

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

Date: June 18, 2015

Facility: Lila Canyon Wastewater Treatment Facility
UPDES No. UT0026018

Receiving water: Lila Canyon Wash (2B, 3C, 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

Outfall 001: Drainage Ditch → Lila Canyon Wash → Grassy Wash → Marsh Flats Wash → Price River → Green River

The maximum daily design discharge is 0.00875 MGD and the maximum monthly design discharge is 0.004375 MGD for the facility.

Receiving Water

The receiving water for Outfall 001 is Lila Canyon Wash, which is a tributary to the Price River.

Per UAC R317-2-13.1b, the beneficial uses for Price River and tributaries, from confluence with Green River to Carbon Canal Diversion at Price City Golf Course are 2B, 3C and 4.

- *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 3C - Protected for nongame fish and other 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 average flow for seven consecutive days with a ten year return frequency (7Q10). Lila Canyon Wash is an

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ephemeral dry wash which only has flow during rain events; therefore, there is no flow during critical conditions.

TMDL

The receiving water and Price River downstream are not listed as impaired for any parameters according to the 2010 303(d) list.

The Price River and tributaries from confluence with Green River to confluence with Soldier Creek has a site specific standard for TDS of 3,000 mg/l.

Mixing Zone

The maximum allowable mixing zone is 15 minutes of travel time for acute conditions, not to exceed 50% of stream width, and 2,500 feet for chronic conditions, per UAC R317-2-5. Water quality standards must be met at the end of the mixing zone. Due to the lack of dilution in Lila Canyon Wash during critical conditions, no mixing zone is allowed.

Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water were total suspended solids (TSS), dissolved oxygen (DO), BOD₅, total ammonia (TAN), E. coli, 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 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 1: WET Limits for IC₂₅

Season	Percent Effluent
Annual	100%

Effluent Limits

Effluent limits were determined using a mass balance mixing analysis (UDWQ 2012). The mass balance analysis is summarized in Appendix A. Some of the dissolved metals standards and resulting total recoverable metals effluent limits are dependent on the hardness of the effluent. As no data was available on the hardness of the source water, the water treatment system, or the proposed wastewater treatment system, the hardness was assumed to be 100 mg/L (as CaCO₃).

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 water quality standards for ammonia are summarized in Appendix B. Based on other installations of the

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proposed treatment system in Utah, the Engineer projected the pH of the effluent will range from 6.8 to 7.5 and the temperature from 10 to 15.5 degrees Celsius.

Since the receiving water is an ephemeral wash and not a perennial stream, the effects of TP, TN, DO and BOD₅ in the effluent on the DO in the downstream receiving waters was not assessed. It is presumed that secondary standards for BOD₅ and water quality criteria for DO are sufficiently protective of the receiving water. If the effluent from the treatment system results in the formation of a perennial stream, these limits will be revisited.

Table 3: Water Quality Based Effluent Limits Summary

Effluent Constituent	Acute			Chronic		
	Standard	Limit	Averaging Period	Standard	Limit	Averaging Period
Flow (MGD)		0.00875	1 day		0.004375	30 days
Dissolved Oxygen, Min. (mg/L)	3.0	3.0	Instantaneous	5.0	5.0	30 days
Ammonia (mg/L) ¹	Varies		1 hour	Varies		30 days
Summer (Jul-Sep)		8.4			4.1	
Fall (Oct-Dec)		8.4			5.1	
Winter (Jan-Mar)		8.4			5.8	
Spring (Apr-Jun)		8.4			5.1	
pH Minimum	6.5	6.5	Instantaneous	6.5	6.5	30 days
pH Maximum	9.0	8.0	Instantaneous	9.0	7.5	30 days

¹: Ammonia limit due to toxicity requirements. For chronic standards, fish early life stages were assumed to be absent.

Models and supporting documentation are available for review upon request.

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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.

As the proposal is for a new discharge, a Level II Antidegradation Review (ADR) is required for this discharge since the allowable pollutant load will increase under this permit.

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Standards and Technical Services Section**

Documents:

WLA Document: *lila_canyon_wla_2015_preliminary.docx*
Wasteload Analysis: *lila_canyon_wla_2015.xlsm*

References:

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

WASTELOAD ANALYSIS [WLA]

Date: 6/18/2015

Appendix A: Mass Balance Mixing Analysis for Conservative Constituents

Discharging Facility:	Lila Canyon Mine Wastewater Treatment Facility		
UPDES No:	UT-0026018		
Permit Flow [MGD]:	0.00875 Annual	Max. Daily	
	0.004375 Annual	Max. Monthly	
Receiving Water:	Lila Canyon Wash		
Stream Classification:	2B, 3C, 4		
Stream Flows [cfs]:	0.0 All Seasons	Critical Low Flow	
Fully Mixed:	YES		
Acute River Width:	100%		
Chronic River Width:	100%		

Modeling Information

A mass balance mixing analysis was used to determine the effluent limits.

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

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 reflect the environmental conditions expected at low stream flows.

Effluent Limitations for Protection of Recreation (Class 2B Waters)

Physical Parameter	Concentration	
	Minimum	Maximum
pH	6.5	9.0
Turbidity Increase (NTU)		10.0

Bacteriological

E. coli (30 Day Geometric Mean)	206 (#/100 mL)
E. coli (Maximum)	668 (#/100 mL)

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Effluent Limitations for Protection of Aquatic Wildlife (Class 3D Waters)

Temperature (deg C)	Maximum
Instantaneous	27.0
Change	4.0

Dissolved Oxygen (mg/L)	Minimum Concentration
Instantaneous	3.0
30-day Average	5.0

Inorganics	Parameter	Acute Standard (1 Hour Average) Standard
	Phenol (mg/L)	0.010
	Hydrogen Sulfide (Undissociated) [mg/L]	0.002

Ammonia-Total (mg/L)	Chronic (30-day ave)			Acute (1-hour ave)			
	Season	Standard	Background	Limit	Standard	Background	Limit
	Summer	4.1		4.1	8.4		8.4
	Fall	5.1		5.1	8.4		8.4
	Winter	5.8		5.8	8.4		8.4
	Spring	5.1		5.1	8.4		8.4

Metals-Total Recoverable	Chronic (4-day ave)			Acute (1-hour ave)			
	Parameter	Standard¹	Background	Limit	Standard¹	Background	Limit
	Aluminum (µg/L)	87.0		87.0	750.0		750.0
	Arsenic (µg/L)	150.0		150.0	340.0		340.0
	Cadmium (µg/L)	0.2		0.2	2.0		2.0
	Chromium VI (µg/L)	11.0		11.0	16.0		16.0
	Chromium III (µg/L)	74.1		74.1	569.8		569.8
	Copper (µg/L)	9.0		9.0	13.4		13.4
	Cyanide (µg/L) ²	5.2		5.2	22.0		22.0
	Iron (µg/L)				1000.0		1000.0
	Lead (µg/L)	2.5		2.5	64.6		64.6
	Mercury (µg/L) ²	0.012		0.012	2.4		2.4
	Nickel (µg/L)	52.0		52.0	468.2		468.2
	Selenium (µg/L)	4.6		4.6	18.4		18.4
	Silver (µg/L)				3.2		3.2
	Tributyltin (µg/L) ²	0.072		0.072	0.46		0.46
	Zinc (µg/L)	118.1		118.1	117.2		117.2

1: Based upon a Hardness of 100 mg/l as CaCO₃

2: Background concentration assumed 67% of chronic standard

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Organics [Pesticides]

Parameter	Chronic (4-day ave)		Acute (1-hour ave)	
	Standard	Limit	Standard	Limit
Aldrin (µg/L)			1.5	1.5
Chlordane (µg/L)	0.0043	0.0043	1.2	1.2
DDT, DDE (µg/L)	0.001	0.001	0.55	0.55
Diazinon (µg/L)	0.17	0.17	0.17	0.17
Dieldrin (µg/L)	0.0056	0.0056	0.24	0.24
Endosulfan, a & b (µg/L)	0.056	0.056	0.11	0.11
Endrin (µg/L)	0.036	0.036	0.086	0.086
Heptachlor & H. epoxide (µg/L)	0.0038	0.0038	0.26	0.26
Lindane (µg/L)	0.08	0.08	1.0	1.0
Methoxychlor (µg/L)			0.03	0.03
Mirex (µg/L)			0.001	0.001
Nonylphenol (µg/L)	6.6	6.6	28.0	28.0
Parathion (µg/L)	0.0130	0.0130	0.066	0.066
PCB's (µg/L)	0.014	0.014		
Pentachlorophenol (µg/L)	15.0	15.0	19.0	19.0
Toxephene (µg/L)	0.0002	0.0002	0.73	0.73

Radiological

Parameter	Maximum Concentration	
	Standard	Limit
Gross Alpha (pCi/L)	15	

Effluent Limitation for Protection of Agriculture (Class 4 Waters)

Parameter	Maximum Concentration			Site specific standard
	Standard	Background	Limit	
Total Dissolved Solids (mg/L)	3000		3000	
Boron (mg/L)	0.75		0.8	
Arsenic, Dissolved (µg/L)	100		100	
Cadmium, Dissolved (µg/L)	10		10.0	
Chromium, Dissolved (µg/L)	100		100	
Copper, Dissolved (µg/L)	200		200	
Lead, Dissolved (µg/L)	100		100	
Selenium, Dissolved (µg/L)	50		50	
Gross Alpha (pCi/L)	15		15.0	

**Freshwater total ammonia criteria based on Title R317-2-14 Utah Administrative Code
Acute**

INPUT				
	Summer	Fall	Winter	Spring
pH:	8.00	8.00	8.00	8.00
Beneficial use classification:	3C	3C	3C	3C
OUTPUT				
Acute:	Total ammonia nitrogen criteria (mg NL):	8.408	8.408	8.408
		8.408	8.408	8.408

**Freshwater total ammonia criteria based on Title R317-2-14 Utah Administrative Code
Chronic**

INPUT				
	Summer	Fall	Winter	Spring
Temperature (deg C):	15.5	12.0	10.0	12.0
pH:	7.50	7.50	7.50	7.50
Are fish early life stages present?	No	No	No	No
OUTPUT				
Total ammonia nitrogen criteria (mg N/L):				
Chronic - Fish Early Life Stages Present:	4.096	4.364	4.364	4.364
Chronic - Fish Early Life Stages Absent:	4.096	5.133	5.840	5.133

