

**Utah Division of Water Quality
ADDENDUM
Statement of Basis
Wasteload Analysis**

Date: September 17, 2018

**Facility: Intermountain Concrete
Jensen, UT
UPDES No. UT0024015**

Receiving water: Green 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.

Discharge

Intermountain Concrete has two permitted outfalls:

Outfall 001: Discharge from the main pond near gravel washer to pasture land which drains to the Green River. Latitude 40°22'31" and longitude 109°20'22". Maximum discharge of 34 gpm, as provided by the permittee.

Outfall 002: Discharge of overflow from the main water supply pond to pasture land which drains to the Green River. Latitude 40°22'31" and longitude 109°20'22". Maximum discharge of 603 gpm, as provided by the permittee.

Receiving Water

The receiving water for the discharge is the Green River. Per UAC R317-2-13.1.b, the Green River from confluence with Colorado River to state line has designated uses of 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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The critical flow for the wasteload analysis was considered the lowest stream flow for seven consecutive days with a ten year return frequency (7Q10). Daily mean discharge records from USGS stream gage #09261000 GREEN RIVER NEAR JENSEN, UT, were obtained. The 7Q10 was calculated for water years 1965 – 2017 using the EPA computer software DFLOW V4.1.

7Q10 Flow (Annual) = 936 cfs

Mixing Zone

Per UAC R317-2-5, 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. Water quality criteria must be met at the end of the mixing zone.

The EPA Region 8 stream mixing zone analysis (STREAMIX1, 1994), was used to determine the plume width and mixed flow rate. A rectangular channel with a width of 700 feet, channel slope of 0.10 foot/foot, and roughness coefficient of 0.030 was assumed for channel geometry. Mannings equation was used to solve for the flow depth and velocity for the 7Q10 flow. The results of the mixing analysis are summarized in Table 1.

Table 1: Mixing zone dimensions

Outfall	Condition	Distance (ft)	Plume Width (ft)	Dilution Flow (cfs)	Dilution Ratio
001	Chronic	2,500	59.9	80.1	1,057:1
001	Acute	2,690	62.3	83.2	1,099:1
002	Acute	2,690	62.3	83.2	61:1

Parameters of Concern

The parameters of concern for the discharge are total dissolved solids (TDS), total suspended solids (TSS), and pH, as provided by the UPDES Permit Writer.

TMDL

The receiving water segment (Green River-2, Green River from Duchesne River confluence to Utah-Wyoming border) does not have an approved TMDL for any parameters. However, the receiving water was on the 303(d) list of impaired waters for selenium in Utah's 2016 Integrated Report.

Effluent Limits

Due to the high dilution ratio of receiving water to effluent discharge for Outfall 001 (1,057:1 for chronic conditions and 1,099:1 for acute conditions), WQBELs are not required for pollutants for which the ambient conditions in the receiving water are below water quality criteria. WQBELs for Outfall 002 were calculated using a mass balance mixing analysis and are attached in Appendix A.

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Due to the impairment of the Green River for selenium, and the lack of an approved TMDL, the effluent limits are the water quality criteria for that pollutant (Table 2). Remaining permit limits should be set according to rules found in R-317-1 and categorical UPDES discharge requirements for a design flow of 30 gallons per minute.

Table 2: Water Quality Based Effluent Limits Summary

Effluent Constituent	Acute			Chronic		
	Standard	Limit	Averaging Period	Standard	Limit	Averaging Period
Flow (gpm) Outfall 001		34	Maximum			
Flow (gpm) Outfall 002		603	Maximum			
Selenium (µg/L)	18.4	18.4	1 hour	4.6	4.6	4 days

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 permit renewal since the pollutant concentration and load are not increasing beyond the current permit and design capacity of the facility.

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Documents:

Wasteload Document: *IntermountainConcreteWLA2018-09-13.docx*

Wasteload Model: *IntermountainConcreteWLA2018.xlsx*

References

Utah Division of Water Quality. 2012. *Utah Wasteload Analysis Procedures Version 1.0*. State of Utah, Department of Environmental Quality, Division of Water Quality.

Utah Division of Water Quality. 2016. *Utah's 2016 Integrated Report*. State of Utah, Department of Environmental Quality, Division of Water Quality.

WASTELOAD ANALYSIS [WLA]

Date: 9/13/2018

Appendix A: Mass Balance Mixing Analysis for Conservative Constituents

Discharging Facility: Intermountain Concrete
 UPDES No: UT-0024015
 Outfall: 002
 Permit Flow [gpm]: 603.00 Max. Daily 1.343 cfs

Receiving Water: Green River
 Stream Classification: 1C, 2A, 3B, 4
 Stream Flow [cfs]: 936.0 All Seasons Critical Low Flow

Fully Mixed: NO
 Acute River Width: 8.5% Plume Model Used
 Chronic River Width: N/A

Acute Stream Flow [cfs]: 79.56
 Acute Combined Flow [cfs]: 80.90

Modeling Information

A simple 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 Drinking Water (Class 1C Waters)

Metals, Dissolved (mg/L)	Standard	Background	Limit
Arsenic	0.01	0.007	0.21
Barium	1.0	0.7	20.5
Beryllium	0.004	0.003	0.082
Cadmium	0.01	0.007	0.21
Chromium	0.05	0.03	1.03
Lead	0.015	0.010	0.308
Mercury	0.002	0.001	0.041
Selenium	0.05		0.05
Silver	0.05	0.03	1.03

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

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

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Effluent Limitations for Protection of Aquatic Wildlife (Assumed Class 3B 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

pH	Concentration
Minimum	6.5
Maximum	9.0

Inorganics	Chronic Standard (4 Day Average)	Acute Standard (1 Hour Average)
	Parameter	Standard
Phenol (mg/L)		0.010
Hydrogen Sulfide (Undissociated) [mg/L]		0.002

Metals-Total Recoverable

Parameter	Chronic (4-day ave)			Acute (1-hour ave)		
	Standard ¹	Background ²	Limit	Standard ¹	Background ²	Limit
Aluminum (µg/L)	87.0	58.3	N/A	750.0	58.3	809.0
Arsenic (µg/L)	150.0	100.5	N/A	340.0	100.5	360.4
Cadmium (µg/L)	0.4	0.27	N/A	3.9	0.27	4.3
Chromium VI (µg/L)	11.0	7.4	N/A	16.0	7.4	16.7
Chromium III (µg/L)	130.8	87.6	N/A	1005.2	87.6	1083.4
Copper (µg/L)	16.2	10.8	N/A	25.8	10.8	27.1
Cyanide (µg/L) ²	5.2	3.5	N/A	22.0	3.5	23.6
Iron (µg/L)				1000.0	23.0	1083.3
Lead (µg/L)	5.3	3.6	N/A	136.1	3.6	147.4
Mercury (µg/L) ²	0.012	0.008	N/A	2.4	0.008	2.6
Nickel (µg/L)	93.5	62.6	N/A	841.7	62.6	908.1
Selenium (µg/L)	4.6	3.1	N/A	18.4		18.4
Silver (µg/L)				10.6	1.1	11.4
Tributyltin (µg/L) ²	0.072	0.048	N/A	0.46	0.048	0.50
Zinc (µg/L)	212.5	142.4	N/A	210.8	142.4	216.7

1: Based upon a Hardness of 200 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	
Gross Alpha (pCi/L)	15	

Effluent Limitation for Protection of Agriculture (Class 4 Waters)

Parameter	Maximum Concentration		
	Standard	Background	Limit
Total Dissolved Solids (mg/L)	1200		1200
Boron (mg/L)	0.75	0.5	15.4
Arsenic, Dissolved (µg/L)	100	67.0	2054
Cadmium, Dissolved (µg/L)	10	6.7	205
Chromium, Dissolved (µg/L)	100	67.0	2054
Copper, Dissolved (µg/L)	200	134.0	4108
Lead, Dissolved (µg/L)	100	67.0	2054
Selenium, Dissolved (µg/L)	50	33.5	1027
Gross Alpha (pCi/L)	15	10.1	308