

Publication No. 74-e25

TO: Gerry Calkins

FROM: Dan Glantz

SUBJECT: South Bend Sewage Lagoon Efficiency Study

DATE: June 5, 1974

WA-24-2020

State of
Washington
Department
of Ecology



On April 9, 1974, the writer conducted a routine efficiency study at the South Bend Lagoon. Hourly samples of the influent and effluent were composited from 1030 thru 1530. Six coliform grab samples were also made during this time.

The weather was cool and overcast during this inspection and there had been heavy rain for several previous days. As a result, there was excessive storm drainage and ground water incursion into the antiquated sewer lines. The pump stations are not able to handle this hydraulic volume and the overflow is bypassed and discharged, raw, into the river.

The two lagoons are located across the river from the town on marshy, tide land. They operate in parallel with individual chlorination chambers (one engineer's drawing with design data is attached). One of the chambers has recently been dredged and functions quite well, whereas the other chamber is in need of the same treatment to restore its capacity and eliminate a heavy accumulation of brown algae. Both basins discharge into a common effluent chamber from which the sample was taken. Influent is thru a 10" pipe into a Parshall flume. There was a full flow during the entire period of the study.

The tidal action has its effect as evidenced by the attached field and lab data, especially in the areas of conductivity and solids. There is also an effect from an oyster plant operation in the area. The 1530 influent conductivity figure of 2500 (see field data), an extreme increase over previous readings, was attributed to "washing down" at the oyster plant by the STP operator.

General appearance of the area is poor. An effort has been made to remove some of the brush, but much overgrowth remains. There is no electrical service or hot water; probably a partial cause for the lack of good housekeeping, regular sampling and lab procedures. The operation and maintenance of the plant appears to be somewhat neglected; however it must be recognized, a major problem at South Bend is a deteriorated and poorly designed collection system which overloads the plant and necessitates discharge of raw sewage into the receiving water.

DG:bjj

STP Survey Report Form

Efficiency Study

City So. Bend Plant Type Lagoon Pop. Served 1430 Design 2350
 Receiving Water Willipa River Perennial X Intermittent _____
 Date 4/9/74 Survey Period 1030-1530 Survey Personnel D. Glantz
 Comp. Sampling Frequency Hourly Sampling Alequot 800 ml (adj. to influent)
 Weather Conditions (24 hr) Cool and Overcast Are facilities provided for complete by-
 pass of raw sewage? X Yes _____ No/Frequency of bypass Frequent when raining
 Reason for bypass rainwater incursion Is bypass chlorinated? _____ Yes X No
 Was DOE Notified? _____ Discharge - Intermittent X Continuous _____

Plant Operation

Total flow 1.2 MGD How measured Parshall Flume
 Maximum flow 1.6 MGD Time of Max. 1530
 Minimum flow 1.0 MGD Time of Min. 1030
 Pre Cl₂ None #/day Post Cl₂ 30 #/day

Field Results

<u>6</u> Determinations	Influent				Effluent			
	Max.	Min.	Mean	Median	Max.	Min.	Mean	Median
Temp °C	11.5	11.0		11.0	13.0	12.0		12.0
pH (Units)	6.8	6.5		6.8	9.2	7.9		9.6
Conductivity (µmhos/cm ²)	2500	300		338	1075	1050		1050
Settleable Solids (mls/l)	1.4	0.5	1.0	1.2	0.5	TR	0.1	0.1

Laboratory Results on Composites

	Influent	Effluent	% Reduction
Laboratory No.	<u>1161</u>	<u>62</u>	
5-Day BOD ppm	<u><26</u>	<u>14</u>	<u>46%</u>
COD ppm	<u>32</u>	<u>44</u>	<u>--</u>
T.S. ppm	<u>303</u>	<u>415</u>	<u>--</u>
T.N.V.S. ppm	<u>142</u>	<u>211</u>	<u>--</u>
T.S.S. ppm	<u>23</u>	<u>45</u>	<u>--</u>
N.V.S.S. ppm	<u>6</u>	<u>26</u>	<u>--</u>
pH (Units)	<u>6.6</u>	<u>7.5</u>	
Conductivity (µmhos/cm ²)	<u>560</u>	<u>800</u>	
Turbidity (JTU's)	<u>2</u>	<u>2</u>	

Laboratory Bacteriological Results

Lab No.	Sampling Time	Colonies/100 ml (MF)			Cl ₂ Residual	
		Total Coliform	Fecal Coliform	Fecal Strep	15"	3'
63	1030	Est. 300	Est. 10		15" = 0.2	3' = 0.2
64	1130	Est. 280	Est. 20		15" = 0.4	3' = 0.5
65	1230	Est. 140	Est. 10		15" = 0.3	3' = 0.5
66	1330	Est. 180	< 10		15" = 0.4	3' = 0.5
67	1430	Est. 360	< 10		15" = 0.4	3' = 0.5
68	1530	Est. 20	< 10		15" = 0.3	3' = 0.5

Additional Laboratory Results

NO ₃ -N ppm	-	.10	
NO ₂ -N ppm	-	ND	
NH ₃ -N ppm	-	.54	
T. Kjeldahl-N ppm	-	2.2	
O-PO ₄ -P ppm	-	.03	
T-PO ₄ -P ppm	-	.94	

Operator's Name Milt Hess Phone No. 875-5571

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

Engineer drawing attached.

Type of Collection System

Combined Separate Both

Estimate flow contributed by surface or ground water (infiltration)

.3 MGD

Plant Loading Information

Annual average daily flow rate (mgd)

Peak flow rate (mgd)

Dry .7 MGD

Dry 1.5 MGD

Wet 1 MGD

Wet 1.8 MGD

COMMENTS: Very antiquated sewer lines - heavy infiltration requiring bypass of system, direct to river, during heavy rains.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

DATA SUMMARY

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

Source Sc. Ber. & L. Hoops

Collected By D. J. L.

Date Collected 4-1-74

Soil, Irr / Obj _____

Log Number:	14-	11	62	64	65	6	-7	68	STORET
Station:	1 F	EF	1036	1.	1 30	101		320	
pH	6.6	7.5							
Turbidity (JTU)	2.	.							070
Conductivity (umhos/cm)@25°C	560	800							00095
COD	32	44							00340
BOD (5 day)	<26	14							00310
Total Coliform (Col./100ml)	-		EST 300	EST 280	ES 14	EST 180	EST 360	EST 20	31504
Fecal Coliform (Col./100ml)	-	.	EST 0	EST -	EST 1	<10	<0	<0	31616
NO3-N (Filtered)		10							00620
NO2-N (Filtered)		ND							00615
NH3-N (Unfiltered)		.54							00610
T. Kjeldahl-N (Unfiltered)		22							00625
O-PO4-P (Filtered)		.0							00671
Total Phos.-P (Unfiltered)		.94							00665
Total Solids	303	43							00500
Total Non Vol. Solids	142	211							
Total Suspended Solids	3	5							00530
Total Sus. Non Vol. Solids	6	26							
<u>Chlorides</u>	77	129							

Note: All results are in PPM unless otherwise specified. ND is "None Detected"
Convert those marked with a * to PPB (PPM X 10³) prior to entry into STORET

Summary By Steph & Roll Date 2-12

4/9/74

SOUTH BEND PH 875-5571

TIME	TEMP	PH	INFLUENT		M.G.D. FLOW
			COND	S.S.	
1030	11 ⁵	6.7	310	0.5	1.6
1130	11 ⁰	6.8	325	1.2	✓
1230	11 ⁰	6.5	350	1.5	✓
1330	11 ⁰	6.6	350	0.6	✓
1430	11 ⁰	6.8	300	1.2	✓
1530	11 ⁵	6.8	2500	1.4	✓

CL₂
 15" 0.2
 3" 0.4
 15" 0.5
 3" 0.5
 15" 0.5
 3" 0.5
 15" 0.4
 3" 0.4
 15" 0.4
 3" 0.4

EFFLUENT

TEMP	PH	COND.	S.S.	COLIF
17 ⁰	8.5	1050	TRACE (ALGAE)	✓
12 ⁰	8.8	1050	0.1	✓
12 ⁰	7.9	1050	TRACE	✓
12 ⁰	8.4	1075	TRACE (COND.)	✓
13 ⁰	9.0	1060	0.5	✓
13 ⁰	9.2	1050	0.1	✓

ROCKY SEMEN - 875-5571
 SUPT.
 MILT HESS - OPERATOR - 875-5166

The map on page 6 of this publication is too illegible to be viewed online. To request a printed copy of this publication, please contact the Environmental Assessment Program at the Washington State Department of Ecology.