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

Date: **August 20, 2021**

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Standards and Technical Services

Facility: **Ashley Valley Water Reclamation Facility**
Vernal, Utah
UPDES Permit No. UT-0025348

Receiving water: **Ashley Creek into Green River**

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 (DWQ).

Discharge

Outfall 001

The design flow for the treatment plant is 4.7 MGD, consistent with the wasteload analysis performed for the 2016 permit. The annual average flow is 2.4 MGD. The maximum daily flow is 2.7 MGD; however, the peak hourly flow is 9.4 MGD.

Receiving Water
The receiving water for Outfall 001 is Ashley Creek, which is a tributary of the Green River.

Per UAC R317-2-13.1(b), the designated beneficial uses of the assessment unit in the immediate area and downstream are: *Ashley Creek and tributaries, from confluence with Green River to Steinaker diversion: 2B,3B,4* and *Green River and tributaries, from confluence with Colorado River to state line except as listed below: 1C,2A,3B,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 2B -- Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.*

- *Class 3B -- Protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain.*

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

Typically, the critical flow for the wasteload analysis is considered the lowest stream flow averaged over seven consecutive days with a ten year return frequency (7Q10). The USGS 09266500 ASHLEY CREEK NEAR VERNAL, UT stream gauge located approximately 15 miles upgradient was used to evaluate ambient or background flow conditions. The stream gauge has a daily average flow record from 1914 to present. Therefore, DWQ used the minimum of the 7Q10 over the entire period to estimate the seasonal critical flow in the receiving water (Table 1). The average annual critical low flow condition is 3.8 ft3/s.

Table 1: Seasonal Flow Data at USGS 09266500 ASHLEY CREEK NEAR VERNAL, UT.

Season	Minimum 7Q10 flow (ft3/s)
Summer	5.8
Fall	4.4
Winter	3.8
Spring	4.3
Annual Overall	**3.8**

Ambient, upstream, background receiving water quality was characterized using combined data from UDWQ 4937440 ASHLEY CK AB ASHLEY VALLEY WWTP AT CR XING (1500 S) and USGS 09271400 ASHLEY CREEK NEAR NAPLES, UT. The average seasonal value was calculated for each constituent with available monitoring and sampling data in the upstream receiving water. Effluent discharge parameters, where available, were characterized using data supplied in the permit application, the discharge monitoring report (DMR), or monitoring site DWQ 4937040 Ashley Valley WWTP.

Total Maximum Daily Load (TMDL)

According to the Utah's 2021 303(d) Water Quality Assessment Report "Combined 2018/2020 Integrated Report Version 1.0", the receiving water for the discharge, Ashley Creek and tributaries, from confluence with Green River to Steinaker diversion (UT14060002-002_00) was listed for TDS, aluminum, selenium, and E. coli with a low priority of TMDL development.

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. Individual mixing zones may be further limited or disallowed in consideration of the following factors in the area affected by the discharge: Zone of passage for migrating fish or other species (including access to tributaries).

For Outfall 001, the effluent was considered to be totally mixed as the ratio of river flow (from 7Q10) to effluent discharge flow (from DMR) was 0.66. A ratio less than 2 (twice as much upstream flow as effluent discharge) assumes that complete mixing occurs. Acute limits were calculated using 50% of the seasonal critical low flow.

The EPA Region 8 stream mixing zone analysis (STREAMIX1, 1994), was used to determine the plume width and mixed flow rate for both acute and chronic conditions. A rectangular channel with a width of 24 feet, channel slope of 0.005 feet/feet, and roughness coefficient of 0.030 was assumed for channel geometry. Mannings equation was used to solve for the flow depth (0.49 feet) and velocity for the 7Q10 flow.

Table 2: Summary of plume characteristics at mixing zone boundary.

Criteria	Distance to End of Mixing Zone (feet)	Plume Width		Flow
		feet	% of River	cfs
Acute	1,900	44.8	212.2	40
Chronic	2,500	51.4	247.8	79

Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water were ammonia, aluminum, total dissolved solids (TDS**)**, selenium, and E. coli, as determined in consultation with the UPDES Permit Writer and the Watershed Protection Specialist.

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.

Table 3: WET Limits for IC_{25}

Outfall	Percent Effluent
Outfall 001	36.9%

Wasteload Allocation Methods

Effluent limits were determined for conservative constituents using a simple mass balance mixing analysis (UDWQ, 2021). The mass balance analysis is summarized in the Wasteload Addendum.

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. However, temperature, pH, and ammonia concentration of the effluent were not provided. 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.

Secondary standards for BOD_5 were considered sufficiently protective to meet instream criteria for DO.

Table 4: Water Quality Based Effluent Limits Summary

Effluent Constituent	Acute			Chronic		
	Standard	Limit	Averaging Period	Standard	Limit	Averaging Period
Flow (MGD)		2.7	1 day		4.7	30 days
Ammonia (mg/L)						
Summer (Jul-Sep)	2.9	20.2		1.1	5.1	
Fall (Oct-Dec)	1.3	14.5	1 hour	1.2	5.5	30 days
Winter (Jan-Mar)	3.0	13.9		1.7	4.4	
Spring (Apr-Jun)	2.5	14.6		1.7	5.1	
BOD_5 (mg/L)	N/A	35	7 days	N/A	25	30 days

Models and supporting documentation are available for review upon request.

Antidegradation Level I Review

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

A Level II Antidegradation Review (ADR) is not required for this facility because the upgraded and expanded facility has previously been permitted.

Documents:

WLA Document*: Ashley_Val_WRF_WLA_2021.docx*
Wasteload Analysis and Addendums: *Ashley_Val_WRF _WLA_2021.xlsm*

References:

Lewis, B., J. Saunders, and M. Murphy. 2002. Ammonia Toxicity Model (AMMTOX, Version2): A Tool for Determining Effluent Ammonia Limits. University of Colorado, Center for Limnology.

Utah Division of Water Quality. 2014, *TMDL for Selenium in the Colorado River Watershed*

Utah Division of Water Quality. 2021. *Combined 2018/2020 Integrated Report Version 1.0*

Utah Division of Water Quality. 2021. *Utah Wasteload Analysis Procedures Version 2.0*.

Utah Division of Water Quality
Salt Lake City, Utah

WASTELOAD ANALYSIS [WLA] = not included in the WLA
Addendum: Statement of Basis

20-Aug-21
4:00 PM

Facilities: **Ashley Valley Water Reclamation Facility** **UPDES No: UT-0025348**
Discharging to: **Ashley Creek to Green River**

I. Introduction

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

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

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

II. Receiving Water and Stream Classification

Ashley Creek to Green River:	2B,3B,4
Antidegradation Review:	Level I review completed. Level II review is required.

III. Numeric Stream Standards for Protection of Aquatic Wildlife

Total Ammonia (TNH3)	Varies as a function of Temperature and pH Rebound. See Water Quality Standards
Chronic Total Residual Chlorine (TRC)	0.0 mg/l (4 Day Average) 0.0 mg/l (1 Hour Average)
Chronic Dissolved Oxygen (DO)	5.5 mg/l (30 Day Average) 4.0 mg/l (7Day Average) 3.0 mg/l (1 Day Average)
Maximum Total Dissolved Solids	1200.0 mg/l

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**	4.095 lbs/day	750.00 ug/l	35.304 lbs/day
Arsenic	150.00 ug/l	7.061 lbs/day	340.00 ug/l	16.005 lbs/day
Cadmium	2.94 ug/l	0.138 lbs/day	9.53 ug/l	0.449 lbs/day
Chromium III	332.18 ug/l	15.637 lbs/day	6949.92 ug/l	327.149 lbs/day
ChromiumVI	11.00 ug/l	0.518 lbs/day	16.00 ug/l	0.753 lbs/day
Copper	38.12 ug/l	1.795 lbs/day	66.10 ug/l	3.112 lbs/day
Iron			1000.00 ug/l	47.072 lbs/day
Lead	25.91 ug/l	1.220 lbs/day	664.86 ug/l	31.296 lbs/day
Mercury	0.0120 ug/l	0.001 lbs/day	2.40 ug/l	0.113 lbs/day
Nickel	210.21 ug/l	9.895 lbs/day	1890.71 ug/l	89.000 lbs/day
Selenium	4.60 ug/l	0.217 lbs/day	20.00 ug/l	0.941 lbs/day
Silver	N/A ug/l	N/A lbs/day	64.36 ug/l	3.030 lbs/day
Zinc	483.88 ug/l	22.777 lbs/day	483.88 ug/l	22.777 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 519.37 mg/l as CaCO3

IV. Numeric Stream Standards for Protection of Agriculture

	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
	Concentration	**Load***	**Concentration**	**Load***
Arsenic			100.0 ug/l	lbs/day
Boron			750.0 ug/l	lbs/day
Cadmium			10.0 ug/l	0.24 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	28.24 tons/day

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

	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
Metals	**Concentration**	**Load***	**Concentration**	**Load***
Arsenic			ug/l	lbs/day
Barium			ug/l	lbs/day
Cadmium			ug/l	lbs/day
Chromium			ug/l	lbs/day
Lead			ug/l	lbs/day
Mercury			ug/l	lbs/day
Selenium			ug/l	lbs/day
Silver			ug/l	lbs/day
Fluoride (3)			ug/l	lbs/day
to			ug/l	lbs/day
Nitrates as N			ug/l	lbs/day

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**	
Metals				
Antimony	ug/l	lbs/day		
Arsenic	ug/l	lbs/day	4300.00 ug/l	302.94 lbs/day
Asbestos	ug/l	lbs/day		
Beryllium				
Cadmium				
Chromium (III)				
Chromium (VI)				
Copper				
Cyanide	ug/l	lbs/day	2.2E+05 ug/l	15499.47 lbs/day
Lead	ug/l	lbs/day		
Mercury			0.15 ug/l	0.01 lbs/day
Nickel			4600.00 ug/l	324.08 lbs/day
Selenium	ug/l	lbs/day		
Silver	ug/l	lbs/day		
Thallium			6.30 ug/l	0.44 lbs/day
Zinc				

There are additional standards that apply to this receiving water, but were not considered in this modeling/waste load allocation analysis.

VII. Mathematical Modeling of Stream Quality

Model configuration was accomplished utilizing standard modeling procedures. Data points were plotted and coefficients adjusted as required to match observed data as closely as possible.

The modeling approach used in this analysis included one or a combination of the following models.

(1) The Utah River Model, Utah Division of Water Quality, 1992. Based upon STREAMDO IV (Region VIII) and Supplemental Ammonia Toxicity Models; EPA Region VIII, Sept. 1990 and QUAL2E (EPA, Athens, GA).

(2) Utah Ammonia/Chlorine Model, Utah Division of Water Quality, 1992.

(3) AMMTOX Model, University of Colorado, Center of Limnology, and EPA Region 8

(4) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al. Harper Collins Publisher, Inc. 1987, pp. 644.

Coefficients used in the model were based, in part, upon the following references:

(1) Rates, Constants, and Kinetics Formulations in Surface Water Quality Modeling. Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Athens Georgia. EPA/600/3-85/040 June 1985.

(2) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al. Harper Collins Publisher, Inc. 1987, pp. 644.

VIII. Modeling Information

The required information for the model may include the following information for both the upstream conditions at low flow and the effluent conditions:

Flow, Q, (cfs or MGD)	D.O. mg/l
Temperature, Deg. C.	Total Residual Chlorine (TRC), mg/l
pH	Total NH3-N, mg/l
BOD5, mg/l	Total Dissolved Solids (TDS), mg/l
Metals, ug/l	Toxic Organics of Concern, ug/l

Other Conditions

In addition to the upstream and effluent conditions, the models require a variety of physical and biological coefficients and other technical information. In the process of actually establishing the permit limits for an effluent, values are used based upon the available data, model calibration, literature values, site visits and best professional judgement.

Model Inputs

The following is upstream and discharge information that was utilized as inputs for the analysis. Dry washes are considered to have an upstream flow equal to the flow of the discharge.

Current Upstream Information

	Stream Critical Low Flow cfs	Temp. Deg. C	pH	T-NH3 mg/l as N	BOD5 mg/l	DO mg/l	TRC mg/l	TDS mg/l
Summer (Irrig. Season)	5.8	18.9	8.2	0.12	1.50	6.95	0.00	638.3
Fall	4.4	7.8	8.1	0.04	2.14	---	0.00	657.9
Winter	3.8	3.4	8.1	0.32	1.62	---	0.00	657.9
Spring	4.3	13.9	8.2	0.11	1.86	---	0.00	657.9

	Dissolved Metals	Al ug/l	As ug/l	Cd ug/l	CrIII ug/l	CrVI ug/l	Copper ug/l	Fe ug/l	Pb ug/l
All Seasons		362.00	0.85	0.05	1.00	2.65*	0.99	0.0	0.06

	Dissolved Metals	Hg ug/l	Ni ug/l	Se ug/l	Ag ug/l	Zn ug/l	Boron ug/l
All Seasons		0.0000	2.50	0.43	0.25	5.07	10.0

* 1/2 MDL

Projected Discharge Information

Season	Flow, MGD	Temp.	TDS mg/l	TDS tons/day
Summer	4.70000	20.6	372.60	7.30113
Fall	4.70000	13.8		
Winter	4.70000	9.3		
Spring	4.70000	16.9		

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

IX. Effluent Limitations

Current State water quality standards are required to be met under a variety of conditions including in-stream flows targeted to the 7-day, 10-year low flow (R317-2-9).

Other conditions used in the modeling effort coincide with the environmental conditions expected at low stream flows.

Effluent Limitation for Flow based upon Water Quality Standards

In-stream criteria of downstream segments will be met with an effluent flow maximum value as follows:

Season	Daily Average	
Summer	4.700 MGD	7.271 cfs
Fall	4.700 MGD	7.271 cfs
Winter	4.700 MGD	7.271 cfs
Spring	4.700 MGD	7.271 cfs

Flow Requirement or Loading Requirement

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 4.7 MGD. If the discharger is allowed to have a flow greater than 4.7 MGD during 7Q10 conditions, and effluent limit concentrations as indicated, then water quality standards will be violated. In order to prevent this from occuring, the permit writers must include the discharge flow limititation as indicated above; or, include loading effluent limits in the permit.

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

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

WET Requirements	LC50 >	EOP Effluent	[Acute]
	IC25 >	55.6% Effluent	[Chronic]

Effluent Limitation for Biological Oxygen Demand (BOD) based upon Water Quality Standards or Regulations

In-stream criteria of downstream segments for Dissolved Oxygen will be met with an effluent BOD limitation as follows:

Season	Concentration	
Summer	25.0 mg/l as BOD5	979.8 lbs/day
Fall	25.0 mg/l as BOD5	979.8 lbs/day
Winter	25.0 mg/l as BOD5	979.8 lbs/day
Spring	25.0 mg/l as BOD5	979.8 lbs/day

Effluent Limitation for Dissolved Oxygen (DO) based upon Water Quality Standards

In-stream criteria of downstream segments for Dissolved Oxygen will be met with an effluent

D.O. limitation as follows:

Season	Concentration
Summer	5.00
Fall	5.00
Winter	5.00
Spring	5.00

Effluent Limitation for Total Ammonia based upon Water Quality Standards

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

Season		Concentration		Load	
Summer	4 Day Avg. - Chronic	5.1	mg/l as N	200.3	lbs/day
	1 Hour Avg. - Acute	20.2	mg/l as N	791.1	lbs/day
Fall	4 Day Avg. - Chronic	5.5	mg/l as N	216.2	lbs/day
	1 Hour Avg. - Acute	14.5	mg/l as N	570.1	lbs/day
Winter	4 Day Avg. - Chronic	4.4	mg/l as N	172.8	lbs/day
	1 Hour Avg. - Acute	13.9	mg/l as N	545.1	lbs/day
Spring	4 Day Avg. - Chronic	5.1	mg/l as N	198.1	lbs/day
	1 Hour Avg. - Acute	14.6	mg/l as N	570.2	lbs/day

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

Effluent Limitation for Total Residual Chlorine based upon Water Quality Standards

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

Season		Concentration		Load	
Summer	4 Day Avg. - Chronic	0.023	mg/l	0.91	lbs/day
	1 Hour Avg. - Acute	0.030	mg/l	1.18	lbs/day
Fall	4 Day Avg. - Chronic	0.020	mg/l	0.80	lbs/day
	1 Hour Avg. - Acute	0.028	mg/l	1.08	lbs/day
Winter	4 Day Avg. - Chronic	0.019	mg/l	0.75	lbs/day
	1 Hour Avg. - Acute	0.026	mg/l	1.03	lbs/day
Spring	4 Day Avg. - Chronic	0.020	mg/l	0.00	lbs/day
	1 Hour Avg. - Acute	0.027	mg/l	0.00	lbs/day

Effluent Limitations for Total Dissolved Solids based upon Water Quality Standards

Season		Concentration		Load	
Summer	Maximum, Acute	1648.1	mg/l	32.29	tons/day
Fall	Maximum, Acute	1632.4	mg/l	31.99	tons/day
Winter	Maximum, Acute	1558.7	mg/l	30.54	tons/day
Spring	4 Day Avg. - Chronic	1736.6	mg/l	34.03	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 519.37 mg/l):

	4 Day Average Concentration		Load		1 Hour Average Concentration		Load	
Aluminum	N/A		N/A		904.8	ug/l	42.6	lbs/day
Arsenic	268.98	ug/l	6.8	lbs/day	475.3	ug/l	22.4	lbs/day
Cadmium	5.25	ug/l	0.1	lbs/day	13.3	ug/l	0.6	lbs/day
Chromium III	596.37	ug/l	15.1	lbs/day	9,721.5	ug/l	457.6	lbs/day
Chromium VI	16.60	ug/l	0.4	lbs/day	20.8	ug/l	1.0	lbs/day
Copper	67.75	ug/l	1.7	lbs/day	92.1	ug/l	4.3	lbs/day
Iron	N/A		N/A		1,398.8	ug/l	65.8	lbs/day
Lead	46.53	ug/l	1.2	lbs/day	930.0	ug/l	43.8	lbs/day
Mercury	0.02	ug/l	0.0	lbs/day	3.4	ug/l	0.2	lbs/day
Nickel	375.90	ug/l	9.5	lbs/day	2,643.8	ug/l	124.5	lbs/day
Selenium	7.92	ug/l	0.2	lbs/day	27.8	ug/l	1.3	lbs/day
Silver	N/A	ug/l	N/A	lbs/day	89.9	ug/l	4.2	lbs/day
Zinc	865.83	ug/l	21.9	lbs/day	674.9	ug/l	31.8	lbs/day
Cyanide	9.35	ug/l	0.2	lbs/day	30.8	ug/l	1.4	lbs/day

Effluent Limitations for Heat/Temperature based upon Water Quality Standards

Summer	21.6	Deg. C.	71.0	Deg. F
Fall	10.4	Deg. C.	50.7	Deg. F
Winter	5.9	Deg. C.	42.6	Deg. F
Spring	16.5	Deg. C.	61.7	Deg. F

Effluent Targets for Pollution Indicators Based upon Water Quality Standards

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

	1 Hour Average Concentration		Loading	
Gross Beta (pCi/l)	50.0	pCi/L		
BOD (mg/l)	5.0	mg/l	235.4	lbs/day
Nitrates as N	4.0	mg/l	188.3	lbs/day
Total Phosphorus as P	0.05	mg/l	2.4	lbs/day
Total Suspended Solids	90.0	mg/l	4236.5	lbs/day

Note: Pollution indicator targets are for information purposes only.

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

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

	Maximum Concentration Concentration		Load	
Metals				
Antimony		ug/l		lbs/day
Arsenic		ug/l		lbs/day
Asbestos		ug/l		lbs/day
Beryllium				
Cadmium				
Chromium (III)				
Chromium (VI)				

Copper	ug/l	lbs/day
Cyanide	ug/l	lbs/day
Lead		
Mercury	ug/l	lbs/day
Nickel	ug/l	lbs/day
Selenium		
Silver		
Thallium	ug/l	lbs/day
Zinc		

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		904.8				904.8	N/A
Antimony				7730.1		7730.1	
Arsenic	179.8	475.3			0.0	179.8	269.0
Asbestos						0.00E+00	
Barium						0.0	
Beryllium						0.0	
Cadmium	17.9	13.3			0.0	13.3	5.2
Chromium (III)		9721.5			0.0	9721.5	596.4
Chromium (VI)	179.0	20.8			0.0	20.80	16.60
Copper	358.8	92.1				92.1	67.7
Cyanide		30.8	395494.1			30.8	9.3
Iron		1398.8				1398.8	
Lead	179.7	930.0			0.0	179.7	46.5
Mercury		3.36		0.27	0.0	0.27	0.022
Nickel		2643.8		8269.4		2643.8	375.9
Selenium	89.5	27.8			0.0	27.8	7.9
Silver		89.9			0.0	89.9	
Thallium				11.3		11.3	
Zinc		674.9				674.9	865.8
Boron	1348.1					1348.1	

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	904.8	N/A	
Antimony	7730.11		
Arsenic	179.8	269.0	Acute Controls
Asbestos	0.00E+00		
Barium			
Beryllium			
Cadmium	13.3	5.2	
Chromium (III)	9721.5	596	
Chromium (VI)	20.8	16.6	
Copper	92.1	67.7	
Cyanide	30.8	9.3	
Iron	1398.8		
Lead	179.7	46.5	
Mercury	0.270	0.022	
Nickel	2643.8	376	
Selenium	27.8	7.9	
Silver	89.9	N/A	
Thallium	11.3		

Zinc	674.9	865.8	Acute Controls
Boron	1348.15		

Other Effluent Limitations are based upon R317-1.

E. coli	126.0	organisms per 100 ml

X. Antidegradation Considerations

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

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

An Antidegradation Level I Review was conducted on this discharge and its effect on the receiving water. Based upon that review, it has been determined that an Antidegradation Level II Review is not required.

XI. Colorado River Salinity Forum Considerations

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

XII. Summary Comments

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

XIII. Notice of UPDES Requirement

This Addendum to the Statement of Basis does not authorize any entity or party to discharge to the waters of the State of Utah. That authority is granted through a UPDES permit issued by the Utah Division of Water Quality. The numbers presented here may be changed as a function of other factors. Dischargers are strongly urged to contact the Permits Section for further information. Permit writers may utilize other information to adjust these limits and/or to determine other limits based upon best available technology and other considerations provided that the values in this wasteload analysis [TMDL] are not compromised. See special provisions in Utah Water Quality Standards for adjustments in the Total Dissolved Solids values based upon background concentration.

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APPENDIX - Coefficients and Other Model Information

CBOD Coeff. (Kd)20 1/day	CBOD Coeff. FORCED (Kd)/day	CBOD Coeff. (Ka)T 1/day	REAER. Coeff. (Ka)20 (Ka)/day	REAER. Coeff. FORCED 1/day	REAER. Coeff. (Ka)T 1/day	NBOD Coeff. (Kn)20 1/day	NBOD Coeff. (Kn)T 1/day

2.000	0.000	1.897	60.602	0.000	58.972	0.400	0.366
Open Coeff. (K4)20 1/day	Open Coeff. (K4)T 1/day	NH3 LOSS (K5)20 1/day	NH3 (K5)T 1/day	NO2+NO3 LOSS (K6)20 1/day	NO2+NO3 (K6)T 1/day	TRC Decay K(Cl)20 1/day	TRC K(Cl)(T) 1/day
0.000	0.000	4.000	3.794	0.000	0.000	32.000	29.927

BENTHIC DEMAND (SOD)20 gm/m2/day	BENTHIC DEMAND (SOD)T gm/m2/day
1.000	0.930

K1 CBOD {theta}	K2 Reaer. {theta}	K3 NH3 {theta}	K4 Open {theta}	K5 NH3 Loss {theta}	K6 NO2+3 {theta}	K(Cl) TRC {theta}	S Benthic {theta}
1.0	1.0	1.1	1.0	1.0	1.0	1.1	1.1

Antidegredation Review

An antidegradation review (ADR) was conducted to determine whether the proposed activity complies with the applicable antidegradation requirements for receiving waters that may be affected. The Level I ADR evaluated the criteria of R317-2-3.5(b) and determined that a Level II antidegradation Review is not required.

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