August 12, 1974

Publication No. 74-e09

WA-07-1110

State of Washington Department of Ecology

Memo to: John Glynn

From: Hans Cregg

Subject: Efficiency Survey Conducted at North Bend STP.

During April 23, 1974, an efficiency study was conducted at the North Bend Sewage Treatment Plant. The operator appears to be concerned with the workings of his plant and is well aware of its existing short comings. He is particularly plagued with the problem of getting parts for the outdated pumps and machinery.

Lab results show that BOD, COD and total solids reductions are reasonable for a primary plant with room for improvement. They are 42%, 23% and 23% respectively. The only immediate problem to be dealt with is the high coliform level (both total and fecal). The additional coliform samples taken upstream and downstream from the STP discharge point show the following results:

	Upstream	Downstream
Total Coliform	32,000	24,000
Fecal Coliform	Est. 80	1,700

HC:jmh

STP Survey Report Form

Efficiency Study

City North Bend Plant Type Primary Pop. Served _____ Design Capacity _____

Receiving Water _____ Perennial _____ Intermittent _____

Date 4/23/74 Survey Period 8 hour Survey Personnel Hans Cregg

Comp. Sampling Frequency Every 1/2 hour Sampling Alequot 1000 mls.

Weather Conditions (24 hr) Rainy 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 See Attached Letter How measured _____

Maximum flow _____ Time of Max. _____

Minimum flow _____ Time of Min. _____

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

Field Results

	Influent				Effluent			
___Determinations	Max.	Min.	Mean	Median	Max.	Min.	Mean	Median
Temp °C	12	11		11	11	10		10
pH (Units)	6.8	6.5		6.6	6.8	6.4		6.7
Conductivity ($\mu mhos/cm^2$)	180	150		150	160	150		150
Settleable Solids (mls/l)	10	7.5	8.5	8	2	1.5	1.6	1.5

Laboratory Results on Composites

	Influent	Effluent	% Reduction
Laboratory No.	74-1353	74-1354	
5-Day BOD ppm	<100	58	42
COD ppm	118	91	23
T.S. ppm	173	134	23
T.N.V.S. ppm	67	54	20
T.S.S. ppm	52	25	48
N.V.S.S. ppm	0	0	---
pH (Units)	6.9	6.9	
Conductivity ($\mu mhos/cm^2$)	190	130	
Turbidity (JTU's)	20	15	

Laboratory Bacteriological Results

Lab No.	Sampling Time	Colonies/100 ml (MF) Total Coliform	Fecal Coliform	Fecal Strep	Cl_2 Residual 15 sec	3 min
74-1355	0930	$>4 \times 10^4$	> 4000		0	0
1356	1130	$>4 \times 10^4$	> 4000		0	0
1357	1130 [1]	32,000	Est.80			
1358	1130 [2]	24,000	1,700			
1359	1330	$>4 \times 10^4$	> 4000		.05	.15
1360	1430	$>4 \times 10^4$	12,000		.1	.4

1 - Upstream
2 - Downstream

Additional Laboratory Results

NO_3-N ppm -	4.15
NO_2-N ppm -	N.D.
NH_3-N ppm -	4.85
T. Kjeldahl-N ppm -	5.3
O-PO_4-P ppm -	.92
T-PO_4-P ppm -	2.90

Operator's Name _____ Phone No. _____

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

Type of Collection System

__ Combined x Separate __ 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: H.J. Carey
COPIES TO:
LAB FILES

DATA SUMMARY

Source North Bend STP — Collected By H.J.C.

Date Collected 4-23-74 — Goal, Pro./Obj.

Log Number: 74-	1353	54	55	56	57	58	59	60			STORET
Station:	INF	EFF	9:30	11:30	UPS 11:30	DNS. 11:30	13:30	14:30			
pH	6.9	6.9									00403
Turbidity (JTU)	20.	15.									00070
Conductivity (umhos/cm)@25°C	190.	130.									00095
COD	118	91									00340
BOD (5 day)	<100	58									00310
Total Coliform (Col./100ml)	-	-	>4x10⁴	>4x10⁴	32,000	24,000	>4x10⁴	>4x10⁴			31504
Fecal Coliform (Col./100ml)	-	-	>4000	>4000	EST 80	1700	>4000	12,000			31616
NO3-N (Filtered)		4.15									00620
NO2-N (Filtered)		ND									00615
NH3-N (Unfiltered)		4.45									00610
T. Kjeldahl-N (Unfiltered)		5.3									00625
O-PO4-P (Filtered)		.92									00671
Total Phos.-P (Unfiltered)		2.90									00665
Total Solids	173	134									00500
Total Non Vol. Solids	67	54									
Total Suspended Solids	52	25									00530
Total Sus. Non Vol. Solids	0	0									

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

Summary By Stephen D. Roll Date 5-13-74

HAMMOND, COLLIER, & WADE – LIVINGSTONE ASSOCIATES, INC.
CONSULTING ENGINEERS
4010 STONE WAY NORTH
SEATTLE, WASHINGTON 98103

TELEPHONE: (206) 632-2664

GEORGE R. HAMMOND
WILLIAM P. COLLIER
LARRY R. WADE
DAVID LIVINGSTONE
BRUCE LIVINGSTONE
GORDON S. RECTOR
TED F. LUEBKE

April 24, 1974

State of Washington
Department of Ecology
Comp. Investigations & Studies Division
Olympia, Washington 98504

Attention: Mr. Hans Cregg, Instrument Technician

Subject : North Bend S.T.P. Field investigation, 23 April 1974.

Dear Hans:

Following are the results of the flow measurements we made between about 10:30 and 11:30 AM while you were taking samples, etc.

Our measurements were made by the cross-sectional area of flow/velocity method. The area of flow in the 10-inch effluent sewer was calculated from measurements from the crown of the pipe to the water surface at both ends of the test section, and averaged. Velocity was determined by timing (stop-watch) slugs of dye through the 317.4 ft. test section.

Data and results:

10" Effluent Sewer, D	= 0.83 ft.		0.83 ft.
Upstream, crown to W.S.	= 0.35 ft.	Downstream, crown to W.S.	= 0.50+ ft.
Upstream, d	0.48 ft.	Downstream d	= 0.33 ft.

'd' for calculations assumed to be the average and = 0.40 ft.
Cross-section area of flow for 'd' assumed = 0.256 sq. ft.
Length of test section = 317.4 ft.

Observation	Min. - Sec.	Sec.	Velocity, ft/sec.	C.F.S.	G.P.M.
No. 1	1:42	102.	3.11	0.796	357
No. 2	1:42.6	102.6	3.09	0.791	355
No. 3	1:40	100.	3.17	0.812	365
No. 4	1:39	99.	3.21	0.822	369

I suspect that the calculations from No. 3 and No. 4 are a little low as the cross-section of flow was undoubtedly increasing; since it was in a state of change (and we had used all our dye) I could see no point in re-measuring the depths.

The elevation of the water surface in the wet well was measured just before the first and just after the last flow observations. Reading from the system curves prepared and confirmed by flow measurements during the study for our comprehensive plan, both pumps operating together should have been delivering about 643 and 660 gpm when working from the two water levels observed.

After making the flow calculations and noting that they were on the order of half of what they should be, I telephoned Mr. Schultz for confirmation that both pumps had been in operation during our observations; he assured me that they were.

If I can be of any further help, please call.

Yours very truly,

HAMMOND, COLLIER & WADE - LIVINGSTONE ASSOCIATES, INC.

David Livingstone, P.E.

cc: Robert Schultz, Supt. of Public Works

DL/lc