0	ug/l

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

	<b>Maximum Conc., ug/l - Acute Standards</b>	
	<b>Class 1C</b>	<b>Class 3A, 3B, 3C, 3D</b>
	[2 Liters/Day for 70 Kg Person over 70 Yr.	[6.5 g for 70 Kg Person over 70 Yr.]
Antimony	5.6 ug/l	640 ug/l

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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
Ethylidibromide	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

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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-ChloroisopropylEther	1400 ug/l		65,000 ug/l
Bis2-EthylhexylPhthalate	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
Hexachlorobutidine	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



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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: 14.7 to 1**  
**Chronic Dilution Ratio: 84.2 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**

<b>Lake Information</b>	<b>Temp.</b>	<b>pH</b>	<b>T-NH3</b>	<b>BOD</b>	<b>DO</b>	<b>TRC</b>	<b>TDS</b>	<b>Metals</b>
	<b>Deg. C</b>		<b>mg/l as N</b>	<b>mg/l</b>	<b>mg/l</b>	<b>mg/l</b>	<b>mg/l</b>	<b>ug/l</b>
	19.4	8.2	0.00	N/A	N/A	0.00	521.8	0.0
<b>Discharge Information</b>	<b>Season</b>		<b>Flow, MGD</b>	<b>Temp.</b>				
	All Seasons		0.0	16.7				

**IX. Effluent Limitations based upon Water Quality Standards**

**Effluent Limitation for Flow**

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All Seasons		
Not to Exceed:	0.00 MGD	Daily Average
	0.01 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)**

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

**Effluent Limitation for Total Ammonia**

	<b>4 Day Average [Chronic]</b>	<b>Load</b>
	<b>Concentration</b>	
All Seasons	202.94 mg/l as N	6.1 lbs/day
	<b>1 Hour Average [Acute]</b>	<b>Load</b>
	<b>Concentration</b>	
	14.9 mg/l as N	0.4 lbs/day

**Effluent Limitation for Total Residual Chlorine**

	<b>4 Day Average [Chronic]</b>	<b>Load</b>
	<b>Concentration</b>	
All Seasons	0.926 mg/l	0.0 lbs/day
	<b>1 Hour Average [Acute]</b>	<b>Load</b>
	<b>Concentration</b>	
	0.280 mg/l	0.0 lbs/day

**Effluent Limitations for Metals**

	<b>4 Day Average (Chronic)</b>	<b>1 Hour Average (Acute)</b>
	<b>Concentration</b>	<b>Concentration</b>
	<b>Load</b>	<b>Load</b>

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Aluminum	6083.76 ug/l*	0.1 lbs/day	10847.14 ug/l	0.2 lbs/day
Arsenic	12495.48 ug/l	0.2 lbs/day	4987.95 ug/l*	0.1 lbs/day
Barium			14736.30 ug/l	0.3 lbs/day
Cadmium	24.20 ug/l*	0.0 lbs/day	74.27 ug/l	0.0 lbs/day
Chromium III	7749.27 ug/l*	0.2 lbs/day	17748.02 ug/l	0.3 lbs/day
ChromiumVI	801.47 ug/l	0.0 lbs/day	215.18 ug/l*	0.0 lbs/day
Copper	1488.53 ug/l	0.0 lbs/day	458.03 ug/l*	0.0 lbs/day
Cyanide	76.63		324.20	
Iron			320.20 ug/l	0.0 lbs/day
Lead	558.98 ug/l*	0.0 lbs/day	2713.55 ug/l	0.1 lbs/day
Mercury	0.01 ug/l*	0.000 lbs/day	35.20 ug/l	0.0 lbs/day
Nickel	9769.91 ug/l*	0.2 lbs/day	15793.89 ug/l	0.3 lbs/day
Selenium	337.43 ug/l	0.0 lbs/day	262.91 ug/l*	0.0 lbs/day
Silver			249.75 ug/l	0.0 lbs/day
Zinc	138521.02 ug/l	2.7 lbs/day	3853.52 ug/l*	0.1

\* Most stringent between Chronic & Acute Effluent Limitations

**Effluent Limitations for Organics [Pesticides]**

Pesticide	4 Day Average		1 Hour Average	
	Concentration	Load	Concentration	Load
Aldrin			22.1044 ug/l	0.000 lbs/day
Chlordane	0.3621 ug/l*	0.000 lbs/day	17.6836 ug/l	0.000 lbs/day
DDT, DDE	0.0842 ug/l*	0.000 lbs/day	8.1050 ug/l	0.000 lbs/day
Dieldrin	0.4716 ug/l*	0.000 lbs/day	3.5367 ug/l	0.000 lbs/day
Endosulfan	4.7156 ug/l	0.000 lbs/day	1.6210 ug/l*	0.000 lbs/day
Endrin	3.0315 ug/l	0.000 lbs/day	1.2673 ug/l*	0.000 lbs/day
Guthion			0.0000 ug/l	0.000 lbs/day
Heptachlor	0.3200 ug/l*	0.000 lbs/day	3.8314 ug/l	0.000 lbs/day
Lindane	6.7366 ug/l*	0.000 lbs/day	14.7363 ug/l	0.000 lbs/day
Methoxychlor			0.4421 ug/l	0.000 lbs/day
Mirex			0.0147 ug/l	0.000 lbs/day
Parathion			0.9726 ug/l	0.000 lbs/day
PCB's	1.1789 ug/l	0.000 lbs/day	0.0000 ug/l*	0.000 lbs/day
Pentachlorophenol	1263.1110 ug/l	0.025 lbs/day	279.9896 ug/l*	0.005 lbs/day
Toxophene	0.0168 ug/l*	0.000 lbs/day	10.7575 ug/l	0.000 lbs/day

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

Metals	1 Hour Average (Acute) Standard	
	Concentration	Load
Arsenic	0.00 ug/l	0.00 lbs/day
Barium	0.00 ug/l	0.00 lbs/day
Cadmium	0.00 ug/l	0.00 lbs/day
Chromium	0.00 ug/l	0.00 lbs/day
Lead	0.00 ug/l	0.00 lbs/day
Mercury	0.00 ug/l	0.00 lbs/day
Selenium	0.00 ug/l	0.00 lbs/day
Silver	0.00 ug/l	0.00 lbs/day
Fluoride	0.00 ug/l	0.00 lbs/day

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to	0.00 ug/l	0.00 lbs/day
Nitrates as N	0.00 ug/l	0.00 lbs/day
<b>Pesticides</b>		
2,4-D	0.00 ug/l	0.00 lbs/day
2,4,5-TP	0.00 ug/l	0.00 lbs/day
Methoxychlor	0.00 ug/l	0.00 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**

Toxics Rule Parameters	Class 1C		Class 3A, 3B	
	[2 Liters/Day for 70 Kg Person over 70 Yr.		[6.5 g for 70 Kg Person over 70 Yr. Period]	
Antimony	0.00 ug/l	0.00 lbs/day	82.52 ug/l	0.0 lbs/day
Arsenic				
Beryllium				
Cadmium				
Chromium III				
Chromium VI				
Copper	0.00 ug/l	0.00 lbs/day	19157.18 ug/l	0.4 lbs/day
Lead				
Mercury		lbs/day	1473.63 ug/l	0.0 lbs/day
Nickel	0.00 ug/l	0.00 lbs/day		
Selenium			109048.58 ug/l	2.1 lbs/day
Silver			2063.08 ug/l	0.0 lbs/day
Thallium	0.00 ug/l	0.00 lbs/day		
Zinc	0.00 ug/l	0.00 lbs/day	2799.90 ug/l	0.1 lbs/day
Cyanide	0.00 ug/l	0.00 lbs/day	0.75 ug/l	0.0 lbs/day
Asbestos	0.00 ug/l	0.00E+00 lbs/day	63.37 ug/l	0.0 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	1473.63 ug/l	0.0 lbs/day
Acrolein	0.00 ug/l	0.00 lbs/day	5.89 ug/l	0.0 lbs/day
Acrylonitrile	0.00 ug/l	0.00 lbs/day		
Benzene	0.00 ug/l	0.00 lbs/day		
Bromoform	0.00 ug/l	0.00 lbs/day	84.00 ug/l	0.0 lbs/day
Carbon Tetrachloride	0.00 ug/l	0.00 lbs/day		
Chlorobenzene	0.00 ug/l	0.00 lbs/day		
Chlorodibromomethane	0.00 ug/l	0.00 lbs/day	5.60 ug/l	0.0 lbs/day
Chloroethane	0.00 ug/l	0.00 lbs/day	103.15 ug/l	0.0 lbs/day
2-Chloroethylvinyl Ether	0.00 ug/l	0.00 lbs/day	7.37 ug/l	0.0 lbs/day
Chloroform	0.00 ug/l	0.00 lbs/day	5.01 ug/l	0.0 lbs/day
Dichlorobromomethane	0.00 ug/l	0.00 lbs/day	692.61 ug/l	0.0 lbs/day
1,1-Dichloroethane	0.00 ug/l	0.00 lbs/day		
1,2-Dichloroethane	0.00 ug/l	0.00 lbs/day	67.79 ug/l	0.0 lbs/day
1,1-Dichloroethylene	0.00 ug/l	0.00 lbs/day	2.51 ug/l	0.0 lbs/day
1,2-Dichloropropane	0.00 ug/l	0.00 lbs/day	14736.30 ug/l	0.3 lbs/day
1,3-Dichloropropene	0.00 ug/l	0.00 lbs/day	8.69 ug/l	0.0 lbs/day
Ethylbenzene	0.00 ug/l	0.00 lbs/day	36.84 ug/l	0.0 lbs/day
Methyl Bromide	0.00 ug/l	0.00 lbs/day	0.37 ug/l	0.0 lbs/day
Methyl Chloride	0.00 ug/l	0.00 lbs/day	1193.64 ug/l	0.0 lbs/day
Methylene Chloride	0.00 ug/l	0.00 lbs/day	1134.69 ug/l	0.0 lbs/day
1,1,2,2-Tetrachloroethane	0.00 ug/l	0.00 lbs/day	5599.79 ug/l	0.1 lbs/day
Tetrachloroethylene	0.00 ug/l	0.00 lbs/day	191.57 ug/l	0.0 lbs/day

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Toluene	0.00 ug/l	0.00 lbs/day		
1,2 -Trans-Dichloroethylene	0.00 ug/l	0.00 lbs/day		
1,1,1-Trichloroethane	0.00 ug/l	0.00 lbs/day	3.98 ug/l	0.0 lbs/day
1,1,2-Trichloroethane	0.00 ug/l	0.00 lbs/day	309462.20 ug/l	6.0 lbs/day
Trichloroethylene	0.00 ug/l	0.00 lbs/day	20.63 ug/l	0.0 lbs/day
Vinyl Chloride	0.00 ug/l	0.00 lbs/day	9873.32 ug/l	0.2 lbs/day
2-Chlorophenol	0.00 ug/l	0.00 lbs/day		
2,4-Dichlorophenol	0.00 ug/l	0.00 lbs/day	122311.25 ug/l	2.4 lbs/day
2,4-Dimethylphenol	0.00 ug/l	0.00 lbs/day		
2-Methyl-4,6-Dinitrophenol	0.00 ug/l	0.00 lbs/day	0.06 ug/l	0.0 lbs/day
2,4-Dinitrophenol	0.00 ug/l	0.00 lbs/day	0.06 ug/l	0.0 lbs/day
2-Nitrophenol	0.00 ug/l	0.00 lbs/day	0.06 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	0.06 ug/l	0.000 lbs/day
Penetachlorophenol	0.0000 ug/l	0.0000 lbs/day		
Phenol	0.0000 ug/l	0.00E+00 lbs/day	0.44 ug/l	0.000 lbs/day
2,4,6-Trichlorophenol	0.0000 ug/l	0.0000 lbs/day	20630.81 ug/l	0.400 lbs/day
Acenaphthene	0.00 ug/l	0.00 lbs/day		
Acenaphthylene	0.00 ug/l	0.00 lbs/day	22104.44 ug/l	0.4 lbs/day
Anthracene	0.00 ug/l	0.00 lbs/day	14736.30 ug/l	0.3 lbs/day
Benzidine	0.00 ug/l	0.00 lbs/day		
BenzoaAnthracene	0.00 ug/l	0.00 lbs/day	0.06 ug/l	0.0 lbs/day
BenzoaPyrene	0.00 ug/l	0.00 lbs/day	0.1 ug/l	0.0 lbs/day
BenzobFluoranthene	0.00 ug/l	0.00 lbs/day	6189.24 ug/l	0.1 lbs/day
BenzoghiPerylene	0.00 ug/l	0.00 lbs/day	4715.61 ug/l	0.1 lbs/day
BenzokFluoranthene				
Bis2-ChloroethoxyMethane				
Bis2-ChloroethylEther	0.0000 ug/l	0.00000 lbs/day	2.51E+05 ug/l	4.86E+00 lbs/day
Bis2-ChloroisopropylEther	0.0000 ug/l	0.00E+00 lbs/day	3.98E+06 ug/l	7.72E+01 lbs/day
Bis2-EthylhexylPhthalate	0.0000 ug/l	0.00000 lbs/day	##### ug/l	0.57189 lbs/day
4-Bromophenyl Phenyl Ether	0.0000 ug/l	0.00000 lbs/day	1.62099 ug/l	0.00003 lbs/day
Butylbenzyl Phthalate	0.0000 ug/l	0.00E+00 lbs/day		
2-Chloronaphthalene	0.0000 ug/l	0.00000 lbs/day		
4-Chlorophenyl Phenyl Ether	0.0000 ug/l	0.00000 lbs/day	0.53051 ug/l	0.00001 lbs/day
Chrysene	0.0000 ug/l	0.00000 lbs/day	##### ug/l	0.03717 lbs/day
Dibenzoa, hAnthracene	0.0000 ug/l	0.00000 lbs/day	##### ug/l	0.31454 lbs/day
1,2-Dichlorobenzene	0.0000 ug/l	0.00000 lbs/day	0.00413 ug/l	0.00000 lbs/day
1,3-Dichlorobenzene	0.0000 ug/l	0.00000 lbs/day	6.48397 ug/l	0.00013 lbs/day
1,4-Dichlorobenzene	0.0000 ug/l	0.00000 lbs/day	20.63081 ug/l	0.00040 lbs/day
3,3-Dichlorobenzidine				
Diethyl Phthalate				
Dimethyl Phthalate				
Di-n-Butyl Phthalate	0.00000 ug/l	0.00000 lbs/day		
2,4-Dinitrotoluene	0.00000 ug/l	0.00000 lbs/day	##### ug/l	0.004861 lbs/day
2,6-Dinitrotoluene	0.00000 ug/l	0.00000 lbs/day	0.010168 ug/l	0.000000 lbs/day
Di-n-Octyl Phthalate	0.00000 ug/l	0.00000 lbs/day	0.073681 ug/l	0.000001 lbs/day
1,2-Diphenylhydrazine	0.00000 ug/l	0.00000 lbs/day	48.629774 ug/l	0.000944 lbs/day
Fluoranthene	0.00000 ug/l	0.00000 lbs/day		
Fluorene	0.00000 ug/l	0.00000 lbs/day	1.22E+04 ug/l	2.37E-01 lbs/day
Hexachlorobenzene				
Hexachlorobutedine				
Hexachloroethane	0.00 ug/l	0.00 lbs/day		
Hexachlorocyclopentadiene				
Ideno 1,2,3-cdPyrene				
Isophorone	0.00 ug/l	0.00 lbs/day		

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Naphthalene				
Nitrobenzene				
N-Nitrosodimethylamine	0.00 ug/l	0.00 lbs/day		
N-Nitrosodi-n-Propylamine	0.00 ug/l	0.00 lbs/day	0.00 ug/l	0.0 lbs/day
N-Nitrosodiphenylamine	0.00E+00 ug/l	0.00E+00 lbs/day		
Phenanthrene	0.00 ug/l	0.00 lbs/day	913.65 ug/l	0.0 lbs/day
Pyrene	0.00 ug/l	0.00 lbs/day		
1,2,4-Trichlorobenzene			913.65 ug/l	0.0 lbs/day
Aldrin			0.87 ug/l	0.0 lbs/day
alpha-BHC	0.00000000 ug/l	0.000000 lbs/day		
beta-BHC	0.00000000 ug/l	0.000000 lbs/day		
gamma-BHC (Lindane)	0.00000000 ug/l	0.000000 lbs/day		
delta-BHC		0.000000 lbs/day		
Chlordane	0.00000000 ug/l	0.000000 lbs/day		
4,4-DDT	0.00000000 ug/l	0.000000 lbs/day		
4,4-DDE	0.00000000 ug/l	0.000000 lbs/day		
4,4-DDD	0.00000000 ug/l	0.000000 lbs/day		
Dieldrin		0.000000 lbs/day		
alpha-Endosulfan	0.00 ug/l	0.000 lbs/day		
beta-Endosulfan	0.00 ug/l	0.000 lbs/day		
Endosulfan Sulfate	0.00 ug/l	0.000 lbs/day		
Endrin	0.00000000 ug/l	0.000 lbs/day		
Endrin Aldehyde	0.00000000 ug/l	0.000 lbs/day		
Heptachlor		lbs/day		
Heptachlor Epoxide		lbs/day		
Polychlorinated Biphenyls		lbs/day		
0	0.00000000 ug/l	0.000000 lbs/day		
Toxaphene	0.00000000 ug/l	0.000000 lbs/day		
<b>Specific Parameter: TDS</b>	<b>0 ug/l</b>	<b>0.000000 lbs/day</b>	<b>1698.76 mg/l</b>	<b>0.0 tons / day</b>

**Effluent Limitations for the Protection of Agriculture**

**1 Hour Average (Acute) Standard**  
**Concentration                      Load**

Arsenic	1473.63 ug/l	0.03 lbs / day
Boron	11052.22 ug/l	0.21 lbs / day
Cadmium	147.36 ug/l	0.00 lbs / day
Chromium	1473.63 ug/l	0.03 lbs / day
Copper	736.81 ug/l	0.01 lbs / day
Lead	1473.63 ug/l	0.03 lbs / day
Selenium	736.81 ug/l	0.01 lbs / day

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

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	<b>Class 4 Acute Agricultural ug/l</b>	<b>Class 3 Acute Aquatic Wildlife ug/l</b>	<b>Acute Toxics Drinking Water Source ug/l</b>	<b>Acute Toxics Wildlife ug/l</b>	<b>1C Acute Health Criteria ug/l</b>	<b>Acute Most Stringent ug/l</b>	<b>Class 3 Chronic Aquatic Wildlife ug/l</b>
Aluminum		10847.14				10847.14	6083.76
Antimony			0.00			0.00	
Arsenic	1473.63	4987.95			10.00	10.00	12495.48
Asbestos							
Barium		14736.30			1000.00	1000.00	
Boron							
Cadmium	147.36	74.27			0.00	0.00	24.20
Chromium (III)		17748.0			50.00	50.00	7749.27
Chromium (VI)	1473.63	215.18				215.18	801.47
Copper	736.81	458.03				458.03	1488.53
Cyanide		324.20		0.00		0.00	76.63
Iron		320.20				320.20	
Lead	1473.63	2713.55			15.00	15.00	558.98
Mercury		35.2023			0.00	0.00	0.0120
Nickel		15793.89		0.00		0.00	9769.91
Selenium	736.81	262.91			50.00	50.00	337.43
Silver		249.75			0.00	0.00	
Thallium				0.00		0.00	
Zinc		3853.52				3853.52	138521.02

**Summary Effluent Limitations for Metals [Wasteload Allocation, TMDL]**

	<b>ug/l</b>	<b>Acute lbs/day</b>	<b>Chronic ug/l</b>	<b>lbs/day</b>
Aluminum	10847.14	0.3	6083.76	0.2
Antimony				
Arsenic	10.00	0.0	12495.48	0.4
Asbestos				
Cadmium	0.00	0.0	24.20	0.0
Chromium (III)	50.00	0.0	7749.27	0.2
Chromium (VI)	215.18	0.0	801.47	0.0
Copper	458.03	0.0	1488.53	0.0
Cyanide	0.00	0.0	76.63	0.0
Iron	320.20	0.0		
Lead	15.00	0.0	558.98	0.0
Mercury	0.00	0.0	0.01	0.0
Nickel	0.00	0.0	9769.91	0.3
Selenium	50.00	0.0	337.43	0.0
Silver	0.00	0.0		
Zinc	3853.52	0.1	138521.02	4.2

**Effluent Indicators / Targets for Pollution Indicators**



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

	Indicator / Target mg/l	Target	
		mg/l	lbs/day
Gross Beta (pCi/l)	50.0 pCi/L		
BOD	5.0	73.68	33442.39
Nitrates as N	4.0	58.95	26753.91
Total Phosphorus as P	0.05	0.74	334.42
Total Suspended Solids	90.0	1326.27	601963.07

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 interfere 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. This doesn't apply to facilities that do not discharge to the Colorado River Basin.

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 water beneficial 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 limits 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 permittee.

### 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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Sand Hollow GWTP-WLA-11-17-2020

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