

March 25, 1974

Memo to: Mike Price and Ron Robinson
From: Hans Cregg
Subject: Tacoma Narrows STP Efficiency Study.



Tacoma Narrows STP (Western Slopes) efficiency survey was conducted on September 18, 1973. The plant and laboratory facilities were clean and it appeared that good housekeeping practices were followed throughout the treatment plant.

Lab results show that BOD, COD and solids reductions could be improved upon. The total and fecal coliform counts are somewhat inconclusive due to the high dilutions used. I was, however, assured by the department's microbiologist that although the actual coliform count is indeterminate, the order of magnitude is correct.

HC:jmh

SIX MONTH REPORT
(EFFICIENCY STUDY)

City Tacoma (Narrows) Plant Type Primary Population 12,000 Design 16,000
 Served Capacity
 Receiving Water Tacoma Narrows Engineer _____
 Date 9/18/73 Survey Period 0900-1500 Survey Personnel H. Cregg
 Comp. Sampling Frequency 1/2 hour Weather Conditions Cloudy
 (last 48 hours)
 Sampling Alequot _____

PLANT OPERATION

Total Flow _____ How Measured _____
 Max. (Flow) _____ Time of Max. _____ Min. _____ Time of Min. _____
 Pre Cl₂ _____ #/day Post Cl₂ 65 #/day

FIELD RESULTS

Determinations	Influent (Grab Sample)				Effluent			
	Max.	Min.	Mean	Median	Max.	Min.	Mean	Median
Temp. °C	19.5	19.0	19.2	19.2	19.5	19.0	19.2	19.3
pH	7.4	7.2	---	7.2	7.3	7.0	---	7.2
Conductivity (umhos/cm)	---	---	---	---	---	---	---	---
Settleable Solids	13	12	12.5	12.5	.2	.1	.15	.15

LABORATORY RESULTS ON COMPOSITE IN PPM

Laboratory Number	Influent (Grab)	Effluent	% Reduction
	73-3380	73-3381	
5-Day BOD	182	101	45
COD	362	225	38
T.S.	706	396	44
T.N.V.S.	466	240	44
T.S.S.	173	87	50
N.V.S.S.	17	9	47
pH	7.2	7.4	
Conductivity	1080	770	
Turbidity	70	41	41

Tacoma Narrows

BAACTERIOLOGICAL RESULTS

Na₂S₂O₃ added to sample Before sampling after _____ min.

LAB #	SAMPLING TIME	COLONIES/100 MLS (M _F)		Cl Residual	
		Total	Fecal	ppm	(after secs.)
73-3382	0900	<4000	<4000	.75	15
3383	1100	<20000	<20000	.75	15
3384	1400	<20000	<20000	.35	15
3385	1600	31000	<20000	---	--

Operator's Name _____ Phone # _____

Comments: _____

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

ORIGINAL TO:
J. ARMSTRONG
COPIES TO:
.....
.....
LAB FILES

DATA SUMMARY

Source TACOMA NARROWS STP

Collected By J. A.

Date Collected 9-18-73

Goal, Pro./Obj. _____

Log Number:	73-3380	81	82	83	84	85					STORET
Station:	INF GRAB	EFF COMP	0900	1100	1400	1600					
pH	7.2	7.4									00403
Turbidity (JTU)	70.	41.									00070
Conductivity (umhos/cm)@25°C	1080	770									00095
COD	362	225									00340
BOD (5 day)	182	101									00310
* Total Coliform (Col./100ml)	-	-	<4,000	<20,000	<20,000	31,000					31504
* Fecal Coliform (Col./100ml)	-	-	<4,000	<20,000	<20,000	<20,000					31616
NO3-N (Filtered)											00620
NO2-N (Filtered)											00615
NH3-N (Unfiltered)											00610
T. Kjeldahl-N (Unfiltered)											00625
O-PO4-P (Filtered)											00671
Total Phos.-P (Unfiltered)											00665
Total Solids	706	396									00500
Total Non Vol. Solids	466	240									
Total Suspended Solids	173	87									00530
Total Sus. Non Vol. Solids	17	9									

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
 * High dilutions used due to high turbidity
 Summary By Stephen D. Hall Date 10-9-73

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

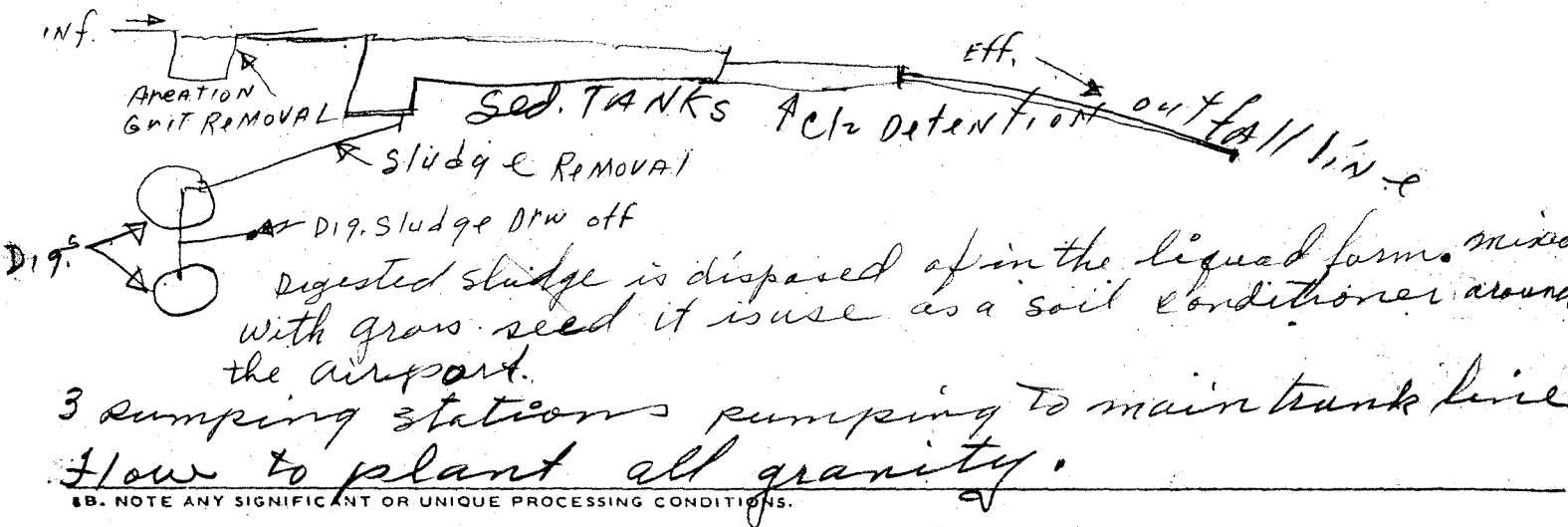
FORM APPROVED
BUDGET BUREAU NO. 42-31152

CHECK ONE: 1ST AUDIT RE-AUDIT
 DATE OF AUDIT: Sept. 18-73
 PLANT DESCRIPTION CODE (For Official Use Only):

A. GENERAL INFORMATION

1. PROJECT (State, Number):
 2. PLANT LOCATION (City, county): TACOMA PIERCE CO. WA.
 3. POPULATION:
 3A. FRACTION OF AREA POPULATION SERVED (%): 99
 3B. PLANT DESIGN (population equivalent): 16,000
 3C. SERVED BY PLANT (Domestic): 12,000
 4. TYPE OF COLLECTION SYSTEM:
 4A. COMBINED SEPARATE BOTH
 4B. ESTIMATED FLOW CONTRIBUTED BY SURFACE OR GROUND WATER (infiltration, mgd): 12
 5. YEAR COMMUNITY BEGAN SEWAGE TREATMENT: Aug. 1963
 6. YEAR PRESENT SYSTEM PLACED IN OPERATION:
 6A. SEWER: 1930
 6B. PLANT: Aug. 1963
 6C. ANCILLARY WORKS:
 7A. SIZE OF PLANT SITE (acres): 3
 7B. APPROXIMATE AREA LEFT FOR EXPANSION (acres): 2

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.



8B. NOTE ANY SIGNIFICANT OR UNIQUE PROCESSING CONDITIONS.

9. RECEIVING STREAM

9A. NAME OF STREAM: THE NARROWS of puget sound
 9B. STREAM FLOW IS: tide
 PERENNIAL INTERMITTENT NATURAL REGULATED
 INTERSTATE INTRASTATE COASTAL
 B. CURRENT PERFORMANCE AND PLANT LOADING INFORMATION
 1A. ANNUAL AVERAGE DAILY FLOW RATE (mgd): 1 M.C.D.
 1B. PEAK FLOW RATE (mgd):
 DRY WEATHER: 1.5 M.C.D. WET WEATHER: 3 M.C.D.
 1C. MINIMUM FLOW RATE (mgd): .5 M.C.D.
 2. AVERAGE BOD OF RAW SEWAGE (5 DAY 20°C) (ppm): 163
 3. AVERAGE SETTLEABLE SOLIDS OF RAW SEWAGE (mg/l): 14 M/L
 4. AVERAGE SUSPENDED SOLIDS OF RAW SEWAGE (mg/l): 147 P.P.M
 5. AVERAGE COLIFORM DENSITY OF RAW SEWAGE (mpn/100 ml): UNKNOWN
 5. ANNUAL AVERAGE PLANT REDUCTION:
 6A. BOD (%): 40
 6B. SETTLEABLE SOLIDS (%): 99
 6C. SUSPENDED SOLIDS (%): UNKNOWN
 6D. COLIFORM (%): UNKNOWN

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

8A. PURPOSE OF CHLORINATION

Disinfection & odor control

8B. TYPE OF CHLORINATOR

WSTV Notch

8C. POINT OF APPLICATION OF CHLORINE

Influent & Effluent

8D. CAN BYPASSED SEWAGE BE CHLORINATED? YES NO

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

65

8F. CHLORINE RESIDUAL IN EFFLUENT

.5 PPM AT END OF 30 MINUTES

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

TWO 1 TON TANKS

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)

NONE

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

Mixing tubes & overflow weir

9G. AGENCIES NOTIFIED OF BYPASS ACTION

Washington Dept. of Ecology

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

Air GAP
 OTHER (specify)

11. USES OF TREATMENT PLANT EFFLUENT

NONE

12. USES OF RECEIVING STREAM WITHIN 10 MILES OF OUTFALL

Fishing, boating, Rec.

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

Normal primary effluent.

15. STABILIZATION PONDS

A. WEEDS CUT AND VEGETATIVE GROWTH IN PONDS ELIMINATED? <input type="checkbox"/> YES <input type="checkbox"/> NO	D. BANKS AND DIKES MAINTAINED (erosion etc.)? <input type="checkbox"/> YES <input type="checkbox"/> NO
C. FENCING AND "WARNING - POLLUTED WATER" SIGNS PRESENT AND IN GOOD REPAIR? <input type="checkbox"/> YES <input type="checkbox"/> NO	E. FREQUENCY OF INSPECTION BY OPERATOR
E. WATER DEPTH (feet) _____ 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. MOSQUITO BREEDING PROBLEM? <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 *U of W North west Biological waste water Treat. 1973. March-1973*
 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) *IN SUFFICIENT WATER*

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?

A LARGE ENOUGH WATER SUPPLY TO MEET THE NEED.

5. ARE OPERATING RECORDS MAINTAINED? (If maintained, check general items included) <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO						REPORTED? <input checked="" 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	X	A	X	X	X	X				X	
WEEKLY											
MONTHLY							X	X			
ANNUALLY											

6. ARE LABORATORY RECORDS MAINTAINED? (check appropriate box)
 NOT AT ALL DAILY WEEKLY MONTHLY ANNUALLY *OCCASIONALLY*

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?
Flow Meter Ph Meter Chlorinator SANITIZER

7. IS LABORATORY TESTING ADEQUATE FOR THE CONTROL REQUIRED FOR THIS SIZE AND TYPE OF PLANT?
 YES NO (If no, explain) *1 MAN OPERATION MAKES THIS IMPOSSIBLE*

B. INDUSTRIAL WASTES DISCHARGED TO MUNICIPAL SYSTEM: <i>NONE</i>	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?
The plant operator was left on his own.

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
8

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	1	40	1	10	20
3. LABORATORY TECHNICIANS					
4. LABORERS					
5. PART-TIME LABORERS					
6. TOTAL	1	40	1	10	20

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	8			8				9
2. SUSPENDED SOLIDS								
3. SETTLEABLE SOLIDS	4			4				
4. SUSPENDED VOLATILE								
5. DISSOLVED OXYGEN	6			6	6	6	6	9
6. TOTAL SOLIDS								
7. VOLATILE SOLIDS								
8. pH	3	3		3	6	3	3	9
9. TEMPERATURE	2			2				
10. COLIFORM DENSITY								9
11. RESIDUAL CHLORINE				2				
12. VOLATILE ACIDS						7	7	
13. M. B. STABILITY								
14. ALKALINITY						7	7	
15.								
16.								
17.								
18.								
19.								

F. OPERATION AND MAINTENANCE COST FOR PLANT

YEAR OF OPERATION	SALARIES/WAGES	ELECTRICITY	CHEMICALS	MAINTENANCE	OTHER ITEMS	TOTAL
Budgeted MOST CURRENT YEAR 1973	27,229	includes office % TRANS. %	15,176		cap. out 6000	46,475
PRIOR YEAR 1970	17,266		13,974		cap. out 2000	32,442
PRIOR YEAR 1969	18,922		10,037			34,896
PRIOR YEAR 1968	17,959					21,996

EVALUATION PERFORMED BY	TITLE	ORGANIZATION
HANS GREGG	INST. TECHNICIAN	Dept. O. E.

INFORMATION FURNISHED BY	TITLE	ORGANIZATION	DATE
JOHN E. CANONICA	SUPV. Western Slopes	City of TAC.	9-18-73

G. NOTATIONS BY EVALUATOR

5. ADDITIONAL REMARKS (If remarks refer to a particular item, identify by number)

C-4.D Water supply should be updated.
C-7. Routine lab testing is in the process of being instituted.

2. GENERAL COMMENTS ON HOUSEKEEPING AND MAINTENANCE

Plant in fine shape. Clean & orderly.

3. REQUIREMENTS OF HIGHER AUTHORITY

3A. DOES THE PLANT PROVIDE THE DEGREE OF TREATMENT PRESENTLY REQUIRED BY THE STATE? (If no, explain)

YES NO

3B. ARE THERE ANY PENDING ACTIONS (enforcement conferences, change in water quality standards, etc.) THAT WOULD REQUIRE UPGRADING OF TREATMENT BY THIS PLANT?

YES NO (If yes, explain)

3C. NUMBER OF STATE INSPECTIONS OF PRESENT PLANT TO DATE.

2/year

4. IS ANY FOLLOW-THRU ACTION REQUIRED TO (1) CORRECT DEFICIENCIES IN THE PLANT OR ITS OPERATION OR (2) RESOLVE INDUSTRIAL WASTE PROBLEMS? (If yes, describe required corrective action)

YES NO