

MEMORANDUM

October 23, 1975

To: Gerry Calkins

From: Shirley Prescott, *SP*

Subject: Columbia Academy STP Efficiency Study

Scott Jeane and I conducted a routine efficiency study on the above plant on September 9, 1975.

Attached is the standard survey report form showing available plant information and results of lab and field tests.

Flows were measured over a 22 1/2° v-notch weir during this survey resulting in an estimated daily flow of .020 MGD. Meter flow resulted in an average .031, a 64% difference in totals. The totalizer reads about 20% lower than the meter tape.

The lab tests indicate an 85% reduction in BOD and 79% reduction in T.S.S. Pounds per day of BOD and T.S.S. respectively were 5#/day and 10#/day. Nutrient analyses as follows:

	ppm	#/day
NO <sub>3</sub> -N	10.2	1.7
NO <sub>2</sub> -N	0.82	.1
NH <sub>3</sub> -N	12.0	2.0
T. Kjeldahl-N	17.3	2.9
O-PO <sub>4</sub> -P	6.3	1.05
T-PO <sub>4</sub> -P	8.3	1.05

The plant was out of chlorine because one of the students working in the plant had on the previous week used 15 gallons of undiluted 12% Sodium hypo chlorate in the chlorination system. This is normally mixed at one five gallon jug to two parts water; three five gallon containers last one week. By Tuesday (9/9) there was no chlorine, let alone a residual on the first test and the bacteria sample taken at that time showed total coliform of more than 40,000 colonies/100 ml and more than 4000 fecal coliform colonies/100 mls. The sodium hypo chlorate was delivered during the morning and the next sampling showed a residual of .75 ppm in 15 seconds and 1.0 ppm in 3 minutes; total coliform colonies/100 ml had dropped to 60 and fecal to less than 10.

The lab results from this plant seem to indicate something better than actually exists. There was sludge rising in all the basins and showing even in the contact chamber. There was no visible waste sludge facility; possibly it is hauled away.

The debris and scum raked from the primary clarifier is gathered in a pail and dumped outside the fence in an adjacent lot. The plant is in a populated area with a nursing home on one side, a grocery store and gas station in front. A primary school playground is adjacent to the rear and separated only by the fence around the immediate plant area. Columbia Academy is located across the street from the grocery store and plant.

The open space in the plant area is graveled; the area is littered with boxes, empty cartons, chlorine jugs, etc. The lab area is extremely small and dirty. The only positive note I could make on the lab is that it did have running water (hot) and a bar of soap. No indication of any kind of disinfectant nor did it appear that the soap got much use.

All of the hosing, cleaning, sampling and testing is mainly performed by students from the academy. From my observations it would appear that they need a great deal of instruction and supervision in their sampling and testing techniques and, more importantly, in STP hygiene for their own protection as well as others with whom they may come in contact.

The operation of the plant should be handled by more mature competent personnel. Possibly an arrangement could be made with the city of Battleground. The present operation and maintenance chores performed by students between classes presents severe health hazards to the student body of the academy.

The effect on the receiving water is complete degradation because at the time of the survey almost no flow was observed above from the adjacent nursing home. A possible solution to the effect on the receiving water and immediate access to the effluent by young school children would be ground disposal of the effluent.

Generally the plant equipment (excepting the new contact chamber) is in the same condition as the cracked and tilted trickling filter.

SP:ee  
Attachment

STP Survey Report Form

Efficiency Study

(School Years)

City Columbia Academy Plant Type Secondary Pop. Served 200 Design Capacity 5000 g/day  
 Receiving Water Salmon Creek via unnamed creek Perennial  Intermittent   
 Date 9/9/75 Survey Period 0900 - 1600 hrs Survey Personnel Prescott/Jeane  
 Comp. Sampling Frequency hourly Sampling Alequot 800 mls  
 Weather Conditions (24 hr) clear/dry Are facilities provided for complete by-pass of raw sewage?  Yes  No/Frequency of bypass \_\_\_\_\_  
 Reason for bypass \_\_\_\_\_ Is bypass chlorinated?  Yes  No  
 Was DOE Notified? \_\_\_\_\_ Discharge - Intermittent  Continuous

Plant Operation

Total flow avg. .02 How measured 22°V-Notch Weir  
 Maximum flow .025 Time of Max. 0900 and noon  
 Minimum flow .013 Time of Min. 10 a.m.  
 Pre Cl<sub>2</sub> \_\_\_\_\_ #/day Post Cl<sub>2</sub> 15 gal/week #/day

Field Results

Influent

Effluent

Determinations	Max.	Min.	Mean	Median	Max.	Min.	Mean	Median
Temp °C	28	19		23.5	23	21		22
pH (Units)	8.4	7.1		7.5	7.7	7.4		7.6
Conductivity (µmhos/cm <sup>2</sup> )	630	520		582	560	360		545
Settleable Solids (mls/l)	5.0	.6	2.6	2.5	.8	trace	.2	.2

Laboratory Results on Composites

Laboratory No.	Influent	Effluent	% Reduction	lbs/day
	<u>75-4188</u>	<u>4189</u>		
5-Day BOD ppm	<u>220</u>	<u>32</u>	<u>85%</u>	<u>5.</u>
COD ppm	<u>395</u>	<u>78</u>		
F.S. ppm	<u>654</u>	<u>347</u>		
F.N.V.S. ppm	<u>266</u>	<u>216</u>		
F.S.S. ppm	<u>282</u>	<u>59</u>	<u>79%</u>	<u>10</u>
F.V.S.S. ppm	<u>18</u>	<u>7</u>		
pH (Units)	<u>46</u>	<u>30 7.8</u>		
Conductivity (µmhos/cm <sup>2</sup> )	<u>520</u>	<u>490</u>		
Opacity (JTU's)	<u>46</u>	<u>30</u>		

Laboratory Bacteriological Results

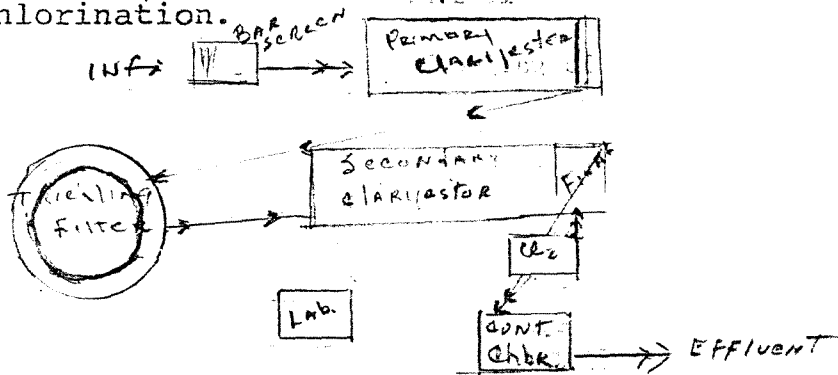
Lao No.	Sampling Time	Colonies/100 ml (MF)			Cl <sub>2</sub> Residual	
		Total Coliform	Fecal Coliform	Fecal Strep	15 sec.	3 min.
4190	1000	> 40,000	> 4,000		> .05	> .05
4191	1200	400	< 10		.75	1.0
4192	1500	60	< 10		1.0	< 1.0

Additional Laboratory Results

			#/day
NO <sub>3</sub> -N ppm	-	10.2	1.7
NO <sub>2</sub> -N ppm	-	0.82	.1
NH <sub>3</sub> -N ppm	-	12.0	2.0
T. Kjeldahl-N ppm	-	17.3	2.9
O-PO <sub>4</sub> -P ppm	-	6.3	1.05
T-PO <sub>4</sub> -P ppm	-	8.3	1.05

Operator's Name Mr. Dahl (Science Teacher) Phone No. 687-3161

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 \_\_\_\_\_

Dry \_\_\_\_\_

Wet \_\_\_\_\_

Wet \_\_\_\_\_

COMMENTS: \_\_\_\_\_

STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

DATA SUMMARY

ORIGINAL TO: S.P.  
COPIES TO:  
.....  
.....  
LAB FILES

Source Columbia Academy @ Battle Ground

Collected By S. PACEON & SCOTT J.

Date Collected 9-9-75

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

Log Number:	75-4188	89	10	91	92					STORET	
Station:	INF	EFF	EFF	→							
			1000	1200	1600						
pH	7.9	7.8									00403
Turbidity (JTU)	46.	30.									00070
Conductivity (umhos/cm)@25°C	520.	490.									00095
COD	395.	78									00340
BOD (5 day)	220.	32.									00310
Total Coliform (Col./100ml)			>4000	400	537 60						31504
Fecal Coliform (Col./100ml)			>4000	<10	<10						31616
NO3-N (Filtered)		10.2									00620
NO2-N (Filtered)		0.82									00615
NH3-N (Unfiltered)		12.									00610
T. Kjeldahl-N (Unfiltered)		17.3									00625
O-PO4-P (Filtered)		6.3									00671
Total Phos.-P (Unfiltered)		8.3									00665
Total Solids	654	347									00500
Total Non Vol. Solids	266	216									
Total Suspended Solids	282	59									00530
Total Sus. Non Vol. Solids	18	7									

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. Hill Date 9-22-75