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STATE OF
WASHINGTON

Dixy Lee Ray
Governor

DEPARTMENT OF ECOLOGY
Olympia, Washington 98504 206/753-2800

MEMORANDUM

To: Ron Devitt

From: Bill Yake

Re: Lakehaven Redondo
Class II Inspection

Date: May 2-3, 1978

Findings and Conclusions:

The Redondo STP is a primary treatment facility with discharge to Puget Sound. Sludge is digested and centrifugally dewatered. Sludge is disposed of by allowing individuals to haul it away for use as a soil builder. The head plant operator is Ken Morrison, and wastewater samples are analyzed at the Lakehaven-Lacoda facilities by Melba Yolba.

Plant design flow is 0.9 MGD and the NPDES flow limitation is 1.75 MGD. Flow recorders at the plant were measuring approximately 15% below flows determined using direct head measurements at the Parshall flume. Instantaneous flows of 2.17 and 1.95 MGD were measured and the 24 hour flow, corrected for totalizer error, was approximately 1.62 MGD.

The facility is operating under conditions of hydraulic overload. Although plant personnel are doing an excellent job of operating and maintaining the facility under this overload, treatment efficiency is marginal during periods of high flow.

Laboratory techniques were generally good. The plant is, howeve using orthotolodine to determine residual chlorine. This technique is no longer acceptable and should be replaced with an acceptable technique.

WY:ee

cc: Dick Cunni gham
Central Fi es through George Houck

24 Hour Composite Sampler Installations

Sampler	Date and Time Installed	Location
1. Influent aliquot - 250 ml/30 min.	5/2/78 (1045)	Immediately below bar screens
2. Unchlorinated Effluent aliquot - 250 ml/30 min.	5/2/78 (1050)	Immediately above chlorinator
3. Chlorinated Effluent aliquot - 250 ml/30 min.	5/2/78 (1005)	In manhole approximately 200' below chlorination.

Grab Samples

	Date and Time	Analysis	Sample Location
1.	5/2/78 (1000)	Total and fecal coliforms	Chlorinated effluent
2.	5/3/78 (0950)	Total and fecal coliforms	Chlorinated effluent
3.			
4.			
5.			
6.			

Flow Measuring Device

1. Type - Parshall flume
2. Dimensions - 6" throat

a. Meets standard criteria

/__/ Yes

/XX/ No Explain: Undersized for flows experienced at Redondo.

b. Accuracy check _

	MGD Actual Instan. Flow	Recorder Reading Needle	Recorder Reading Chart	Recorder Reading Totalizer	Totalizer ~~Recorder~~ Accuracy (% of inst. flow)
1.	2.17	1.68	1.95	---	---
2.	1.95	1.60	1.60	1.68	86%
3.					

/XX/ is within accepted 15% error limitations (marginal)

/__/ is in need of calibration

Field Data

Parameter	Date and Time	Sample Location	Result
Chlorine Residuals	5/2/78 (1000)	Chlorinated effluent	2.75 mg/l
pH, Cond, Temp.	5/2/78 (1045)	Influent	See results
pH, Cond, Temp.	5/2/78 (1050)	Unchlorinated effluent	See results
pH, Cond, Temp.	5/2/78 (1005)	Chlorinated effluent	See results

Review of Laboratory Procedures and Techniques

Laboratory procedures were reviewed with Melba Yolba (Laboratory Technician) who analyzes Redondo STP samples at the Lakehaven-Lacoda plant. Comparisons of analytical results were very good. This, in addition to the procedure review of techniques, indicates that the laboratory is generally doing excellent analytical work. Two points, however, should be addressed.

1. Chlorine Residual Analysis - The orthotolodine technique is presently being used. This is no longer acceptable. The sewer district should convert to either DPD or Amperiometric Titration. Written communication to this effect should be directed to Ivan Day at the Lakehaven Sewer District office.

2. BOD_5 dilutions appeared to be generally weak leading to insufficient dissolved oxygen depletions. Dilutions which result in a minimum D.O. drop of 2 mg/l but do not decrease residual 5 day D.O.'s below 1 mg/l should improve the sensitivity and accuracy of the test.

In addition, the 15 minute holding time of fecal coliform samples prior to dechlorination appears to be realistic and probably conservative. Retention time (contact time) in the outfall line can be roughly calculated based on the following equation:

$$\theta_t = \frac{54.4}{Q},$$ where θ_t = detention time in minutes
Q = flow in MGD

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 Unchlor. Effluent	Chlorinated Effluent	Influent	Unchlor. Effluent	Chlor. Effluent	NPDES *** (Monthly average)
BOD_5 mg/l	174	132	140	153	115		162
lbs/day	2050[1]	1550[1]	1650[1]	1800[1]	1350[1]		2340
TSS mg/l	170	94	70	190	95		110
lbs/day	2000[1]	1110[1]	823[1]	2230[1]	1120[1]		1440
Total Plant Flow MGD					1.41[1]		1.75
Tot. Coli. (#/100 ml)			>100,000[2] 7,200,000[2] 7900 est.[3]				
Fec. Coli. (#/100 ml)			>100,000[2] 500,000[2] 50 est.[3]			22[4]	700
Chlor. Res. (mg/l)			2.75				
pH	7.7 7.7* 7.6**	7.6 7.6* 7.5**	7.5 7.3* 6.9*				6.5-8.5
Spec. Cond. (umhos/cm)	584 510* 525**	529 455* 420**	550 520* 545**				
Temp., °C	15.7°C	15.5°C	15°C				
Total Solids (mg/l)	465	370	400				
T.N.V.S. (mg/l)	257	229	244				
T.S.S. (mg/l)	170	94	70				
T.N.V.S.S. (mg/l)	43	12	24				
COD (mg/l)	440	286	- -	401	280		
Turbidity (JTU)	64	50	52				
NH_3-N (mg/l)	20.0	20.0	17.6				
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)	4.8	4.6	4.8				
T-PO_4-P (mg/l)	8.0	8.2	7.8				

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

** Field analysis - composite

*** Interim limitations based on compliance order issued October 25, 1977.

1) Based on plant totalizer (0800-0800), probably at least 15% low.
2) Dechlorinated immediately. 3) Dechlorinated after 15 minutes contact time.
4) 5/3/78, separate grab

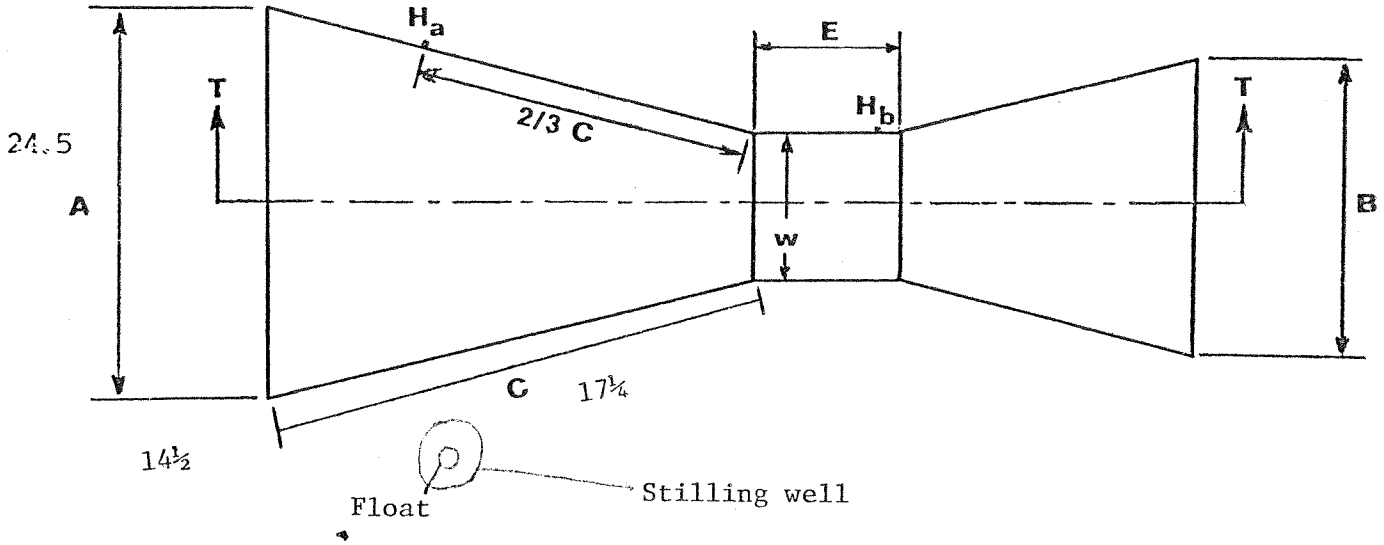
	DOE						NPDES
	Raw sludge	Digested sludge					(Monthly Average
Heavy metals							
% Solids	3.6%	34%					
Zinc (mg/l, dry wt)	780	1200					
Copper (mg/l, dry wt)	137	32					
Lead (mg/l, dry wt)	73	250					
Cadmium (mg/l, dry wt)	4	8					
Chromium (mg/l, dry wt)	11	35					

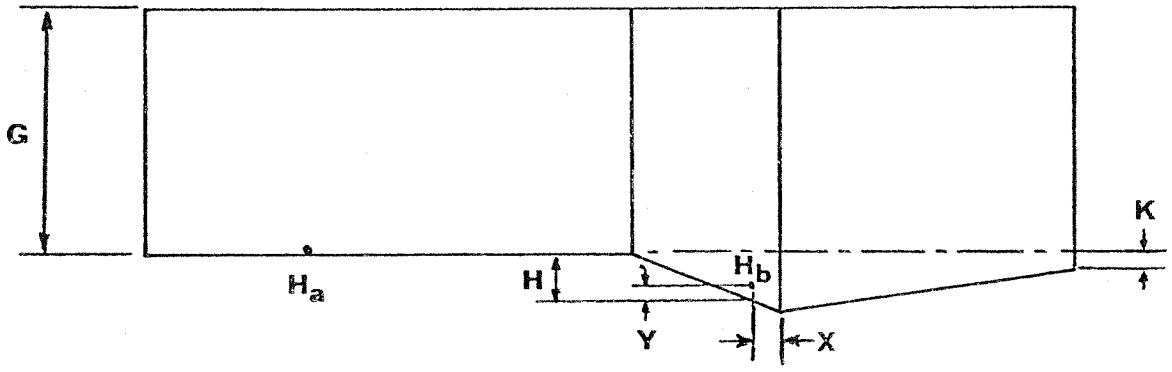
* Field Analysis

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

PARSHALL FLUME:

Dimensions & Flow





Code	Spec's	Measured
A	15"	15½"
B	22"	15'
C	23"	24 7/16"
2/3C	17¼"	16 5/16"
E	11½"	12"
G	34"	18"
H		
K		
W	6.0"	6.0"
X		
Y		

Time	H_a	H_b	Theoretical Flow	Recorded Flow		
				Needle	Chart	Totalizer
1530(5/2)	16		>1.87	1.68	1.95	
		16 3/4"				
1140(5/3)	15 3/8"		1.95	1.60	1.60	~1.68