

February 5, 1974

Memo to: John Glynn, Ron Pine, Files.

From: Darrel Anderson,

Subject: Sedro Woolley STP Efficiency Evaluation.



On January 8, 1974, I conducted an efficiency survey of the City of Sedro Woolley, Skagit County sewage treatment plant. Security and general plant appearance are very good. Since the plant has recently been completed, the operating personnel were still in the process of arranging equipment in the lab and working with the design engineers on operational and mechanical problems. One such problem is the aerobic digester which had a structural leak. All other operations seemed to be working properly.

Following is a short summary of field and lab results. Maximum effluent temperature was 6.8° C. Settleable solids in effluent were <0.1. Five day BOD reduction was 68%, COD 78%, total suspended solids 62% and turbidity on effluent 16. Fecal coliform colonies are less than 10/100 mls., taken at six different times. Chlorides in effluent are 22 and total oils in effluent are 2.5.

DA:jmh

STP SURVEY REPORT FORM

(EFFICIENCY STUDY)
Oxidation

City Sedro Woolley Plant Type Ditch Population 4900 Design 7000
Served Capacity

Receiving Water Skagit River Engineer _____

Date 1/8/74 Survey Period 0830-1630 hours Survey Personnel D. Anderson

Comp. Sampling Frequency half hour Weather Conditions Cloudy-cold.
(last 48 hours)

Sampling Alequot 1000 ml.

PLANT OPERATION

Total Flow .199 MGD How Measured Plant Totalizer

Max. (Flow) 550 GPM Time of Max. 1130 Min. 300 GPM Time of Min. 0830

Pre Cl₂ ----- #/day Post Cl₂ 34 #/day

FIELD RESULTS

Influent

Effluent

Determinations

	Max.	Min.	Mean	Median	Max.	Min.	Mean	Median
Temp. °C	11.9	8.9	10.7	10.8	6.8	4.6	5.8	6.0
pH	7.6	7.0	--	--	7.6	7.3	--	---
Conductivity (umhos/cm)	650	425	--	--	450	300	--	---
Settleable Solids	8.0	5.5	6.2	7.5	<.1	<.1	<.1	<.1

LABORATORY RESULTS ON COMPOSITE IN PPM

Laboratory Number	Influent	Effluent	% Reduction
	74-0019	74-0020	
5-Day BOD	119	38	68%
COD	390	85	78%
T.S.	451	273	40%
T.N.V.S.	216	146	32%
T.S.S.	243	93	62%
N.V.S.S.	84	54	36%
pH	7.7	6.0	--
Conductivity	490	340	--
Turbidity	75	16	--

Sedro Woolley

BACTERIOLOGICAL RESULTS

Na₂S₂O₃ added to sample before sampling. after _____ min.

FECAL COLIFORM

LAB #	SAMPLING TIME	COLONIES/100 MLS (MF)	Cl Residual	
			15 sec ppm	3 min. (after secs.)
74-0021	0930	< 10	.3	1.0
0022	1030		.3	1.0
0023	1145		.3	1.0
0024	1330		.15	.75
0025	1400		.3	1.0
0026	1530		.3	1.0

Operator's Name John Rowland Phone # 856-3000

Comments:	Influent	Effluent
Chlorides	28	22
Total Oils	ND	2.5
NO ₃ -N (filt)	--	17.9
NO ₂ -N (filt)	--	0.09
NH ₃ -N (unfilt)	--	2.2
T-Kjeldahl-N (unfilt)	--	4.7
O-PO ₄ -P (filt)	--	0.90
T-PO ₄ -P (unfilt)	--	7.70

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

DATA SUMMARY

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

Source Selma Wooley STP

Collected By D. Anderson

Date Collected 1-8-74

Goal, Pro./Obj. _____

Log Number:	74-0019	20	21	22	23	24	25	26	STORET
Station:	INF	EFF	0930	1030	1145	1250 time	1400	1530	
pH	7.7	6.0							00403
Turbidity (JTU)	75.	16.							00070
Conductivity (umhos/cm)@25°C	490.	340.							00095
COD	390.	85.							00340
BOD (5 day)	119	38							00310
Total Coliform (Col./100ml)	-	-	<20	EST 20	<20	<20	<20	EST 40	31504
Fecal Coliform (Col./100ml)	-	-	<10	<10	<10	<10	<10	<10	31616
NO3-N (Filtered)	-	17.9							00620
NO2-N (Filtered)	-	0.09							00615
NH3-N (Unfiltered)	-	2.2							00610
T. Kjeldahl-N (Unfiltered)	-	4.7							00625
O-PO4-P (Filtered)	-	0.90							00671
Total Phos.-P (Unfiltered)	-	7.70							00665
Total Solids	451	273							00500
Total Non Vol. Solids	216	146							
Total Suspended Solids	243	93							00530
Total Sus. Non Vol. Solids	84	54							
Chlorides	28.	22.							
TOTAL Oics	-	2.5							

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 P. Rolt Date 1-25-74

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 <i>1-8-77</i>	PLANT DESCRIPTION CODE (See Official Use Only)
-----------------------------------------------------------------------------------------------	--------------------------------	------------------------------------------------

A. GENERAL INFORMATION

1. PROJECT (State, Number)		SCOPE OF PROJECT (new plant, additions, etc.)	
2. PLANT LOCATION (City, county) <i>Sahio woodlly - skagit</i>		IDENTIFICATION OF AREAS SERVED <i>city</i>	
3. POPULATION			
3A. FRACTION OF AREA POPULATION SERVED (%) <i>100%</i>	3B. PLANT DESIGN (population equivalent) 4200 <i>7000</i>	3C. SERVED BY PLANT (domestic) <i>4900</i>	
4. TYPE OF COLLECTION SYSTEM			
4A. <input type="checkbox"/> COMBINED <input checked="" type="checkbox"/> SEPARATE <input type="checkbox"/> BOTH		4B. ESTIMATE FLOW CONTRIBUTED BY SURFACE OR GROUND WATER (infiltration, mgd)	
5. YEAR COMMUNITY BEGAN SEWAGE TREATMENT <i>1950</i>		6. YEAR PRESENT SYSTEM PLACED IN OPERATION	
		6A. SEWER <i>1973</i>	6B. PLANT
			6C. ANCILLARY WORKS
7A. SIZE OF PLANT SITE (acres) <i>3</i>		7B. APPROXIMATE AREA LEFT FOR EXPANSION (acres) <i>2</i>	

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.

SEE ATTACHED COPY

8B. NOTE ANY SIGNIFICANT OR UNIQUE PROCESSING CONDITIONS.

9. RECEIVING STREAM

9A. NAME OF STREAM <i>Skagit</i>		9. RECEIVING STREAM	
9B. STREAM FLOW IS		<input type="checkbox"/> INTERSTATE	<input type="checkbox"/> INTRASTATE
<input type="checkbox"/> PERENNIAL	<input type="checkbox"/> INTERMITTENT	<input type="checkbox"/> NATURAL	<input checked="" type="checkbox"/> REGULATED
		<input type="checkbox"/> COASTAL	

B. CURRENT PERFORMANCE AND PLANT LOADING INFORMATION

1A. ANNUAL AVERAGE DAILY FLOW RATE (mgd) <i>1.2</i>	1B. PEAK FLOW RATE (mgd)	1C. MINIMUM FLOW RATE (mgd)	
	DRY WEATHER <i>.97</i>	WET WEATHER <i>1.728</i>	<i>.97</i>
2. AVERAGE BOD OF RAW SEWAGE (5 DAY 20°C) (ppm) <i>.35</i>	3. AVERAGE SETTLEABLE SOLIDS OF RAW SEWAGE (mg/l) (5 DAY 20°C) <i>UNK</i>		
4. AVERAGE SUSPENDED SOLIDS OF RAW SEWAGE (mg/l) <i>UNK</i>	5. AVERAGE COLIFORM DENSITY OF RAW SEWAGE (ppm) (5 DAY 20°C) <i>UNK</i>		
3. ANNUAL AVERAGE PLANT PRODUCTION			
6A. BOD (T)	6B. SETTLEABLE SOLIDS (T)	6C. SUSPENDED SOLIDS (T)	6D. COLIFORM DENSITY (T)
<i>+</i>	<i>—</i>	<i>—</i>	<i>—</i>

7A. DOES PLANT HAVE STANDBY POWER GENERATOR FOR MAJOR PUMPING FACILITIES? <input checked="" type="checkbox"/> YES <input 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

8A. PURPOSE OF CHLORINATION

Disinfection

8B. TYPE OF CHLORINATOR
Wallace + Tiernan

8C. POINT OF APPLICATION OF CHLORINE
Entrance Chlorine Contact Chamber

8D. CAN BYPASSED SEWAGE BE CHLORINATED?
 YES NO

8E. AVERAGE FEED RATE OF CHLORINE (lb/day)
34#

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

8G. MINIMUM SUPPLY OF CHLORINE STORED ON PREMISES (lb)
2,000#

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

Cooling water for Aux. Generator / injector for Chlorine Mach.

12. USES OF RECEIVING STREAM WITHIN 10 MILES OF OUTFALL

Recreational

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

Clear with minimal solids present.

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 "WARNING - POLLUTED WATER" SIGNS PRESENT AND IN GOOD REPAIR?
 YES NO

E. 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

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)
NEW PLANT - complete efficiency NOT DETERMINED AS YET.

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

A. STRUCTURAL YES NO (If yes explain)
OXIDATION ditch has one leak at the EAST WALL, ABOUT center. ALSO splash guards were installed AT BEATERS.

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? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <i>(If maintained, check general items included)</i>						REPORTED? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO TO WHOM? <i>Dept of Ecology</i>					
FREQUENCY	WEATHER	FLOW	SLUDGE HANDLED	CHEMICALS USED	DIGESTER	GRIT HANDLED	ELEC. USED	COST DATA	ARR. 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							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
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?

Phmeter D.O meter Chlorine Analyzer flow meters

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 <i>NONE</i>
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)	

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?

S.T.R. - Design Engineers.

11. IS A MANUAL OF PRACTICE OR INSTRUCTIONS AVAILABLE?

YES NO

IF YES, WHO WROTE AND PROVIDED IT?

S.T.R. Design Engineers

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

28 Lab. 8hr Records + 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					<i>15 yrs</i>
2. OPERATORS					<i>12 yrs</i>
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

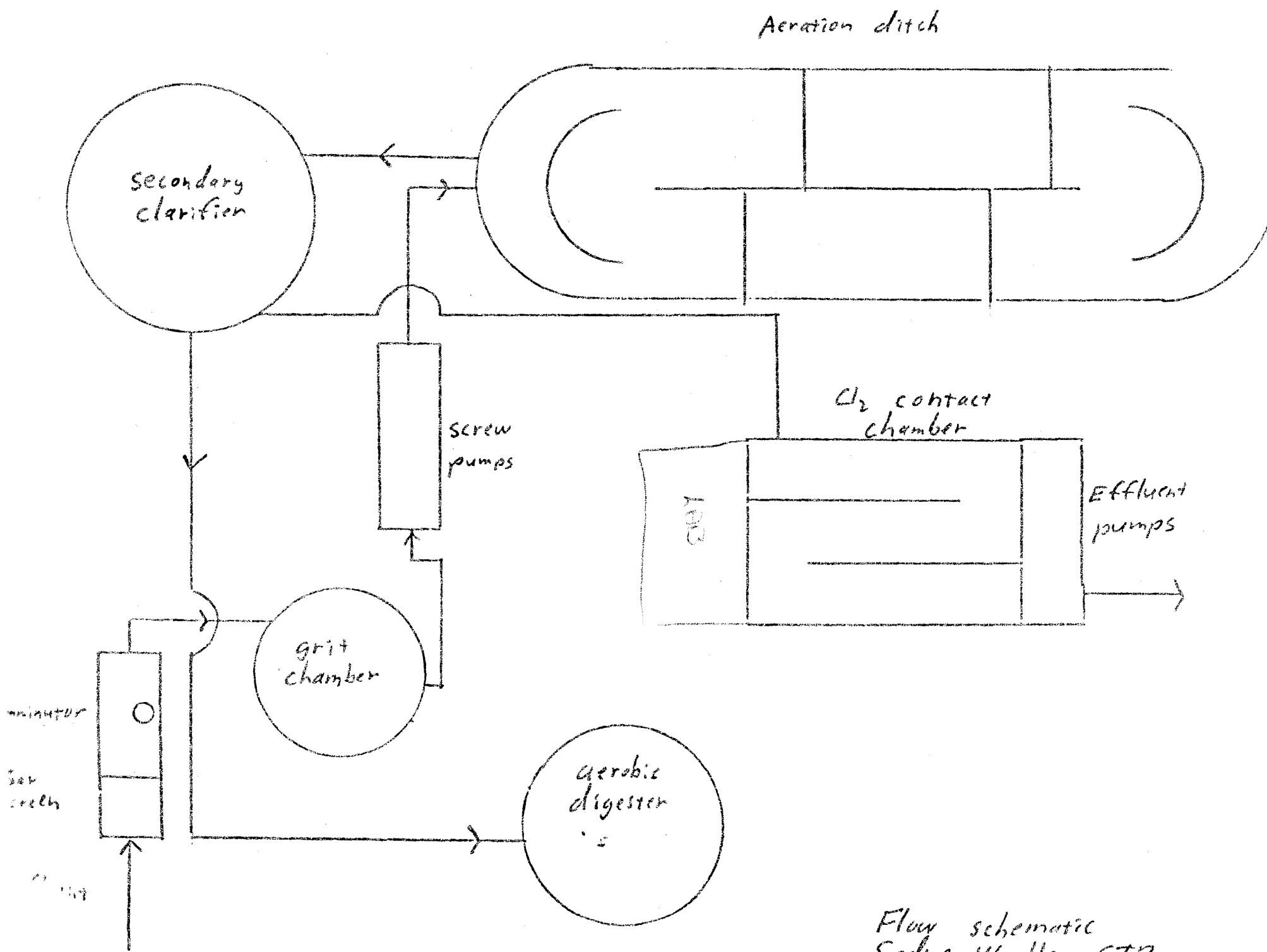
ITEM	RAW	PRIMARY EFFLUENT	MIXED LIQUOR	FINAL	SLUDGE		DIGESTOR	RECEIVING STREAM
					RAW	SUPER-NATANT		
1. BOD								
2. SUSPENDED SOLIDS								
3. SETTLEABLE SOLIDS								
4. SUSPENDED VOLATILE								
5. DISSOLVED OXYGEN								
6. TOTAL SOLIDS								
7. VOLATILE SOLIDS								
8. pH								
9. 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
DARRYL L. ANDERSON	ENVIRO. TECH. II	D.O.E.

INFORMATION FURNISHED BY	TITLE	ORGANIZATION	DATE
JOHN ROWLAN	SUPERVISOR	CITY OF SEDRO WOOLLEY	1-8-74



Flow schematic
Sedro Woolley STP