



STATE OF
WASHINGTON

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Governor

DEPARTMENT OF ECOLOGY

Olympia, Washington 98504 206/753-2800

M E M O R A N D U M

April 18, 1978

To: Ron Devitt

From: Bill Yake

Re: Enumclaw STP
Class II Inspection

Date: March 14-15/78

Findings and Conclusions:

A Class II inspection of the Enumclaw STP was performed on March 14-15, 1978 by Bill Yake. Ron Devitt of the Northwest Regional Office and Neil Thompson of EPA were also in attendance. A receiving water (Boise Creek) study was carried out on the same days by Greg Cloud and Shirley Prescott of the Department of Ecology.

The Enumclaw plant is a trickling filter with chlorination prior to final clarification. Solids are digested and ordinarily spread on agricultural land. The digester mixing pump was inoperable at the time of inspection.

The flow measuring device at the plant is very inaccurate and in need of replacement if the plant is to meet its flow measuring and reporting commitments. Flows are presently recorded as "unknown". The flow reported here is based on two instantaneous measurements using a magnetic flow meter in the influent grit channels.

The plant was, at the time of inspection, meeting current NPDES limitations for pH and fecal coliforms. DOE suspended solids analysis indicated that the plant was exceeding monthly suspended solids concentration limitations. The plant was exceeding BOD₅ concentration limitations and based on the estimated daily flow, it was exceeding daily BOD₅ discharge in terms of lbs/day.

Instantaneous measurements at the plant indicate fluctuations in influent pH and conductivity which may be related to activities at Farmer's Pickle Company.

The results of the simultaneous stream survey will be included under a separate cover.

BY:ee

Attachments

cc: Dick Cunningham
Central Files

24 Hour Composite Sampler Installations

Sampler	Date and Time Installed	Location
1. Influent aliquot - 250 ml/30 min.	3/21/78 - 0955	Below grit chamber weirs
2. Primary Effluent aliquot - 250 ml/30 min.	3/21/78 - 0948* * sampler ceased operating	In primary outfall weir channel
3. Chlorinated Effluent aliquot - 250 ml/30 min.	in first 6 hours 3/21/78 - 0945	At outfall of secondary clarifier

Grab Samples

	Date and Time	Analysis	Sample Location
1.	3/21/78 - 1007	Total & Fecal Coliforms	Sec. clarifier outfall
2.	3/21/78 - 1015	" " "	Outfall at Boise Creek
3.	3/22/78 - 1115	" " "	Sec. clarifier outfall
4.	3/22/78 - 1130	" " "	Outfall at Boise Creek
5.			
6.			

Flow Measuring Device

- Type - Unknown, unique quasi-in-line meter of unknown configuration
- Dimensions - Unknown

a. Meets standard criteria Yes

No Explain: Device is not of standard construction, is not calibrated, and is extremely sensitive to error caused by recycle flows

b. Accuracy check

	Actual Instan. Flow	Recorder Reading	Recorder Accuracy (% of inst. Flow)
1.	1.02 MGD (recycle on)	1.17 MGD	89%
2.	1.25 MGD (recycle off)	0.32 MGD	26%
3.			

is within accepted 15% error limitations

is in need of ~~calibration~~ replacement

Field Data

Parameter	Date and Time	Sample Location	Result
Chlorine Residual	3/21/78 - 1007	Sec. Clarifier Outfall	1.4 mg/l
Chlorine Residual	3/21/78 - 1015	Outfall at Boise Creek	1.0 mg/l
Chlorine Residual	3/22/78 - 1115	Sec. Clarifier Outfall	2.0 mg/l
Chlorine Residual	3/22/78 - 1130	Outfall at Boise Creek	1.5 mg/l
Temp., Cond., pH	3/21/78 - 1255	Influent	See Results
Temp., Cond., pH	3/21/78 - 1312	Primary Effluent	See Results
Temp., Cond., pH	3/21/78 - 1320	Chlorinated Effluent	See Results
Temp., Cond., pH	3/22/78 - 1030	Influent	See Results
Temp., Cond., pH	3/22/78 - 1040	Primary Effluent	See Results
Temp., Cond., pH	3/22/78 - 1047	Chlorinated Effluent	See Results

Review of Laboratory Procedures and Techniques

BOD₅

- 1) Samples are collected manually (50-60 ml/hr) and composited during the working shift. They are refrigerated as taken.
- 2) BOD₅ determinations are made on influent and effluent samples. Chlorine is added above the final clarifier, the effluent sample is therefore chlorinated. This sample is dechlorinated using several drops of 10% sodium thiosulfate. It is not reseeded.
- 3) BOD₅ determinations are made using a Hach (manometric) BOD kit. They are occasionally checked against normal (Winkler-Standard Methods) procedures. Both results are reported for the sample split made during this inspection.
- 4) Although BOD₅ values from the plant agree well with DOE's determinations there are several current problems with the methods which should be addressed:
 - a) Chlorinated samples should be reseeded.
 - b) The Hach (manometric) BOD₅ determination is not recognized by either Standard Methods or the Department of Ecology. Conversion to an accepted procedure should be undertaken. The plant was provided with a copy of DOE's BOD procedure manual.
 - c) PAO used in dissolved oxygen determination is not standardized. This should be done on a regular (weekly) basis.

Chlorine Residual

- 1) Chlorine residual determinations are made using orthotolidine. This procedure is no longer accepted by Standard Methods or the Department of Ecology. It is suggested that the plant purchase a DPD kit for chlorine residual analysis.

Suspended Solids

- 1) 50-100 ml samples are processed on the final effluent. 50 ml samples are processed on the influent.
- 2) Whatman filters are cut to fit Gooch crucibles. Jim Crossler will be ordering the accepted Gelman A/E or Reeves Angel 934H filters when the present supply of Whatman filters is depleted.
- 3) Comparison of results indicate acceptable agreement.

Fecal Coliform

- 1) Jim Crossler had recently attended a Department of Ecology seminar on fecal coliform procedure. This procedure was being performed correctly.

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.

	Influent	DOE	Chlorinated Effluent	Influent		Primary Effluent	Chlorinated Effluent		NPDES (Monthly average)
		Primary Effluent ***		Winkler	Hach		Winkler	Hach	
BOD ₅ mg/l lbs/day	195 (1790) ⁵	110 (1010) ⁵	78 (716) ⁵	237 (2170) ⁵	190 (1740) ⁵	-- --	73 (670) ⁵	75 (688) ⁵	40 670
TSS mg/l lbs/day	119 (1090) ⁵	109 (1000) ⁵	45 (413) ⁵	169 (1550) ⁵			37 (340) ⁵		40 670
Total Plant Flow MGD	1.25* 1.02*		(1.1) ⁵				(1.1) ⁵		
Total Coliform			2000 ¹ 7000 ²						
Fecal Coliform			20 est ¹ 50 est ² 35 est ³ 25 est ⁴						200/100 ml
Residual Chlorine			1.4* ¹ 1.0* ² 2.0* ³ 1.5* ⁴						
pH	7.1 8.6* 7.4* 7.1**	7.4 7.6* 7.0* 7.1**	7.2 7.3* 7.0* 7.6**						6-9
Temp. °C	14.5* 14.0*	14.0* 13.2*	14.0* 14.0*						
Sp. Cond. µmho/cm	1170 650* 580* 1150**	638 605* 650* 580**	1170 570* 750* 990**						
COD mg/l	400	250	260						
Turbidity (NTU's)	45	45	34						
NH ₃ -N (mg/l)	14	21	22						
NO ₂ -N (mg/l)	.02	< .02	< .02						
NO ₃ -N (mg/l)	0.10	< .02	< .02						
O-PO ₄ -P (mg/l)	3.8	4.2	4.8						
T-PO ₄ -P (mg/l)	6.4	6.0	6.2						

** Field analysis - composite
*** Shut off on first day

1. Sec. clarifier outfall, 3/21/78
2. Outfall at Boise Creek, 3/21/78
3. Sec. clarifier outfall, 3/22/78
4. Outfall at Boise Creek, 3/22/78
5. Est. - Based on estimated daily flow

	Influent	DOE Primary Effluent***	Chlor. Eff.			NPDES (Monthly Average)
Settleable Solids (mg/l)	- -	- -	0.5			
Total Solids (mg/l)	785	420	670			
TNVS (mg/l)	542	224	538			
TSS (mg/l)	119	109	45			
TSNVS (mg/l)	7	6	4			
MBAS (mg/l)	- -	- -	0.6*			
<u>Trace Metals</u>				Sludge		
Zn (mg/Kg)**				1690		
Pb (ng/Kg)				340		
Cu (mg/Kg)				420		
Cd (mg/Kg)				7		
Cr (mg/Kg)				41		

* Field Analysis - Grab "<" is "less than" and ">" is "greater than"
** mg/Kg dry wt (2.9% Solids)
*** Shut off on first day