

M E M O R A N D U M

September 8, 1976

To: Phil Williams

From: Douglas Houck

Subject: Kaiser (Trentwood) Class II Inspection

On June 8, 1976, Morhous and I arrived at the Kaiser plant in Trentwood to conduct our part of the scheduled Class II inspection. We met with Mr. L.V. Roe, Environmental Control Engineer, who introduced us to Duane Brewster, Laboratory Foreman, and Tom Johnson, Foreman. After a short tour of the plant we set up our composite samplers.

One composite sampler was located in the divergent section of the Parshall flume which measured the flow of their industrial effluent. The other two samplers were located at the end of the chlorine contact chamber of the plant's sanitary sewage treatment facilities. All composite samplers were adjusted to take a 250 ml aliquot every 30 minutes.

The industrial Parshall flume was checked and found to be correctly constructed and installed and reading to within one percent of the actual flow. This is one of the more sophisticated and better Parshall flume installations I've seen. The sanitary effluent Parshall flume was found to be reading within 10 percent of the actual measured flow. This is still an acceptable error. The two sharp-crested weirs used to measure Kaiser's total discharge flow from their lagoons were properly built but their accuracy could not be checked at the time of the survey.

The chlorine residual from the sanitary effluent was measured using a DPD field kit and found to be approximately 1.5 ppm for both days. Kaiser's script chart recorder was recording a chlorine residual of 0.2 ppm. This should be checked into as the plant should probably reduce the chlorine dosage that they were using. This is further substantiated by the fact that Kaiser seldom detects any fecal coliforms from their effluent.

On inspection of the plant's combined industrial and sanitary lagoon, small sheens of oil were observed flowing over the discharge weir. Grab samples for total oils preserved with sulfuric acid were taken both days. The grab sample taken on the 8th had a total oils concentration of 22 mg/l. The concentration for the sample taken on the 9th was 14 mg/l. Another grab sample was taken on the 9th for total oils from the industrial effluent. The concentration was 7 mg/l.

On the 9th both Morhous and I returned to review Kaiser's laboratory procedures and composite and split with Kaiser our 24-hour composites.

In reviewing their laboratory procedures several inadequacies were noted. Kaiser does the five-day BOD test the Standard Methods way using the Hach powder pillows and PAO to determine the dissolved oxygen concentration. They dechlorinate both their influent and effluent samples but do not reseed. While this is not a standard method it does not seem to affect the final results. The one thing which should be changed are the dilutions of the samples. The dilutions are too high, resulting in an insufficient D.O. drop within the five days of the test. A D.O. drop of at least 2 mg/l with a final D.O. of at least 1-2 mg/l is required. At the time of the inspection Kaiser had not been getting a 2 mg/l D.O. drop over the five day test period.

They perform the suspended solids test according to Standard Methods using Whatman GF/A filter paper. An improvement of their acceptable technique would be to vary the sample volume so that a filtration time of approximately three minutes is obtained.

Kaiser analyzes for fecal coliforms using the Hach MPN method. While the EPA has not officially made a decision as to the validity of their method they do not recommend it. It is my feeling that doing the test using the membrane filter technique, which is quite acceptable, would actually shorten the overall time which it takes to perform the test. The time it takes to perform an analysis is a major concern of Kaiser's. The low fecal coliform concentrations which Kaiser has been reporting are in all probability still valid. With the degree of treatment which their sanitary sewage receives and the high chlorine residuals low fecal coliform concentrations are expected.

Kaiser also uses the Hach method to do their ortho-phosphorus and hexavalent and total chromium analyses.

Our composite sampler for the industrial effluent malfunctioned so that we split a composite sample from Kaiser's own composite sampler. We then split a composite sample of the chlorinated sanitary effluent from just one of our samplers. The following table gives our laboratory results along with Kaiser's and their NPDES daily maximum effluent limitations. The lbs/day values from the sanitary and industrial discharges were computed using the total flow values obtained by the DOE. The total flow from the lagoon was Kaiser's reported value.

<u>Parameter</u>	<u>DOE</u>	<u>Kaiser</u>	<u>NPDES</u>
Flow (MGD)		28.5	33 *
TSS (lbs/day)	167	50	350
Oil (lbs/day - mg/l)	256; 18 ⁺	0; ND	132; 15.0
O-PO ₄ -P (lbs/day)	0.21	1.21	12.0
Cr (+6) (lbs/day)	ND	.06	0.2
T. Cr. (lbs/day)	1.93	0.29	1.0
BOD ₅ (lbs/day)	11.1	11.1	124
Fecal Coliforms (#/100 ml)	0		400
Cl ₂ Residual (mg/l)	1.5	0.2	0.5
pH	7.0	7.3	6.5 - 8.5
Temperature (°F)	66	64	

* = Daily average
 ND = None detected
 + = Mean value

As can be seen from the above table there were a number of analytical discrepancies.

The difference in the total suspended solids results was primarily due to a difference in concentration of the industrial composite. We reported a concentration of 70 mg/l while Kaiser reported a concentration of 20 mg/l. I believe the main reason for the discrepancy is because Kaiser's filtration time was of the order of ten seconds. I talked with Mr. Brewster about this and it was agreed to that a better filtration time was in the order of three minutes.

The discrepancies in the total oil, ortho-phosphorus and total chromium results were not explainable at the time so another set of samples were split with Kaiser on July 8, 1976. The following table shows both DOE's and Kaiser's results.

<u>Parameter</u>	<u>DOE</u>	<u>Kaiser</u>
O-PO ₄ -P (mg/l)	0.02	0.02
T. Oils (mg/l)	ND	1
	ND	0.8
	6	6.4
Cr (+6) (mg/l)	0.04	0.03
T. Cr. (mg/l)	0.12	0.12

As can be seen from the above table whatever the problems were the first time they did not occur for these split samples. The reason for the high total chromiums observed in June was due to an infrequent problem in the industrial waste water treatment plant.

It is recommended that Kaiser fix their continuous chlorine residual analyzer, which they said they were going to do, and reduce the chlorine residual. Also, the loading limit for BOD₅ is excessively high and should be reduced to approximately 42 lbs/day. This would be the loading if the flow was 0.25 MGD with a BOD₅ concentration of 20 mg/l. Finally, it should be noted that Kaiser was very cooperative and showed a real interest in waste water control.

DH:ee



DATA SUMMARY

ORIGINAL TO: .D.H.....
COPIES TO: .M.M.....
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LAB FILES.....

Source Kaiser Aluminum Treatment

Collected By Heck & Machov

Date Collected 6/8-9/76

Log Number: 76-2039 40 41 42 43 44 45 46

Station:	SAM. INF. PILED TO COMM. V	SAM. INF. A PILED COMM. V	SAM. INF. CHLOR. EFF. COMM. V	→ (iled)	INDUS. EFF. KAISER 2 COMM. V	INDUS. EFF. LAB	LABOR. EFF. LAB	LABOR. EFF. LAB		
pH	7.6	7.7	7.4	7.2	10.5					
Turbidity (NTU)										
Sp. Conductivity (umhos/cm)										
COD	100	130	38	320	310					
BOD (5 day)		24	7	50						
Total Coliform (Col./100ml)										
Fecal Coliform (Col./100ml)							-0-	-0-		
NO3-N (Filtered)		3.5	5.9	5.4	0.22					
NO2-N (Filtered)		0.32	0.26	0.38	0.02					
NH3-N (Unfiltered)		7.5	3.6	4.0	1.2					
T. Kjeldahl-N (Unfiltered)										
O-PO4-P (Filtered)		0.90	0.80	1.2	0.10					
Total Phos.-P (Unfiltered)		1.0	— ⁺	— ⁺	0.40					
Total Solids	555	484	357	620	3110					
Total Non. Vol. Solids	374	326	228	320	2740					
Total Suspended Solids	86	45	13	280	70					
Total Sus. Non Vol. Solids	29	8	2	97	27					
Hex. Chromium					<0.05	<0.05				
					0.92	0.32				
T. Oils						7.	22.	14.		

Note: All results are in PPM (mg/L) unless otherwise specified. ND is "None Detected"
" < " is "Less Than" and " > " is "Greater Than"

* INTERFERENCE
ECY 040-2-32

Summary By Stephen P. Roll Date 6-16-76