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May 31, 1974

Mr. Peter B. Boyer
 2724 N. E. Dunckley Street
 Portland, Oregon 97212

Dear Mr. Boyer:

Ross Dissolved Gas

Enclosed for your information is a table summarizing the 1972 monitoring of total dissolved gases on the Skagit Project. Included in this table are only data which had a lab (Van Slyke or gas chromatograph) analysis accompanying the field (saturometer) readings. A comparison of lab to field data is shown in the last column.

Our previous transmittal to you dated April 5, 1974, of "Skagit River Project Dissolved N₂ Record," No. M² 8/29/72-B on 11" x 17" sheets has erroneous values for the % saturation N₂ + Ar and O₂. The ML/L N₂ + Ar and PFM O₂ are correct values, however. This error was caused by the National Marine Fisheries, Montlake Lab personnel assuming the wrong barometric pressure.

Also enclosed is a map showing the locations of the above referenced sample stations. Below is a description of each station location:

- 2 At log boom in front of right bank spillway on Ross Lake.
- 3 150 feet upstream of Ross Powerhouse on Diablo Lake.
- 5 On right bank, 100 feet downstream of suspension bridge on Diablo Lake below Ross Powerhouse.
- 6 Midstream, 100 feet downstream of suspension bridge on Diablo Lake below Ross Powerhouse.
- 7 Under State Highway 20 bridge over Thunder Arm on Diablo Lake.

cc: Drobnack
 Freitas/Bates
 Hoidal
 Ross Chron.
 Skone
 File &

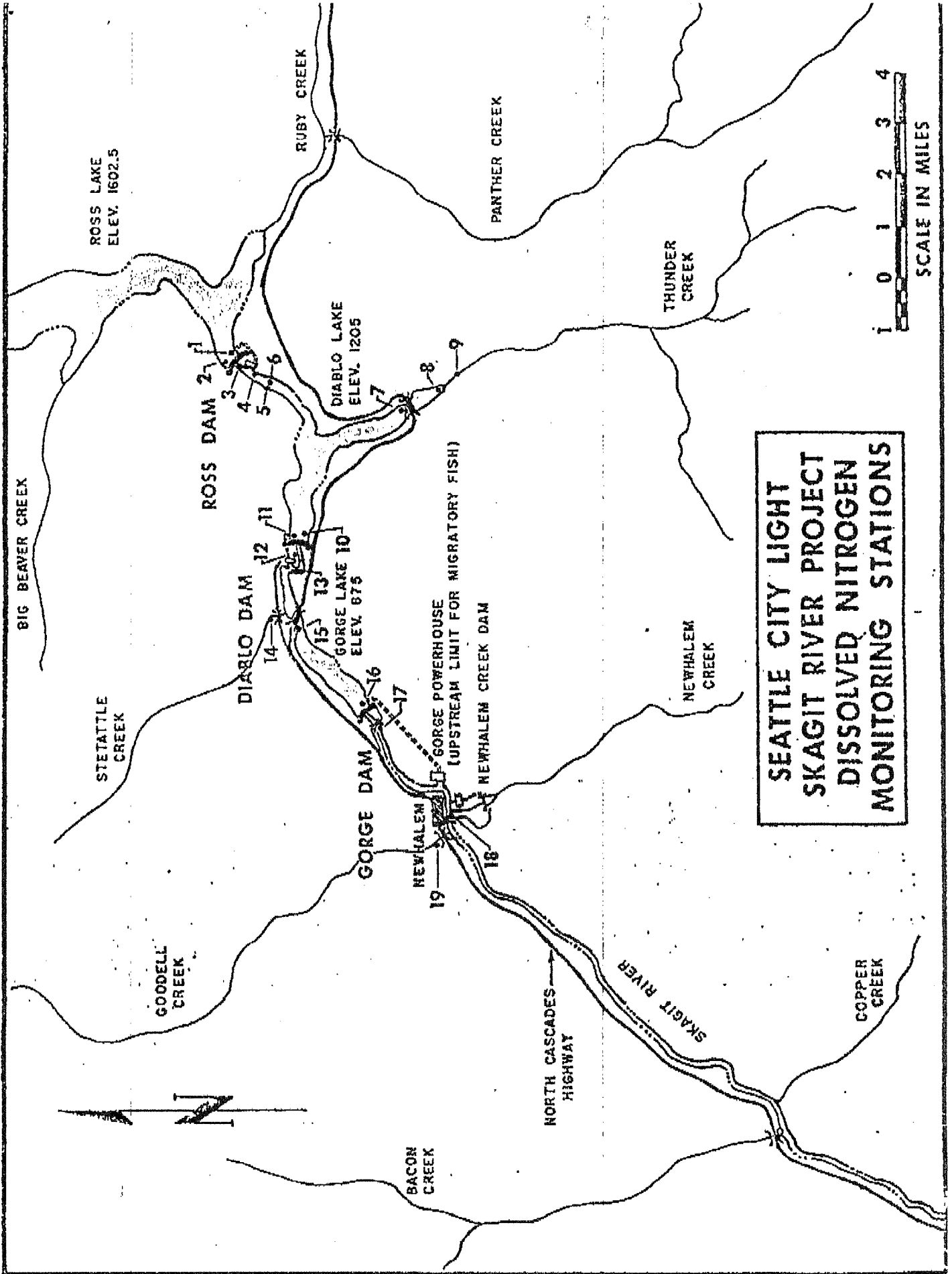
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JUN 8 1974

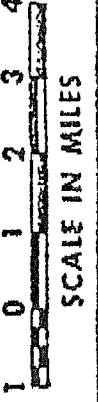
COMPARATIVE FIELD (SATUROMETER) AND LABORATORY
DISSOLVED GAS ANALYSES
SKAGIT RIVER PROJECT, 1972

DATE	CITY LIGHT STATION	TOTAL GAS SATURATION (%)		
		LAB	FIELD	RATIO LAB/FIELD
6/21/72	2	104.0	104.7	.99
	3	116.5	118.3	.98
	6	114.4	116.2	.98
	7	102.2	103.5	.99
	10	112.1	112.1	1.00
	12	110.5	113.2	.98
	15	110.3	112.0	.98
	18	107.4	108.2	.99
6/28/72	5	108.5	111.8	.97
	7	105.7	105.0	1.01
	15	108.7	111.0	.98
	18	106.8	107.5	.99
8/17/72	13	108.1	108.8	.99
	16	108.5	107.8	1.01

REB:en
5/31/74



**SEATTLE CITY LIGHT
SKAGIT RIVER PROJECT
DISSOLVED NITROGEN
MONITORING STATIONS**



SHEET 1 OF 5

ROSS INTAKE

TIME: 920 16 AUGUST 73
 FLOW: 6000
 ELEVATION: 1601
 WATER TEMP: 15.2
 SAT. READING 28

PERCENT SATURATION
NITROGEN + ARGON

106.36

PERCENT SATURATION
TOTAL DISSOLVED GAS

103.92

ROSS TAILRACE

TIME: 950 16 AUGUST 73
 FLOW: 6000
 ELEVATION: 1203
 WATER TEMP: 7.8
 SAT. READING 28

PERCENT SATURATION
NITROGEN + ARGON

105.91

PERCENT SATURATION
TOTAL DISSOLVED GAS

103.86

SHEET 2 OF 5

DIABLO INTAKE

TIME:	1320	15 AUGUST 73
FLOW:	2869	
ELEVATION:	1203	
WATER TEMP:	13.4	
SAT. READING	39	

PERCENT SATURATION
NITROGEN + ARGON

PERCENT SATURATION
TOTAL DISSOLVED GAS

106.94

105.37

DIABLO TAILRACE

TIME:	1415	15 AUGUST 73
FLOW:	2869	
ELEVATION:	876	
WATER TEMP:	11.1	
SAT. READING	67	

PERCENT SATURATION
NITROGEN + ARGON

PERCENT SATURATION
TOTAL DISSOLVED GAS

108.42

109.11

SHEET 3 OF 5

GORGE LAKE BRIDGE

TIME: 1340 15 AUGUST 73
FLOW: 3000
ELEVATION: 876
WATER TEMP: 12.0
SAT. READING 67

PERCENT SATURATION
NITROGEN + ARGON

110.34

PERCENT SATURATION
TOTAL DISSOLVED GAS

109.11

GORGE INTAKE

TIME: 1510 15 AUGUST 73
FLOW: 3357
ELEVATION: 876
WATER TEMP: 12.4
SAT. READING 69

PERCENT SATURATION
NITROGEN + ARGON

107.88

PERCENT SATURATION
TOTAL DISSOLVED GAS

109.38

SHEET 4 OF 5

GORGE TAILRACE

TIME: 1540 15 AUGUST 73
 FLOW: 3357
 ELEVATION: 481
 WATER TEMP: 11.1
 SAT. READING 53

PERCENT SATURATION
NITROGEN + ARGON

106.29

PERCENT SATURATION
TOTAL DISSOLVED GAS

107.10

N.P.S. BRIDGE

TIME: 1610 15 AUGUST 73
 FLOW: 3357
 ELEVATION: 480
 WATER TEMP: 11.1
 SAT. READING 38

PERCENT SATURATION
NITROGEN + ARGON

103.71

PERCENT SATURATION
TOTAL DISSOLVED GAS

105.09

00001 200 2

DIABLO TAILRACE-D.S. SIDE

TIME: 1440 15 AUGUST 73
FLOW: 2869
ELEVATION: 876
WATER TEMP: 10.6
SAT. READING 63

PERCENT SATURATION
NITROGEN + ARGON

PERCENT SATURATION
TOTAL DISSOLVED GAS

111.20 %
~~107.39~~

108.20 %
~~105.17~~

USED 33 IN CALL.

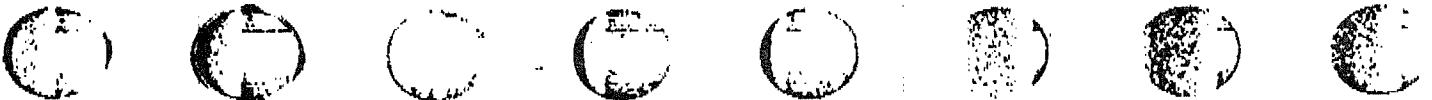
OUT OF DATA IN 170

USED .58 UNITS

BYE

0002.04 CRU 0000.32 TCH 0007.50 KC

OFF AT 10:07PDT 08/31/73



SKAGIT PROJECT DISSOLVED GAS TEST FOR JULY 1973

SHEET 1 OF 5

ROSS INTAKE

TIME: 0930 17 JULY 73
FLOW: 3875
ELEVATION: 1600
WATER TEMP: 15.4
SAT. READING 35

PERCENT SATURATION
NITROGEN + ARGON

101.89

PERCENT SATURATION
TOTAL DISSOLVED GAS

104.89

ROSS TAILRACE

TIME: 1020 17 JULY 73
FLOW: 5375
ELEVATION: 1203
WATER TEMP: 8.0
SAT. READING 36

PERCENT SATURATION
NITROGEN + ARGON

107.19

PERCENT SATURATION
TOTAL DISSOLVED GAS

104.96

SHEET 2 OF 5

DIABLO INTAKE

TIME:	1345	16 JULY 73
FLOW:	5375	
ELEVATION:	1203	
WATER TEMP:	17.1	
SAT. READING	77	

PERCENT SATURATION
NITROGEN + ARGON

PERCENT SATURATION
TOTAL DISSOLVED GAS

110.06

110.60

DIABLO TAILRACE

TIME:	1440	16 JULY 73
FLOW:	5800	
ELEVATION:	876	
WATER TEMP:	11.2	
SAT. READING	104	

PERCENT SATURATION
NITROGEN + ARGON

PERCENT SATURATION
TOTAL DISSOLVED GAS

113.56

114.14

SHEET 3 OF 5

GORGE LAKE BRIDGE

TIME:	1410	16 JULY 73
FLOW:	5800	
ELEVATION:	876	
WATER TEMP:	12.8	
SAT. READING	80	

PERCENT SATURATION
NITROGEN + ARGON

PERCENT SATURATION
TOTAL DISSOLVED GAS

109.52

110.88

GORGE INTAKE

TIME:	1515	16 JULY 73
FLOW:	5800	
ELEVATION:	876	
WATER TEMP:	12.0	
SAT. READING	96	

PERCENT SATURATION
NITROGEN + ARGON

PERCENT SATURATION
TOTAL DISSOLVED GAS

114.13

113.05

SHEET 4 OF 5

GORGE TAILRACE

TIME: 1540 16 JULY 73
FLOW: 5800
ELEVATION: 481
WATER TEMP: 10.1
SAT. READING 92

PERCENT SATURATION
NITROGEN + ARGON

112.46

PERCENT SATURATION
TOTAL DISSOLVED GAS

112.32

N.P.S. BRIDGE

TIME: 1615 16 JULY 73
FLOW: 5800
ELEVATION: 481
WATER TEMP: 10.2
SAT. READING 71

PERCENT SATURATION
NITROGEN + ARGON

109.98

PERCENT SATURATION
TOTAL DISSOLVED GAS

109.51

SHEET 5 OF 5

DIADLO TAILRACE D.S. SIDE

TIME:	1315	17 JULY 73
FLOW:	5800	
ELEVATION:	876	
WATER TEMP:	9.8	
SAT. READING	72	

PERCENT SATURATION
NITROGEN + ARGON

110.18

PERCENT SATURATION
TOTAL DISSOLVED GAS

109.79

OUT OF DATA IN 160

USED .58 UNITS

100 PRINT
 110 PRINT " SKAGIT PROJECT DISSOLVED GAS TEST FOR JULY 1973"
 120 PRINT
 130 Q=1
 140 PRINT " SHEET 1 OF 5"

150 PRINT
 160 PRINT
 170 READ L\$,M\$,N\$,O\$,P\$,Q\$
 180 PRINT L\$
 190 PRINT "-----"
 200 PRINT
 210 PRINT
 220 PRINT
 230 PRINT
 240 PRINT " TIME: ",M\$
 250 PRINT " FLOW: ",N\$
 260 PRINT " ELEVATION: ",O\$
 270 PRINT " WATER TEMP: ",P\$
 280 PRINT " SAT. READING ",Q\$
 290 PRINT
 300 PRINT
 310 PRINT
 320 PRINT
 330 PRINT
 340 PRINT

350 PRINT "PERCENT SATURATION PERCENT SATURATION"
 360 PRINT " NITROGEN + ARGON TOTAL DISSOLVED GAS"
 370 READ O,E,W,B,P2
 380 P1=760-(E*0.028)
 390 X1=((P1+P2-(O/B)*0.532-W)/((P1-W)*0.7902))*100
 400 Y=((P1+P2)/P1)*100

410 PRINT
 420 PRINT
 430 PRINT USING 440,X1,Y
 440: ###.## ###.##

100
 3 100 =

450 PRINT
 460 PRINT
 470 PRINT
 480 PRINT
 490 PRINT
 500 PRINT "-----"
 510 PRINT
 520 PRINT
 530 IF ((Q/2)-INT(Q/2))=0 THEN 550
 540 GO TO 560

550 PRINT " SHEET OF 5"
 560 PRINT
 570 PRINT
 580 Q=Q+1
 590 GO TO 170
 600 DATA "ROSS INTAKE","0930 17 JULY 73"
 610 DATA "3875","1600","15.4","35"
 620 DATA 11.0,1600,13.121,.0340577,35
 630 DATA "ROSS TAILRACE","1020 17 JULY 73"
 640 DATA "5375","1203","8.0","36"

SKAGIT PROJECT
PROPOSED SAMPLING PROGRAM

	TOTAL FLOW AT DAM CFS	POWERHOUSE DISCHARGE CFS	SPILLWAY DISCHARGE CFS	ROSS EL. 1340 VALVES DISCHARGE CFS	SPILL/TOTAL
<u>ROSS DAM:</u>					
JUNE 25 (9-12)	21,000	10,500	10,500		1/2
27 (9-12)	21,000	14,000	7,000		1/3
29 (9-12)	18,000	9,000	9,000		1/2
JULY 1 (9-12)	18,000	12,000	6,000		1/3
1 (12-3)	18,000	13,500	4,500		1/4
1 (3-6)	12,000	8,000	4,000		1/3
3 (9-12)	12,000	9,000	3,000		1/4
3 (12-3)	18,000	9,000	4,500	4,500	

DIABLO DAM:

JUNE 25 (2-3)	15-20,000	0	Total	
27 (2-3)	15-20,000	1/3 Total	2/3 Total	
29 (2-3)	14,000	7,000	7,000	

GORGE DAM:

JUNE 25 (3-6)	15-20,000	0	Total	
27 (3-6)	15-20,000	1/3 Total	2/3 Total	
29 (3-6)	14,000	7,000	7,000	

NOTE: ALL FLOWS THRU THE ROSS P.H. TURBINES SHOULD BE MAINTAINED AS CLOSE AS POSSIBLE USING THE MINIMUM NUMBER OF TURBINES.