



STATE OF
WASHINGTON

Dixy Lee Ray
Governor

DEPARTMENT OF ECOLOGY

Olympia, Washington 98504

206/753-2800

M E M O R A N D U M

To: Gerry Calkins

From: Mike Morhous

Re: Cowlitz County Regional STP
Class II Inspection

Date: January 23, 1978

Findings and Conclusions:

The above referenced inspection was conducted on August 16 and 17, 1977 by Eric Egbers and myself. The Cowlitz County Regional STP is a secondary (activated sludge) wastewater treatment facility.

At the time of this inspection the STP was well within their NPDES permit limitations.

Laboratory procedures and techniques were reviewed and appeared to be in order. Recommendations resulting from this inspection have been included in the "Review of Laboratory Procedures" section of this memo.

MM:ee

cc: Central Files
Bill Yake

Class II Field Review and Sample Collection
24 Hour Composite Sampler Installations

Sampler	Date and Time Installed	Location
1. Influent aliquot -	8/16 at 1035 250 mL/30 min.	Headworks
2. Chl. eff. aliquot -	8/16 at 1015 250 mLs/30 min.	Combined chl. contact chamber outfall
3. aliquot -		

Grab Samples

	Date and Time	Analysis	Sample Location
1.	8/17 at 1045	Fecal Coliforms	N 1/2 chl. contact chamber
2.	8/17 at 1045	Fecal Coliforms	S 1/2 chl. contact chamber
3.	8/17 at 1120	Heavy Metals	Holding tank (wet sludge)
4.	8/17 at 1120	Heavy Metals	After incineration (sludge ash)
5.			
6.			

Flow Measuring Device

1. Type Magnetic flow meters (inoperative at the time of this inspection)
2. Dimensions

- a. Meets standard criteria Yes
 No Explain:

STP was measuring plant flow with a submerged in-line propeller flow meter.

- b. Accuracy check

Actual Instan. Flow	Recorder Reading	Recorder Accuracy (% of inst. flow)
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1. Propeller flow meter was not checked for accuracy.
- 2.
- 3.

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

Field Data

Parameter	Date and Time	Sample Location	Result
Total Residual Chlorine	8/17 at 1045	Same as sampler #2	4.5 ppm
pH, sp. cond., temp.	8/17 at 1045	Same as sampler #2	6.8, 640 umhos/cm, 24.8°C
pH, sp. cond., temp.	8/17 at 1115	Same as sampler #1	7.0, 475 umhos/cm, 22.0°C

Review of Laboratory Procedures and Techniques

Laboratory procedures were reviewed with Jerry Schulz, labman. The laboratory was well organized and their laboratory procedures appeared to be in order.

BOD₅

The lab uses a D.O. meter (membrane electrode) to measure dissolved oxygen. The meter is calibrated in a common water sample using the Winkler (titrimetric) D.O. procedure to obtain the true D.O. value.

As part of the chlorinated effluent BOD₅ procedure, the lab determines the seed correction from a 5 day D.O. depletion of their seed material as opposed to a more common practice of using the D.O. depletion of the seeded blank for seed correction. The lab should be commended for their conscientious seed correction technique which is in very close agreement with techniques described in Standard Methods.

The lab was experiencing a problem with an excessive D.O. drop (greater than .2 ppm) in their unseeded blank during the 5 day incubation period. In view of the fact that the lab prepares 5 liters of dilution water which lasts 4-5 days, it was recommended that the phosphate buffer be added to the dilution water as it is used instead of being added during initial preparation of the dilution water.

TSS

The lab uses Whatman GF/A 2.1 cm. glass fiber filters. Standard Methods and EPA no longer recognize the use of Whatman GF series filters, specifically GF/C, for solids analyses. Therefore, it is recommended that one of the following acceptable glass fiber filters, Reeves Angel type 934AH or Gelman type A/E, be acquired when reordering filters.

In lieu of the filtering time previously recommended, the following guideline should be used as a check for optimum sample volumes. When processing TSS samples, the sample volume should be sufficient to reduce the initial filtration rate by approximately 50-60 per cent, at the end of the sample filtering period. Sample volumes should be adjusted accordingly. This may require filtering a portion of the sample, prior to the analysis, to determine the sample volume needed.

Fecal Coliforms

The lab uses the membrane filter technique and procedures appeared to be in order. It was recommended, however, that the sample volume be adjusted to provide an optimum plate count of 20-60 colonies after incubation. This may necessitate filtering three different volumes of sample to provide one plate with an optimum count. Subsequent to this inspection, the DOE publication "Membrane Filter Procedure for the Fecal Coliform Test" was mailed to the STP.

Review of Laboratory Procedures and Techniques
(Continued)

The STP uses a DPD chlorine test kit to measure total residual chlorine. The fecal coliform/total residual chlorine data collected during this inspection indicated an excessive chlorination of the secondary effluent at the time the sample was collected. It is therefore recommended that the STP consider the possibility of reducing their chlorine dosage, taking into consideration previous fecal coliform and respective total residual chlorine data.

The lab has been experiencing chloride interferences during their COD analyses. EPA states that when the chloride level exceeds 1000 mg/l, the minimum accepted value for the COD will be 250 mg/l. In view of these circumstances, it is recommended that the STP begin analyzing for chlorides prior to running individual COD analyses. The chloride results will indicate (1) the validity of the COD result and (2) the amount of mercuric sulfate needed to complex the chloride, using the 10:1 ratio of mercuric sulfate:chloride. This procedure is explained in "Standard Methods", 14th Edition, page 552 and should be observed.

As part of the composite sampling procedure, DOE installed a Manning composite sampler and the STP installed an Issco composite sampler at each of the two sampling stations. Each Issco sampler was adjusted to take a 104 ml aliquot per hour. All four composite samples were split between DOE and the STP for a comparison of the 24 hour composites and subsequent laboratory results.

DOE COMPOSITE SAMPLES

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.

	Cowlitz Co. Regional STP						NPDES (Monthly average)
	Inf.	DOE	Chl. Inf.	Inf.	Head end of Cont. Chamber	Chl. Eff.	
BOD ₅ mg/l lbs/day	212		13 434	235		13 434	30 2500 32(1)
TSS mg/l lbs/day	160		5 167			11 367	30 2500 24(1)
Total Plant Flow (MGD)					4.0		Not to exceed 15.0
Fecal Coliforms (colonies/100 mls)							200
at 1045 N 1/2			<2				
at 1045 S 1/2			<2				
* Total Residual Chlorine (ppm) at 1045			4.5				
pH	7.0		7.6				
Cadmium (mg/l)	<0.01						
Chromium (mg/l)	0.05						
Copper (mg/l)	0.12						
Lead (mg/l)	<0.05						
Nickel (mg/l)	<0.10						
Zinc (mg/l)	0.41						

* Field Analysis "<" is "less than" and ">" is "greater than"
 DPD Chl. Kit

(1) 15% of influent concentration (mg/l)

STP COMPOSITE SAMPLES

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.

				Cowlitz Co. Regional STP		NPDES (Monthly average)
	Inf.	DOE	Chl. Eff.	Inf.	Chl. Eff.	
BCD ₅ mg/l lbs/day	212		24 801	279	24 801	30 2500 32(1)
TSS mg/l lbs/day	315		10 334		14 467	30 2500 47(1)
Total Plant Flow MGD						

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

(1) 15% of influent concentration (mg/l)

HEAVY METALS ANALYSIS
OF SLUDGE SAMPLES

	Wet Sludge	DOE Sludge Ash				NEDES (Monthly Average)
% dry solids	6.3	57.0				
Cadmium (mg/Kg - dry wt.)	20.0	14.0				
Chromium (mg/Kg - dry wt.)	230.0	590.0				
Copper (mg/Kg - dry wt.)	275.0	920.0				
Lead (mg/Kg - dry wt.)	150.0	530.0				
Nickel (mg/Kg - dry wt.)	50.0	82.0				
Zinc (mg/Kg - dry wt.)	1750.0	5900.0				

* Field Analysis

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