

June 6, 1974

Memo to: Rhys Sterling, Howard Buntten

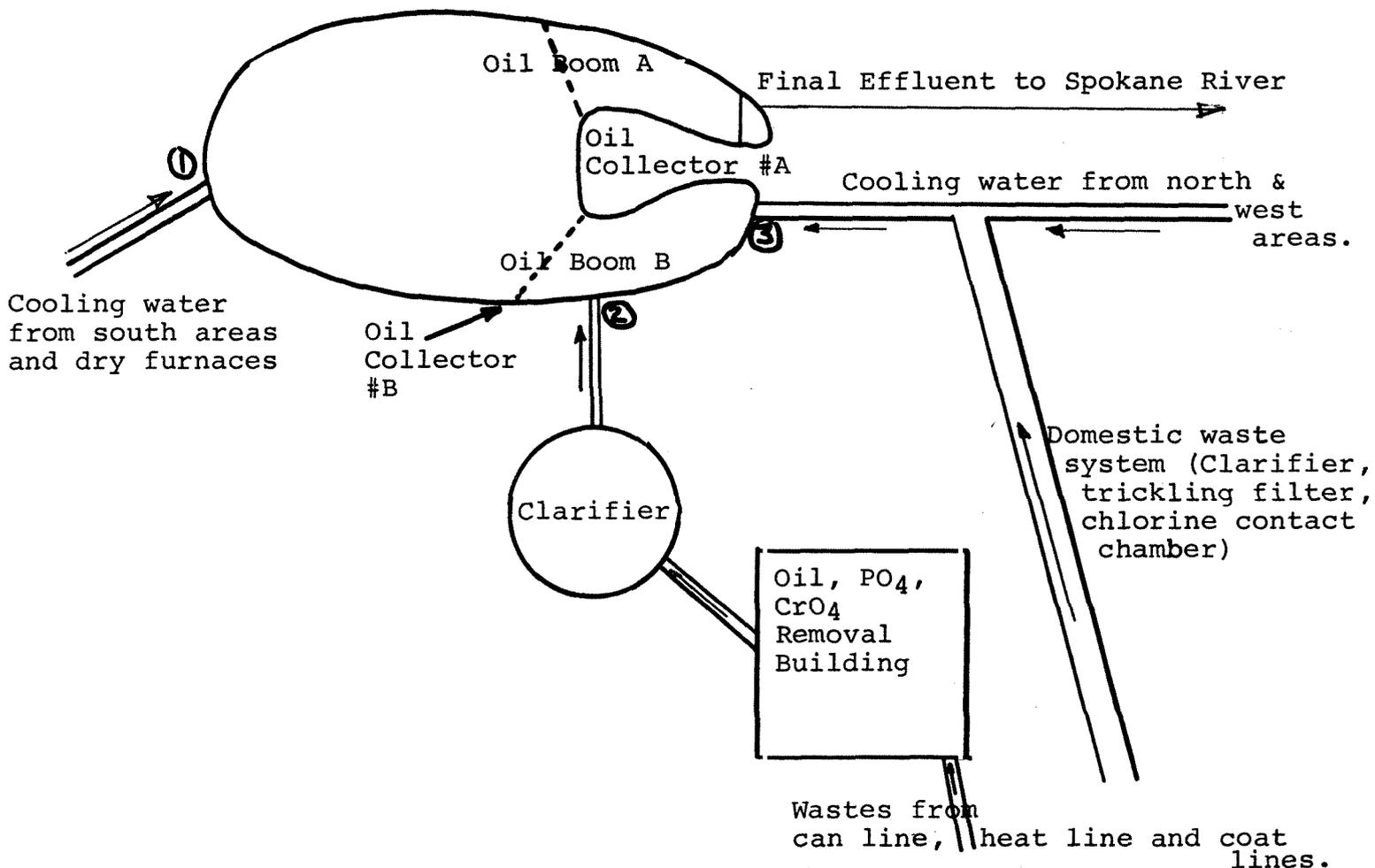
From: Pat Lee

Subject: Kaiser Aluminum Survey of January 30, 1974.



Darrel Anderson and I conducted an effluent characterization at Kaiser Aluminum in Trentwood on January 30, 1974. This survey consisted of an efficiency study of the domestic waste system and a characterization of the three industrial lines to the lagoon and then a composite of the final effluent which is a mixture of the three industrial lines and the domestic line. A diagram of the system is as follows:

Figure 1.



The field and lab results for the domestic trickling filter system are as follows:

Field Results

Influent

Effluent

12 Determinations

	Max.	Min.	Mean	Median	Max.	Min.	Mean	Median
Temp °C	11.3	10.0		11.1	9.7	8.0		7.0
pH (Units)	7.6	6.8		7.4	7.6	7.0		7.0
Conductivity (µmhos/cm <sup>2</sup> )	1150	500		600	700	550		600
Settleable Solids (mls/l)	3	2	2.5	2.5	Trace	Trace	Trace	Trace

Laboratory Results on Composites

	Influent	Effluent	% Reduction
Laboratory No.	74-0305	74-0306	
5-Day BOD ppm	45	13	71
COD ppm	66	31	53
T.S. ppm	315	206	35
T.N.V.S. ppm	185	187	--
T.S.S. ppm	86	28	67
N.V.S.S. ppm	22	11	50
pH (Units)	8.2	7.8	
Conductivity (µmhos/cm <sup>2</sup> )	480	480	
Turbidity (JTU's)	25	10	

Laboratory Bacteriological Results

Lab No.	Sampling Time	Colonies/100 ml (MF)			Cl <sub>2</sub> Residual
		Total Coliform	Fecal Coliform	Fecal Strep	
74-0307	0930	80	<10		.5 in 3 min.
308	1100	80	<10		.4
309	1200	60	<10		.4
310	1300	280	<10		.4
311	1400	20	30		.4
312	1430	120	<10		.4

Additional Laboratory Results

NO <sub>3</sub> -N ppm	-	3.58	
NO <sub>2</sub> -N ppm	-	N.D.	
NH <sub>3</sub> -N ppm	-	5.9	
T. Kjeldahl-N ppm	-	7.1	
O-PO <sub>4</sub> -P ppm	-	.5	
T-PO <sub>4</sub> -P ppm	-	2.0	

As can be seen by the results on page 2, the plant is operating pretty efficiently with good disinfection and BOD and S.S. reduction. The system seems to be somewhat underloaded as the trickling filter arms would sometimes halt their circular motion thereby overloading part of the filter. The plant grounds weren't the neatest I've seen and some of the trickling filter arm holes were plugged. Also there seems to be more than just domestic waste coming to the plant as the 6.8 pH and 1150 conductivity at 1500 hours shows.

The industrial part of the survey consisted of composites of the three lines (labeled lines 1, 2 & 3 in Figure 1) entering the pond and the final effluent plus a series of grabs for total oils and coliform out of the final effluent. I also ran a series of field tests on the final effluent during the survey period of 0930 to 1600. The results of the field tests were as follows:

Field Results

Final Effluent

12 determinations	Max.	Min.	Mean	Median
Temp °C	9.6	9.0		9.2
pH (Units)	7.1	6.8		7.0
Conductivity (µmhos/cm <sup>2</sup> )	150	105		110
Settleable Solids (mls/l)	Trace	Trace	Trace	Trace
Flow (MGD)	2.30	2.24	2.26	

A visual inspection of the waste treatment system turned up a few areas where improvement could be made. These were 1) the skimmer in the industrial clarifier is not operating properly, thus allowing scum over the weirs; 2) oil collector #A [as labeled in Figure 1] was entangled for most of the day and not collecting the oil properly. A more frequent schedule of inspections by plant personnel would solve this problem; and 3) the oil booms did not seem to be doing the best possible job as there was oil on the surface of the final effluent as it crossed the last weir throughout the survey period. The lab data shows this is not a great amount of oil.

The laboratory results on the four composites are as follows:

Log Number:	74-0313	314	315	316
Station:	1	2	3	Final
pH	7.0	10.4	7.6	7.3
Turbidity (JTU)	10	20	10	10
Conductivity (umhos/cm)@25°C	84	1090	100	93
COD	8	270	8	16
BOD (5 day)	<4	36	<8	<8
Total Coliform (Col./100ml)				
Fecal Coliform (Col./100ml)				
NO3-N (Filtered)	.12	ND	.60	.32
NO2-N (Filtered)	ND	ND	ND	ND
NH3-N (Unfiltered)	.2	.4	.2	.3
T. Kjeldahl-N (Unfiltered)	.5	.6	.8	.3
O-PO4-P (Filtered)	.2	.08	.10	.10
Total Phos.-P (Unfiltered)	1.5	1.0	1.0	1.0
Total Solids	91	1133	81	90
Total Non Vol. Solids	60	982	52	61
Total Suspended Solids	23	39	20	19
Total Sus. Non Vol. Solids	16	30	15	15
Chromium (Total)	--	14	ND	<.05
Phenols				ND
Total Oils				
Fluorides	.16	11.4	.14	.25

Note: All results are in PPM unless otherwise specified.  
Convert those marked with a \* to PPB (PPM X 10<sup>3</sup>) p

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As can be seen by the above results, line #2 is the most heavily polluted but when mixed with #1 and #3, all the parameters are diluted as is seen by the final effluent values. I collected three grab samples for oil analysis and two for coliform analysis at various times in the day from the final effluent. The results were:

Time	Total Oils	Total Coliform	Fecal Coliform
1000	None Detectable		
1300	4. ppm	1300 col/100 ml	20 col/100 ml
1500		1500 col/100 ml	30 col/100 ml
1600	<1. ppm		

PL:jmh

STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

ORIGINAL TO:  
.P.Lee.....  
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.....  
.....  
LAB FILES.....

DATA SUMMARY

Source Kaiser Alum-Indus.

Collected By D. Anderson

Date Collected 1-30-74

Goal, Pro./Obj. \_\_\_\_\_

Log Number:	74-0313	314	315	316	317	318	319	320	-	STORET
Station:	1	2	3	FINAL	1000	1300	1600	EFF A	EFF B	
pH	7.0	10.4	7.6	7.3						00403
Turbidity (JTU)	10	20	10	10						00070
Conductivity (umhos/cm)@25°C	84	1090	100	93						00095
COD	8	270	8.	16.						00340
BOD (5 day)	<4	36	<8	<8						00310
Total Coliform (Col./100ml)								1300	1500	31504
Fecal Coliform (Col./100ml)								EST 20	EST 30	31616
NO3-N (Filtered)	.12	ND	.60	.32						00620
NO2-N (Filtered)	ND	ND	ND	ND						00615
NH3-N (Unfiltered)	.2	.4	.2	.3						00610
T. Kjeldahl-N (Unfiltered)	.5	.6	.8	.3						00625
O-PO4-P (Filtered)	.2	.08	.10	.10						00671
Total Phos.-P (Unfiltered)	1.5	1.0	1.0	1.0						00665
Total Solids	91	1133	81	90						00500
Total Non Vol. Solids	60	982	52	61						
Total Suspended Solids	23	39	20	19						00530
Total Sus. Non Vol. Solids	16	30	15	15						
Chromium (TOTAL)	-	14	ND	<.05						
Phenols				ND						
Total Oils					ND	4	<1			
Fluorides	.16	11.4	.14	.25						

Note: All results are in PPM unless otherwise specified. ND is "None Detected"  
Convert those marked with a \* to PPB (PPM X 10<sup>3</sup>) prior to entry into STORET

Summary By Stephen D. Roll Date 2-20-74

