



MEMORANDUM

To: Paul Fendt

July 1, 1998

From: Ken Ludwa ^{KLW}

55-2912-01

Re: Results of Reasonable Potential Analysis

This memo is to describe the results of the Reasonable Potential Analysis (RPA) that was performed yesterday for the STIA Third Runway area. The analysis was done in a working meeting attended by Lisa Zinner (Ecology), Lori Terry (Preston, Gates, and Ellis), Tom Hubbard (POS), John Rogers (CH2M Hill), Bill Taylor (Taylor and Assoc.), Jim Good, and myself.

Lisa Zinner stated at the beginning of the meeting that the analysis was intended to be informal. Some of the data used was based on best available information and professional judgment reached by consensus.

The attached spreadsheet documents the process, which was performed in steps:

1. Data from outfall 005 (SDS-3) was used to represent the predicted runoff from the Third Runway (with two 1996 deicing sampling events removed from the data set). The geometric 95th percentile of the SDS-3 data was calculated as per the RPA methods. This was done by calculating the natural log of each parameter's reported value, taking the 95th percentile of the transformed values, then taking the antilog of that value.
2. The criteria for Miller Creek and Des Moines Creek were determined, based on background condition and hardness information. The fecal coliform criterion is the limit set for all class AA waters. The turbidity criterion is based on observations made in Miller Creek during winter 1997-98 storms, for NEPL treatment plant and Lake Reba discharge monitoring (to be verified upon review of the data). The metals criteria were based on a hardness of 23 ppm in Miller Creek, and 35.6 ppm in Des Moines Creek, as discussed in the STIA 1998 NPDES Permit Fact Sheet/Response to Comments (for comparison, metals criteria were also calculated for hardness values of 20 and 70 ppm).
3. Expected pollutant removal efficiencies for various BMPs were agreed upon. The high and low ends of the treatment range, and a recommended value, or best guess, were determined based on the results of a literature review that I had performed for

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this analysis (summary attached). The literature review was not comprehensive, and consisted of a number of other compilations and project-specific studies. The values chosen for the RPA were weighted heavily on studies done after 1990.

4. The resulting predicted effluent pollutant concentrations (high, low, and best guess) were calculated based on the treatment efficiencies.

Using the assumptions described above, pollutant concentrations are predicted to be at approximately the criteria values or less, except for copper. Copper concentrations after treatment remained higher than the criteria.

Dilution in the receiving waters was also discussed. Based on our cursory examination of available data, pollutant concentrations in the receiving waters (during storms) exceed criteria, and are higher than the concentrations of pollutants predicted for Third Runway stormwater runoff.

The results of the literature review and this analysis suggest the bioswales, sand filters, and wet ponds/vaults would provide roughly similar treatment results. Infiltration was not discussed among these BMPs because infiltrated water would not be subject to surface water criteria.

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Parameter	Units	Criteria		GeoTransformed 95% of SDS3 1994-98 data
		DesMoines	Miller	
Fecals	CFU/100mL	50	50	122
Turbidity	NTU	30*	30*	15.9
Copper	ppb	6.7	4.4	86.3
Lead	ppb	21.9	12.6	11.3
Zinc	ppb	48.8	33.7	107

* provisional, to be verified with turbidity data taken in Miller Creek as part of NEPL monitoring

metals criteria based on 10%ile values of hardness in Miller Creek (23ug/L) and DesMoines Creek (35.6 ug/L)

Copper at 20 ppm hardness: 3.7
Copper at 70 ppm hardness: 12.2

Zinc at 20 ppm hardness: 30.0
Zinc at 70 ppm hardness: 86.5

Parameter	Units	Removal Efficiency (%)											
		Detention			Bioswale			Sand Filter			WetPond/Vault		
		lo	hi	rec val	lo	hi	rec val	lo	hi	rec val	lo	hi	rec val
Fecals	CFU/100mL	74	100	80	20	40	30	22	69	50	0	90	45
Turbidity	NTU	11	54	25	42	46	45	19	70	30	10	47	40
Copper	ppb	2	79	40	62	67	65	65	85	75	10	95	70
Lead	ppb	6	80	30			63	33	80	55	20	95	60
Zinc	ppb												

Parameter	Units	RESULTS (predicted values)											
		Detention			Bioswale			Sand Filter			WetPond/Vault		
		hi	lo	rec val	hi	lo	rec val	hi	lo	rec val	hi	lo	rec val
Fecals	CFU/100mL	31.72	0	24.4	97.6	73.2	85.4	95.16	37.82	61	122	12.2	67.1
Turbidity	NTU	76.81	39.7	64.73	50.05	46.6	47.47	69.9	25.89	60.41	77.67	45.74	51.78
Copper	ppb	11.07	2.373	6.78	4.294	3.729	3.955	3.955	1.695	2.825	10.17	0.565	3.39
Lead	ppb	100.6	21.4	74.9			39.59	71.69	21.4	48.15	85.6	5.35	42.8
Zinc	ppb												

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