

November 27, 1973

WA-26-1020

State of
Washington
Department
of Ecology



Memo to: Howard Steeley and Gerry Calkins.

From: Jim Armstrong

Subject: Kelso STP Efficiency Survey.

On October 24, 1973, an efficiency study was conducted at the Kelso Sewage Treatment Plant. The survey lasted from 0900 hours until 1730 hours with samples taken every one half hour.

The grounds were well fenced, but there was a lack of warning signs.

The effluent BOD was 138 and the suspended solids were 91.

The color was 380 for the influent and 360 for the effluent. The reduction was 5%.

Nutrient samples were also taken on the effluent. The results were as follows:

<u>Test</u>	<u>Results</u> <i>1.0 mg/l</i>
NO ₃ -N (Filtered)	.10
NO ₂ -N (Filtered)	ND
NH ₃ -N (Unfiltered)	18.6
T-Kjeldahl-N (Unfiltered)	27.8
O-PO ₄ -P (Filtered)	1.4
Total Phosphates - P (Unfiltered)	18.5

JA:jmh

STP SURVEY REPORT FORM

(EFFICIENCY STUDY)

City Kelso Plant Type Primary Population 10,000 Design 15,000
 Served Capacity
 Receiving Water Coweman River Engineer Howard Steeley
 Date 10-24-73 Survey Period 0900-1630 hours Survey Personnel J. C. Armstrong
 Comp. Sampling Frequency every 1/2 hours Weather Conditions rain.
 (last 48 hours)
 Sampling Alequot 700 mls.

PLANT OPERATION

Total Flow 3,970,000 Gallons How Measured Totalizer
 Max. (Flow) 1.2 MGD Time of Max. 1115 hrs. Min. .7 MGD Time of Min. 1445 - 1545
 Pre Cl₂ #/day Post Cl₂ 120 #/day

FIELD RESULTS

Determinations	Influent				Effluent			
	Max.	Min.	Mean	Median	Max.	Min.	Mean	Median
Temp. °C	17.5	16.2	16.9	17.0	17.6	16.2	17.0	17.2
pH	7.8	7.4		7.6	7.7	7.4		7.6
Conductivity (umhos/cm)								
Settleable Solids	14	8	11.7	13	.2	<.1	.1	<.1

LABORATORY RESULTS ON COMPOSITE IN PPM

Laboratory Number	Influent	Effluent	% Reduction
5-Day BOD	236	138	42%
COD	500	160	68%
T.S.	736	362	51%
T.N.V.S.	260	198	24%
T.S.S.	483	91	81%
N.V.S.S.	90	22	76%
pH	7.3	7.2	
Conductivity	530	520	
Turbidity	100	46	54%

Kelso

BACTERIOLOGICAL RESULTS

Na₂S₂O₃ added to sample Before Sampling after min.

LAB #	SAMPLING TIME	COLONIES/100 MLS (MF)	Cl Residual	
			ppm	(after secs.)
73-3951	0907	<100	>.5	15
3952	1036	<100	>.5	15
3953	1239	<200	>.5	15
3954	1538	<200	.75	15

Operator's Name _____ Phone # _____

Comments: _____

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

DATA SUMMARY

ORIGINAL TO:
✓ V. Armstrong
COPIES TO:
.....
.....
LAB FILES

Source Kelso STP

Collected By J. A.

Date Collected 10/24/73

Goal, Pro./Obj. _____

Log Number:	73-3949	50	51	52	53	54					STORET
Station:	INF	EFF	0907	1036	1239	1538					
pH	7.3	7.2									00403
Turbidity (JTU)	100	46									00070
Conductivity (umhos/cm)@25°C	530	520									00095
COD	500	160									00340
BOD (5 day)	236	138									00310
Total Coliform (Col./100ml)			<100	<100	<200	690					31504
Fecal Coliform (Col./100ml)			<100	<100	<200	<200					31616
NO3-N (Filtered)		.10									00620
NO2-N (Filtered)		ND									00615
NH3-N (Unfiltered)		18.6									00610
T. Kjeldahl-N (Unfiltered)		27.8									00625
O-PO4-P (Filtered)		1.40									00671
Total Phos.-P (Unfiltered)		18.5									00665
Total Solids	736	362									00500
Total Non Vol. Solids	260	194									
Total Suspended Solids	483	91									00530
Total Sus. Non Vol. Solids	90	22									
FECAL STRIP (coliform)			<100	<100	<200	<200					
COLOR	380	360									

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 11-16-73

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

8D. TYPE OF CHLORINATOR
Wallace & Tiernan

8C. POINT OF APPLICATION OF CHLORINE
Final filter

8D. CAN BYPASSED SEWAGE BE CHLORINATED?
 YES NO

8E. AVERAGE FEED RATE OF CHLORINE (lb/day)
120

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

8G. MINIMUM SUPPLY OF CHLORINE STORED ON PREMISES (lb)
1700

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)
2 yr. avg.

9B. AVERAGE DURATION (hours)
24 hrs. day

9C. REASON FOR BYPASSING
Rain

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
Valve

9G. AGENCIES NOTIFIED OF BYPASS ACTION
Edom

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

12. USES OF RECEIVING STREAM WITHIN 10 MILES OF OUTFALL

Recreation

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

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

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

FORM APPROVED
 BUDGET BUREAU, NO. 42-11527

CHECK ONE: 1ST AUDIT RE-AUDIT

DATE OF AUDIT: **10/24**

PLANT DESCRIPTION CODE (For Official Use Only): **Primary**

A. GENERAL INFORMATION

1. PROJECT (State, Number): **10/24**

2. PLANT LOCATION (City, county): **Kelso Cowi, Itz**

IDENTIFICATION OF AREAS SERVED: **City of Kelso**

3. POPULATION

3A. FRACTION OF AREA POPULATION SERVED (%): **100%**

3B. PLANT DESIGN (population equivalent): **15,000**

3C. SERVED BY PLANT (domestic): **10,000**

4. TYPE OF COLLECTION SYSTEM

4A. COMBINED SEPARATE BOTH

4B. ESTIMATE FLOW CONTRIBUTED BY SURFACE OR GROUND WATER (infiltration, mgd): **0.2**

5. YEAR COMMUNITY BEGAN SEWAGE TREATMENT: **1952**

6. YEAR PRESENT SYSTEM PLACED IN OPERATION: **1952**

6A. SEWER: **1952**

6B. PLANT: **1952**

6C. ANCILLARY WORKS: **1952**

7A. SIZE OF PLANT SITE (acres): **5**

7B. APPROXIMATE AREA LEFT FOR EXPANSION (acres): **5**

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 STRUCTURE OF STABILIZATION PONDS AND NUMBER OF CELLS. INDICATE WHETHER FLOW TO AND FROM PLANT IS BY DRAINAGE OR GRAVITY.

Influent lift station, three 20 H.P. pumps, started during high flow so half pump direct to river. Then through one of the grit chambers then through a Worthington Comminator into two chambers. Sludge is pumped to a primary digester overflowing to a secondary clarifier. Clarifier overflow from secondary back to influent end of plant. Clarifier water or effluent overflows weirs and into a chlorine contact basin approximate size of 25 ft X 45 ft 10 ft deep. From there through an effluent wet well and pumped direct to river.

8B. NOTE ANY SIGNIFICANT OR UNIQUE PROCESSING CONDITIONS.

9. RECEIVING STREAM

9A. NAME OF STREAM: **Coweeeman**

9B. STREAM FLOW IS: PERENNIAL INTERMITTENT NATURAL REGULATED

INTERSTATE INTRASTATE

COASTAL NON-COASTAL

B. CURRENT PERFORMANCE AND PLANT LOADING INFORMATION

1A. ANNUAL AVERAGE DAILY FLOW RATE (mgd): **1,675,000**

1B. PEAK FLOW RATE (mgd)

DRY WEATHER: .75	WET WEATHER: 5
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1C. MINIMUM FLOW RATE (mgd): **.75**

2. AVERAGE SOLUBLE SOLIDS OF RAW SEWAGE (mg/l): **12**

3. AVERAGE SUSPENDED SOLIDS OF RAW SEWAGE (mg/l): **12**

4. AVERAGE SUSPENDED SOLIDS OF RAW SEWAGE (mg/l): **12**

5. AVERAGE COLIFORM DENSITY OF RAW SEWAGE (ppm): **12**

5. ANNUAL AVERAGE PLANT PRODUCTION

5A. BOD (mg/l)

5B. SETTLABLE SOLIDS (mg/l)

5C. SUSPENDED SOLIDS (mg/l)

5D. COLIFORMS (ppm)

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

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	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?

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

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					
3. LABORATORY TECHNICIANS					
4. LABORERS					
5. PART-TIME LABORERS					
6. TOTAL					

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

G. 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

Centrailia

Dept. of Ecology

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)

Values breaking Pumps going out

C. OPERATIONAL YES NO (If yes, explain)

Lack of Personnel

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

More help

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 CANALS
					RAW	SUPER-NATANT		
1. BOD								
2. SUSPENDED SOLIDS								
3. SETTLEABLE SOLIDS								
4. SUSPENDED VOLATILE								
5. DISSOLVED OXYGEN								
6. TOTAL SOLIDS								
7. VOLATILE SOLIDS								
8. pH								
9. TEMPERATURE								
10. COLIFORM DENSITY								
11. RESIDUAL CHLORINE								
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

INFORMATION FURNISHED BY	TITLE	ORGANIZATION	DATE