Publication No. 74-e17

March 14, 1974

WA-24-2020

Memo to: Howard Steeley, Gerry Calkins

From: Hans Cregg

Subject: Efficiency Study of Raymond Sewage Treatment Plant.

On July 12, 1973, an efficiency study was conducted at the Raymond STP. The plant appeared clean and it was evident that good housekeeping practices were being followed. The operator was competent and was well aware of the problems plaguing his plant.

As verified by the laboratory results, the primary problem to be overcome is heavy salt water intrusion. The relatively high conductivities, total solids and total nonvolatile solids encountered in both influent and effluent samples tend to confirm this diagnosis. (See lab results.)

Total and fecal coliform levels appear to be stabilized at <400 and <200 respectively.

HC:jmh

STP SURVEY REPORT FORM

(EFFICIENCY STUDY)

City Raymond Plant Type Primary Population Served 2500 Design Capacity 5000

Receiving Water Willapa River Engineer

Date July, 1973 Survey Period 8 hour Survey Personnel H. Cregg

Comp. Sampling Frequency hourly Weather Conditions (last 48 hours) Warm & fair.

Sampling Alequot 1000 mls.

PLANT OPERATION

Total Flow 363,000 GD How Measured Totalizer

Max. (Flow) Time of Max. Min. 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	12.0	9.0	10.0	10.0	12.0	10.0	10.5	10.0
pH	7.0	6.4	---	6.6	6.8	6.5	---	6.6
Conductivity (umhos/cm)								
Settleable Solids								

LABORATORY RESULTS ON COMPOSITE IN PPM

Laboratory Number	Influent 73-2514	Effluent 73-2515	% Reduction
5-Day BOD	68	49	28
COD	192	96	50
T.S.	3258	3613	Positive
T.N.V.S.	2722	3053	Positive
T.S.S.	92	66	29
N.V.S.S.	22	16	28
pH	7.2	7.3	
Conductivity	6300	6900	
Turbidity	38	32	

Raymond

BACTERIOLOGICAL RESULTS

$Na_2S_2O_3$ added to sample Before sampling after _____ min.

LAB #	SAMPLING TIME	COLONIES/100 MLS (MF)		Cl Residual	
		Total	Fecal	15 sec ppm	3 min (after secs.)
73-2516	0830	<400	<200	.1	.35
2517	1030	<200	<200	.1	.35
2518	1230	<400	<200	.2	.35
2519	1330	<400	<200	.15	.5
2520	1430	<400	<200	.15	.5
2521	1530	<400	<200	.2	.75

Operator's Name _____ Phone # _____

Comments: _____

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

ORIGINAL TO: H. CREW
COPIES TO:
LAB FILES

DATA SUMMARY

Source RAYMOND STP — Collected By H. C.

Date Collected 7/12/73 — Goal, Pro./Obj.

Log Number:	73-2514	2515	16	17	18	19	20	21			STORET
Station:	INF	EFF	8:30	10:30	12:30	13:30	14:30	15:30			
pH	7.2	7.3									00403
Turbidity (JTU)	38.	32.									00070
Conductivity (umhos/cm)@25°C	6300	6900									00095
COD	192	96									00340
BOD (5 day)	68	49									00310
Total Coliform (Col./100ml)			<400	<200	<400	<400	<400	<400			31504
Fecal Coliform (Col./100ml)			<200	<200	<200	<200	<200	<200			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	3258*	3613*									00500
Total Non Vol. Solids	2722	3053									
Total Suspended Solids	92	66									00530
Total Sus. Non Vol. Solids	22	16									

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

*CRYSTALS APPEARING TO BE SALT WERE EVIDENT

Summary By Stephen D. Reed Date 7/25/73

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION

SEWAGE TREATMENT PLANT OPERATION AND MAINTENANCE PRACTICES QUESTIONNAIRE

FORM APPROVED
BUDGET BUREAU NO. 43-R1527

CHECK ONE	DATE OF AUDIT	PLANT DESCRIPTION CODE (For Official Use Only)
☐ 1ST AUDIT ☐ RE-AUDIT		

A. GENERAL INFORMATION

1. PROJECT (State, Number)	SCOPE OF PROJECT (new plant, additions, etc.)
	CONTACT TANKS
2. PLANT LOCATION (City, county)	**IDENTIFICATION OF AREAS SERVED**
RAYMOND WASH	DOWNTOWN & GARDENTRACT & RIVERVIEW AREA

3. POPULATION

3A. FRACTION OF AREA POPULATION SERVED (%)	3B. PLANT DESIGN (population equivalent)	3C. SERVED BY PLANT (domestic)
	5000	2500 +

4. TYPE OF COLLECTION SYSTEM

4A.	4B. ESTIMATED FLOW CONTRIBUTED BY SURFACE OR GROUND WATER (infiltration, mgd)
☒ COMBINED ☒ SEPARATE ☐ BOTH	.3

5. YEAR COMMUNITY BEGAN SEWAGE TREATMENT	6. YEAR PRESENT SYSTEM PLACED IN OPERATION		
	6A. SEWER	6B. PLANT	6C. ANCILLARY WORKS
1964	1964	1964	

7A. SIZE OF PLANT SITE (acres)	7B. APPROXIMATE AREA LEFT FOR EXPANSION (acres)
.6	

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
So Fork of Willapa River

9B. STREAM FLOW IS			
☐ PERENNIAL ☐ INTERMITTENT	☒ NATURAL ☐ REGULATED	☐ INTERSTATE ☐ INTRASTATE	☒ COASTAL

B. CURRENT PERFORMANCE AND PLANT LOADING INFORMATION

1A. ANNUAL AVERAGE DAILY FLOW RATE (mgd)	1B. PEAK FLOW RATE (mgd)		1C. MINIMUM FLOW RATE (mgd)
	DRY WEATHER	WET WEATHER	
.7	.5	.9	.400.

2. AVERAGE BOD OF RAW SEWAGE (5 DAY 20°C) (ppm)	3. AVERAGE SETTLEABLE SOLIDS OF RAW SEWAGE (ml/l)
266	INF 4.0 EFF 0.2

4. AVERAGE SUSPENDED SOLIDS OF RAW SEWAGE (mg/l)	5. AVERAGE COLIFORM DENSITY OF RAW SEWAGE (mpn per 100 ml)
498	240 000

6. ANNUAL AVERAGE PLANT REDUCTION

6A. BOD (%)	6B. SETTLEABLE SOLIDS (%)	6C. SUSPENDED SOLIDS (%)	6D. COLIFORM DENSITY

 We just started Tests 1 JAN 73

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
V Notch

8C. POINT OF APPLICATION OF CHLORINE
E F F

8D. CAN BYPASSED SEWAGE BE CHLORINATED?
☐ YES ☒ NO

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

8F. CHLORINE RESIDUAL IN EFFLUENT
_____ PPM AT END OF _____ MINUTES

8G. MINIMUM SUPPLY OF CHLORINE STORED ON PREMISES (lb)
300 lbs

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)	9B. AVERAGE DURATION (hours)	9C. REASON FOR BYPASSING
0	0	0

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
Side Gates

9G. AGENCIES NOTIFIED OF BYPASS ACTION
State Dept of Eco.

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

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

11. USES OF TREATMENT PLANT EFFLUENT
Fish Life

12. USES OF RECEIVING STREAM WITHIN 10 MILES OF OUTFALL
Fish Life

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
Good

15. STABILIZATION PONDS

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

B. BANKS AND DIKES MAINTAINED (erosion etc.)? [X] YES [ ] NO

C. FENCING AND "WARNING – POLLUTED WATER" SIGNS PRESENT AND IN GOOD REPAIR? [ ] YES [X] NO

D. FREQUENCY OF INSPECTION BY OPERATOR: Daily

E. WATER DEPTH (feet) ____ HIGH ____ LOW X MEDIUM

F. ADEQUATE CONTROL OF DEPTH? [X] YES [ ] NO

G. SEEPAGE REPORTED? [ ] YES [X] NO

H. ANY REPORTS OF GROUND WATER CONTAMINATION FROM POND (If yes, give details)? [ ] YES [X] NO

I. MOSQUITO BREEDING PROBLEM ? [ ] YES [X] NO IF YES, NAME OF SPECIES IF KNOWN

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

C. SUPERVISORY SERVICES

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

[X] YES [ ] NO IF YES IS IT ON: [ ] CONTINUING BASIS OR [X] 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?

[X] YES [ ] NO

IF YES, CITE COURSE SPONSOR AND DATE OF LAST COURSE ATTENDED State of Wash Waste Water Lab course Sept To Dec 1972

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

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

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

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

A. STRUCTURAL [X] YES [X] NO (If yes explain)

B. MECHANICAL [ ] YES [ ] NO (If yes, explain)

C. OPERATIONAL [ ] YES [ ] NO (If yes, explain)

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

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

REPORTED? ☒ YES ☐ NO

TO WHOM? Dept of Eco

FREQUENCY	WEATHER	FLOW	SLUDGE HANDLED	CHEMICALS USED	DIGESTER	GRIT HANDLED	ELEC. USED	COST DATA	AIR USED	MAIN-TENANCE	OTHER
DAILY	X	X	X	X	X						
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?

None

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

☒ YES ☐ NO (If no, explain)

8. INDUSTRIAL WASTES DISCHARGED TO MUNICIPAL SYSTEM: None

A. NUMBER AND TYPES OF INDUSTRIES DISCHARGING TO SYSTEMS

B. POPULATION EQUIVALENT (BOD) OF INDUSTRIAL WASTES (pe)

C. POPULATION EQUIVALENT (SS) OF INDUSTRIAL WASTES (pe)

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?

11. IS A MANUAL OF PRACTICE OR INSTRUCTIONS AVAILABLE? ☐ YES ☐ NO

IF YES, WHO WROTE AND PROVIDED IT?

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

8 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					
2. OPERATORS	2	20	2	4	4
3. LABORATORY TECHNICIANS					
4. LABORERS					
5. PART-TIME LABORERS					
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	6	6						
2. SUSPENDED SOLIDS	6	6						
3. SETTLEABLE SOLIDS	2	2						
4. SUSPENDED VOLATILE	0	0						
5. DISSOLVED OXYGEN	2	2						
6. TOTAL SOLIDS	0	0						
7. VOLATILE SOLIDS	0	0						
8. pH	2	2						
9. TEMPERATURE	2	0						
10. COLIFORM DENSITY	6	6						
11. RESIDUAL CHLORINE	0	2						
12. VOLATILE ACIDS	0	0						
13. M. B. STABILITY	0	2						
14. ALKALINITY	0	0						
15.								
16.								
17.								
18.								
19.								

UNNECESSARY P.Q

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

INFORMATION FURNISHED BY	TITLE	ORGANIZATION	DATE