

WASTELOAD ANALYSIS [WLA]

Date:

Appendix A: Mass Balance Mixing Analysis for Conservative Constituents

Discharging Facility:	Kane Springs Water Company		
UPDES No:	UT-0026204		
Permit Flow [MGD]:	0.27 Annual	Max. Daily	
	0.27 Annual	Max. Monthly	
Receiving Water:	Matheson Wetlands Preserve		
Stream Classification:	1C, 2A, 3B, 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.

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 0.27 MGD. If the discharger is allowed to have a flow greater than 0.27 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 Limitations for Protection of Drinking Water (Class 1C Waters) (R317-2-14.1)

Physical Parameter	Concentration	
	Minimum	Maximum
pH	6.5	9.0

Bacteriological

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

Metals-Dissolved Maximum

Parameter	Standard'	Maximum Background	Limit
Arsenic (µg/L)	10.0		10.0
Barium (µg/L)	1000.0		1000.0
Beryllium (µg/L)	4.0		4.0
Cadmium (µg/L)	10.0		10.0
Chromium (µg/L)	50.0		50.0
Lead (µg/L)	15.0		15.0
Mercury (µg/L) ^c	2.000		2.000
Selenium (µg/L)	50.0		50.0
Silver (µg/L)	50.0		50.0

Inorganics-Maximum

Maximum

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Parameter	Standard'	Background	Limit
Bromate (mg/L)	0.01		0.01
Chlorite (mg/L)	1.0		1.0
Fluoride (mg/L)	4.0		4.0
Nitrates as N (mg/L)	10.0		10.0

Radiological

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

Effluent Limitations for Protection of Recreation (Class 2A Waters) (R317-2-14.1)

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

Bacteriological

E. coli (30 Day Geometric Mean)	126 (#/100 mL)
E. coli (Maximum)	409 (#/100 mL)

Effluent Limitations for Protection of Aquatic Wildlife (Class 3B Waters) (R317-2-14.1)

Physical Parameter	Concentration Minimum	Maximum
pH	6.5	9.0
Turbidity Increase (NTU)		10.0
Temperature (deg C)		27
Temperature Change (deg C)		4

Dissolved Oxygen (mg/L)	Minimum Concentration ELS Present	Others Present
Instantaneous	5.0	3.0
30-day Average	5.5	5.5
7-day Average	6.0	4

Inorganics

Parameter	Chronic (30-day ave)	Acute (1-hour ave) Standard
Phenol (mg/L)		0.010
Hydrogen Sulfide (Undissociated-mg/L)		0.002
Total Residual Chlorine (mg/L)	0.011	0.019

Ammonia-Total (mg/L)

Season	Chronic (30-day ave) ELS Present			Acute (1-hour ave)	
	Standard	Background	Limit	Standard	Background
Summer	2.2		2.2	13.3	
Fall	2.2		2.2	13.3	
Winter	2.2		2.2	13.3	
Spring	2.2		2.2	13.3	
Season	ELS Absent				
	Standard	Background	Limit	Standard	Background
Summer	2.2		2.2	13.3	
Fall	2.2		2.2	13.3	
Winter	2.2		2.2	13.3	
Spring	2.2		2.2	13.3	

Metals-Total Recoverable

Parameter	Chronic (4-day ave) Standard'	Background	Limit	Acute (1-hour ave) Standard'	Background
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Aluminum (µg/L)	87.0	87.0	750.0
Arsenic (µg/L)	150.0	150.0	340.0
Cadmium (µg/L)	2.4	2.4	7.4
Chromium VI (µg/L)	11.0	11.0	16.0
Chromium III (µg/L)	268.2	268.2	5,612
Copper (µg/L)	30.5	30.5	51.7
Cyanide (µg/L) ^c	5.2	5.2	22.0
Iron (µg/L)			1,000
Lead (µg/L)	18.6	18.6	476.8
Mercury (µg/L) ^c	0.012	0.012	2.4
Nickel (µg/L)	168.5	168.5	1,516
Selenium (µg/L)	4.6	4.6	18.4
Silver (µg/L)			41.1
Tributyltin (µg/L) ^c	0.072	0.072	0.46
Zinc (µg/L)	387.8	387.8	387.8

1: Based upon a Hardness of 400 mg/l as CaCO₃

2: Background concentration assumed 67% of chronic standard

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

6/29/2023

e)

Limit
13.3
13.3
13.3
13.3

Limit
13.3
13.3
13.3
13.3

e)

Limit

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750.0
340.0
7.4
16.0
5,612
51.7
22.0
1,000
476.8
2.4
1,516
18.4
41.1
0.46
387.8

