December 22, 1972

Publication No. 72-e13

Memo to: Mike Price

From: Ron Devitt

Subject: Rainier State School, STP Efficiency Survey

State of Washington Department of Ecology

On November 29, 1972, I conducted a standard efficiency survey on the sewage treatment plant at Rainier State School at Buckley.

Six composites were taken to more effectively evaluate the efficiency of the components, now that the filter seals have been replaced.

It was necessary to composite the influent to each trickling filter because the sludge return line from the chlorine contact chamber, the supernatant return from the digester, and the secondary sludge return enter the influent line to the primary clarifier on the north side.

The data collected for each trickling filter is reported, but the true worth is somewhat questionable. The Lakeside filter (#1) had only been in operation for a couple of weeks. BOD, COD, and solid data indicate that the Lakeside was in a period of active biological development while the Walker filter (#2) was sloughing.

Dye added to the point of chlorination began leaving the chlorine contact chamber after three minutes at a flow of 430 gpm. The chlorine residual was .15 ppm after 15 seconds, and .15 ppm after three minutes. Corresponding high coliform values indicate that insufficient chlorine was being added. Mr. Buck said that it was difficult to regulate the chlorinator properly. It may be more practical and more economical in the long run to install a proportional chlorinator. This would insure proper disinfection without excess chlorine usage during the night time low flows. Increased chlorination gave satisfactory disinfection later in the survey. The hose which transports the chlorine solution is badly deteriorated. A leak in the hose at the contact chamber is corroding the concrete. Arrangements should be made to have this replaced.

The State of Washington Water Pollution Plant Manual 1972 indicates that it would be advantageous to increase the number of routine tests conducted by the operator.

Also Mr. Buck was experiencing some difficulty with his colorimetric pH apparatus. It is my personal experience that occasionally it is impossible to correlate values determined by this method to actual values obtained by a buffered pH meter. I suggested that he try some newer indicator solution. Also there may be a possibility of a chemical interference in the sewage. If he is considering replacing the existing equipment he should be encouraged to purchase a pH meter, this would also be a help in maintaining his digester.

STP SURVEY REPORT FORM

(EFFICIENCY STUDY)

City Rainier State School at Buckley Plant Type T. Filter Population Served 2500 Design Capacity

Receiving Water White River Engineer Mike Price

Date 11-29-72 Survey Period 1030-1630 Survey Personnel RDSmith

Comp. Sampling Frequency 1/2 hour Weather Conditions (last 48 hours) Snow - overcast

Sampling Alequot GPM X 2

PLANT OPERATION

Total Flow 118,000 gallons in 6 hours How Measured venturi - meter

Max. (Flow) 430 GPM Time of Max. 1300 hours Min. 200 GPM Time of Min. 1545

Pre Cl_2 #/day Post Cl_2 15 #/day

FIELD RESULTS

Determinations	Influent Max.	Influent Min.	Influent Mean	Influent Median	Effluent Max.	Effluent Min.	Effluent Mean	Effluent Median
Temp. °C	27	18	23	22.5	19.5	16	18	18.5
pH	8.5	6.2	6.9	6.7	6.6	6.5	6.5	6.5
Conductivity (umhos/cm)	500	150	280	250	400	340	360	350
Settleable Solids	9.0	4.0	5.7	4.0	.1	.05	.08	.08

LABORATORY RESULTS ON COMPOSITE IN PPM

Final overall

Laboratory Number	Influent 72-4725	Effluent 72-4726	% Reduction
5-Day BOD	135	32	76
COD	320	77	76
T.S.	446	263	41
T.N.V.S.	161	165	none
T.S.S.	121	29	76
N.V.S.S.	14	1	92
pH	6.8	7.2	
Conductivity	330	360	
Turbidity	50	10	

Rainier School

BACTERIOLOGICAL RESULTS

$Na_2S_2O_3$ added to sample After in bottle min.

LAB #	SAMPLING TIME	COLONIES/100 MLS (MF)		15 sec. 3 min. Cl Residual	
		TOTAL	FECAL	ppm	(after secs)
72 4718	1200	450,000	8,000	.1	.1
72 4719	1330	130,000	1,500	.1	.1
72 4720	1515	200	< 200	.4	>1.0

Operator's Name Allen Buck Phone # 829-1111

Comments:

Rainier School

#1 - Lakeside Filter

	Influent				Effluent			
	Max.	Min.	Mean	Median	Max.	Min.	Mean	Median
T (^{o}C)	22	19.5	21	21	20.5	18	19.3	19.0
pH	7.4	6.4	6.8	6.8	6.7	6.2	6.6	6.6
Conductivity (µmhos/cm)	370	250	320	325	380	310	350	350
Settleable Solids (ml/l)	---	---	---	.3	.4	.2	---	---

	Influent	Effluent	% Reduction
BOD	106	31	71
COD	240	110	54
TS	351	283	19
TNVS	173	165	4
TSS	80	40	50
TSNVS	4	7	None
pH	6.9	7.1	--
Conductivity (µmhos/cm)	35	15	--
Turbidity	400	340	--

Rainier School

#2 - Walker Filter

	Influent				Effluent			
	Max.	Min.	Mean	Median	Max.	Min.	Mean	Median
T. (^{o}C)	23.5	20.5	22.2	22	21	18	19.8	20
pH	7.3	6.3	6.7	6.7	6.8	6.2	6.6	6.6
Conductivity (µmhos/cm)	400	300	355	350	410	290	360	370
Settleable Solids (ml/l)	----	----	----	.3	.6	.5	----	----

	Influent	Effluent	% Reduction
BOD	129	56	56
COD	280	140	50
TS	288	326	None
TNVS	183	146	20
TSS	73	43	41
TNVS	5	2	60
pH	6.9	7.1	--
Turbidity	35	20	--
Conductivity (µmhos/cm)	410	410	--

Exhibit F

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-R1527

CHECK ONE	DATE OF AUDIT	PLANT DESCRIPTION CODE (For Official Use Only)
☐ 1ST AUDIT ☐ RE-AUDIT		

A. GENERAL INFORMATION

1. PROJECT (State, Number)	SCOPE OF PROJECT (new plant, additions, etc.)
RAINIER STATE School	New + Upgrade WWTS
2. PLANT LOCATION (City, county)	**IDENTIFICATION OF AREAS SERVED**
BURLEY - PIERCE	INSTITUTION

3. POPULATION

3A. FRACTION OF AREA POPULATION SERVED (%)	3B. PLANT DESIGN (population equivalent)	3C. SERVED BY PLANT (domestic)
100%		2500

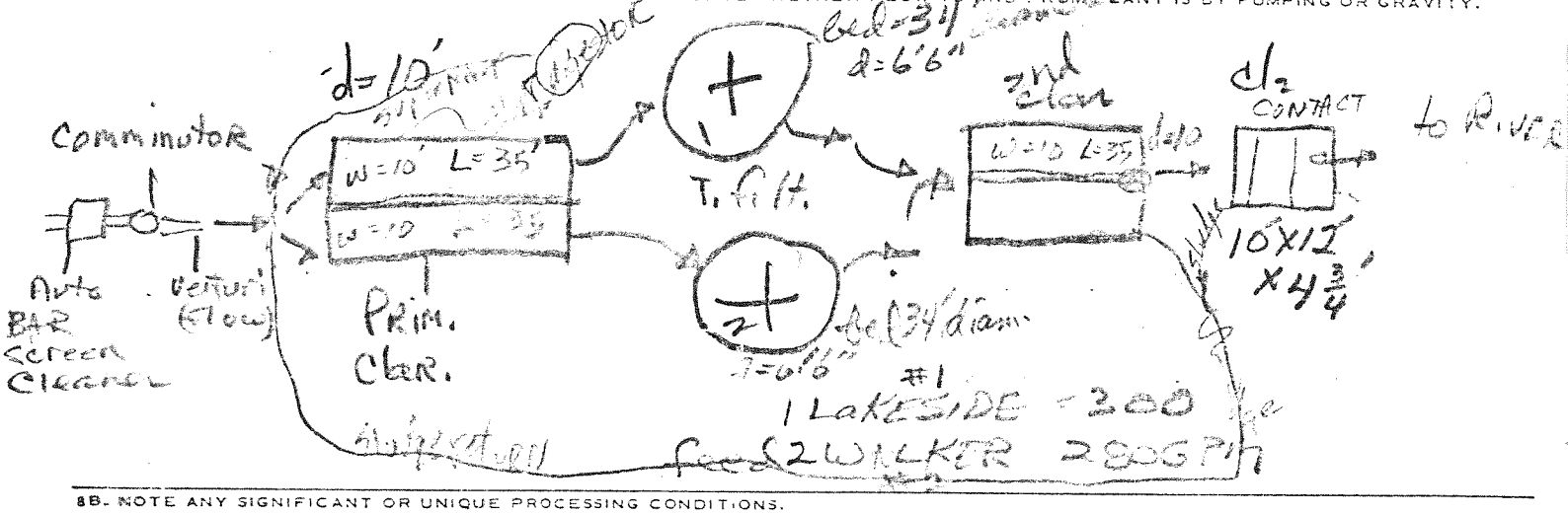
4. TYPE OF COLLECTION SYSTEM

4A.	4B. ESTIMATED FLOW CONTRIBUTED BY SURFACE OR GROUND WATER (infiltration, mgd)
☐ COMBINED ☒ SEPARATE ☐ BOTH	

5. YEAR COMMUNITY BEGAN SEWAGE TREATMENT	6. YEAR PRESENT SYSTEM PLACED IN OPERATION		
	6A. SEWER	6B. PLANT	6C. ANCILLARY WORKS
			1962

7A. SIZE OF PLANT SITE (acres)	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 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: White (A)

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)	1B. PEAK FLOW RATE (mgd)		1C. MINIMUM FLOW RATE (mgd)
	DRY WEATHER	WET WEATHER	

2. AVERAGE BOD OF RAW SEWAGE (5 DAY 20°C) (ppm)	3. AVERAGE SETTLEABLE SOLIDS OF RAW SEWAGE (IMHOFF Cone) (ml/l)

4. AVERAGE SUSPENDED SOLIDS OF RAW SEWAGE (mg/l)	5. AVERAGE COLIFORM DENSITY OF RAW SEWAGE (mpn /100 ml)

6. ANNUAL AVERAGE PLANT REDUCTION

6A. BOD (%)	6B. SETTLEABLE SOLIDS (%)	6C. SUSPENDED SOLIDS (%)	6D. COLIFORM DENSITY (%)

GRAVITY

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

di

8A PURPOSE OF CHLORINATION

disinfection

8B. TYPE OF CHLORINATOR

Builders Providence (1954

8C. POINT OF APPLICATION OF CHLORINE

At the Chlorinator

8D. CAN BYPASSED SEWAGE BE CHLORINATED?

☒ YES ☐ NO

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

15

8F. CHLORINE RESIDUAL IN EFFLUENT

.1 PPM AT END OF 3 MINUTES at 1200 i.d

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

150 lbs

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
0	—	—

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

nothing

12. USES OF RECEIVING STREAM WITHIN 10 MILES OF OUTFALL

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

15. STABILIZATION POND?

A. WEEDS CUT AND VEGETATIVE GROWTH IN PONDS ELIMINATED? ☐ YES ☐ NO

B. BANKS AND DIKES 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 SPRING 71

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)*

T. F. Hose Leaks

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?

Larger Cl2 contact tank

5 ARE OPERATING RECORDS MAINTAINED? [X] YES [ ] NO (*If maintained, check general items included*) | REPORTED? [X] YES [ ] NO TO WHOM? [illegible]

FREQUENCY	WEATHER	FLOW	SLUDGE HANDLED	CHEMICALS USED	DIGESTER	GRIT HANDLED	ELEC. USED	COST DATA	AIR USED	MAIN-TENANCE	OTHER
DAILY		X	X	X						X	
WEEKLY											
MONTHLY											
ANNUALLY											

6. ARE LABORATORY RECORDS MAINTAINED? (*check appropriate box*)

[ ] NOT AT ALL [X] DAILY [ ] WEEKLY [ ] MONTHLY [ ] ANNUALLY

IF MAINTAINED CHECK FORM OF RECORD BELOW:

[ ] LOG BOOK [X] 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*)

8. INDUSTRIAL WASTES DISCHARGED TO MUNICIPAL SYSTEM: A. NUMBER AND TYPES OF INDUSTRIES DISCHARGING TO SYSTEMS [illegible]

B. POPULATION EQUIVALENT (*BOD*) OF INDUSTRIAL WASTES (*pe*)

C. POPULATION EQUIVALENT (SS) OF INDUSTRIAL WASTES (*pe*)

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?

11. IS A MANUAL OF PRACTICE OR INSTRUCTIONS AVAILABLE? [X] YES [ ] NO | IF YES, WHO WROTE AND PROVIDED IT? DOE

12. ESTIMATE OF MAN-HOURS PER WEEK DEVOTED TO LABORATORY WORK AND MAINTENANCE OF RECORDS AND REPORTS 10

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 (1st)	3	
3. LABORATORY TECHNICIANS					
4. LABORERS					
5. PART-TIME LABORERS					
6. TOTAL					

[illegible]

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 – 4, 5 or 6 per week
3 – 1, 2, or 3 per week
4 – as required
5 – 2 or 3 per month
6 – 1 per month
7 – Quarterly
8 – Semi–Annually
9 – Annually

ITEM	RAW	PRIMARY EFFLUENT	FILTER MIXED LIQUOR	FINAL	SLUDGE		DIGESTOR	RECEIVING STREAM
					RAW	SUPER-NATANT		
1. BOD								
2. SUSPENDED SOLIDS								
3. SETTLEABLE SOLIDS	2	2	2	2				
4. SUSPENDED VOLATILE								
5. DISSOLVED OXYGEN	2	2	2	2				
6. TOTAL SOLIDS								
7. VOLATILE SOLIDS								
8. pH	2	2	2	2			3	
9. TEMPERATURE	2						2	
10. COLIFORM DENSITY								
11. RESIDUAL CHLORINE				2				
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
RC Dewey	Environmentalist I	DOE

INFORMATION FURNISHED BY	TITLE	ORGANIZATION	DATE
Allen Buck	Operator	Rainier School	4-29

G. NOTATIONS BY EVALUATOR

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

Operator unable to duplicate his pH values using his colorimetric apparatus.

2. GENERAL COMMENTS ON HOUSEKEEPING AND MAINTENANCE

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.

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

although they have a new Cl2 contact chamber, the regulator on the chlorinator is not capable of the required rate for adequate control disinfection.