

February 13, 1974

WA-22-0030

Memo to: Mike Price, Ron Robinson, Files
From: Jim Armstrong
Subject: Hoquiam Sewage Treatment Plant Efficiency
Survey.



On December 16, 1973, an efficiency study was conducted at the Hoquiam Sewage Treatment Plant. The survey lasted from 0800 hours to 1530 hours. Samples were taken every one half hour from the influent and every hour from the effluent.

The plant is not well fenced. Access is easy from all sides.

The BOD on the influent was 40 and 9 on the effluent. The reduction was 77%.

The suspended solids went from 14 on the influent to 42 on the effluent for an increase of 200%. There seems to be a salt water intrusion problem at all times at the effluent. The conductivity was 3000 ($\mu\text{mhos/cm}$ @ 25°C) all day.

The city storm sewers also enter the plant, greatly increasing the flow. During periods of high runoff the storm and domestic sewage bypass into the bay at five points throughout the city sewer system.

The chlorine contact chamber needs to be reworked to allow for increased chlorine contact time.

All coliform samples were over 200 colonies per 100 mls. I could detect no chlorine residual at the final effluent.

JA:jmh

STP SURVEY REPORT FORM

(EFFICIENCY STUDY)

City Hoquiam Plant Type Lagoon Population 10,000 Design 15,000
 Served Capacity
 Receiving Water Grays Harbor Engineer Mike Price
 Date 1/16/74 Survey Period 0800-1530 Hrs. Survey Personnel J.C. Armstrong
 Comp. Sampling Frequency half hour Weather Conditions Wind, rain.
 (last 48 hours)
 Sampling Alequot _____

PLANT OPERATION

Total Flow for 8 hr period - 1.997 MGD How Measured Ave. flow x 8 hr.
 Max. (Flow) 5.991 MGD Time of Max. All day Min. _____ Time of Min. _____
 Pre Cl₂ _____ #/day Post Cl₂ 36 #/day

FIELD RESULTS

Determinations	Influent				Effluent			
	Max.	Min.	Mean	Median	Max.	Min.	Mean	Median
Temp. °C	8.6	8.4	8.5	8.6	9.6	9.6	9.6	9.6
pH	6.8	6.4	---	6.65	8.0	7.4	---	7.8
Conductivity (umhos/cm)	500	400	---	450	3000	3000	---	3000
Settleable Solids	.3	.2	.23	.2	.2	<.1	.1	<.1

LABORATORY RESULTS ON COMPOSITE IN PPM

Laboratory Number	Influent	Effluent	% Reduction
	74-0120	74-0121	
5-Day BOD	<40	9	77%
COD	24	67	Increase 179%
T.S.	227	1259	Increase 455%
T.N.V.S.	157	1044	Increase 565%
T.S.S.	14	42	Increase 200%
N.V.S.S.	8	19	Increase 138%
pH	6.5	7.6	
Conductivity	360	2400	
Turbidity	13	18	Increase 38%

Hoquiam

BACTERIOLOGICAL RESULTS

Na₂S₂O₃ added to sample before sampling after _____ min.

LAB #	SAMPLING TIME	COLONIES/100 MLS (MF)		Cl Residual	
		Total	Fecal	ppm	(after secs.)
74-0122	1145	3.2 x 10 ⁴	680	0	15
74-0123	1350	2.6 x 10 ⁴	480	0	15
74-0124	1445	3.5 x 10 ⁴	510	0	15
74-0125	1550	4.4 x 10 ⁴	340	0	15

Operator's Name _____ Phone # _____

Comments:	Test / Nutrients	Results (ppm)
	NO ₃ -N (Filtered)	.27
	NO ₂ -N (Filtered)	.02
	NH ₃ -N (Unfiltered)	2.10
	T-Kjeldahl-N (Unfiltered)	3.2
	O-PO ₄ -P (Filtered)	.01
	Total Phos.-P(Unfiltered)	.57

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

DATA SUMMARY

ORIGINAL TO: J. Armstrong
COPIES TO:
.....
.....
LAB FILES

Source Hoquiam STP

Collected By J.A.

Date Collected 1/16/74

Goal, Pro./Obj. _____

Log Number:	74-0120	121	122	123	124	125					STORET
Station:	INF	EFF	1145	1350	1445	1550					
pH	6.5	7.6									00403
Turbidity (JTU)	13.	18.									00070
Conductivity (umhos/cm)@25°C	360.	2,400									00095
COD	24.	67.									00340
BOD (5 day)	<40	9									00310
Total Coliform (Col./100ml)	-	-	3.2×10^4	2.6×10^4	3.5×10^4	4.4×10^4	EST				31504
Fecal Coliform (Col./100ml)	-	-	680	480	510	340					31616
NO3-N (Filtered)	-	.27									00620
NO2-N (Filtered)	-	.02									00615
NH3-N (Unfiltered)	-	2.1									00610
T. Kjeldahl-N (Unfiltered)	-	3.2									00625
O-PO4-P (Filtered)	-	.01									00671
Total Phos.-P (Unfiltered)	-	.57									00665
Total Solids	227.	1259.									00500
Total Non Vol. Solids	157.	1044									
Total Suspended Solids	14.	42.									00530
Total Sus. Non Vol. Solids	8.	19.									

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 Stephen D. Roll Date 1-31-74

U.S. DEPARTMENT OF THE INTERIOR
 FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
 SEWAGE TREATMENT PLANT OPERATION AND MAINTENANCE
 PRACTICES QUESTIONNAIRE

FORM APPROVED
 BUDGET BUREAU NO. 45-111527

CHECK ONE: <input type="checkbox"/> 1ST AUDIT <input type="checkbox"/> RE-AUDIT	DATE OF AUDIT: 1/16/74	PLANT DESCRIPTION CODE (For Official Use Only)
--	----------------------------------	--

A. GENERAL INFORMATION

1. PROJECT (State, Number)	SCOPE OF PROJECT (new plant, additions, etc.)
----------------------------	---

2. PLANT LOCATION (City, county) Hoguenon Grays Harbor	IDENTIFICATION OF AREAS SERVED Hoguenon
--	---

3. POPULATION

3A. FRACTION OF AREA POPULATION SERVED (%) 99%	3B. PLANT DESIGN (population equivalent) 15,000	3C. SERVED BY PLANT (domestic) 70,000
--	---	---

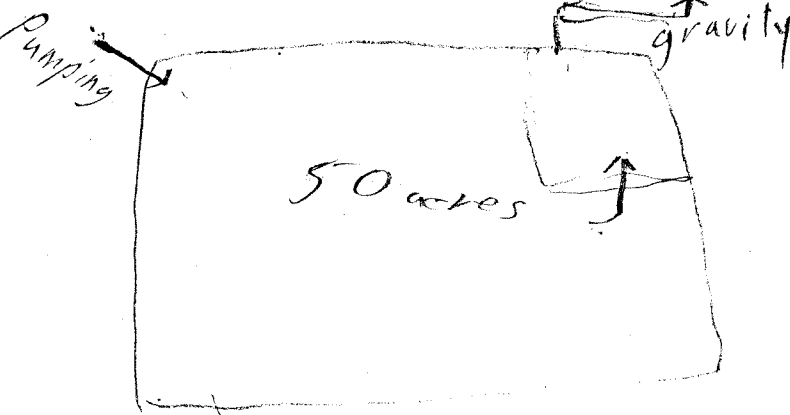
4. TYPE OF COLLECTION SYSTEM

4A. <input checked="" type="checkbox"/> COMBINED <input type="checkbox"/> SEPARATE <input type="checkbox"/> BOTH	4B. ESTIMATED FLOW CONTRIBUTED BY SURFACE OR GROUND WATER (infiltration, mgd)
--	---

5. YEAR COMMUNITY BEGAN SEWAGE TREATMENT 1959	6. YEAR PRESENT SYSTEM PLACED IN OPERATION		
	6A. SEWER 1913	6B. PLANT 1959	6C. ANCILLARY WORKS

7A. SIZE OF PLANT SITE (acres) 50	7B. APPROXIMATE AREA LEFT FOR EXPANSION (acres) 50
---	--

8A. IN THE SPACE PROVIDED BELOW FURNISH A SIMPLIFIED FLOW DIAGRAM OR A WRITTEN DESCRIPTION OF THE PLANT UNITS IN FLOW SEQUENCE. INCLUDE THE METHOD OF ULTIMATE SLUDGE DISPOSAL. SHOW APPROXIMATE SURFACE AREA OF STABILIZATION PONDS AND NUMBER OF CELLS. INDICATE WHETHER FLOW TO AND FROM PLANT IS BY PUMPING OR GRAVITY.



8B. NOTE ANY SIGNIFICANT OR UNIQUE PROCESSING CONDITIONS.

9. RECEIVING STREAM

9A. NAME OF STREAM Grays Harbor

9B. STREAM FLOW IS: <input type="checkbox"/> PERENNIAL <input checked="" type="checkbox"/> INTERMITTENT <input type="checkbox"/> NATURAL <input type="checkbox"/> REGULATED	<input type="checkbox"/> INTERSTATE <input type="checkbox"/> INTRASTATE <input checked="" type="checkbox"/> COASTAL
--	--

B. CURRENT PERFORMANCE AND PLANT LOADING INFORMATION

1A. ANNUAL AVERAGE DAILY FLOW RATE (mgd) 1,308,134,714 365	1B. PEAK FLOW RATE (mgd) 61,200,569 31 <small>DRY WEATHER</small>	1C. MINIMUM FLOW RATE (mgd) 158,036,472 31 <small>WET WEATHER</small>
2. AVERAGE BOD OF RAW SEWAGE (5 DAY 20°C) (ppm)	3. AVERAGE SETTLEABLE SOLIDS OF RAW SEWAGE (mg/l)	4. AVERAGE SUSPENDED SOLIDS OF RAW SEWAGE (mg/l)
5. ANNUAL AVERAGE PLANT REDUCTION:	6A. BOD (%)	6B. SETTLEABLE SOLIDS (%)
6C. SUSPENDED SOLIDS (%)	6D. COLIFORM DENSITY	

7A. DOES PLANT HAVE STANDBY POWER GENERATOR FOR MAJOR PUMPING FACILITIES? YES NO

7B. ADEQUATE ALARM SYSTEM FOR POWER OR EQUIPMENT FAILURES? YES NO

8. ARE CHLORINATION FACILITIES PROVIDED? YES NO
 IF YES, ANSWER 8A THRU G

IF YES, IS CHLORINATION CONTINUOUS? YES NO
 IF NO, EXPLAIN REASON FOR INTERMITTENT CHLORINATION

8A. PURPOSE OF CHLORINATION

Disinfection

8B. TYPE OF CHLORINATOR
Wallace and Tiernan

8C. POINT OF APPLICATION OF CHLORINE
Final Effluent

8D. CAN BYPASSED SEWAGE BE CHLORINATED?
 YES NO

8E. AVERAGE FEED RATE OF CHLORINE (lb/day)
36

8F. CHLORINE RESIDUAL IN EFFLUENT
3 PPM AT END OF *5* MINUTES

8G. MINIMUM SUPPLY OF CHLORINE STORED ON PREMISES (lb)
None

9. ARE FACILITIES PROVIDED FOR COMPLETE BYPASS OF RAW SEWAGE?
 YES NO IF YES, ANSWER A THRU G BELOW, ANSWER H IN EITHER CASE.

9A. FREQUENCY (times monthly)
During Heavy Flows

9B. AVERAGE DURATION (hours)

9C. REASON FOR BYPASSING
Over Flow

9D. ESTIMATED FLOW RATE DURING BYPASS IS
 WITHIN HYDRAULIC CAPACITY OF PLANT
 BEYOND HYDRAULIC CAPACITY OF PLANT BY

9E. DOES SEWAGE OVERFLOW IN DRY WEATHER?
 YES NO

9F. TYPE OF DIVERSION STRUCTURE
Diversion Box

9G. AGENCIES NOTIFIED OF BYPASS ACTION
None

9H. DO OPERATORS HAVE OPTION TO BYPASS INDIVIDUAL PLANT UNITS? (If no, has this caused any operational problems?)
 YES NO

10A. ARE BACK FLOW DEVICES PROVIDED AT ALL CONNECTIONS TO CITY WATER SUPPLY? (If no, explain)
 YES NO
None required at time of installation

10B. CHECK TYPE OF BACK FLOW PREVENTION DEVICE
 DOUBLE CHECK VALVE PRESSURE OPERATED PHYSICAL DISCONNECT OTHER (specify)

11. USES OF TREATMENT PLANT EFFLUENT

None

12. USES OF RECEIVING STREAM WITHIN 10 MILES OF OUTFALL

Recreation, Shipping, Commercial Fishing, Industry

13. HAVE THERE BEEN ANY ODOR COMPLAINTS BEYOND THE PLANT PROPERTY? (If yes, explain)
 YES NO

14. OBSERVED APPEARANCE AND CONDITION OF EFFLUENT, RECEIVING STREAM, OR DRAINAGE WAY

15. STABILIZATION PONDS

A. WEEDS CUT AND VEGETATIVE GROWTH IN PONDS ELIMINATED? YES NO

D. BANKS AND DIKLS MAINTAINED (erosion etc.)? YES NO

C. FENCING AND "LEAKING" - "POLLUTED WATER" SIGNS PRESENT AND IN GOOD REPAIR? YES NO

U. FREQUENCY OF INSPECTION BY OPERATOR

E. WATER DEPTH (feet) 3 HIGH 3 LOW 4 MEDIUM

F. ADEQUATE CONTROL OF DEPTH? YES NO

G. SEEPAGE REPORTED? YES NO

II. ANY REPORTS OF GROUND WATER CONTAMINATION FROM POND (If yes, give details)? YES NO

I. MOSQUITO BREEDING PROBLEM? YES NO

IF YES, NAME OF SPECIES IF KNOWN

J. CAN SURFACE RUN-OFF ENTER POND? YES NO

C. SUPERVISORY SERVICES

1. IS A CONSULTING ENGINEER RETAINED OR AVAILABLE FOR CONSULTATION ON OPERATING AND MAINTENANCE PROBLEMS?

YES NO IF YES IS IT ON: CONTINUING BASIS OR UPON REQUEST BASIS

IF CONTINUING BASIS, WHAT IS THE FREQUENCY OF VISITS:

2. DO OPERATORS AND OTHER PERSONNEL ROUTINELY ATTEND SHORT COURSES, SCHOOLS OR OTHER TRAINING ACTIVITIES?

YES NO

IF YES, CITE COURSE SPONSOR AND DATE OF LAST COURSE ATTENDED

IF NO, DO YOU KNOW OF ANY COURSES AVAILABLE TO SERVE THIS AREA?

None available

3A. ARE ALL EQUIPMENT AND PARTS OF THE PRESENT PLANT STILL IN OPERATION? YES NO (If no, explain)

B. ARE PROCESSING UNITS OPERATING AT DESIGN EFFICIENCY? YES NO (If no, explain)

A. HAVE THERE BEEN ANY DIFFICULTIES WITH THE SEWAGE TREATMENT PLANT?

A. STRUCTURAL YES NO (If yes explain)

B. MECHANICAL YES NO (If yes, explain)

C. OPERATIONAL YES NO (If yes, explain)

went sep tie 1964

D. BASED ON OPERATING EXPERIENCE TO DATE WHAT IF ANY CHANGES WOULD YOU RECOMMEND TO IMPROVE OPERATION OF THE PLANT?

Improve 2nd chamber, Possibly Retention, Insulation.

5. ARE OPERATING RECORDS MAINTAINED? YES NO
(If maintained, check general items included)

REPORTED TO WHOM? DOE

FREQUENCY	WEATHER	FLOW	SLUDGE HANDLED	CHEMICALS USED	DIGESTER	GRIT HANDLED	ELEC. USED	COST DATA	AIR USED	MAINTENANCE	OTHER
DAILY	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>									
WEEKLY											
MONTHLY											
ANNUALLY											

6. ARE LABORATORY RECORDS MAINTAINED? (check appropriate box)

NOT AT ALL DAILY WEEKLY MONTHLY ANNUALLY

IF MAINTAINED CHECK FORM OF RECORD BELOW:

LOG BOOK TABULAR SHEET SEPARATE BY OPERATION CONTROL CHARTS GRAPHS

WHAT PLANT AND/OR LABORATORY EQUIPMENT, GAGES AND METERS ARE CALIBRATED PERIODICALLY?

7. IS LABORATORY TESTING ADEQUATE FOR THE CONTROL REQUIRED FOR THIS SIZE AND TYPE OF PLANT?

YES NO (If no, explain)

BOD, CaliForm, suspended solids

B. INDUSTRIAL WASTES DISCHARGED TO MUNICIPAL SYSTEM:	A. NUMBER AND TYPES OF INDUSTRIES DISCHARGING TO SYSTEMS
B. POPULATION EQUIVALENT (BOD) OF INDUSTRIAL WASTES (pc)	C. POPULATION EQUIVALENT (SS) OF INDUSTRIAL WASTES (pc)
D. VOLUME OF INDUSTRIAL WASTES (mgd)	E. COMPOSITION AND CHARACTERISTICS OF INDUSTRIAL WASTES
F. MAIN DIFFICULTY EXPERIENCED WITH INDUSTRIAL WASTE (explain)	

G. HAVE INDUSTRIAL EFFLUENT PROBLEMS BEEN SOLVED? YES NO (If yes, how?)

9A. METHOD OR METHODS USED TO ASSESS INDUSTRIAL WASTE TREATMENT COST (check appropriate box)

NO CHARGE BY CITY PROPERTY TAX WATER USE ASSESSMENT CHARGE BASED ON FLOW
 CHARGED BASED ON BOD CHARGE BASED ON SS OTHER METHODS (describe)

COMMENT ON HOW CHARGE IS COLLECTED (fixed charge, sliding scale, etc.)

9B. IS INDUSTRIAL WASTE ORDINANCE IN EFFECT AND ENFORCED? YES NO

10. WHO PROVIDED INITIAL INSTRUCTION IN THE OPERATION OF THE PLANT?

Bryan Johnson DOE

11. IS A MANUAL OF PRACTICE OR INSTRUCTIONS AVAILABLE?

YES NO

IF YES, WHO WROTE AND PROVIDED IT?

DOE

12. ESTIMATE OF MAN-HOURS PER WEEK DEVOTED TO LABORATORY WORK AND MAINTENANCE OF RECORDS AND REPORTS

7 hrs.

D. PLANT PERSONNEL (Annual Average Staff for Most Recent Year Reported in Section "F")

JOB CATEGORY	NUMBER	TOTAL MAN-HOURS PER WEEK	TOTAL NUMBER CERTIFIED OR LICENSED	RANGE IN YEARS EMPLOYED AT PRESENT PLANT	RANGE IN YEARS OF EXPERIENCE IN TREATMENT
1. SUPERINTENDENT	1	10	1	15	15
2. OPERATORS	1	40			
3. LABORATORY TECHNICIANS					
4. LABORERS					
5. PART-TIME LABORERS	1	10			
6. TOTAL					

E. LABORATORY CONTROL

Enter test codes opposite appropriate items. If any of the below tests are used to monitor industrial wastes place an "X" in addition to the test code.

CODES

- 1 - 7 or more per week 3 - 1, 2, or 3 per week 5 - 2 or 3 per month 7 - Quarterly 9 - Annually
 2 - 4, 5 or 6 per week 4 - as required 6 - 1 per month 8 - Semi-Annually

ITEM	RAW	PRIMARY EFFLUENT	MIXED LIQUOR	FINAL	SLUDGE		DIGESTOR	RECEIVING STREAM
					RAW	SUPER-NATANT		
1. BOD								
2. SUSPENDED SOLIDS								
3. SETTLEABLE SOLIDS								
4. SUSPENDED VOLATILE								
5. DISSOLVED OXYGEN	1			1				
6. TOTAL SOLIDS								
7. VOLATILE SOLIDS								
8. pH	1			1				
9. TEMPERATURE	1			1				
10. COLIFORM DENSITY								
11. RESIDUAL CHLORINE	1			1				
12. VOLATILE ACIDS								
13. M. B. STABILITY								
14. ALKALINITY								
15.								
16.								
17.								
18.								
19.								

F. OPERATION AND MAINTENANCE COST FOR PLANT

YEAR OF OPERATION	SALARIES/WAGES	ELECTRICITY	CHEMICALS	MAINTENANCE	OTHER ITEMS	TOTAL
MOST CURRENT YEAR 19						
PRIOR YEAR 19						
PRIOR YEAR 19						
PRIOR YEAR 19						

EVALUATION PERFORMED BY	TITLE	ORGANIZATION
<i>J. C. Armstrong</i>	<i>Environmental Techn. II</i>	<i>D. O. E.</i>

INFORMATION FURNISHED BY	TITLE	ORGANIZATION	DATE
<i>Anton H. Paulson</i>	<i>Street & Sewer Superintendent</i>	<i>City of Houston</i>	<i>1/16/71</i>