

M E M O R A N D U M

May 5, 1976

To: Rhys Sterling

From: Douglas Houck

Subject: Spokane STP Class II Inspection

On January 20, 1976 I arrived at Spokane's sewage treatment plant to conduct my portion of a Class II inspection. After talking with G. M. Wilson and his assistant I installed three composite samplers. The first sampler was located just before the headworks. The second in the pre-aeration chamber and the third in the overflow from the first clarifier. The location of the second and third composite samplers corresponded with Spokane's own sampling locations. Each sampler was adjusted to take a 250 ml aliquot every 30 minutes.

The city has a flow measuring device with which to measure the influent flow. It had just been installed but had not been calibrated. Therefore, the city of Spokane did not have any confidence in its accuracy. I could not check on it due to its location.

In reviewing their laboratory procedures Spokane made mention of excessive D.O. drops in their BOD dilution water. They were experiencing drops in their BOD₅ blanks averaging 1.0 ppm. The D.O. drop in a BOD blank should not exceed 0.2 ppm. They analyze for fecal coliform bacteria using the MPN method.

I returned on the 21st to collect the composite samples, take two grab samples for fecal coliforms and a sample of their dewatered sludge for heavy metals analysis. In collecting the composited samples it could be determined that a discharge of heavy oil had gone through the treatment plant between 5:00-6:00 the afternoon of the 20th. The city has experienced oil problems (usually fuel from the railroad yards) before but the operator on duty had not noticed this one.

The grab samples for fecal coliforms were taken from the Spokane River as the treatment plant had no chlorine contact chamber. The first grab sample was taken approximately 300 yards downstream from the outfall along the east side of the bank. The second grab was taken near the discharge point. Both grab samples exceeded their permit limitation for fecal coliforms. While probably not of critical

importance now the lack of a chlorine contact chamber could very well pose a problem during the Spokane River's low flow period this summer.

The composited samples were split with the city except for the influent composite taken before the headworks. The following table shows DOE's and Spokane's results along with their NPDES monthly average.

	DOE		Spokane		NPDES
	Inf.	Eff.	Inf.	Eff.	Monthly Avg.
BOD ₅ (mg/l)	96	87	87	67	204
T.S.S. (mg/l)	100	73	141	61	97
Fecal Coliforms (/100 mls)		24,000			6,800
pH	7.3	7.3			6.5 - 8.5

As can be seen from the above table there was not good agreement between DOE's and Spokane's laboratory results. This should be looked at closer in the next Class II inspection. It is recommended that the city continue taking grab samples for fecal coliforms both below and above their discharge pipe. If it appears that their discharge is causing a bacteriological problem then a more comprehensive survey of the receiving water should be done.

DH:ee

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DATA SUMMARY

Source Spokane STP

Collected By D. Houck

Date Collected 1-20/21-76

Log Number: 76-265 266 267 268 269 270

Station:	INF Pre-AIR	INF BEFORE TREATMENT	EFF	0945	0950	SLUDGE				
pH	7.8	7.3	7.3							
Turbidity (NTU)										
Sp. Conductivity (umhos/cm)										
COD	270.	200.	170.							
BOD (5 day)	120.	96.	87.							
Total Coliform (Col./100ml)										
Fecal Coliform (Col./100ml)				10,000	24,000					
NO3-N (Filtered)			0.92							
NO2-N (Filtered)			0.10							
NH3-N (Unfiltered)			9.6							
T. Kjeldahl-N (Unfiltered)										
O-PO4-P (Filtered)			2.1							
Total Phos.-P (Unfiltered)			4.9							
Total Solids	465.	450.	430.							
Total Non. Vol. Solids	290.	300.	270.							
Total Suspended Solids	140.	100.	73.							
Total Sus. Non Vol. Solids	18.	14.	10.							
Copper (mg/kg)						150.				
Cadmium "						2.5				
Zinc "						470.				
Chromium "						84.				
Lead "						200.				
Mercur "						12.				

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

STP Survey Report Form

Efficiency Study

City Spokane Plant Type Primary Pop. Served 173,971 Design 50 MGD
 Receiving Water Spokane River Perennial Intermittent _____
 Date 1-20/21-76 Survey Period 21 hrs. Survey Personnel Houck
 Comp. Sampling Frequency 30 min. Sampling Alequot 250 ml
 Weather Conditions (24 hr) 27°F Are facilities provided for complete by-
 pass of raw sewage? Yes _____ No/Frequency of bypass Once
 Reason for bypass Construction Is bypass chlorinated? _____ Yes No
 Was DOE Notified? Yes Discharge - Intermittent Continuous _____

Plant Operation

Total flow 50 MGD How measured _____
 Maximum flow 40 MGD Time of Max. 1500 - 1800
 Minimum flow 17.4 MGD Time of Min. 0300 - 0500
 Pre Cl₂ _____ #/day Post Cl₂ 1000 #/day

Field Results

Influent

Effluent

Determinations	Max.	Min.	Mean	Median	Max.	Min.	Mean	Median
Temp °C				13.0				12.0
pH (Units)				7.8				7.7
Conductivity (µmhos/cm ²)								
Settleable Solids (mls/l)								

Laboratory Results on Composites

	Influent	Effluent	% Reduction	lbs/day
Laboratory No.	<u>76-265</u>	<u>76-267</u>		
5-Day BOD ppm	<u>120</u>	<u>87</u>	<u>27.5%</u>	
BOD ppm	<u>270</u>	<u>170</u>	<u>37.0%</u>	
F.S. ppm	<u>465</u>	<u>430</u>	<u>7.5%</u>	
F.N.V.S. ppm	<u>290</u>	<u>270</u>	<u>6.9%</u>	
F.S.S. ppm	<u>140</u>	<u>73</u>	<u>47.6%</u>	
I.V.S.S. ppm	<u>18</u>	<u>10</u>	<u>44.4%</u>	
pH (Units)	<u>7.8</u>	<u>7.3</u>		
Conductivity (µmhos/cm ²)				
Turbidity (JTU's)				

Laboratory Bacteriological Results

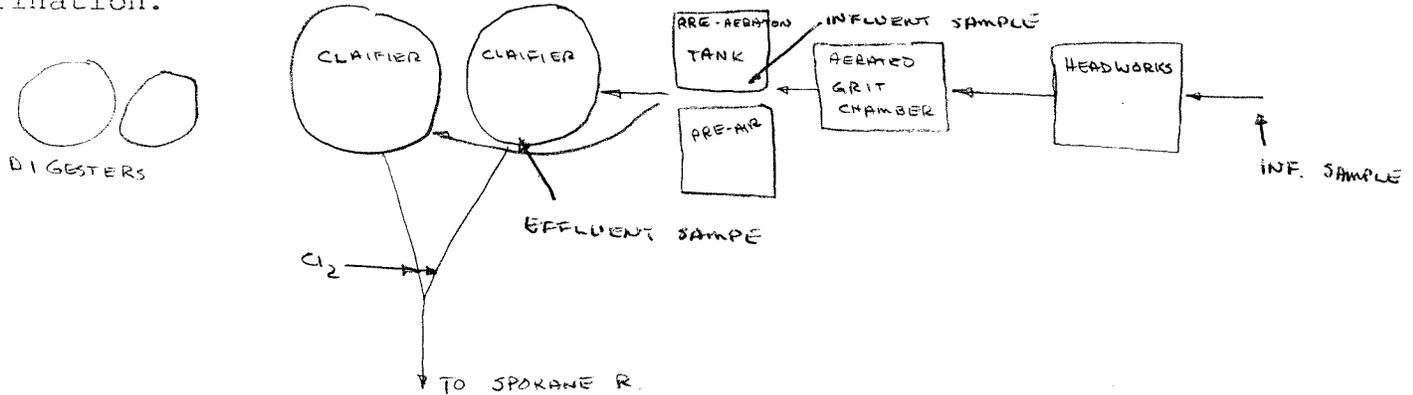
Lab No.	Sampling Time	Colonies/100 ml (MF)			Cl ₂ Residual
		Total Coliform	Fecal Coliform	Fecal Strep	
76-268	Below		10,000		
-269			24,000		

Additional Laboratory Results

		Sludge (mg/Kg)
NO ₃ -N ppm -	0.92	Cu - 150
NO ₂ -N ppm -	0.10	Cd - 2.5
NH ₃ -N ppm -	9.6	Zn - 470
T. Kjeldahl-N ppm -		Cr - 84
O-PO ₄ -P ppm -	2.1	Pb - 200
T-PO ₄ -P ppm -	4.9	Ni - 12

Operator's Name A. J. Reisdorph Phone No. 456-4305

Furnish a flow diagram with sequence and relative size and points of chlorination.



Type of Collection System

Combined Separate Both

Estimate flow contributed by surface or ground water (infiltration)

MGD

Plant Loading Information

Annual average daily flow rate (mgd)

Peak flow rate (mgd)

Dry 31 MGD

Dry 45.2

Wet 50 (100 MGD)

Wet 50

COMMENTS: No chlorine contact chamber and using 1/2 of normal #/day dosage.

Fecal samples taken in river below and at the outfall.