

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

Date: January 7, 2021

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Standards and Technical Services

Facility: Red Cliffs Lodge
Highway 128, Moab UT
UPDES Permit No. UT-7UT0026166

Receiving water: Colorado River (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 (DWQ).

Discharge

Outfall 001.

Receiving Water

The receiving water for Outfall 001 is Colorado River

Per UAC R317-2-13.1(a), the designated beneficial uses of both assessment units in the immediate area (Colorado River and tributaries, from Lake Powell to state line except as listed below; Castle Creek from confluence with the Colorado River to Seventh Day Adventist Diversion) are 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.*

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- *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. There is a site specific TDS standard for Castle Creek from confluence with the Colorado River to Seventh Day Adventist Diversion that states “Castle Creek from confluence with the Colorado River to Seventh Day Adventist Diversion: 1,800 mg/l.*

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 USGS 09180500 COLORADO RIVER NEAR CISCO, UT stream gauge approximately 15 miles upgradient was used to evaluate ambient or background flow conditions. The stream gauge has a daily average flow record from 1913 to 1917 and 1922 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 annual average critical low flow condition is 736.0 ft³/s.

Table 1. Seasonal Flow Data at Red Cliffs Lodge Site 1

Season	Minimum 7Q10 flow (ft ³ /s)
Summer	736.0
Fall	1265.7
Winter	1567.1
Spring	1350.0
Annual Overall	736.0

Ambient, upstream, background receiving water quality was also characterized using data from USGS 09180500 COLORADO RIVER NEAR CISCO, UT stream gauge approximately 15 miles upgradient of the site. The average seasonal value was calculated for each constituent with available data in the receiving water. Effluent discharge parameters, where available, were characterized using data supplied in the permit application at monitoring site Outfall 001. It should be noted that only discharge, TDS, nitrate, sulfate, and sulfide data were provided.

Total Maximum Daily Load (TMDL)

According to the Utah’s 2016 303(d) [Water Quality Assessment Report](#) dated December 7, 2016, the receiving water for the discharge, Colorado River from Moab to HUC unit (14030005) boundary (UT14030005-004_00) was listed for dissolved selenium with an approved TMDL. The adjacent assessment unit, Castle Creek and tributaries from confluence with Colorado River to Seventh-Day Adventist diversion (UT14030005-009_00) transects the alluvial/colluvial depositional area that Red Cliffs Lodge is sited. This assessment unit is “Not Supporting” for “OE Bioassessment”. Red Cliffs Lodge has requested the ability to discharge directly into Castle Creek assessment unit (UT14030005-009_00); however, Castle Creek is impaired for TDS and the maximum effluent concentration (8000 mg/l) is significantly higher than the site specific standard (1800 mg/l).

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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.

The modeled plume width at 15 minutes of travel time or 4100 ft is 21.9% of the river and the plume width at 2500 ft downstream is 17.1% of the width of the river. Therefore, the plume is considered to be incompletely mixed. Acute limits were calculated using 50% and 100% of the seasonal critical low flow for acute and chronic conditions, respectively.

Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water were TDS, aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, fluoride, iron, lead, mercury, nickel, selenium, silver, zinc, and nitrate 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 LC₅₀ (lethal concentration, 50%) percent effluent for acute toxicity and the IC₂₅ (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 LC₅₀ is typically 100% effluent and does not need to be determined by the WLA.

Table 2: WET Limits for IC₂₅

Outfall	Percent Effluent
Outfall 001	0.1%

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 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.

Models and supporting documentation are available for review upon request.

Antidegradation Level I Review

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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 because it is a new permit.

Documents:

WLA Document: *Moab_Red_Cliffs_RO_WLA_2020.docx*

Wasteload Analysis and Addendums: *Moab_Red_Cliffs_RO_WLA_2020.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. 2012. *Utah Wasteload Analysis Procedures Version 1.0*.

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

7-Jan-21
4:00 PM

Facilities: Red Cliffs Lodge, Moab UT
Discharging to: Colorado River

UPDES No: UT-0026166

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 in terms 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

Colorado River: 1C,2A,3B,4
Antidegradation Review: Level I review completed. Level II review is required.

III. Numeric Stream Standards for Protection of Aquatic Wildlife

Maximum Total Dissolved Solids 1800.0 mg/l Background

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Acute and Chronic Heavy Metals (Dissolved)

Parameter	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard		
	Concentration	Load*	Concentration		Load*
Aluminum	87.00 ug/l**	0.031 lbs/day	750.00	ug/l	0.270 lbs/day
Arsenic	150.00 ug/l	0.054 lbs/day	340.00	ug/l	0.123 lbs/day
Cadmium	2.57 ug/l	0.001 lbs/day	8.07	ug/l	0.003 lbs/day
Chromium III	288.85 ug/l	0.104 lbs/day	6043.20	ug/l	2.179 lbs/day
ChromiumVI	11.00 ug/l	0.004 lbs/day	16.00	ug/l	0.006 lbs/day
Copper	32.95 ug/l	0.012 lbs/day	56.28	ug/l	0.020 lbs/day
Iron			1000.00	ug/l	0.361 lbs/day
Lead	20.85 ug/l	0.008 lbs/day	535.01	ug/l	0.193 lbs/day
Mercury	0.0120 ug/l	0.000 lbs/day	2.40	ug/l	0.001 lbs/day
Nickel	181.94 ug/l	0.066 lbs/day	1636.48	ug/l	0.590 lbs/day
Selenium	4.60 ug/l	0.002 lbs/day	20.00	ug/l	0.007 lbs/day
Silver	N/A ug/l	N/A lbs/day	47.99	ug/l	0.017 lbs/day
Zinc	418.72 ug/l	0.151 lbs/day	418.72	ug/l	0.151 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 437.87 mg/l as CaCO3

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IV. Numeric Stream Standards for Protection of Agriculture

	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
	Concentration	Load*	Concentration	Load*
Arsenic			100.0 ug/l	lbs/day
Boron			750.0 ug/l	0.14 lbs/day
Cadmium			10.0 ug/l	0.00 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			1800.0 mg/l	0.32 tons/day

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

Metals	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
	Concentration	Load*	Concentration	Load*
Arsenic			50.0 ug/l	10.255 lbs/day
Barium			1000.0 ug/l	205.110 lbs/day
Cadmium			10.0 ug/l	2.051 lbs/day
Chromium			50.0 ug/l	10.255 lbs/day
Lead			50.0 ug/l	10.255 lbs/day
Mercury			2.0 ug/l	0.410 lbs/day
Selenium			10.0 ug/l	2.051 lbs/day
Silver			50.0 ug/l	10.255 lbs/day
Fluoride (3) to			1.4 ug/l	0.287 lbs/day
Nitrates as N			2.4 ug/l	0.492 lbs/day
			10.0 ug/l	2.051 lbs/day

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

Metals	Maximum Conc., ug/l - Acute Standards			
	Class 1C		Class 3A, 3B	
Antimony	14.0 ug/l	2.87 lbs/day		
Arsenic	50.0 ug/l	10.26 lbs/day	4300.00 ug/l	881.97 lbs/day
Asbestos	7.00E+06 ug/l	1.44E+06 lbs/day		
Beryllium				
Cadmium				
Chromium (III)				
Chromium (VI)				
Copper				
Cyanide	1.30E+03 ug/l	266.64 lbs/day	2.2E+05 ug/l	45124.18 lbs/day
Lead	700.0 ug/l	143.58 lbs/day		
Mercury			0.15 ug/l	0.03 lbs/day
Nickel			4600.00 ug/l	943.51 lbs/day
Selenium	0.1 ug/l	0.03 lbs/day		
Silver	610.0 ug/l	125.12 lbs/day		
Thallium			6.30 ug/l	1.29 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

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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	Temp.	pH	T-NH3	BOD5	DO	TRC	TDS
	cfs	Deg. C		mg/l as N	mg/l	mg/l	mg/l	mg/l
Summer (Irrig. Season)	736.0	31.3	7.9	0.06	1.00	5.66	0.00	3591.8
Fall	1265.7	7.3	8.0	0.13	1.00	---	0.00	3423.9
Winter	1567.1	5.2	7.9	0.24	1.00	---	0.00	3423.9
Spring	1350.0	31.4	7.8	0.07	1.00	---	0.00	3423.9
Dissolved Metals	Al	As	Cd	CrIII	CrVI	Copper	Fe	Pb
All Seasons	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
	9.25	1.04	0.75	1.70	2.65*	4.78	0.0	25.63

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Dissolved
Metals
All Seasons

Hg
ug/l
0.0000

Ni
ug/l
16.08

Se
ug/l
4.60

Ag
ug/l
0.46

Zn
ug/l
23.28

Boron
ug/l
10.0

* 1/2 MDL

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Projected Discharge Information

Season	Flow, MGD	Temp.	TDS mg/l	TDS tons/day
Summer	0.03600	NA	7230.00	1.08515
Fall	0.03600	NA		
Winter	0.03600	NA		
Spring	0.03600	NA		

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

IX. Effluent Limitations

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

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

Effluent Limitation for Flow based upon Water Quality Standards

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

Season	Daily Average	
Summer	0.036 MGD	0.056 cfs
Fall	0.036 MGD	0.056 cfs
Winter	0.036 MGD	0.056 cfs
Spring	0.036 MGD	0.056 cfs

Flow Requirement or Loading Requirement

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 0.036 MGD. If the discharger is allowed to have a flow greater than 0.036 MGD during 7Q10 conditions, and effluent limit concentrations as indicated, then water quality standards will be violated. In order to prevent this from occurring, the permit writers must include the discharge flow limitation 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 segments if the values below are met.

WET Requirements	LC50 >	0.1% Effluent	[Acute]
	IC25 >	0.0% Effluent	[Chronic]

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Effluent Limitations for Total Dissolved Solids based upon Water Quality Standards

Season		Concentration		Load	
Summer	Maximum, Acute	3591.8	mg/l	0.54	tons/day
Fall	Maximum, Acute	3591.8	mg/l	0.54	tons/day
Winter	Maximum, Acute	3591.8	mg/l	0.54	tons/day
Spring	4 Day Avg. - Chronic	3591.8	mg/l	0.54	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 437.87 mg/l):

	4 Day Average		Load	1 Hour Average		
	Concentration			Concentration	Load	
Aluminum	N/A		N/A	4,895,456.6	ug/l	1765.1 lbs/day
Arsenic	99,254.57	ug/l	19.3 lbs/day	2,240,110.2	ug/l	807.7 lbs/day
Cadmium	1,213.78	ug/l	0.2 lbs/day	48,373.5	ug/l	17.4 lbs/day
Chromium III	191,331.49	ug/l	37.1 lbs/day	39,926,926.7	ug/l	14395.8 lbs/day
Chromium VI	4,684.80	ug/l	0.9 lbs/day	79,474.5	ug/l	28.7 lbs/day
Copper	18,775.61	ug/l	3.6 lbs/day	340,380.3	ug/l	122.7 lbs/day
Iron	N/A		N/A	6,608,692.0	ug/l	2382.8 lbs/day
Lead	(3,160.27)	ug/l	-0.6 lbs/day	3,366,396.7	ug/l	1213.8 lbs/day
Mercury	7.99	ug/l	0.0 lbs/day	15,861.0	ug/l	5.7 lbs/day
Nickel	110,533.48	ug/l	21.4 lbs/day	10,708,860.7	ug/l	3861.1 lbs/day
Selenium	7.26	ug/l	0.0 lbs/day	101,806.1	ug/l	36.7 lbs/day
Silver	N/A	ug/l	N/A lbs/day	314,107.5	ug/l	113.3 lbs/day
Zinc	263,510.87	ug/l	51.1 lbs/day	2,613,415.4	ug/l	942.3 lbs/day
Cyanide	3,464.81	ug/l	0.7 lbs/day	145,393.0	ug/l	52.4 lbs/day

Effluent Limitations for Heat/Temperature based upon Water Quality Standards

Summer	100.0 Deg. C.	212.0 Deg. F
Fall	100.0 Deg. C.	212.0 Deg. F
Winter	100.0 Deg. C.	212.0 Deg. F
Spring	100.0 Deg. C.	212.0 Deg. F

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**Effluent Targets for Pollution Indicators
Based upon Water Quality Standards**

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

	Concentration	1 Hour Average Loading
Nitrates as N	4.0 mg/l	1.4 lbs/day

Note: Pollution indicator targets are for information purposes only.

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

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

	Concentration	Maximum Concentration Load
Metals		
Antimony	185031.60 ug/l	55.54 lbs/day
Arsenic	647082.97 ug/l	194.24 lbs/day
Asbestos	9.25E+10 ug/l	2.78E+07 lbs/day
Beryllium		
Cadmium		
Chromium (III)		
Chromium (VI)		
Copper	17181505.42 ug/l	5157.54 lbs/day
Cyanide	9251579.84 ug/l	2777.14 lbs/day
Lead	0.00	0.00
Mercury	1850.24 ug/l	0.56 lbs/day
Nickel	8062091.00 ug/l	2420.08 lbs/day
Selenium	0.00	0.00
Silver	0.00	0.00
Thallium	22468.12 ug/l	6.74 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		4895456.6				4895456.6	N/A
Antimony			185031.6	56831133.3		185031.6	
Arsenic	1321654.3	2240110.2	647083.0		0.0	647083.0	99254.6
Asbestos			9.25E+10			9.25E+10	
Barium					13216542.6	13216542.6	
Beryllium						0.0	
Cadmium	122306.6	48373.5			0.0	48373.5	1213.8
Chromium (III)		39926926.7			0.0	39926926.7	191331.5
Chromium (VI)	1299227.5	79474.5			0.0	79474.45	4684.80
Copper	2580151.4	340380.3	17181505.4			340380.3	18775.6
Cyanide		145393.0	2907639378.0			145393.0	3464.8
Iron		6608692.0				6608692.0	

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Lead	982939.9	3366396.7			0.0	982939.9	-3160.3
Mercury		15861.01	1850.2	1982.48	0.0	1850.24	7.992
Nickel		10708860.7	8062091.0	60796096.1		8062091.0	110533.5
Selenium	600088.5	101806.1			0.0	101806.1	7.3
Silver		314107.5			0.0	314107.5	
Thallium			22468.1	83264.2		22468.1	
Zinc		2613415.4				2613415.4	263510.9
Boron	9910979.7					9910979.7	

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	4895456.6	N/A
Antimony	185031.60	
Arsenic	647083.0	99254.6
Asbestos	9.25E+10	
Barium		
Beryllium		
Cadmium	48373.5	1213.8
Chromium (III)	39926926.7	191331
Chromium (VI)	79474.5	4684.8
Copper	340380.3	18775.6
Cyanide	145393.0	3464.8
Iron	6608692.0	
Lead	982939.9	-3160.3
Mercury	1850.237	7.992
Nickel	8062091.0	110533
Selenium	101806.1	7.3
Silver	314107.5	N/A
Thallium	22468.1	
Zinc	2613415.4	263510.9
Boron	9910979.69	

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

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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.

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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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801-538-6052
File Name: Moab_Red_Cliffs_RO_WLA_2020.xlsm

**Utah Division of Water Quality
Salt Lake City, Utah**

APPENDIX - Coefficients and Other Model Information

CBOD Coeff. (Kd)20 1/day 2.000	CBOD Coeff. FORCED (Kd)/day 0.000	CBOD Coeff. (Ka)T 1/day 3.367	REAER. Coeff. (Ka)20 (Ka)/day 371.565	REAER. Coeff. FORCED 1/day 0.000	REAER. Coeff. (Ka)T 1/day 486.249	NBOD Coeff. (Kn)20 1/day 0.400	NBOD Coeff. (Kn)T 1/day 0.958
Open Coeff. (K4)20 1/day 0.000	Open Coeff. (K4)T 1/day 0.000	NH3 LOSS (K5)20 1/day 4.000	NH3 (K5)T 1/day 6.734	NO2+NO3 LOSS (K6)20 1/day 0.000	NO2+NO3 (K6)T 1/day 0.000	TRC Decay K(CI)20 1/day 32.000	TRC K(CI)(T) 1/day 61.969
BENTHIC DEMAND (SOD)20 gm/m2/day 1.000	BENTHIC DEMAND (SOD)T gm/m2/day 2.043						
K1 CBOD {theta} 1.0	K2 Reaer. {theta} 1.0	K3 NH3 {theta} 1.1	K4 Open {theta} 1.0	K5 NH3 Loss {theta} 1.0	K6 NO2+3 {theta} 1.0	K(CI) TRC {theta} 1.1	S Benthic {theta} 1.1

Antidegradation 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 required.

DWQ-2021-002042