

STATE OF
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Governor

DEPARTMENT OF ECOLOGY

Olympia, Washington 98504 206-753 2500

M E M O R A N D U M

To: John Hodgson

From: Bill Yake

Re: Hyak STP
Class II Inspection

Date: March 21, 1978

Findings and Conclusions:

On February 25-26, 1978 sampling was conducted at the Hyak STP and Coal Creek which receives the plant effluent. The plant consists of headworks which measure plant influent flow, two aerated lagoons operated in series, chlorinations followed a final clarifier and an effluent V-notch weir which measures effluent flow. Jerry Moses is supervisor of the responsible sewer district, George Popovich is the plant operator and Jim Hunt is his assistant.

The plant effluent was within NPDES permit limitations presently in effect.

Effluent ammonia levels were high (40 mg/l).

The plant effluent enters Coal Creek about 30 feet downstream from another major effluent. This second effluent contains storm drainage from unpaved parking lots at the Hyak Ski Resort. This drainage flow was turbid, carried a large load of suspended solids and represented about 17% of downstream Coal Creek flow. The most noticeable effect of these two effluents on Coal Creek were increases in turbidity and total suspended solids.

Several rather serious errors in plant analytical procedures are noted in the review of laboratory procedures and techniques. The most serious of these is probably the failure to dechlorinate and reseed the BOD dilutions. Because of plant configuration, collection of chlorinated BOD samples is essentially unavoidable. Dechlorination and reseedling should be instituted as soon as possible to provide valid effluent BOD data.

WY:ee

cc: Central Files
Dick Cunningham

24 hour Composite Sampler Installations

Sampler	Date and Time Installed	Location
1. Influent aliquot - 250 ml/30 min.	2/25/78 - 1053	Immediately upstream of Parshall flume
2. South cell aliquot - 250 ml/30 min.	2/25/78 - 1058	On dock in South (#2) Cell
3. Chlorinated effluent aliquot - 250 ml/30 min.	2/25/78 - 1042	Behind effluent weir on final clarifier

Grab Samples

	Date and Time	Analysis	Sample Location
1.	2/25/78 - 1505	BOD, COD, pH, Cond., Solids, T.C., F.C., Nutrients	Coal Cr., upstream of effluents
2.	2/25/78 - 1515	BOD, COD, pH, Cond., Solids, T.C., F.C., Nutrients	Coal Cr., downstream of effluents
3.	2/25/78 - 1527	BOD, COD, pH, Cond., Solids, T.C., F.C., Nutrients	Storm drainage including parking lot runoff
4.	2/26/78 - 0945	BOD, COD, pH, Cond., Solids, Nutrients	South (#2) Cell, from dock
5.	2/25/78 - 1535	T.C., F.C., Chlor. Res.	STP effluent at Coal Creek

Flow Measuring Device

- Type - Influent Parshall flume, precast.
- Dimensions - 3 inch throat, see attachment.

a. Meets standard criteria Yes
 No Explain:

b. Accuracy check

	Actual Instan. Flow	Recorder Reading	Recorder Accuracy (% of inst. flow)
1.	.233 mgd	.18 to .24 mgd	90% (77% to 103%)
2.	.247 mgd	.18 to .24 mgd	85% (73% to 97%)
3.			

is within accepted 15% error limitations
 is in need of calibration

Field Data

Parameter	Date and Time	Sample Location	Result
Temp., pH, Cond.	2/25/78 1505	Coal Cr., upstream of eff.	See data summary
" " "	2/25/78 1515	Coal Cr., downstream of eff.	" " "
" " "	2/25/78 1527	Storm drainage including parking lot runoff	" " "
" " "	2/25/78 1210	Influent, same as composite	" " "
" " "	2/25/78 1158	South Cell, " " "	" " "
" " "	2/25/78 1140	Chlor. eff. " " "	" " "

Review of Laboratory Procedures and Techniques

The following errors in analytical techniques and suggested improvements are as follows:

BOD - BOD samples are taken from the final clarifier, and are analyzed without dechlorinating or reseeded the samples.

- 1) It is suggested that BOD samples be dechlorinated and reseeded in accordance with the procedures published in "Laboratory Test Procedure for Biochemical Oxygen Demand of Water and Wastewater" (DOE 77-24). Blank D.O. depletions of greater than 0.2 mg/l are occasionally noted. This is usually an indication of dilution water contamination.
- 2) It is suggested that the purity of the distilled water and chemicals used in preparing dilution water be investigated. In addition, plant personnel should continue to prepare dilution water daily as needed.

Chlorine Residual - Chlorine residual is presently obtained using orthotolodine and a color comparitor. The orthotolodine procedure is no longer accepted by Standard Methods or the Department of Ecology.

- 1) It is suggested that a DPD kit be purchased and used by plant personnel for total residual chlorine analysis.

Fecal Coliform - Coliform samples are not dechlorinated when taken.

- 1) It is suggested that coliform samples be dechlorinated with sodium thiosulfate (or other suitable reducing agent) immediately upon sampling and that the subsequent analyses be conducted in accordance with procedures published in "The Membrane Filter Procedure for the Fecal Coliform Test" (DOE 77-5).

	DOE					NPDES (Monthly Average)
	South Cell Grab Sample	Final Eff. Grab at Coal Creek	Storm Drainage Grab Sample	Upstream Coal Creek Grab Sample	Downstream Coal Creek Grab Sample	
Flow (cfs)		.37	4.05	18.8	23.2**	
BOD ₅ mg/l	24		< 4	< 4	< 4	
COD mg/l	104		16	24	16	
pH	7.8 7.7*		7.3 7.35*	7.3 7.3*	7.2 7.6*	
Sp. Cond. (Mmhos/cm)	552		76 54*	175 165*	160 180*	
TSS (mg/l)	29		23	3	10	
TSNVS (mg/l)	9		19	2	8	
TS (mg/l)	214		83	98	107	
TNVS (mg/l)	136		61	73	81	
NH ₃ -N	36		.05	.11	.06	
NO ₂ -N	< 0.02		< 0.02	< 0.02	< 0.02	
NO ₃ -N	< 0.02		0.02	0.03	0.04	
D-PO ₄ -P	4.4		.04	.12	.06	
Turb. (NTU's)	22		44	1	12	
Tot. Coli. (#/100 ml)		10 est.	100 est.	8 est.	2	
Fec. Coli. (#/100 ml)		< 5	10 est.	< 1	< 1	
Res. Chlor. (mg/l)		3.0*				
Temp. °C	2.5*	2.9* 2.5*	2.0* 2.8*	1.5* 2.4*	1.7* 2.5*	
T-PO ₄ -P	5.4		.06		.06	

* Field Analysis - grab
 ** Based on mass balance

"<" is "less than" and ">" is "greater than"

The following table is a comparison of laboratory results from 24 hour composite(s) together with NPDES permit effluent limitations. Additional results pertinent to this inspection have also been included.

	DOE			HYAK STP			NPDES (Monthly average)
	Influent Composite	South Cell Composite	Final Eff. Composite	Influent Composite	South Cell Composite	Final Eff. Composite	
BOD ₅ mg/l	165	28	22	198	28.5	15	38
lbs/day	235	39.9	31.4	282	40.6	21.4	40
TSS mg/l	160	30	25	208	32	20	70
lbs/day	228	42.8	35.7	297	45.6	28.5	50
Total Plant Flow MGD				.171**		.140	.19
Temp. °C	4.7°C* 5.1°C*	2.7°C* 2.5°C*	2.6°C* 2.6°C*				
pH	8.5 8.1*	7.8 7.8*	7.8 7.5*				6.5 - 8.5
Spec. Cond. (Mmhos/cm)	705 490* 650*	564 770* 600*	485 630* 610*				
COD mg/l	420	104	104				
T.S. mg/l	397	214	203				
TNVS mg/l	170	136	127				
TNVSS mg/l	22	9	7				
NH ₃ -N mg/l	37.0	36.0	40.0				
NO ₂ -N mg/l	< 0.02	< 0.02	< 0.02				
NO ₃ -N mg/l	< 0.02	< 0.02	< 0.02				
O-PO ₄ -P mg/l	5.6	4.4	4.4				
T-PO ₄ -P mg/l	7.9	5.2	5.4				
Turbidity (NTU's)	50	21	20				
Total Coli (#/100 ml)***			<10				
Fecal Coli (#/100 ml)***			< 5				
Chlorine Residual* mg/l			3.5			1.7	

* Field Analysis-grab "<" is "less than" and ">" is "greater than"

** From influent Parshall flume - this flow used for daily loadings

*** Grab sample