Publication No. 76-e10

WA-01-0050

MEMORANDUM

April 5, 1976

To: John Glynn

From: Douglas Houck

Subject: Bellingham STP

On October 8, 1976 I arrived at the Bellingham Post Point STP to conduct a Class II inspection.

Two different composite samples were taken from Bellingham's own SIRCO samplers. The first sample was composited from the morning of the 7th to the morning of the 8th. The second composite sample was composited from the 8th to the 9th. A grab sample to be analyzed for fecal coliform bacteria was taken on both the 8th and the 9th. A second grab sample taken on the 8th was analyzed for total oils.

The Sparling turbine type flow meter which the city uses to measure the effluent flow was checked by measuring the head over the suppressed sharp-crested rectangular weir at the end of the chlorine contact chamber. It was found that the Sparling flow meter was not accurate at the lower range of its capacity. While we measured a flow of 8.9 MGD, Bellingham was recording about 0 MGD. On the 9th I measured a flow of 13.5 MGD while the city was recording a flow between 12 and 13 MGD.

The following table gives DOE's results along with the NPDES weekly average effluent limitation. The computed loadings were made using DOE's measured flows for each day.

	DOE				NPDES
	10/8		10/9		
	Inf.	Eff.	Inf.	Eff.	Weekly Avg.
BOD_5 mg/l	340	250	270	285	180
(#/day)	(25,236)	(18,556)	(30,399)	(32,088)	(7,200)
T.S.S. mg/l	177	95	116	141	140
(#/day)	(13,138)	(7,051)	(13,060)	(15,875)	(5,880)
Fecal Coliform (colonies/100 ml)		<10		<10	1,500
Total Oils (mg/l)		3.0			

As can be seen by the table, Bellingham's Post Point STP was not even close in meeting either the concentration or loading effluent limitations for BOD_5. While essentially meeting the concentration limits for T.S.S. they did not meet their lbs/day requirements.

It is recommended that when the plant's flow falls below 13 MGD that an hourly measurement be taken of the head of the suppressed rectangular weir. It also appears that the city could reduce the amount of chlorine being used.

DH:ee

STP Survey Report Form

Efficiency Study

City Bellingham Plant Type Primary Pop. Served _____ Design Capacity _____

Receiving Water Bellingham Bay Perennial X Intermittent _____

Date 10-8/9-76 Survey Period 48 hrs. Survey Personnel Houck, Glynn

Comp. Sampling Frequency _____ Sampling Alequot _____

Weather Conditions (24 hr) Clear Are facilities provided for complete by-pass of raw sewage? X Yes ____ No/Frequency of bypass _____

Reason for bypass _____ Is bypass chlorinated? ____ Yes ____ No

Was DOE Notified? _____ Discharge - Intermittent _____ Continuous _____

Plant Operation

Total flow _____ How measured _____

Maximum flow _____ Time of Max. _____

Minimum flow _____ Time of Min. _____

Pre Cl_2 _____ #/day Post Cl_2 _____ #/day

Field Results

Determinations	Influent Max.	Influent Min.	Influent Mean	Influent Median	Effluent Max.	Effluent Min.	Effluent Mean	Effluent Median
Temp °C								
pH (Units)								
Conductivity (μmhos/cm²)								
Settleable Solids (mls/l)								

Laboratory Results on Composites

	Influent	Effluent	% Reduction
Laboratory No.	75-4702	4703	
5-Day BOD ppm	340	250	26%
COD ppm			
T.S. ppm			
T.N.V.S. ppm			
T.S.S. ppm	177	95	46%
N.V.S.S. ppm			
pH (Units)			
Conductivity (μmhos/cm²)			
Turbidity (JTU's)			

Laboratory Bacteriological Results

Lab No.	Sampling Time	Colonies/100 ml (MF) Total Coliform	Fecal Coliform	Fecal Strep	Cl_2 Residual
			<10		
			<10		

Additional Laboratory Results

NO_3-N ppm -	
NO_2-N ppm -	
NH_3-N ppm -	
T. Kjeldahl-N ppm -	
O-PO_4-P ppm -	
T-PO_4-P ppm -	

Operator's Name _____ Phone No. _____

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

Type of Collection System

__ Combined __ Separate __X__ Both

Estimate flow contributed by surface or ground water (infiltration)

_____ MGD

Plant Loading Information

Annual average daily flow rate (mgd)

Dry _____

Wet _____

Peak flow rate (mgd)

Dry _____

Wet _____

COMMENTS: _____

_____

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

ORIGINAL TO: J. Glynn

COPIES TO:

LAB FILES

DATA SUMMARY

Source Bellingham STP

Collected By Hover

Date Collected 10-(7&8)-75

Goal, Pro./Obj.

Log Number:	75-4702 (10-7&8)	03	04	05 (10-9)	06	07					STORET
Station:	COMP INF	COMP EFF	EFF 1330	COMP. INF.	COMP. EFF.	EFF. 0930					
pH											00403
Turbidity (JTU)											00070
Conductivity (μmhos/cm)@25°C											00095
COD											00340
BOD (5 day)	340.	250.		270.	285.						00310
Total Coliform (Col./100ml)											31504
Fecal Coliform (Col./100ml)			<10.			<10.					31616
NO3-N (Filtered)											00620
NO2-N (Filtered)											00615
NH3-N (Unfiltered)											00610
T. Kjeldahl-N (Unfiltered)											00625
O-PO4-P (Filtered)											00671
Total Phos.-P (Unfiltered)											00665
Total Solids											00500
Total Non Vol. Solids											
Total Suspended Solids	177.	95.		116.	141.						00530
Total Sus. Non Vol. Solids											
Total Oils			3.								

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

MEMORANDUM

February 9, 1976

To: Ron Pine

From: Douglas Houck

Subject: Georgia Pacific Pulp Mill
(Bellingham) Class II Inspection

On October 28, 1975, I met with the following persons:

Warren Mowry - Georgia Pacific Environmental Control Director
Dan Tangerone - EPA Sanitary Engineer

Dan Tangerone was present as part of EPA's program to audit DOE's Class II Inspections. We were given a tour of the plant and its sampling equipment and locations. Due to the extreme difficulty of installing our own sampling equipment it was decided to use Georgia Pacific's. At its pulp mill, Georgia Pacific presently has three different outfalls. Each outfall is sampled and composited separately. During the tour the temperature of the refrigerators was measured, empty containers installed and tape was put around the refrigerators so that it could be determined if the composites had been tampered with.

The flow is measured by a different method for each outfall. The flow from outfall number 003 is computed by Georgia Pacific from their formula using the plant's measured incoming flow and their production rate. In April and May this formula was checked, by measuring the flow rate using a known concentration of copper sulfate. The percent difference between the measured and reported flow rates was only 2 percent. The flow from outfall number 005 is measured by a vortex shedding flowmeter. The accuracy of this type of meter is $\pm$ 2% of the flow rate. The flow from their clarifier is measured in a pressure conduit by a magnetic flowmeter. These types of meters show good accuracy in the upper half of the meter's rated capability while a significantly lower degree of accuracy is experienced in the lower range of the meter's capacity.

On the 29th I returned to split the composited samples. The following table shows DOE's and Georgia Pacific's results along with their daily maximum and average effluent limitations. The loading limitations of Georgia Pacific's NPDES Permit are given in terms of the sum of all three outfalls. As can be seen from the table Georgia Pacific's pulp mill meets both daily maximum limitations but not the daily average limitation for BOD_5. This does not put the mill out of compliance with their permit as the daily average is defined as the average of the measured valued obtained over a calendar month's time.

A close watch of the mill's monthly monitoring reports should be made on their BOD_5 values to see if they are continually exceeding their daily average limitations. They also exceed the effluent limitation of calcium-base Sulfite Waste Liquor (SWL) as determined by the Pearl-Benson Index (PBI) method. Georgia Pacific contends that this method is not applicable to their situation and has devised their own method using ultraviolet light. With this method the mill is well within the permit limitations.

DH:ee

Parameter	Department of Ecology				Georgia Pacific				Total Limitations	
	#003	#005	Clarifier	Total	#003	#005	Clarifier	Total	Daily Max.	Daily Avg.
BOD_5 (lbs/day)	138,794	18,014	19,709	176,517	136,584	18,014	24,636	179,234	200,000	160,000
T.S.V.S. (lbs/day)	1,856	5,304	8,623	15,783	2,387	7,806	9,327	19,520	40,000	27,000
PBI as 10% solids of SWL (lbs/day)	3,306,310	350,280	480,409	4,136,999	3,553,840	296,237	450,493	4,300,570	(3,600,000)	
Flow (MGD)	---	---	---	---	5.3	12.0	21.1	38.4		
T.S.S. (lbs/day)	2,519	6,405	11,438	20,362	3,182	9,007	11,790	23,979		
SWL, UV (lbs/day)	---	---	---	---	296,153	51,041	36,954	384,148		

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

ORIGINAL TO: G. H.

COPIES TO:

LAB FILES

DATA SUMMARY

Source Georgia Pacific @ B'ham.

Collected By G. Houck

Date Collected 10-28 & 29 -75

Log Number: 75-	5046	47	48	49	50	51	52	53				
Station:	CLARIF. COMP.	#003 COMP	#005 COMP	#5 10 AM GRAB	EAP H_2O	DOE SAMPLE JAR RINSE	GP SEWER CONTAINER RINSE	G.P. CL-ALK EFF				
pH												
Turbidity (JTU)												
Conductivity (umhos/cm)@25C												
COD												
BOD (5 day)	112.	3,140	180.									
Total Coliform (Col./100ml)												
Fecal Coliform (Col./100ml)												
NO3-N (Filtered)												
NO2-N (Filtered)												
NH3-N (Unfiltered)												
T. Kjeldahl-N (Unfiltered)												
O-PO4-P (Filtered)												
Total Phos.-P (Unfiltered)												
Total Solids				1478								
Total Non Vol. Solids				546								
Total Suspended Solids	65	57	64	65								
Total Sus. Non Vol. Solids	16	15	11	15								
T.S.V.S.	49	42	53	50								
PBI	2,730	74,800	3,500									
Mercury	–	–	–	–								

Note: All results are in PPM unless otherwise specified. ND is "None Detected"

Summary By Stephen S. Roll Date 11-13-75