Publication No. 73-e20

TO: Ron Robinson and Mike Price

FROM: Jim Armstrong

SUBJECT: Puyallup Sewage Treatment Plant

DATE: September 20, 1973

State of Washington Department of Ecology

On Wednesday, September 5, 1973, an efficiency survey was run at the Puyallup Sewage Treatment Plant. The survey was started at 0830 hours and concluded at 1630 hours, with samples taken every one half hour.

The conductivity at the influent read 1200 at 1430 hours. The rest of the time it never was over 500.

The clarifier effluents reported here both went to make up the total effluent.

The operator takes a chlorine residual at 0730 hours and never takes one the rest of the day even though the flow almost doubles.

I took a chlorine residual at 1117 hours and got nothing. The operator increased the $C1_2$ by 10 pounds. AT 1316 hours a residual was taken again, still nothing. The $C1_2$ was increased another 20 pounds. At 1430 hours another residual was run and the result was .2 after 3 minutes. The $C1_2$ was again increased by 20 pounds. At 1525 hours still another residual was taken and read at .2 after 3 minutes. The last residual was taken at 1610 hours and the result was zero after an increase over the day of 50 pounds of $C1_2$. The operator said he was going to increase the $C1_2$ by another 10 pounds before he went home.

Another operator said there is approximately 2 feet of sludge on the bottom of the chlorine contact chamber.

This essentially unchlorinated water is used to water the grounds, which are in good shape and well fenced.

The operator should be instructed on how to run B.O.D.'s. He said he never runs them because he can't get any results.

JA:jmh

STP SURVEY REPORT FORM

(EFFICIENCY STUDY)

City Puyallup Plant Type _____ Population Served 11,000 Design Capacity 18,000

Receiving Water Puyallup River Engineer _____

Date Sept. 5, 1973 Survey Period 0830-1600 hours Survey Personnel Armstrong

Comp. Sampling Frequency Every 1/2 hour Weather Conditions (last 48 hours) Clear, Warm

Sampling Aliquot 600 ml.

PLANT OPERATION

Total Flow 1,030,000 gal. How Measured Totalizer

Max. (Flow) 3.0mgd Time of Max. 1130-1300 Min. 1.9 mgd Time of Min. 0830

Pre Cl_2 _____ #/day Post Cl_2 150 #/day

FIELD RESULTS Left Clarifier

Determinations	Influent				Effluent			
	Max.	Min.	Mean	Median	Max.	Min.	Mean	Median
Temp. °C	20.4	18.0	19	19.0	20.2	18.6	19.7	19.6
pH	6.8	6.4		6.6	6.7	6.4		6.6
Conductivity (umhos/cm)	1200	300		450	500	400		500
Settleable Solids	28	7	14	7	<.1	<.1	<.1	<.1

LABORATORY RESULTS ON COMPOSITE IN PPM

Laboratory Number	Influent	Effluent Left Clarifier	% Reduction
5-Day BOD	171	90	47
COD	447	194	57
T.S.	501	337	33
T.N.V.S.	240	240	0
T.S.S.	304	100	67
N.V.S.S.	90	8	91
pH	7.2	7.2	
Conductivity	590	560	
Turbidity	60	40	34

STP SURVEY REPORT FORM

(EFFICIENCY STUDY)

City Puyallup Plant Type _____ Population Served _____ Design Capacity _____

Receiving Water _____ Engineer _____

Date _____ Survey Period _____ Survey Personnel _____

Comp. Sampling Frequency _____ Weather Conditions (last 48 hours) _____

Sampling Alequot _____

PLANT OPERATION

Total Flow _____ How Measured _____

Max. (Flow) _____ Time of Max. _____ Min. _____ Time of Min. _____

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

FIELD RESULTS Right Clarifier

	Influent				Effluent			
Determinations	Max.	Min.	Mean	Median	Max.	Min.	Mean	Median
Temp. °C	20.4	18.0	19.0	19.0	20.0	18.6	19.4	19.4
pH	6.8	6.4		6.6	6.7	6.6		6.6
Conductivity (umhos/cm)	1200	300		450	500	350		500
Settleable Solids	28	7	14	7	<.1	<.1	<.1	<.1

LABORATORY RESULTS ON COMPOSITE IN PPM

Laboratory Number	Influent	Effluent	% Reduction
		Right Clarifier	
5-Day BOD	171	100	42
COD	447	186	59
T.S.	501	339	32
T.N.V.S.	240	207	14
T.S.S.	304	92	70
N.V.S.S.	90	2	98
pH	7.2	7.2	
Conductivity	590	540	
Turbidity	60	50	17

STP SURVEY REPORT FORM

(EFFICIENCY STUDY)

City Puyallup Plant Type _____ Population Served _____ Design Capacity _____

Receiving Water _____ Engineer _____

Date _____ Survey Period _____ Survey Personnel _____

Comp. Sampling Frequency _____ Weather Conditions (last 48 hours) _____

Sampling Alequot _____

PLANT OPERATION

Total Flow _____ How Measured _____

Max. (Flow) _____ Time of Max. _____ Min. _____ Time of Min. _____

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

FIELD RESULTS

Determinations	Influent				Effluent			
	Max.	Min.	Mean	Median	Max.	Min.	Mean	Median
Temp. °C								
pH								
Conductivity (umhos/cm)								
Settleable Solids								

Average LABORATORY RESULTS ON COMPOSITE IN PPM

Laboratory Number	% Reduction Left Clarifier	% Reduction Right Clarifier	% Reduction - Mean
5-Day BOD	47	42	44.5
COD	57	59	58
T.S.	33	32	32.5
T.N.V.S.	0	14	7
T.S.S.	67	70	68.5
N.V.S.S.	91	98	94.5
pH			
Conductivity			
Turbidity	34	17	25.5

BACTERIOLOGICAL RESULTS

$Na_2S_2O_3$ added to sample Previous to [redacted]---Sampling _____ min.

LAB #	SAMPLING TIME	COLONIES/100 MLS (MF) Fecal Coliform	Cl Residual ppm	Cl Residual (after secs)
3242	0924	2200	<.2	3 min
3243	1118	<2000	0	3 min
3244	1318	1.5×10^5	0	3 min
3245	1445	<2000	.2	3 min
3246	1613	>40,000	0	3 min

rator's Name _____ Phone # _____

ments: _____

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

ORIGINAL TO: J. ARMSTRONG
COPIES TO:
LAB FILES

DATA SUMMARY

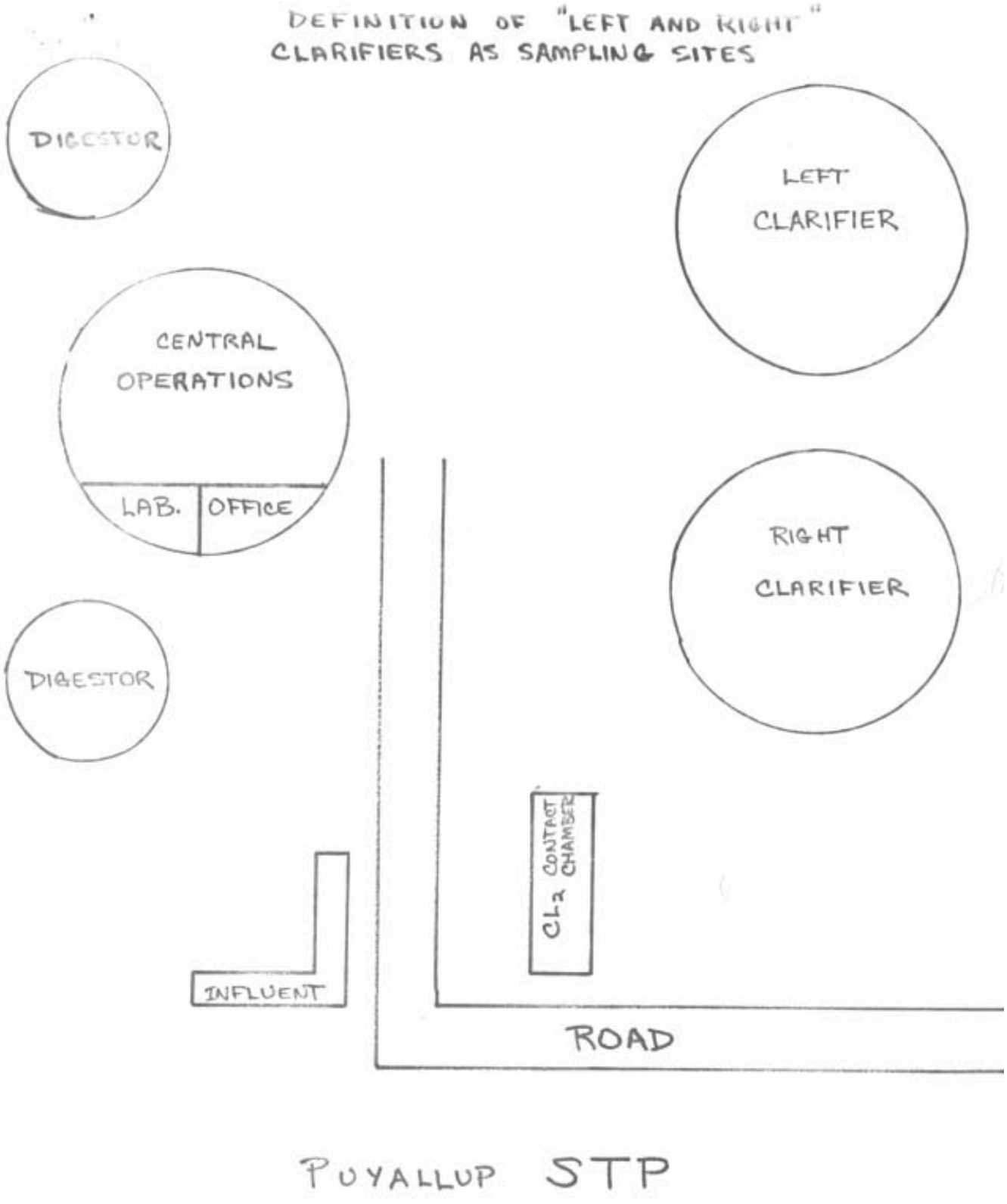
Source PUYALLUP STP — Collected By J. A.

Date Collected 9/5/73 — Goal, Pro./Obj.

Log Number: 73- 3239	40	41	42	43	44	45	46			STORET
Station:	INF.	R. CLAR.	L. CLAR.	0924	1118	1308	1445	1613			
pH	7.2	7.2	7.2							00403
Turbidity (JTU)	60	50	40							00070
Conductivity (umhos/cm)@25°	590	540	560							00095
COD	447	186	194							00340
BOD (5 day)	171	100	90							00310
Total Coliform (Col./100ml)				>16800*	>16800*	>16800*	>16800*	>16800*			31504
Fecal Coliform (Col./100ml)				2200	(2,000)-5400*		(2,000)	49000			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	501	339	337								00500
Total Non Vol. Solids	240	207	240								
Total Suspended Solids	304	92	100								00530
Total Sus. Non Vol. Solids	90	2	8								

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 Kyle D. Nelk — Date 10-13-73



PUYALLUP STP

Exhibit

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

SEWAGE TREATMENT PLANT OPERATION AND MAINTENANCE PRACTICES QUESTIONNAIRE

FORM APPROVED
BUDGET BUREAU NO. 42-R1527

CHECK ONE: ☐ 1ST AUDIT ☑ RE-AUDIT

DATE OF AUDIT: 9/5/73

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): Puyallup Pierce

IDENTIFICATION OF AREAS SERVED: City of Puyallup

3. POPULATION

3A. FRACTION OF AREA POPULATION SERVED (%): 66 2/3 %

3B. PLANT DESIGN (population equivalent): 18,000

3C. SERVED BY PLANT (domestic): 11,000

4. TYPE OF COLLECTION SYSTEM

4A. ☑ COMBINED ☐ SEPARATE ☐ BOTH

4B. ESTIMATED FLOW CONTRIBUTED BY SURFACE OR GROUND WATER (infiltration, mgd): Two wks of rain would overflow

5. YEAR COMMUNITY BEGAN SEWAGE TREATMENT: 1955

6. YEAR PRESENT SYSTEM PLACED IN OPERATION

6A. SEWER	6B. PLANT	6C. ANCILLARY WORKS
	1955	

7A. SIZE OF PLANT SITE (acres): approx 3

7B. APPROXIMATE AREA LEFT FOR EXPANSION (acres): 3,4

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.

-to wet well-to clarifiers- to digesters
↳ ovf. to Detention tank
to river

8B. NOTE ANY SIGNIFICANT OR UNIQUE PROCESSING CONDITIONS.

9. RECEIVING STREAM

9A. NAME OF STREAM: Puyallup 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): DRY WEATHER / WET WEATHER

1C. MINIMUM FLOW RATE (mgd)

2. AVERAGE BOD OF RAW SEWAGE (5 DAY 20°C) (ppm): Not Taken

3. AVERAGE SETTLEABLE SOLIDS OF RAW SEWAGE (ml/l): 1.0

4. AVERAGE SUSPENDED SOLIDS OF RAW SEWAGE (mg/l): Not Taken

5. AVERAGE COLIFORM DENSITY OF RAW SEWAGE (MPN/100 ml): Not Taken

6. ANNUAL AVERAGE PLANT REDUCTION

6A. BOD (%)	6B. SETTLEABLE SOLIDS (%)	6C. SUSPENDED SOLIDS (%)	6D. COLIFORM DENSITY (%)
	95%		

FWPCA-12 (Rev. 4-68)

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

7D. 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 & Tiernen

8C. POINT OF APPLICATION OF CHLORINE

Final Effluent

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

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

150

8F. CHLORINE RESIDUAL IN EFFLUENT

1 PPM AT END OF 3 MINUTES

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

2000

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)

4-5 times year

9B. AVERAGE DURATION (hours)

1 hr.

9C. REASON FOR BYPASSING

Heavy 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

By pass line

9G. AGENCIES NOTIFIED OF BYPASS ACTION

Dept. of Ecology

9H. DO OPERATORS HAVE OPTION TO BYPASS INDIVIDUAL PLANT UNITS? (If so, 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

Water Plant Grounds

12. USES OF RECEIVING STREAM WITHIN 10 MILES OF OUTFALL

Agriculture, Industry, Recreation

13. HAVE THERE BEEN ANY ODOR COMPLAINTS BEYOND THE PLANT PROPERTY? (If yes, explain)

☑ YES ☐ NO

Odor from clarifiers. May be from Tacoma

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

Dark grey in color. Scum on top.

15. STABILIZATION PONDS

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

B. DAMS AND DIKES MAINTAINED (erosion etc.)? ☐ YES ☐ NO

C. FENCING AND POSTED SIGNS – POLLUTED WATER? SIGNS PRESENT AND IN GOOD REPAIR? ☑ YES ☐ NO

D. FREQUENCY OF INSPECTION BY OPERATOR

E. WATER DEPTH (feet)

_____ HIGH _____ LOW _____ MEDIUM

F. ADEQUATE CONTROL OF DEPTH? ☐ YES ☐ NO

G. SEEPAGE REPORTED? ☐ YES ☐ NO

H. 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 Centralia Comm College Dept. of Ecology 5/73

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? ☑ 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 ☐ YES ☑ 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? Recirculation

5. ARE OPERATING RECORDS MAINTAINED? ☑ YES ☐ NO (If maintained, check general items included) — REPORTED? ☑ YES ☐ NO — TO WHOM? State

FREQUENCY	WEATHER	FLOW	SLUDGE HANDLED	CHEMICALS USED	DIGESTER	GRIT HANDLED	ELEC. USED	COST DATA	AIR USED	MAINTENANCE	OTHER
DAILY		✓	✓	✓		✓				✓	
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?

pH, flow meter

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

☐ YES ☑ NO (If no, explain)

No BODs

8. INDUSTRIAL WASTES DISCHARGED TO MUNICIPAL SYSTEM:	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?

Bob Lever Engineer (State)

11. IS A MANUAL OF PRACTICE OR INSTRUCTIONS AVAILABLE? ☑ YES ☐ NO — IF YES, WHO WROTE AND PROVIDED IT? State.

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	1	40	1	10 Full 2pt	10 Full 2pt
2. OPERATORS	2	56	2	7 Full 3pt	8 Full 2pt
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
2 – 4, 5 or 6 per week
3 – 1, 2, or 3 per week
4 – as required
5 – 2 or 3 per month
6 – 1 per month
7 – Quarterly
8 – Semi-Annually
9 – Annually

ITEM	RAW	PRIMARY EFFLUENT	MIXED LIQUOR	FINAL	SLUDGE		DIGESTOR	RECEIVING STREAM
					RAW	SUPER-NATANT		
1. BOD								
2. SUSPENDED SOLIDS	7	7		7				
3. SETTLEABLE SOLIDS	7			7				
4. SUSPENDED VOLATILE								
5. DISSOLVED OXYGEN	7			7				
6. TOTAL SOLIDS								
7. VOLATILE SOLIDS								
8. pH	7			7			7	
9. TEMPERATURE	7						7	
10. COLIFORM DENSITY								
11. RESIDUAL CHLORINE	-			7				
12. VOLATILE ACIDS							6	
13. M. O. STABILITY								
14. ALKALINITY							7	
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
James C. Armstrong	Environmental Tech. II	Dept. of Ecology

INFORMATION FURNISHED BY	TITLE	ORGANIZATION	DATE
Louis Porenta	Supintendent	City Puyallup	9/5