

December 21, 1973

**State of  
Washington  
Department of  
Ecology**



Memo to: John Glynn, Ron Pine, Ron Devitt and Files

From: Darrel Anderson

Subject: Lynden STP Efficiency Survey.

On November 27, 1973, I conducted an efficiency survey at the City of Lynden STP, Whatcom County. Visual appearance of the plant and grounds is very good, security of the plant was also sufficient.

The operator of the plant indicated that there is an infiltration problem during wet periods of the year. Also during the summer and fall, two food processing plants discharge into the system which creates some problems for the plant.

Laboratory results indicate a reduction of 69% for five day BOD and 65% for COD. Total solids reduction is 51%. Fecal coliform was no greater than 1,600/100 ml, and total coliform as high as  $40 \times 10^4$ /100 ml.

DA:jmh

STP SURVEY REPORT FORM

(EFFICIENCY STUDY)

City Lynden Plant Type Secondary Population 2,850 Design Unknown  
 Served Capacity  
 Receiving Water Nooksack River Engineer Unknown  
 Date 11-27-73 Survey Period 0900-1630 hrs. Survey Personnel D. Anderson  
 Comp. Sampling Frequency 1/2 hour Weather Conditions Rain, cold  
 (last 48 hours)  
 Sampling Alequot 1000 ml/ one half hour  
 No flow meter available, Stevens recorder did not operate properly. Approx. flow was computed at effluent PLANT OPERATION weir.  
 Total Flow Approx. 509,931 GPD How Measured "V" notch weir - 90°  
 Max. (Flow) ----- Time of Max. ----- Min. ----- Time of Min. -----  
 Pre Cl<sub>2</sub> ----- #/day Post Cl<sub>2</sub> 15 #/day

FIELD RESULTS

Determinations	Influent				Effluent			
	Max.	Min.	Mean	Median	Max.	Min.	Mean	Median
Temp. °C	12.6	10.9	11.8	12.0	11.4	10.2	10.9	11.0
pH	8.4	6.7	-----	-----	7.0	6.4	---	---
Conductivity (umhos/cm)	ND			→	ND			→
Settleable Solids	10.0	5.0	6.9	5.6	.2	.3	---	-----

LABORATORY RESULTS ON COMPOSITE IN PPM

Laboratory Number	Influent	Effluent	% Reduction
	73-4351	4352	
5-Day BOD	200	59	69%
COD	320	110	65%
T.S.	373	182	51%
T.K.V.S.	117	63	46%
T.S.S.	213	56	84%
N.V.S.S.	36	3	92%
pH	7.7	7.3	
Conductivity	540	550	
Turbidity	60	30	

Lynden

## 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)		3 <sup>min</sup> Cl Residual	
		Total	fecal	ppm	15 sec (after secs.)
73-4353	0915	>1.6 x 10 <sup>5</sup>	>16,000	.05	.15
54	1000	14,500	<200	.05	.1
55	1130	>1.6 x 10 <sup>5</sup>	>16,000	.05	.3
56	1300	>40 x 10 <sup>4</sup>	>16,000	.05	.5
57	1400	>4 x 10 <sup>4</sup>	>16,000	.3	.75
58	1530	>1.6 x 10 <sup>5</sup>	>16,000	.5	.3

Operator's Name Bob Rough Phone # \_\_\_\_\_

Comments: \_\_\_\_\_

	Influent	Effluent
NO <sub>3</sub> -N	---	17.5
NO <sub>2</sub> -N	---	.010
NH <sub>3</sub> -N	---	13.0
T. Kjeldahl-N	---	13.0
O-PO <sub>4</sub> -P	---	3.45
Total Phos-P	---	12.6
Color	200	130
Chlorides	21	21

STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

ORIGINAL TO: D. Anderson  
COPIES TO:  
.....  
.....  
LAB FILES .....

DATA SUMMARY

Source LYNDEN STP

Collected By D.A.

Date Collected 11-27-73

Goal, Proj./Obj. \_\_\_\_\_

Log Number:	23	4351	52	53	54	55	56	57	58	STORET
Station:	1NF	EFF	0915	1000	1130	1200	1400	1530		
pH	7.7	7.3								00403
Turbidity (JTU)	60.	30.								00070
Conductivity (umhos/cm) @ 25°C	540.	550.								00095
COD	320.	110.								00340
BOD (5 day)	200.	59.								00310
Total Coliform (Col./100ml)	-	-	>1.6x10 <sup>6</sup>	14,500	>1.6x10 <sup>6</sup>	>4.0x10 <sup>6</sup>	>4.8x10 <sup>6</sup>	>1.6x10 <sup>6</sup>		31504
Fecal Coliform (Col./100ml)	-	-	>16,000	<200	>16,000	>16,000	>16,000	>16,000		31616
NO3-N (Filtered)	-	17.5								00620
NO2-N (Filtered)	-	.010								00615
NH3-N (Unfiltered)	-	13.								00610
T. Kjeldahl-N (Unfiltered)	-	12.								00625
O-POL-P (Filtered)	-	3.45								00671
Total Phos.-P (Unfiltered)	-	12.6								00665
Total Solids	373	182								00500
Total Non Vol. Solids	117	63								
Total Suspended Solids	213	56								00530
Total Sus. Non Vol. Solids	36	3								
COLOR	200	130								
Chlorides	21	21								

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 P. Roth Date 12-14-73

*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. 42-71527

CHECK ONE:  1ST ADRIT  RE-AUDIT

DATE OF AUDIT: *11-27-73*

PLANT DESCRIPTION CODE (For Official Use Only):

**A. GENERAL INFORMATION**

1. PROJECT (Name, Number):

2. PLANT LOCATION (City, County): *LYNDEEN, W.V.*

3. POPULATION

3A. FRACTION OF AREA & POPULATION SERVED BY: *whole*

3B. PLANT DESIGN (population equivalent): *2850 APPROX.*

3C. SERVED BY PLANT (domestic):

4. TYPE OF COLLECTION SYSTEM

4A.  COMBINED  SEPARATE  BOTH

4B. ESTIMATED FLOW CONTRIBUTED BY SURFACE OR GROUND WATER (infiltration, etc.):

5. YEAR COMMUNITY BEGAN SEWAGE TREATMENT: *1938*

6. YEAR PRESENT SYSTEM PLACED IN OPERATION

6A. SENES: *1938*

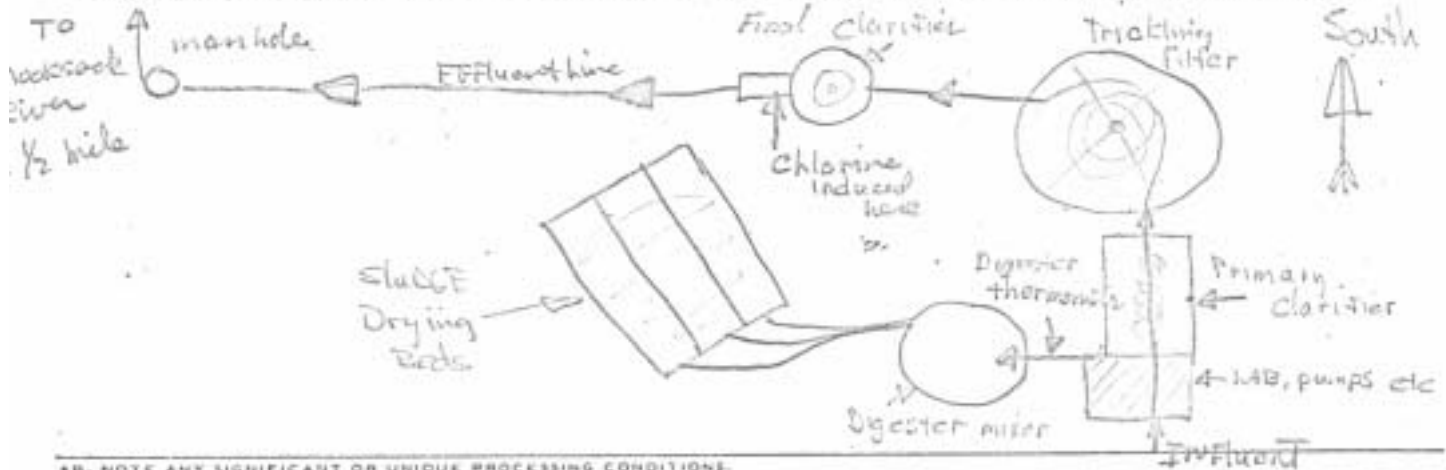
6B. PLANT: *1938*

6C. ANCILLARY WORKS:

7A. SIZE OF PLANT SITE (acres): *1 Acre*

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

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 APPROPRIATE SURFACE AREA OF STABILIZATION PONDS 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: *Nooksack 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): *unk*

1B. PEAK FLOW RATE (mgd)

1C. MINIMUM FLOW RATE (mgd)

2. AVERAGE BOD OF RAW SEWAGE 5 DAY 20°C (mg/l): *44%*

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 (mpn/100 ml):

**5. ANNUAL AVERAGE PLANT PRODUCTION**

6A. BOD (mg/l):

6B. SETTLEABLE SOLIDS (mg/l):

6C. SUSPENDED SOLIDS (mg/l):

6D. COLIFORM (mpn/100 ml):

15. STABILIZATION POND

A. WEEDS CUT AND VEGETATIVE GROWTH IN PONDS ELIMINATED? <input type="checkbox"/> YES <input type="checkbox"/> NO	B. DAMS AND DILLS MAINTAINED (BRUSH, ETC.)? <input type="checkbox"/> YES <input type="checkbox"/> NO
C. FISHING AND TRAWLING - "POLLUTED WATER" SIGNS PRESENT AND IN GOOD REPAIR? <input type="checkbox"/> YES <input type="checkbox"/> NO	D. FREQUENCY OF INSPECTION BY OPERATOR
E. WATER DEPTH (ft) _____ HIGH _____ LOW _____ MEDIUM	
F. ADEQUATE CONTROL OF DEPTH? <input type="checkbox"/> YES <input type="checkbox"/> NO	G. SEEPAGE REPORTED? <input type="checkbox"/> YES <input type="checkbox"/> NO
H. ANY REPORTS OF GROUND WATER CONTAMINATION FROM POND (If yes, give details)? <input type="checkbox"/> YES <input type="checkbox"/> NO	

I. UNUSUAL BLEEDING PROBLEMS? <input type="checkbox"/> YES <input type="checkbox"/> NO	IF YES, NAME OF SPECIES IF KNOWN	J. CAN SURFACE RUN-OFF ENTER POND? <input type="checkbox"/> YES <input type="checkbox"/> NO
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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? N.K.  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?

2A. DOES PLANT HAVE STANDBY POWER GENERATOR FOR MAJOR PUMPING FACILITIES?  YES  NO

2B. ADEQUATE ALARM SYSTEM FOR PUMP OR EQUIPMENT FAILURES?  YES  NO

3. ARE CHLORINATION FACILITIES PROVIDED?  YES  NO

4. IF YES, IS CHLORINATION CONTINUOUS?  YES  NO

5. IF NO, EXPLAIN REASON FOR INTERMITTENT CHLORINATION

6A. PURPOSE OF CHLORINATION  
*Disinfection*

6B. TYPE OF CHLORINATOR  
*W.T. & NUTCH*

6C. POINT OF APPLICATION OF CHLORINE

6D. CAN BYPASSED SEWAGE BE CHLORINATED?  YES  NO

6E. AVERAGE FEED RATE OF CHLORINE (lb/day)  
*15 LBS/DAY*

6F. CHLORINE RESIDUAL IN EFFLUENT  
 \_\_\_\_\_ PPM AT END OF \_\_\_\_\_ MINUTES

6G. MINIMUM SUPPLY OF CHLORINE STORED ON PREMISES (lb)  
*WHAT IS*

7. ARE FACILITIES PROVIDED FOR COMPLETE BYPASS OF RAW SEWAGE?  YES  NO

IF YES, ANSWER A THRU G BELOW. ANSWER H IN EITHER CASE.

8A. FREQUENCY (times monthly)  
*ONLY ONCE*

8B. AVERAGE DURATION (hours)  
*NK*

8C. REASON FOR BYPASSING  
*DOWNHILL FLIGHTS*

8D. ESTIMATED FLOW RATE DURING BYPASS IS  
 WITHIN HYDRAULIC CAPACITY OF PLANT *NK*  
 BEYOND HYDRAULIC CAPACITY OF PLANT BY \_\_\_\_\_

8E. DOES SEWAGE OVERFLOW IN DRY WEATHER?  YES  NO

8F. TYPE OF DIVERSION STRUCTURE  
*MANUAL GATE*

8G. AGENCIES NOTIFIED OF BYPASS ACTION

8H. 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  
*NONE*

12. USES OF RECEIVING STREAM WITHIN 10 MILES OF OUTFALL  
*FISHING - IRRIGATION - REC. SWIMMING*

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

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

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 - 1, 2, or 3 per week    3 - 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	5						5	
2. SUSPENDED SOLIDS	—							
3. SETTLEABLE SOLIDS	2	2		2				
4. SUSPENDED VOLATILE	—							
5. DISSOLVED OXYGEN	2	2		2			5	
6. TOTAL SOLIDS	—							
7. VOLATILE SOLIDS	—							
8. pH	2	2		2			2	
9. TEMPERATURE	2	2		2			2	
10. COLIFORM DENSITY	—							
11. RESIDUAL CHLORINE	2			2				
12. VOLATILE ACIDS	6						6	
13. H. D. STABILITY	—							
14. ALKALINITY	2						2	
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
D.L. ANDERSON	Enviro. TECH II	D.O.E.

INFORMATION FURNISHED BY	TITLE	ORGANIZATION	DATE
Bob ROUGH	Gen. M. operator	City of London	11-27-73



5. ARE OPERATING RECORDS MAINTAINED BY YOU OR CONTRACTOR, CHECK APPROPRIATE BOXES (INCLUDES)

REPORTED TO WHOM?  YES  NO

FREQUENCY	WEATHER	FLOW	SLUDGE HANDLED	CHEMICALS USED	DIGESTER	GRIT HANDLED	ELEC. USED	COST DATA	AIR USED	MAINTENANCE	OTHER
DAILY	<input checked="" type="checkbox"/>	STARTED TRAINING	—	—	<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?

YES  NO (if no, explain)

B. INDUSTRIAL WASTES DISCHARGED TO MUNICIPAL SYSTEM:

A. NUMBER AND TYPES OF INDUSTRIES DISCHARGING TO SYSTEMS  
2 - FORD PROCESSING

B. POPULATION EQUIVALENT (P.E.) OF INDUSTRIAL WASTES (per)

C. POPULATION EQUIVALENT (P.E.) OF INDUSTRIAL WASTES (per)

D. VOLUME OF INDUSTRIAL WASTES (mgd) N.K.

E. COMPOSITION AND CHARACTERISTICS OF INDUSTRIAL WASTES

F. MAIN DIFFICULTY EXPERIENCED WITH INDUSTRIAL WASTE (explain)

STRICKLING FILTER

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.)

N.K.

9B. IS INDUSTRIAL WASTE ORDINANCE IN EFFECT AND ENFORCED?  YES  NO

10. WHO PROVIDED INITIAL INSTRUCTION IN THE OPERATION OF THE PLANT?

PREVIOUS EMPLOYEES

11. IS A MANUAL OF PRACTICE OR INSTRUCTIONS AVAILABLE?

YES  NO

IF YES, WHO WROTE AND PROVIDED IT?

STATE OF WASHINGTON

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

35 HRS PER WEEK

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 THIS POST
1. SUPERINTENDENT					
2. OPERATORS	295	29 HRS	ONE	17 YRS.	9 YRS.
3. LABORATORY TECHNICIAN					
4. LABORERS					
5. PART-TIME LABORERS					
6. TOTAL					