

December 7, 1973

State of
Washington
Department
of Ecology



Memo to: Ron Robinson and Mike Price.

From: Pat Lee

Subject: Efficiency Study of Shelton Sewage Treatment Plant.

An efficiency study was conducted on Shelton STP on November 7, 1973. The influent and effluent were composited on the half hour proportionate to flow. Grab samples were also collected from the Imhoff tank located on the south side of Shelton. The plant premises were not the neatest I have seen, probably due to its age, as much as lack of maintenance. The results of the survey (summarized on the STP efficiency study form) show a primary plant operating relatively efficiently with a BOD reduction of 42% and a total solids reduction of 33%. The coliform counts were very high but do not really portray what is going into Oakland Bay as the sampling location for coliform was in the wet well immediately following the chlorine addition point. The effluent then goes into a pipe that provides an additional 45 minutes of detention time before release to the bay but due to an agreement with EPA, we sample for coliform on the plant premises, as EPA does not consider effluent lines to be part of the detention system.

PL:jmh

cc: Harry Walcott, City of Shelton

STP SURVEY REPORT FORM

(EFFICIENCY STUDY)

City Shelton Plant Type Primary Population 6,600 Design 6,600
 Served Capacity

Receiving Water Oakland Bay - Puget Sound Engineer Mike Price

Date Nov. 7, 1973 Survey Period 0830-1630 hours Survey Personnel Pat Lee

Comp. Sampling Frequency half hour Weather Conditions Cold
 (last 48 hours)

Sampling Alequot (500 ml) (MGD)

PLANT OPERATION

Total Flow 528,800 gallons / 8 hours How Measured Totalizer

Max. (Flow) 1.9 MGD Time of Max. 0900 hours Min. 1.8 MGD Time of Min. 1430 hours

Pre Cl₂ 0 #/day Post Cl₂ 100 #/day

FIELD RESULTS

9Determinations	Influent				Effluent			
	Max.	Min.	Mean	Median	Max.	Min.	Mean	Median
Temp. °C	12.5	11.8	12.3	12.4	12.5	11.4	12.1	12.3
pH	7.0	6.9	---	6.9	6.9	6.8	---	6.9
Conductivity (umhos/cm)	---	---	---	---	---	---	---	---
Settleable Solids	5.0	5.0	5.0	5.0	.8	.2	.5	.4

LABORATORY RESULTS ON COMPOSITE IN PPM

Laboratory Number	Influent	Effluent	% Reduction
	73-4095	73-4096	
5-Day BOD	45	55	. 42%
COD	110	85	33%
T.S.	270	252	10%
T.N.V.S.	140	137	2%
T.S.S.	54	37	32%
N.V.S.S.	2	2	0
pH	7.3	7.4	
Conductivity	370	370	
Turbidity	26	20	

BACTERIOLOGICAL RESULTS

Na₂S₂O₃ added to sample Before Sampling After min.

LAB #	SAMPLING TIME	COLONIES/100 MLS (MF)		Cl Residual	
		Total	Fecal	ppm	(after secs)
73-4098	0915	>40,000	>4,000	2.	300
4099	1045	>40,000	>4,000	2.	"
4100	1125	>40,000	>4,000	2.	"
4101	1240	>40,000	>4,000	2.	"
4102	1415	>40,000	>4,000	1.	"
4103	1530	>40,000	>4,000	1.	"

Operator's Name Harry Walcott Phone # 426-6521

Tests:	Test	Result	Test	Result
	NO ₃ -N	.09	T-PO ₄ -P	4.6
	NO ₂ -N	.16	Color	.83
	NH ₃ -N	6.0		
	Total Kjeldahl - N	12.		
	O-PO ₄ -P	1.5		

LABORATORY RESULTS ON COMPOSITE IN PPM

Lab Number	Effluent (From Imhoff Tank)	Test	Result
73-4097		Total Coliform	19,000
5-Day BOD	45.0	Fecal Coliform	< 200
COD	160.0	NO ₃ -N	.16
T.S.	263.0	NO ₂ -N	.35
T.N.V.S.	128.0	NH ₃ -N	6.0
T.S.S.	35.0	T. Kjeldahl-N	13.0
N.V.S.S.	3.0	O-PO ₄ -P	3.4
pH	6.9	T-PO ₄ -P	8.2
Conductivity	300.0	Color	170
Turbidity	28.0		

Exhibit P

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

FORM APPROVED
BUDGET BUREAU NO. 42-111527

CHECK ONE: 1ST AUDIT RE-AUDIT
DATE OF AUDIT: 11-7-73
PLANT DESCRIPTION CODE (For Official Use Only): Primary

A. GENERAL INFORMATION

1. PROJECT (State Number): Washington
SCOPE OF PROJECT (new plant, additions, etc.): Routine
2. PLANT LOCATION (City, county): Shelton
IDENTIFICATION OF AREAS SERVED: Shelton

3. POPULATION

3A. FRACTION OF AREA POPULATION SERVED (%): 100%
3B. PLANT DESIGN (population equivalent): 6,600
3C. SERVED BY PLANT (domestic): 6,600

4. TYPE OF COLLECTION SYSTEM

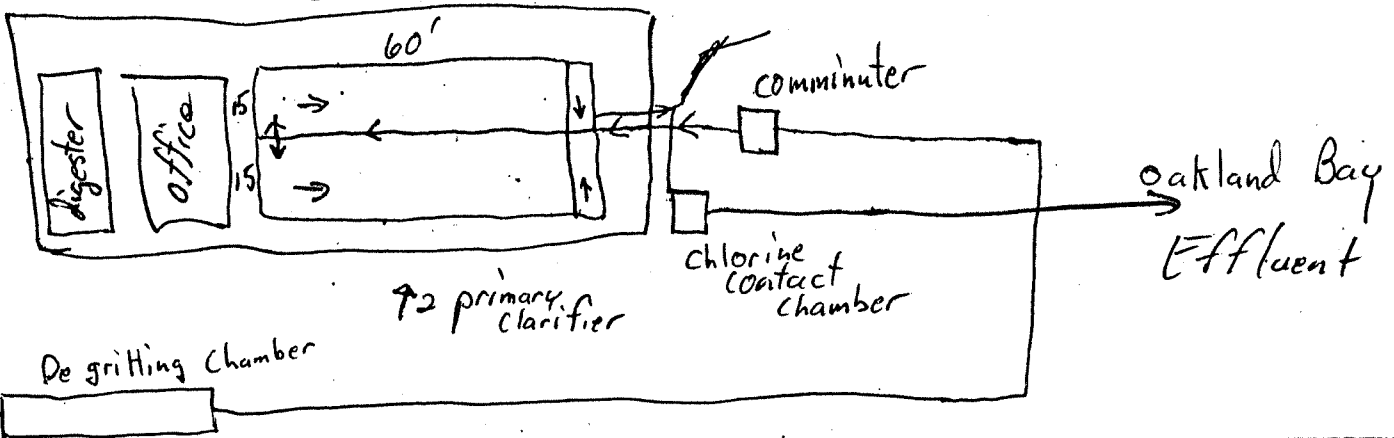
4A. COMBINED SEPARATE BOTH
4B. ESTIMATE FLOW CONTRIBUTED BY SURFACE OR GROUND WATER (infiltration, mgd): 3.25

5. YEAR COMMUNITY BEGAN SEWAGE TREATMENT: 1950
6. YEAR PRESENT SYSTEM PLACED IN OPERATION:
6A. SEWER: 1889
6B. PLANT: 1950
6C. ANCILLARY WORKS: _____

7A. SIZE OF PLANT SITE (acres): 1/2
7B. APPROXIMATE AREA LEFT FOR EXPANSION (acres): 1/4

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.

covered clarifiers



8B. NOTE ANY SIGNIFICANT OR UNIQUE PROCESSING CONDITIONS.
timed water spray as a skimmer mechanism.

9. RECEIVING STREAM

9A. NAME OF STREAM: Oakland Bay

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): 2
1B. PEAK FLOW RATE (mgd): DRY WEATHER 1.5, WET WEATHER 3.25
1C. MINIMUM FLOW RATE (mgd): 1
2. AVERAGE BOD OF RAW SEWAGE (5 DAY 20°C) (ppm): 300
3. AVERAGE SETTLEABLE SOLIDS OF RAW SEWAGE (mg/l): 3
4. AVERAGE SUSPENDED SOLIDS OF RAW SEWAGE (mg/l): _____
5. AVERAGE COLIFORM DENSITY OF RAW SEWAGE (mpn/100 ml): _____

5. ANNUAL AVERAGE PLANT PERFORMANCE

6A. BOD (%) 34
6B. SETTLEABLE SOLIDS (%) 95
6C. SUSPENDED SOLIDS (%) _____
6D. COLIFORM DENSITY (%) 99

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

8D. TYPE OF CHLORINATOR

V-Notch Wallace + Tiernan

8C. POINT OF APPLICATION OF CHLORINE

Effluent

8D. CAN BYPASSED SEWAGE BE CHLORINATED?

YES NO

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

100

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)

9B. AVERAGE DURATION (hours)

9C. REASON FOR BYPASSING

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

9G. AGENCIES NOTIFIED OF BYPASS ACTION

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

no

12. USES OF RECEIVING STREAM WITHIN 10 MILES OF OUTFALL

fishing

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 DIKES MAINTAINED (erosion etc.)?

YES NO

C. FENCING AND WEARING - 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

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)

sludge pumps

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?

update

5. ARE OPERATING RECORDS MAINTAINED? (If maintained, check general items included) <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO						REPORTED TO WHO? DOE <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO					
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"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<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? **PH**

YES NO (If no, explain)

8. INDUSTRIAL WASTES DISCHARGED TO MUNICIPAL SYSTEM: NO	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)	

9. 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?

James Cary Harrison Kramer

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

IF YES, WHO WROTE AND PROVIDED IT? **same**

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

15

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	80	1	13-5	13-5
3. LABORATORY TECHNICIANS					
4. LABORERS					
5. PART-TIME LABORERS					
6. TOTAL	2	80	1	13-5	13-5

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								
3. SETTLEABLE SOLIDS	1			1				
4. SUSPENDED VOLATILE								
5. DISSOLVED OXYGEN	5			5				
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. D. STABILITY								
14. ALKALINITY						3		
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			mil			
PRIOR YEAR 19						
PRIOR YEAR 19						

EVALUATION PERFORMED BY	TITLE	ORGANIZATION
Pat Lee	ETL	DOE

INFORMATION FURNISHED BY	TITLE	ORGANIZATION	DATE
Harry Walcott	Chief Operator	City of Shelton	

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

ORIGINAL TO: P. Lee
COPIES TO:
.....
.....
LAB FILES

DATA SUMMARY

Source Shelton STP

Collected By P. Lee

Date Collected 11-7-73

Goal, Pro./Obj. _____

Log Number:	73 -	4095	96	97	98	99	4100	01	02	03	STORET
Station:	INF	EFF	MHOFF	0915	1045	1125	1240	1415	1530		
pH	7.3	7.4	6.9								00403
Turbidity (JTU)	26.	20.	28								00070
Conductivity (umhos/cm)@25°C	370	370	300								00095
COD	110	83	160								00340
BOD (5 day)	95	57	47								00310
Total Coliform (Col./100ml)	-	-	19,000	>4x10 ⁶	>4x10 ⁴	>4x10 ⁴	>4x10 ⁴	>4x10 ⁴	>4x10 ⁴	>4x10 ⁴	31504
Fecal Coliform (Col./100ml)	-	-	<200	>4x10 ³	>4x10 ³	>4x10 ³	>4x10 ³	>4x10 ³	>4x10 ³	>4x10 ³	31616
NO3-N (Filtered)	-	.09	.16								00620
NO2-N (Filtered)	-	.16	.35								00615
NH3-N (Unfiltered)	-	6.	6.								00610
T. Kjeldahl-N (Unfiltered)	-	12.	13.								00625
O-PO4-P (Filtered)	-	1.50	3.40								00671
Total Phos.-P (Unfiltered)	-	4.60	8.20								00665
Total Solids	279	252	263								00500
Total Non Vol. Solids	140	137	128								
Total Suspended Solids	54	37	35								00530
Total Sus. Non Vol. Solids	2	2	3								
Color	92	93	170.								

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 12-3-73

763-29417