

April 9, 1974

WA-26-1092

State of  
Washington  
Department  
of Ecology



Memo to: Gerry Calkins, Howard Steeley

From: Pat Lee

Subject: Efficiency Study at Winlock STP.

A routine efficiency study was conducted at the Winlock STP on February 26, 1974. The influent and effluent were composited for eight hours at half hour intervals, proportional to flow after comminution and the secondary clarifier respectively. The plant was bypassing throughout the survey period. The bypass operates on an overflow basis on any influent flow greater than 800,000 GPD. Mr. Mathews, the operator, indicated the plant routinely bypasses for the rainy season (4 months). The bypass is chlorinated and a sample taken at the mixing box indicated good (10 colonies) disinfection. The plant is 20 years old and starting to show its age as the trickling filter wall is starting to crumble. Since the flow during the survey was approximately five times the annual average flow rate, the field and laboratory results (summarized on the efficiency study form) are somewhat dubious as valid results. The plant is definitely providing a degree of treatment (as can be seen by the suspended solids reduction percentage) but to what degree will have to be determined during a period when the plant is not hydraulically overloaded. Without a contact chamber, the plant is not providing adequate disinfection.

PL:jmh

STP SURVEY REPORT FORM

(EFFICIENCY STUDY)  
Trickling

City Winlock Plant Type Filter Population 900 Design 2000  
Served Capacity  
Receiving Water Olequa Creek Engineer Howard Steeley  
Date 2-28-74 Survey Period 0800-1600 Survey Personnel Pat Lee  
Comp. Sampling Frequency half hour Weather Conditions Rain  
(last 48 hours)  
Sampling Alequot (flow in MGD) 1000 ml = S.A.

PLANT OPERATION

Total Flow 260,000 gallons thru plant in How Measured Weir  
8 hrs.  
Max. (Flow) .788 MGD Time of Max. all day Min. ----- Time of Min. -----  
Pre Cl<sub>2</sub> 0 #/day Post Cl<sub>2</sub> 20 #/day

FIELD RESULTS

9 Determinations	Influent				Effluent			
	Max.	Min.	Mean	Median	Max.	Min.	Mean	Median
Temp. °C	8.4	7.4	-----	8.1	7.6	7.3	-----	7.5
pH	7.7	6.9	-----	7.3	7.4	7.1	-----	7.3
Conductivity (umhos/cm)	-----	-----	-----	-----	-----	-----	-----	-----
Settleable Solids	2.5	1.0	1.75	2.0	Trace	Trace	Trace	Trace

LABORATORY RESULTS ON COMPOSITE IN PPM

Laboratory Number	Influent	Effluent	% Reduction
	74-547	74-548	
5-Day BOD	<30	13	<57
COD	32	16	50
T.S.	123	103	16
T.N.V.S.	55	53	4
T.S.S.	55	8	85
N.V.S.S.	9	5	44
pH	6.7	7.1	-----
Conductivity	120	110	-----
Turbidity	17	12	-----

Winlock

## BACTERIOLOGICAL RESULTS

Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> added to sample Before sampling after \_\_\_\_\_ min.

LAB #	SAMPLING TIME	COLONIES/100 MLS (MF)		Cl Residual	
		Total	Fecal	ppm	(after secs.)
74-549	0830	>40000	12000	.2	180
550	0930	>40000	8600	.2	"
551	1030	>40000	>4000	.2	"
552	1130	>40000	>4000	.2	"
553	1130 @ bypass	28000	<10	.2	"

Operator's Name Gene Mathews Phone # 785-3891Comments: NO<sub>3</sub>-N = 6.50NO<sub>2</sub>-N = .40NH<sub>3</sub>-N = 1.64T.Kjeldahl-N = 1.8O-PO<sub>4</sub>-P = .20T-PO<sub>4</sub>-P = .70

STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

DATA SUMMARY

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

Source WINLOCK STP

Collected By P. Lee

Date Collected 2/26/74

Goal, Pro./Obj. \_\_\_\_\_

Log Number:	74- 547	548	549	550	551	552	553				STORET
Station:	1NF	EFF	0830	0930	1030	1130	6YPASS 1130				
pH	6.7	7.1									00403
Turbidity (JTU)	17.	12.									00070
Conductivity (umhos/cm)@25°C	120	110									00095
COD	32	16									00340
BOD (5 day)	<30	13									00310
Total Coliform (Col./100ml)	-	-	>4x10 <sup>4</sup>	>4x10 <sup>4</sup>	>4x10 <sup>4</sup>	>4x10 <sup>4</sup>	2.8x10 <sup>4</sup>				31504
Fecal Coliform (Col./100ml)	-	-	EST 1.2x10 <sup>4</sup>	EST 8600	>4,000	>4,000	<10				31616
NO3-N (Filtered)	-	6.50									00620
NO2-N (Filtered)	-	.40									00615
NH3-N (Unfiltered)	-	1.64									00610
T. Kjeldahl-N (Unfiltered)	-	1.8									00625
O-PO4-P (Filtered)	-	.20									00671
Total Phos.-P (Unfiltered)	-	.70									00665
Total Solids	123	103									00500
Total Non Vol. Solids	55	53									
Total Suspended Solids	55	8									00530
Total Sus. Non Vol. Solids	9	5									

Note: All results are in PPM unless otherwise specified. ND is "None Detected"  
Convert those marked with a \* to PPB (PPM X 10<sup>3</sup>) prior to entry into STORET

Summary By Stephen D. Roll Date 3-22-74

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. 42-111527

CHECK ONE <input checked="" type="checkbox"/> 1ST AUDIT <input type="checkbox"/> RE-AUDIT	DATE OF AUDIT <b>2-29-74</b>	PLANT DESCRIPTION CODE (For Official Use Only) <b>Trickling Filter</b>
--	---------------------------------	---

A. GENERAL INFORMATION

1. PROJECT (State, Number) <b>Washington</b>	SCOPE OF PROJECT (new plant, additions, etc.) <b>Routine For NPDES Permit</b>
2. PLANT LOCATION (City, county) <b>Winlock, Lewis</b>	IDENTIFICATION OF AREAS SERVED <b>City of Winlock</b>

3. POPULATION

3A. FRACTION OF AREA POPULATION SERVED (%) <b>90+</b>	3B. PLANT DESIGN (population equivalent) <b>2000</b>	3C. SERVED BY PLANT (domestic) <b>900</b>
--	---	--

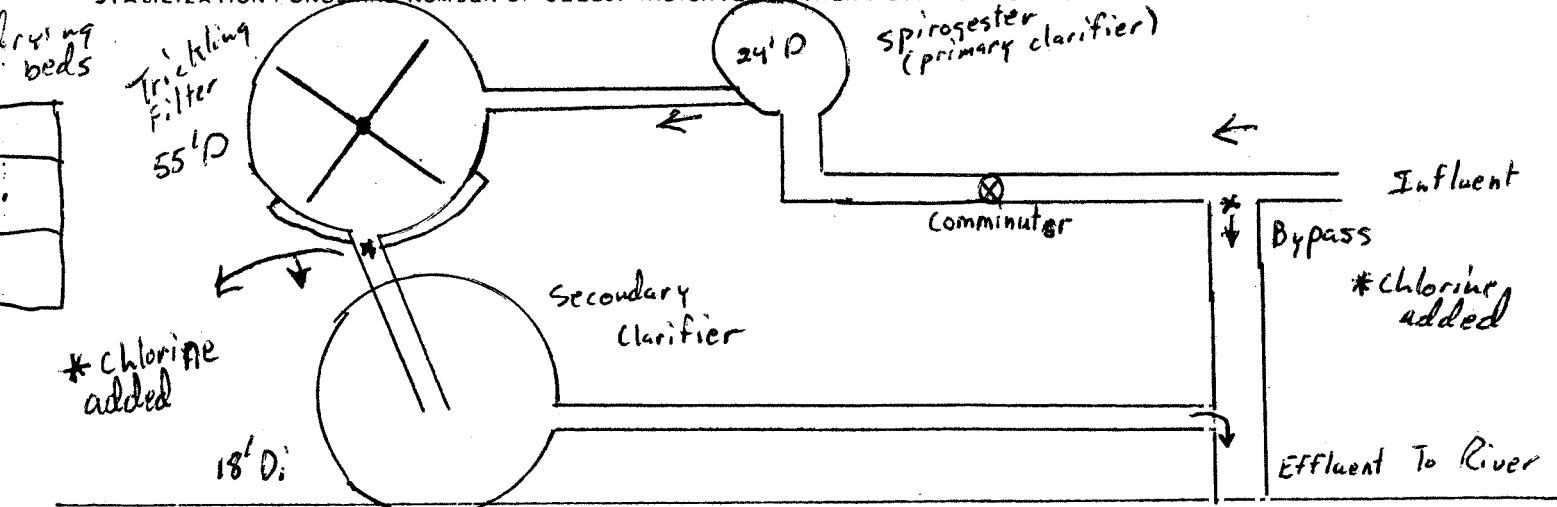
4. TYPE OF COLLECTION SYSTEM

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) <b>2.25</b>
--	--

5. YEAR COMMUNITY BEGAN SEWAGE TREATMENT <b>1954</b>	6. YEAR PRESENT SYSTEM PLACED IN OPERATION		
	6A. SEWER <b>early 1900's</b>	6B. PLANT <b>1954</b>	6C. ANCILLARY WORKS

7A. SIZE OF PLANT SITE (acres) <b>2</b>	7B. APPROXIMATE AREA LEFT FOR EXPANSION (acres) <b>2</b>
--	---

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 POND 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 <b>Olequa Creek</b>	9B. STREAM FLOW IS <input checked="" type="checkbox"/> PERENNIAL <input type="checkbox"/> INTERMITTENT <input checked="" type="checkbox"/> NATURAL <input type="checkbox"/> REGULATED		<input type="checkbox"/> INTERSTATE <input checked="" type="checkbox"/> INTRASTATE
			<input type="checkbox"/> COASTAL

B. CURRENT PERFORMANCE AND PLANT LOADING INFORMATION

1A. ANNUAL AVERAGE DAILY FLOW RATE (mgd) <b>127</b>	1B. PEAK FLOW RATE (mgd) DRY WEATHER WET WEATHER <b>2.5</b>	1C. MINIMUM FLOW RATE (mgd)
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. AVERAGE COLIFORM DENSITY OF RAW SEWAGE (ppm)	

5. ANNUAL AVERAGE PLANT PERFORMANCE

6A. BOD (%)	6B. SETTLEABLE SOLIDS (%) <b>99</b>	6C. SUSPENDED SOLIDS (%)	6D. COLIFORM DENSITY (%)
-------------	--	--------------------------	--------------------------

7A. DOES PLANT HAVE STANDBY POWER GENERATOR FOR MAJOR PUMPING FACILITIES? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	7B. ADEQUATE ALARM SYSTEM FOR POWER OR EQUIPMENT FAILURES? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
8. ARE CHLORINATION FACILITIES PROVIDED? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, ANSWER 8A THRU G	IF YES, IS CHLORINATION CONTINUOUS? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF NO, EXPLAIN REASON FOR INTERMITTENT CHLORINATION

0

8A. PURPOSE OF CHLORINATION  
*Disinfection*

8B. TYPE OF CHLORINATOR  
*Wallace + Tiernan*

8C. POINT OF APPLICATION OF CHLORINE <i>after Trickling Filter</i>	8D. CAN BYPASSED SEWAGE BE CHLORINATED? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
---	--

8E. AVERAGE FEED RATE OF CHLORINE (lb/day) <i>20</i>	8F. CHLORINE RESIDUAL IN EFFLUENT <i>.2</i> PPM AT END OF <i>3</i> MINUTES
---	---

8G. MINIMUM SUPPLY OF CHLORINE STORED ON PREMISES (lb)  
*200*

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) <i>during rainy season</i>	9B. AVERAGE DURATION (hours) <i>4 months</i>	9C. REASON FOR BYPASSING <i>system automatically by passes after 18 mgd</i>
---	---	--

9D. ESTIMATED FLOW RATE DURING BYPASS IS <input type="checkbox"/> WITHIN HYDRAULIC CAPACITY OF PLANT <input checked="" type="checkbox"/> BEYOND HYDRAULIC CAPACITY OF PLANT BY	9E. DOES SEWAGE OVERFLOW IN DRY WEATHER? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
--	---

9F. TYPE OF DIVERSION STRUCTURE <i>overflow</i>	9G. AGENCIES NOTIFIED OF BYPASS ACTION <i>DOE</i>
--	--

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 *some*

\* 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  
*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 DIKLS MAINTAINED (erosion etc.)?

YES  NO

C. FENCING AND "WARNING - 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)

*overloaded*

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)

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?  YES  NO  
(If maintained, check general items included)

REPORTED?  YES  NO  
 TO WHOM? **DOE**

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

B. INDUSTRIAL WASTES DISCHARGED TO MUNICIPAL SYSTEM: <b>NO</b>	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)	

8. 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?  
**Stevens + Koon**

11. IS A MANUAL OF PRACTICE OR INSTRUCTIONS AVAILABLE?  YES  NO  
 IF YES, WHO WROTE AND PROVIDED IT? **S+K**

12. ESTIMATE OF MAN-HOURS PER WEEK DEVOTED TO LABORATORY WORK AND MAINTENANCE OF RECORDS AND REPORTS  
**5**

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	<b>1</b>	<b>15</b>	<b>(almost)</b>	<b>2</b>	<b>2</b>
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	Filter MIXED LIQUOR EFFLUENT	FINAL	SLUDGE		DIGESTOR	RECEIVING STREAM
					RAW	SUPER-NATANT		
1. BOD								
2. SUSPENDED SOLIDS								
3. SETTLEABLE SOLIDS	1	1	1	1				
4. SUSPENDED VOLATILE								
5. DISSOLVED OXYGEN	3	3	3	3				
6. TOTAL SOLIDS								
7. VOLATILE SOLIDS								
8. pH	1	1	1	1	1			
9. TEMPERATURE					1			
10. COLIFORM DENSITY								
11. RESIDUAL CHLORINE				1				
12. VOLATILE ACIDS								
13. M. D. 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
Pat Lee	E II	DOE

INFORMATION FURNISHED BY	TITLE	ORGANIZATION	DATE
Gene Mathews	Operator	City of Winlock	2-29-74