

Utah Division of Water Quality
ADDENDUM
Statement of Basis
Wasteload Analysis

Date: June 28, 2012

Facility: Westwater Produced Water Treatment Facility
Westwater, UT
UPDES No. UT-0025917

Receiving water: Coal Draw (1C, 2A, 3B, 4)
Bitter Creek (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: Coal Draw
Outfall 002: Bitter Creek
Outfall 003: Coal Draw

The design flow for the discharge is 0.65 MGD (1.0 cfs), as estimated by the permittee. The discharge to each outfall was not specified; therefore, the design discharge was assumed for each outfall for this wasteload analysis.

Receiving Water

The receiving water for outfall 001 and 003 is Coal Draw, which is tributary to Westwater Creek and the Colorado River. The designated uses for Coal Draw are 1C, 2A, 3B, and 4.

The receiving water for outfall 002 is Bitter Creek, which is tributary to the Colorado River. The designated uses for Bitter Creek are 2B, 3C, and 4.

The receiving waters do not have an approved TMDL for any parameters. The Colorado River downstream of the confluence with Bitter Creek and Coal Draw is listed as impaired for selenium (2010 Utah Integrated Report).

Both Coal Draw and Bitter Creek are ephemeral washes which only have flow in response to precipitation events and snowmelt runoff in high snowfall years. The critical flow for the

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wasteload analysis was considered the lowest stream flow for seven consecutive days with a ten year return frequency (7Q10). The 7Q10 flow for dry washes is considered to be zero.

Mixing Zone

The 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.

Dilution Factor

Since no flow is in the receiving water during critical conditions, no dilution factor was applied.

Effluent Limits

Effluent limits for this discharge are water quality standards for the receiving water. The applicable water quality standards are attached as an appendix to this wasteload.

In order to determine the water quality standards for dissolved metals, the hardness of the water must be known. The discharge is anticipated to have very low hardness (10 mg/L per information provided by the permittee); however, the effluent is anticipated to pick-up calcium and magnesium as it flows down the wash. Therefore, a hardness of 100 mg/l was assumed at the end of the mixing zone. The permittee is to conduct sampling during the permit period to verify the water quality at the end of the mixing zone.

For parameters without a WQBEL, permit limits should be set according to rules found in R317-1-3 and categorical UPDES discharge requirements.

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 concentration remains below the WQBELs presented in this wasteload.

A Level II Antidegradation Review (ADR) is required for this discharge, as pollutant concentration and load are being increased for the new outfalls.

WLA Document: *westwater_farms_wla_2012.doc*
Analysis: *westwater_farms_wla_2011.xls*

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Water Quality Management Section

Wasteload Analysis

Facility: WestWater Farms Produced Water Treatment Facility **UPDES No:** UT- 0025917
Discharging to: Coal Draw

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 receiving water quality. The wasteload analysis does not take into account downstream designated uses [R317-2-8, UAC] nor anti-degradation policy and procedures [R317-2-3, UAC]. Projected concentrations are compared to numeric water quality standards for acceptability. 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). The numeric criteria in this wasteload analysis may be modified by narrative criteria and other conditions as determined by staff of the Division of Water Quality.

II. Receiving Water and Mixing Zone

Discharge: Coal Draw
Drains To: Westwater Creek Beneficial Use: 1C, 2A, 3B, 4
Mixing Zone Allowed: Due to discharge to dry wash, no dilution is allowed.

III. Effluent Limitation fo Flow

All Seasons		
Not to Exceed:	0.65 MGD	Daily Average
	1.00 cfs	Daily Average

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Appendix

A-I. Numeric Water Quality Standards for Protection of Human Health (Class 1C Waters)

Parameter	Maximum Concentration
Physical	
pH Minimum	6.5
pH Maximum	9.0
Bacteriological	
E. coli (30 Day Geometric Mean)	206 (#/100 mL)
E. coli (Maximum)	668 (#/100 mL)
Dissolved Metals	
Antimony	5.6 ug/L
Arsenic	0.01 mg/L
Barium	1.0 mg/L
Beryllium	<0.004 mg/L
Cadmium	0.01 mg/L
Chromium	0.05 mg/L
Lead	0.015 mg/L
Mercury	0.002 mg/L
Selenium	0.05 mg/L
Silver	0.05 mg/L
Inorganics	
Bromate	0.01 mg/L
Chlorite	<1.0 mg/L
Fluoride	1.4 mg/L
Nitrates	10 mg/L
Organics	
2,4-D	70 ug/L
2,4,5-TP	10 ug/L
Methoxychlor	40 ug/L
Radiological	
Gross Alpha	15 pCi/L
Gross Beta	4 mrem/yr
Radium 226 & 228 (combined)	5 pCi/L
Strontium 90	8 pCi/L
Tritium	20000 pCi/L
Uranium	30 pCi/L

A-II. Numeric Water Quality Standards for Protection of Recreation (Class 2A Waters)

Parameter	Maximum Concentration
Physical	
pH Minimum	6.5
pH Maximum	9.0
Bacteriological	
E. coli (30 Day Geometric Mean)	126 (#/100 mL)
E. coli (Maximum)	409 (#/100 mL)

A-III. Numeric Water Quality Standards for Protection of Aquatic Wildlife (Class 3B Waters)

Physical			
Temperature	27 deg C		
pH Minimum	6.5		
pH Maximum	9.0		
Dissolved Oxygen (DO)		5.5 mg/l (30 Day Average)	
Early Life Stages Present	No	6.0 mg/l (7 Day Average)	
		5.0 mg/l (1 Day Average)	
Inorganics			
Total Ammonia (TNH3)	Function of Temperature and pH	pH	Temp
		3.9 mg/l as N (30 Day Average)	7.00
		1.3 mg/l as N (1 Hour Average)	9.00
			21.1
			26.7

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Total Residual Chlorine (TRC)

0.011 mg/l (4 Day Average)
0.019 mg/l (1 Hour Average)

Dissolved Metals

Parameter	Chronic Standard (4 Day Average)	Acute Standard (1 Hour Average)
	Concentration	Concentration
Aluminum	87.0 ug/L	750.0 ug/L
Arsenic	150.0 ug/L	340.0 ug/L
Cadmium	0.2 ug/L	2.0 ug/L
Chromium VI	11.0 ug/L	16.0 ug/L
Chromium III	74.1 ug/L	569.8 ug/L
Copper	9.0 ug/L	13.4 ug/L
Cyanide	5.2 ug/L	22.0 ug/L
Iron		1000.0 ug/L
Lead	2.5 ug/L	64.6 ug/L
Mercury	0.012 ug/L	2.4 ug/L
Nickel	52.0 ug/L	468.2 ug/L
Selenium	4.6 ug/L	18.4 ug/L
Silver		3.2 ug/L
Zinc	118.1 ug/L	117.2 ug/L

Based upon a Hardness of 100 mg/l as CaCO3

Organics (Pesticides)

Parameter	Chronic Standard (4 Day Average)	Acute Standard (1 Hour Average)
	Concentration	Concentration
Aldrin		1.500 ug/L
Chlordane	0.0043 ug/L	1.200 ug/L
DDT, DDE	0.001 ug/L	0.550 ug/L
Diazinon	0.17 ug/L	0.17 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
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
Nonylphenol	6.6 ug/L	28.0 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

A-IV. Numeric Water Quality Standards for Protection of Agriculture (Class 4 Waters)

Parameter	Maximum Concentration
Total Dissolved Solids	0 mg/L
Arsenic	0.1 mg/L
Boron	0.75 mg/L
Cadmium	0.01 mg/L
Chromium	0.1 mg/L
Copper	0.2 mg/L
Lead	0.1 mg/L
Selenium	0.05 mg/L
Gross Alpha	15 pCi/L