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COLUMBIA RIVER PROGRAM

J. W. Ballowe

November 21, 1968

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Col. River Temps

November 1967

Day	Flow ^{10³}	Priest R	Ringold	Richland
1	74.0	13.5	14.9	14.5
2	85.7	13.0	13.6	13.6
3	78.5	12.8	13.6	13.4
4	60.8	12.4	13.0	12.9
5	66.2	12.1	13.0	12.7
6	87.6	12.0	12.5	12.4
7	85.5	11.9	12.4	12.2
8	80.7	11.9	12.6	12.3
9	76.3	11.8	12.6	12.3
10	63.1	11.8	13.0	12.5
11	46.8	11.7	12.8	12.4
12	53.3	11.7	13.2	12.7
13	75.0	11.7	13.6	13.2
14	74.3	11.8	12.8	12.8
15	81.1	11.9	12.7	12.7
16	71.0	11.7	12.8	12.6
17	65.3	11.5	13.0	12.7
18	51.9	11.4	12.4	12.3
19	52.6	11.0	12.2	12.0
20	87.6	10.9	11.7	11.6
21	84.1	11.0	11.2	11.2
22	76.8	10.9	11.7	11.3
23	54.0	10.8	11.7	11.3
24	74.0	10.6	11.5	11.0
25	76.5	10.1	10.9	10.4
26	73.1	9.9	10.0	9.9
27	97.0	9.6	10.3	9.9
28	90.4	9.6	10.2	9.9
29	92.8	9.7	10.7	10.2
30	91.1	9.4	10.2	9.9
		340.16	366.80	358.80
		11.32	12.22	11.96

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Col. River Temps
December 1967

Day	Flow ^{10³}	Priest R	Ringold	Richland
1	91.0	9.3	9.8	9.6
2	78.5	9.0	9.7	9.4
3	51.6	9.2	10.0	9.5
4	91.2	8.8	10.3	9.9
5	106.0	8.6	9.4	9.2
6	95.8	8.5	8.8	8.7
7	92.1	8.5	9.3	9.0
8	87.4	8.3	9.2	9.0
9	79.2	8.1	9.2	9.0
10	69.3	8.3	9.6	9.3
11	96.3	8.0	9.6	9.1
12	107.0	7.5	8.4	8.2
13	110.0	7.4	7.8	7.6
14	96.6	7.2	7.3	7.1
15	107.0	7.1	7.1	6.9
16	82.2	6.9	6.7	6.5
17	69.2	6.7	6.9	6.5
18	106.0	6.3	6.9	6.5
19	126.0	6.3	6.7	6.4
20	106.0	6.1	6.8	6.5
21	109.0	5.6	6.8	6.5
22	102.0	5.8	6.7	6.5
23	58.1	5.9	7.0	6.8
24	37.7	6.4	8.6	7.8
25	46.9	5.9	8.7	8.2
26	101.0	5.9	8.3	8.2
27	98.7	6.2	7.1	7.4
28	98.3	6.3	7.0	7.1
29	119.0	6.1	6.9	6.9
30	73.9	6.0	6.9	6.8
31	54.3	6.0	6.6	6.6
		222.20	249.10	242.70
		7.16	8.03	7.82

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Col. River Temps

February 1967

Day	Flow ^{10.5}	Priest R.	Ringold	Richland
1	54.8	5.4	7.2	7.1
2	68.3	5.4	7.6	7.4
3	52.1	5.6	7.3	7.3
4	46.0	5.8	8.2	7.9
5	46.4	5.7	8.6	8.3
6	83.6	5.5	7.7	7.8
7	80.1	5.6	6.7	7.0
8	86.7	5.5	6.5	6.6
9	90.0	5.5	7.0	6.9
10	86.8	5.5	7.3	7.2
11	72.5	5.5	7.0	7.0
12	64.6	5.6	7.3	7.2
13	90.5	5.4	7.5	7.3
14	108.0	5.3	6.4	6.5
15	78.4	5.2	6.0	6.1
16	69.6	5.2	6.5	6.4
17	88.3	5.2	7.1	6.9
17	69.9	5.0	6.3	6.4
19	61.9	5.0	6.6	6.5
20	94.8	4.8	6.4	6.4
21	88.9	4.8	6.6	6.6
22	91.1	4.8	6.5	6.5
23	95.5	4.8	6.3	6.4
24	94.0	4.8	6.2	6.3
25	55.9	5.1	6.7	6.6
26	49.1	5.1	7.9	7.6
27	90.2	4.9	8.1	8.1
28	87.5	4.9	7.0	7.3
		146.90	196.50	195.60
		5.24	7.01	6.98

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Columbia River Temperatures January 1967

Day	Flow ^{10³}	Priest Rapids	Ringold	Richland	ΔT PR-RG	ΔT RG-R	ΔT PR-R
1	53.5	6.7	8.1	7.8	+1.4	-0.3	+1.1
2	69.6	6.6	8.2	7.9	+1.6	-0.3	+1.3
3	102.1	6.4	8.2	8.1	+1.8	-0.1	+1.7
4	107.0	6.5	7.4	7.4	+0.9	0.0	+0.9
5	99.3	6.2	7.0	6.9	+0.8	-0.1	+0.8
6	97.4	6.0	6.9	6.8	+0.9	-0.1	+0.8
7	63.8	6.0	6.9	6.8	+0.9	-0.1	+0.8
8	40.7	6.2	7.6	7.3	+1.4	-0.3	+1.1
9	103.0	6.0	7.9	7.7	+1.9	-0.2	+1.7
10	84.1	6.2	6.9	7.0	+0.7	+0.1	+0.8
11	66.1	6.2	7.6	7.4	+1.4	-0.2	+1.2
12	85.6	6.1	7.5	7.4	+1.4	-0.1	+1.3
13	82.0	6.0	7.0	7.1	+1.0	+0.1	+1.1
14	69.7	6.0	7.1	7.1	+1.1	0.0	+1.1
15	57.8	6.2	8.2	7.8	+2.0	-0.4	+1.6
16	88.6	6.0	8.2	8.0	+2.2	-0.2	+2.0
17	85.3	5.9	7.4	7.4	+1.5	0.0	+1.5
18	74.4	5.8	7.2	7.2	+1.4	0.0	+1.4
19	76.9	5.9	7.6	7.4	+1.7	-0.2	+1.5
20	70.0	5.9	7.5	7.3	+1.6	-0.2	+1.4
21	57.3	5.8	7.6	7.4	+1.8	-0.2	+1.6
22	48.2	5.8	7.0	6.9	+1.2	-0.1	+1.1
23	93.1	5.7	7.1	7.0	+1.4	-0.1	+1.3
24	75.2	5.5	6.7	6.7	+1.2	0.0	+1.2
25	85.1	5.4	7.3	7.1	+1.9	-0.2	+1.7
26	76.1	5.3	7.0	6.9	+1.7	-0.1	+1.6
27	59.3	5.3	7.3	7.1	+2.0	-0.2	+1.8
28	57.1	5.4	8.3	8.0	+2.9	-0.3	+2.6
29	48.1	5.6	8.5	8.3	+2.9	-0.2	+2.7
30	90.8	5.4	7.9	7.9	+2.5	0.0	+2.5
31	66.7	5.5	6.9	7.1	+1.4	+0.2	+1.6
					+48.50	-3.80	+44.80
		183.50	232.0	228.20	+1.56	-.12	+1.44
		5.91	2.48	2.36			

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Col. River Temps

March 1967

Day	Flow ^{10³}	Priest R	Ringold	Richland
1	92.1	4.9	6.9	7.0
2	96.1	4.8	6.6	6.7
3	88.9	4.8	6.4	6.5
4	58.3	4.9	6.4	6.5
5	64.5	4.8	7.5	7.3
6	99.1	4.9	7.2	7.3
7	100.0	4.8	5.5	5.9
8	94.1	4.8	6.3	6.2
9	119.0	4.8	6.3	6.3
10	92.0	4.7	5.6	5.8
11	66.0	4.9	6.4	6.3
12	54.2	5.0	7.1	6.9
13	106.0	4.7	7.2	7.2
14	106.0	4.6	5.8	6.1
15	100.3	4.7	6.1	6.1
16	101.0	4.8	6.5	6.5
17	98.9	4.8	5.4	5.9
18	70.5	5.0	5.9	6.0
19	77.0	5.0	6.5	6.5
20	99.5	5.0	6.8	6.9
21	84.5	5.1	6.3	6.6
22	77.4	5.2	6.2	6.4
23	101.0	5.2	6.2	6.4
24	94.3	5.2	6.6	6.6
25	72.6	5.3	6.3	6.5
26	65.4	5.6	7.8	7.5
27	96.0	5.4	8.1	8.0
28	88.6	5.3	7.0	7.3
29	94.4	5.3	7.0	7.1
30	118.0	5.2	6.7	6.9
31	113.0	5.2	6.6	6.7
		154.7	203.20	199.40
		4.99	6.55	6.43

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Col. River Temps April 1967

Day	Flow ^{10³}	Priest P	Ringold	Richland
1	42.9	5.8	6.9	7.0
2	47.5	5.9	9.1	8.6
3	97.0	5.8	10.0	9.8
4	103.0	6.0	8.1	8.6
5	114.0	6.1	8.2	8.4
6	103.0	6.2	8.0	8.3
7	91.3	6.4	8.5	8.6
8	77.1	6.8	9.1	9.1
9	69.0	7.0	9.4	9.4
10	94.6	6.9	9.5	9.5
11	105.0	6.8	9.0	9.2
12	104.0	7.0	8.7	8.9
13	83.5	6.9	8.9	8.9
14	77.2	7.0	9.0	9.0
15	64.5	7.2	9.3	9.3
16	53.2	7.0	9.7	9.5
17	92.1	6.9	9.9	9.8
18	102.0	6.8	9.3	9.4
19	116.0	6.6	7.6	8.0
20	106.0	6.7	7.8	7.8
21	96.1	6.6	8.1	8.1
22	103.0	6.5	8.3	8.5
23	88.6	7.0	8.8	9.0
24	110.0	7.1	8.4	8.7
25	114.0	7.3	8.0	8.3
26	109.0	7.4	8.5	8.7
27	109.0	7.5	8.4	8.5
28	89.6	7.5	8.8	8.9
29	72.7	7.6	9.1	9.0
30	41.7	7.9	9.4	9.3
		264.20	261.80	264.10
		6.80	8.72	8.80

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Cal. River Temps

May 1967

Day	Flow ^{10³}	Priest R.	Ringold	Richland
1	91.8	7.8	10.9	10.7
2	80.4	8.2	9.9	10.4
3	85.0	8.4	10.8	10.9
4	85.3	8.4	11.0	11.2
5	94.5	8.7	11.2	11.5
6	59.3	9.4	10.7	11.2
7	49.0	9.5	12.0	11.9
8	74.7	9.6	12.1	12.3
9	93.4	9.5	11.5	11.8
10	101.0	9.3	10.9	11.0
11	82.2	9.2	10.4	10.6
12	73.4	9.4	10.9	11.0
13	65.8	9.7	11.7	11.8
14	55.5	10.2	12.8	12.7
15	96.1	10.2	13.8	13.8
16	107.0	10.4	12.7	13.3
17	105.0	10.6	12.8	13.1
18	96.3	10.6	12.6	13.0
19	113.0	10.5	12.3	13.5
20	130.0	10.7	12.6	13.1
21	154.0	10.9	12.6	13.0
22	174.0	11.0	12.5	12.9
23	190.0	11.2	12.3	12.6
24	228.0	11.1	11.9	12.1
25	242.0	10.9	11.7	11.9
26	229.0	10.9	11.6	11.8
27	257.0	10.8	11.7	11.9
28	275.0	10.9	11.7	11.8
29	257.0	11.1	11.9	12.0
30	268.0	11.1	11.7	11.8
31	284.0	11.3	12.2	12.3
		311.50	366.30	372.90
		10.04	11.81	12.02

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Cal. River Temps

June 1967

Day	Flow ^{10³}	Priest R	Ringold	Richland
1	290.0	11.5	12.6	12.7
2	317.0	12.1	12.9	13.0
3	336.0	12.1	12.9	12.9
4	373.0	12.2	12.9	13.0
5	382.0	12.7	12.8	13.0
6	406.0	12.8	13.0	13.1
7	432.0	13.3	13.2	13.3
8	436.0	13.6	13.5	13.6
9	454.0	13.2	13.7	13.8
10	460.0	12.8	13.6	13.7
11	454.0	12.6	13.4	13.5
12	452.0	12.5	13.2	13.3
13	449.0	12.6	13.1	13.3
14	445.0	12.8	13.4	13.5
15	467.0	12.9	13.6	13.7
16	466.0	13.1	13.8	13.9
17	462.0	13.3	13.8	14.0
18	439.0	13.5	14.1	14.3
19	436.0	13.7	14.3	14.5
20	436.0	13.8	14.3	14.5
21	440.0	13.8	14.2	14.3
22	445.0	13.7	14.1	14.2
23	432.0	13.7	14.2	14.3
24	436.0	13.6	14.0	14.2
25	458.0	13.9	14.0	14.2
26	482.0	14.1	14.3	14.4
27	471.0	14.3	14.6	14.7
28	460.0	14.5	14.8	14.9
29	462.0	14.6	15.1	15.2
30	434.0	14.7	15.2	15.3
		398.0	412.60	416.30
		13.26	13.75	13.87

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Col. River Temps
July 1967

Day	Flow	Priest R.	Ringold	Richland
1	425.0	14.9	15.4	15.5
2	419.0	15.1	15.5	15.7
3	425.0	15.4	16.0	16.1
4	380.0	15.5	16.0	16.2
5	378.0	15.6	16.3	16.4
6	390.0	15.4	16.2	16.3
7	372.0	15.2	16.0	16.1
8	356.0	15.0	15.8	15.8
9	360.0	14.9	15.3	15.5
10	343.0	15.0	15.6	15.7
11	328.0	15.2	15.7	15.9
12	324.0	15.4	16.0	16.2
13	302.0	15.7	16.5	16.6
14	291.0	15.8	16.6	16.7
15	292.0	16.1	16.8	16.9
16	274.0	16.1	16.9	17.0
17	267.0	16.2	17.0	17.1
18	267.0	16.2	17.1	17.2
19	250.0	16.2	17.0	17.1
20	246.0	16.3	17.2	17.3
21	233.0	16.4	17.4	17.5
22	226.0	16.4	17.6	17.7
23	219.0	16.2	17.6	17.8
24	214.0	16.7	17.9	18.0
25	213.0	16.9	17.7	17.9
26	203.0	17.3	17.7	17.9
27	194.0	17.1	18.1	18.2
28	203.0	17.3	18.2	18.3
29	184.0	17.4	18.4	18.5
30	174.0	17.7	18.8	18.9
31	176.0	17.7	19.0	19.0
		490.00	523.00	527.0
		16.07	16.88	17.0

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Col. River Temps
August 1967

Day	Flow	Priest R	Ringold	Richland
1	183.0	17.7	18.4	18.9
2	177.0	17.8	19.1	19.1
3	182.0	18.0	19.1	19.2
4	182.0	18.0	19.4	19.4
5	162.0	17.9	19.0	19.2
6	148.0	17.8	19.2	19.2
7	138.0	17.5	19.0	19.1
8	145.0	17.6	18.9	19.1
9	123.0	18.0	19.0	19.2
10	102.0	18.0	19.7	19.8
11	107.0	18.1	20.1	20.2
12	104.0	18.6	20.2	20.4
13	92.7	18.9	20.4	20.6
14	107.0	18.9	21.0	21.1
15	116.0	19.1	20.9	21.1
16	129.0	19.3	21.0	21.2
17	112.0	19.1	21.2	21.4
18	115.0	18.9	21.4	21.5
19	108.0	18.9	20.6	21.0
20	96.7	19.0	20.7	20.8
21	126.0	19.1	20.9	20.8
22	110.0	19.1	20.4	20.6
23	115.0	19.2	20.7	20.7
24	124.0	18.8	20.4	20.5
25	122.0	18.9	20.2	20.3
26	87.9	19.0	20.3	20.3
27	77.6	19.0	20.5	20.6
28	122.0	19.0	20.4	20.6
29	126.0	18.7	20.3	20.5
30	120.0	18.5	19.9	20.2
31	115.0	18.6	19.9	20.1
		575.0	622.30	626.70
		18.54	20.07	20.21

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Col. River Temps
September 1967

Day	Flow	Priest R	Ringold	Richland
1	84.6	18.8	20.2	20.2
2	49.7	18.9	19.8	19.9
3	58.8	18.9	20.0	20.1
4	39.6	18.6	20.9	20.8
5	84.6	18.6	20.9	20.8
6	91.5	18.5	19.9	20.2
7	102.0	18.4	20.0	20.1
8	105.0	18.5	20.1	20.1
9	86.4	18.6	19.8	19.9
10	47.2	18.3	19.5	19.4
11	86.2	18.1	19.0	18.8
12	93.1	17.8	18.9	18.8
13	100.0	17.7	18.7	18.8
14	91.7	17.7	18.7	18.8
15	86.9	17.7	18.8	18.9
16	54.9	17.8	18.7	18.9
17	52.2	18.2	19.3	19.2
18	92.6	17.8	19.4	19.4
19	102.0	17.7	18.7	18.9
20	101.0	17.7	18.7	18.9
21	92.0	18.2	19.0	19.1
22	66.7	18.1	19.4	19.2
23	69.1	18.1	19.1	19.0
24	66.5	18.1	19.1	19.0
25	99.0	18.1	19.3	19.2
26	83.8	18.1	18.8	18.9
27	76.4	18.3	19.2	19.2
28	80.4	18.4	19.5	19.5
29	105.0	18.3	19.5	19.3
30	76.7	17.9	18.5	18.4
		545.90	581.40	581.79
		18.19	19.38	19.39

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Col. River Temps

October 1967

Day	Flow ^{10.3}	Priest R.	Ringold	Richland
1	39.0	17.1	18.2	18.0
2	62.1	16.8	16.8	16.9
3	75.0	16.4	16.9	16.3
4	83.1	16.4	17.1	16.7
5	89.6	16.6	17.8	17.3
6	83.2	16.4	17.5	17.3
7	68.1	16.6	17.4	17.4
8	62.0	16.7	17.4	17.4
9	75.5	16.6	17.9	17.8
10	78.7	16.5	17.6	17.6
11	74.5	16.5	18.1	17.7
12	75.6	16.1	17.3	17.2
13	84.7	16.0	17.2	16.9
14	73.4	15.8	16.3	16.3
15	62.9	15.6	16.5	16.4
16	90.8	15.6	16.4	16.4
17	90.3	15.8	16.3	16.2
18	84.6	15.5	16.4	16.1
19	72.8	15.1	15.8	15.8
20	79.3	15.0	15.4	15.4
21	50.6	15.0	16.1	15.6
22	62.5	14.7	16.0	15.4
23	69.6	14.4	15.2	14.9
24	87.8	14.3	14.8	14.6
25	79.0	14.0	14.7	14.3
26	84.0	14.0	14.3	14.2
27	78.6	13.9	14.6	14.2
28	43.8	13.6	14.8	14.1
29	39.7	13.6	14.2	13.9
30	64.6	13.7	14.7	14.4
31	64.9	13.7	15.3	14.9
		481.00	505.00	497.60
		15.51	16.29	16.05

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54	19.1	85.4	17.6	105.1	18.4	107.9
53	19.1	104.8	17.4	107.7	19.1	112.6
52	18.8	105.6	17.2	145.0	18.6	110.4
51	18.6	124.6	17.8	170.4	17.4	125.3
50	18.6	161.0	17.0	160.7	17.3	161.3
49	17.8	175.7	16.0	185.4	16.7	213.3
48	16.9	196.6	15.8	208.3	16.0	224.3
47	15.8	257.4	14.7	229.3	15.6	258.9
46	14.9	360.9	14.4	237.7	14.7	282.7
45	14.3	453.4	13.7	254.3	14.8	300.1
44	13.7	490.9	13.2	284.4	13.9	277.4
43	12.6	485.4	12.0	308.6	12.7	281.9
42	11.7	398.1	11.0	284.3	12.4	277.9
41	11.3	299.1	10.5	179.7	11.8	124.4
40	10.8	250.9	10.5	152.7	10.3	111.7
39	9.5	168.1	9.4	158.1	8.7	133.6
38	9.4	110.3	8.1	162.0	8.4	119.4
37	8.5	105.1	7.3	156.6	7.6	111.3
36	7.3	99.2	6.6	119.4	6.5	96.0
35	6.9	114.6	6.5	88.0	5.6	87.1
34	6.8	101.2	5.5	56.3	5.1	85.6
33	5.9	95.3	4.6	53.0	5.3	70.3
32	5.1	88.1	4.3	65.2	4.8	62.1
31	4.6	86.6	3.5	58.2	4.3	81.1
30	3.8	90.3	2.7	63.4	3.9	86.2
29	3.9	100.7	2.5	68.2	3.8	84.9
28	4.3	94.8	3.7	68.8	3.8	86.9
27	4.8	83.4	3.5	81.9	4.1	94.8
26	5.4	81.3	3.7	85.6	3.7	76.1
25	4.7	77.4	4.2	81.9	3.6	73.5
24	4.9	70.2	2.7	81.0	4.5	83.9
23	6.1	57.4	3.6	75.8	4.6	92.2
22	6.0	56.7	5.0	53.7	6.5	83.1
21	5.2	61.7	5.3	47.8	7.3	79.6
	78.1	78.0	78.1	78.0	78.1	78.0
1961						
1962						
1963						

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	<u>1961</u>		<u>1962</u>		<u>1963</u>	
	PRT	PRQ	PRT	PRQ	PRT	PRQ
35	18.6	88.1	17.1	97.7	17.9	85.5
36	18.9	76.5	17.5	78.9	18.4	70.3
37	18.2	71.1	16.7	70.0	18.9	73.2
38	17.7	62.7	17.0	63.1	18.0	77.0
39	16.8	54.7	17.3	62.2	18.0	67.5
40	16.2	57.8	16.3	58.6	18.0	61.7
41	15.5	56.5	14.5	63.0	17.3	62.4
42	14.9	67.7	14.1	64.9	16.6	61.9
43	13.8	70.8	14.7	70.0	15.4	58.2
44	12.8	65.4	14.4	68.1	13.9	59.6
45	11.5	61.9	13.5	66.1	12.8	62.0
46	10.5	61.4	12.1	62.5	12.2	54.8
47	9.3	62.6	10.9	68.0	11.5	56.5
48	8.5	61.1	10.0	89.1	10.7	56.7
49	8.3	58.7	9.4	82.3	9.2	66.7
50	6.5	59.3	9.6	76.6	7.8	64.0
51	5.8	57.3	9.4	80.3	7.1	58.0
52	5.7	48.3	7.7	81.0	7.0	55.5

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	<u>1964</u>		<u>1965</u>		<u>1966</u>	
	<u>PRT</u>	<u>PRQ</u>	<u>PRT</u>	<u>PRQ</u>	<u>PRT</u>	<u>PRQ</u>
1	6.8	53.2	3.5	69.6	5.8	75.2
2	6.3	58.2	4.2	89.1	5.3	70.0
3	5.5	59.9	4.5	78.9	5.3	63.6
4	4.7	58.4	4.8	79.3	4.8	67.3
5	4.6	53.5	4.5	66.3	4.1	72.7
6	4.5	67.4	3.8	83.0	4.2	78.7
7	4.6	80.0	3.2	114.4	4.5	80.1
8	4.7	78.6	3.2	97.9	4.1	81.0
9	4.8	78.9	3.3	99.7	3.9	77.2
10	4.6	62.0	3.5	86.1	3.6	84.1
11	4.4	56.9	4.1	92.0	4.0	79.3
12	4.8	66.3	4.4	90.0	4.7	74.1
13	4.8	68.2	4.2	86.8	4.6	72.8
14	5.8	59.4	4.6	78.7	5.7	70.3
15	6.6	57.9	5.5	79.8	7.0	65.6
16	7.4	68.2	6.7	92.9	7.9	73.4
17	7.6	74.0	7.2	137.4	8.3	79.1
18	8.1	76.4	8.2	155.1	8.6	90.6
19	8.7	82.5	8.2	323.4	9.8	115.3
20	9.2	144.6	10.0	528.0	10.1	211.3
21	10.1	206.0	10.4	241.6	10.2	192.0
22	11.1	253.6	11.2	247.4	11.6	197.6
23	12.2	307.7	12.0	301.0	11.8	234.4
24	12.3	347.7	12.8	307.7	11.9	305.0
25	13.0	440.6	13.2	313.3	12.7	291.4
26	13.5	452.4	14.3	329.3	12.6	269.3
27	13.7	378.6	14.7	277.4	13.3	244.7
28	14.5	334.6	15.6	253.4	14.0	247.7
29	15.4	328.3	15.7	241.9	15.1	253.4
30	15.6	275.3	16.1	199.3	15.9	227.0
31	16.6	196.0	17.3	159.0	16.5	195.1
32	16.6	154.0	18.1	132.7	17.4	142.2
33	17.2	138.4	18.9	140.9	17.4	124.7
34	17.3	126.7	18.7	125.9	17.8	107.2

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196419651966

	<u>PRT</u>	<u>PR Q</u>	<u>PRT</u>	<u>PR Q</u>	<u>PRT</u>	<u>PR Q</u>
35	17.4	108.2	18.1	116.6	17.9	86.5
36	16.3	81.1	17.4	106.3	17.0	78.1
37	16.5	74.2	17.6	79.3	17.6	71.0
38	16.5	70.4	17.5	71.9	17.6	71.5
39	16.1	70.9	17.1	70.4	17.6	70.3
40	15.8	84.2	16.8	69.3	17.3	74.1
41	15.2	87.4	16.7	63.1	16.6	66.5
42	15.1	91.2	15.8	71.3	14.9	73.1
43	14.2	89.5	14.5	62.1	13.6	66.7
44	13.5	80.1	13.9	63.6	13.5	64.9
45	12.6	74.8	13.6	66.8	13.2	65.5
46	11.4	69.9	12.6	77.8	12.2	60.9
47	10.3	66.6	11.9	63.9	11.5	65.3
48	9.5	69.1	10.7	69.2	10.7	65.4
49	9.0	77.1	9.4	66.4	10.3	68.8
50	8.3	71.2	8.9	70.3	9.2	75.4
51	6.3	70.7	8.3	79.9	8.4	67.2
52	4.1	58.5	7.0	76.2	7.6	78.0

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P. Rapids

1967

Weekly Average (7 days)

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	<u>C</u>	<u>F</u>	<u>Q</u>		<u>C</u>	<u>F</u>	<u>Q</u>
				33-	19.0	66.2	111.4
1-	6.3	43.3	84.7	34-	19.0	66.2	111.6
2-	6.1	43.0	75.9	35-	18.8	65.8	99.3
3-	5.9	42.6	72.9	36-	18.6	65.5	81.8
4-	5.5	41.9	70.6	37-	17.9	64.2	80.0
5-	5.5	41.9	60.8	38-	18.0	64.4	82.2
6-	5.5	41.9	78.0	39-	18.2	64.8	84.0
7	5.3	41.5	81.3	40-	16.6	61.9	71.4
8	4.9	40.8	83.2	41-	16.3	61.3	74.9
9	4.9	40.8	80.3	42-	15.4	59.7	76.0
10	4.8	40.6	90.7	43-	14.1	57.4	73.2
11	4.8	40.6	91.0	44-	13.2	55.8	66.9
12	5.1	41.2	86.7	45-	11.9	53.4	73.0
13	5.4	41.7	88.3	46-	11.7	53.1	67.4
14	6.2	43.2	90.4	47-	10.8	51.4	72.2
15	7.0	44.6	85.4	48-	9.5	49.1	87.7
16	6.7	44.1	95.5	49-	8.6	47.5	86.2
17	7.3	45.1	99.0	50-	7.5	45.5	95.5
18	8.4	47.1	76.9	51-	6.1	43.0	96.6
19	9.5	49.1	77.1	52-	6.1	43.0	82.2
20	10.5	50.9	100.4				
21	11.0	51.8	210.6				
22	11.4	52.5	283.4				
23	12.9	55.2	401.4				
24	12.8	55.0	452.8				
25	13.7	56.7	437.1				
26	14.4	57.9	455.0				
27	15.3	59.5	388.5				
28	15.4	59.7	320.0				
29	16.3	61.3	251.8				
30	17.0	62.6	204.3				
31	17.8	64.0	176.6				
32	17.9	64.2	123.9				

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~~CONFIDENTIAL~~DECLASSIFIED ~~REDACTED~~ ROUGH DRAFT

Brick Roads - Temperature
And Flow, 1961 - 1967

Week	T_c	T_F	Q_{c13}	ΔT_F	ΔT_c	T
1	5.7	42.3	67.4	3.57	1.98	15 747
2	5.6	42.1	70.1	3.58	1.99	16 461
3	5.1	41.2	71.5	3.69	2.05	17 296
4	4.6	40.3	73.0	3.77	2.09	18 003
5	4.5	40.1	69.4	3.79	2.11	17 279
6	4.4	39.9	78.6	3.81	2.12	19 663
7	4.3	39.7	87.9	3.84	2.13	22 093
8	4.1	39.4	84.5	3.86	2.14	21 338
9	3.9	39.0	84.3	3.90	2.17	21 586
10	3.8	38.8	80.4	3.92	2.18	20 682
11	4.2	39.6	77.9	3.85	2.14	19 671
12	4.7	40.5	76.1	3.75	2.08	18 678
13	5.0	41.0	76.4	3.70	2.06	18 571
14	5.7	42.3	77.5	3.57	1.98	18 107
15	6.4	43.5	82.6	3.46	1.92	18 714
16	7.0	44.6	92.2	3.37	1.87	20 345
17	7.7	45.9	108.9	3.24	1.80	23 130
18	8.5	47.3	112.1	3.11	1.73	22 884
19	9.1	48.4	136.9	3.03	1.68	27 139
20	10.2	50.6	169.4	2.86	1.59	31 783
21	10.8	51.4	207.6	2.80	1.56	38 215
22	11.5	52.7	268.9	2.72	1.51	47 913
23	12.3	54.1	323.5	2.63	1.46	55 733
24	12.9	55.2	352.3	2.56	1.42	59 031
25	13.6	56.5	355.7	2.48	1.38	57 922
26	14.1	57.4	338.2	2.44	1.36	54 274
27	14.7	58.5	287.8	2.38	1.32	44 828
28	15.5	59.9	255.0	2.31	1.18	35 506
29	16.1	61.0	235.7	2.26	1.26	35 044
30	16.8	62.2	198.4	2.20	1.22	28 562
31	17.4	63.3	163.9	2.15	1.19	23 015
32	17.8	64.0	130.5	2.13	1.18	18 171

ROUGH DRAFT

T_c = Direct Rapid water temperature (plant inlet temperature) - $^{\circ}\text{C}$
 T_F = " " " " " " " " - $^{\circ}\text{F}$
 Q_{crrs} = " " " flow - cubic feet per second
 ΔT_F = Allowable delta T (state standards) - $^{\circ}\text{F}$
 ΔT_C = " " " " " " - $^{\circ}\text{C}$
 P = " thermal discharge from reactors - MW

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ROUGH DRAFT

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1952

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ROUGH DRAFT

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C Reactor Power Generation (Calculated)

$$\text{Flow} = 103 \times 10^3 \text{ GPM}$$

$$\Delta T = 94.5 - T_1$$

$$K = 0.264$$

$$P = K \times 103 \times 10^3 (\Delta T)$$

Week	ΔT	P	Week	ΔT	P	P @ 7% Loss
1	88.8	2415	27	79.8	2170	
2	88.9	2417	28	79.0	2148	
3	89.4	2431	29	78.4	2132	
4	89.9	2445	30	77.7	2113	
5	90.0	2447	31	77.1	2097	
6	90.1	2450	32	76.7	2086	
7	90.2	2453	33	76.2	2072	
8	90.4	2458	34	76.2	2072	1927
9	90.6	2464	35	76.5	2080	1934
10	90.7	2466	36	76.9	2091	1942
11	90.3	2455	37	76.9	2091	1945
12	89.8	2442	38	77.0	2094	1947
13	89.5	2434	39	77.2	2099	1952
14	88.8	2415	40	77.8	2116	1968
15	88.1	2396	41	78.5	2135	1986
16	87.5	2379	42	79.2	2154	2003
17	86.8	2360	43	80.2	2181	2028
18	86.0	2339	44	80.9	2200	2046
19	85.4	2322	45	81.8	2224	2068
20	84.3	2292	46	82.7	2249	2092
21	83.7	2276	47	83.6	2273	2114
22	83.0	2257	48	84.6	2300	2139
23	82.2	2235	49	85.3	2319	2157
24	81.6	2219	50	86.2	2344	2180
25	80.9	2200	51	87.2	2371	
26	80.4	2186	52	88.0	2393	

$$\text{Total Power} = K @ 8800 + N @ 385 + WPA55 @ 3135 = 12320$$

$$= 12320 + C$$

~~SECRET~~
~~SECRET~~ ROUGH DRAFT

Total Power Generation

Prime & Operating Under Current

Limits And 7% Heat Loss @ $e \pm R$

W/EUR	C	K	N	W/PS	Total	- 385
34	1927	7533	3825	3135	12 980	12 595
35	1934	"	"	"	12 987	12 602
36	1945	"	"	"	12 998	12 613
37	1945				12 998	12 613
38	1947				13 000	12 615
39	1952				13 005	12 620
40	1968				13 021	12 636
41	1986				13 039	12 654
42	2003				13 056	12 671
43	2028				13 081	12 696
44	2046				13 099	12 714
45	2068				13 121	12 736
46	2092				13 145	12 760
47	2114				13 167	12 782
48	2139				13 192	12 807
49	2157				13 210	12 825
50	2180				13 233	12 848

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~~SECRET~~ ROUGH DRAFT
~~SECRET~~

DECLASSIFIED

ROUGH DRAFT

Total Power Generation

Assume 7% Heat Loss @ R & C

Week	C	K	N	WPPS	-385	Total
34	1927	8184	385	3135	13246	13631
35	1934	"	"	"	13253	13638
36	1945	"	"	"	13264	13649
37	1945	"	"	"	13264	13649
38	1947	"	"	"	13266	13651
39	1952	"	"	"	13271	13656
40	1968	"	"	"	13287	13672
41	1986	"	"	"	13305	13690
42	2003	"	"	"	13322	13707
43	2028	"	"	"	13347	13732
44	2046	"	"	"	13365	13750
45	2068	"	"	"	13387	13772
46	2092	"	"	"	13411	13796
47	2114	"	"	"	13433	13818
48	2139	"	"	"	13458	13843
49	2157	"	"	"	13476	13861
50	2180	"	"	"	13499	13884

ROUGH DRAFT

~~CONFIDENTIAL~~~~ROUGH DRAFT~~Total Reactor # WPPSS Power Generation (Calculated)

K = 8800

N = 385

WPPSS = 3135

Total = 12320 (T)

Week	(T)	Final	Week	(T)	Final	-385
1	12320	14735	27	12320	14490	
2	"	14737	28	"	14468	
3	"	14751	29	"	14452	
4		14765	30		14433	
5		14767	31		14417	
6		14770	32		14406	
7		14773	33		14392	
8		14778	34		14392	14007
9		14784	35		14400	14015
10		14786	36		14411	14026
11		14775	37		14411	14026
12		14762	38		14414	14029
13		14754	39		14419	14034
14		14735	40		14436	14051
15		14716	41		14455	14070
16		14699	42		14474	14089
17		14680	43		14501	14116
18		14659	44		14520	14135
19		14642	45		14544	14159
20		14612	46		14569	14184
21		14596	47		14593	14208
22		14577	48		14620	14235
23		14555	49		14639	14254
24		14539	50		14664	14259
25		14520	51		14691	
26		14506	52		14713	

~~ROUGH DRAFT~~ DECLASSIFIED

DECLASSIFIED

Print Record
C-1 1967
Weekly discharge

~~CONFIDENTIAL~~~~ROUGH DRAFT~~

		ALLOWABLE	ACTUAL	ALLOWABLE
	Ti-F	AT-F	RIVER-Q	DISCHARGE-MW
				19 289
1	43.3	3.48 (1.93)	84 700	17 375
2	43.0	3.50 (1.94)	75 900	16 860
3	42.6	3.54 (1.96)	72 900	16 661
4	41.9	3.61 (2.0)	70 600	14 348
5	41.9	3.61 (2.0)	66 800	18 408
6	41.9	3.61 (2.0)	78 000	19 474
7	41.5	3.66 (2.05)	81 500	20 224
8	40.8	3.71 (2.06)	83 200	19 519
9	40.8	3.71 (2.06)	80 300	22 154
10	40.6	3.74 (2.07)	90 700	22 227
11	40.6	3.74 (2.07)	91 000	20 768
12	41.2	3.67 (2.03)	86 700	21 047
13	41.7	3.64 (2.02)	85 500	20 587
14	43.2	3.49 (1.93)	90 400	18 844
15	44.6	3.37 (1.87)	85 400	21 411
16	44.1	3.43 (1.90)	95 500	21 378
17	45.1	3.31 (1.83)	99 000	15 789
18	47.1	3.14 (1.74)	76 900	15 011
19	49.1	2.98 (1.65)	77 100	18 600
20	50.9	2.84 (1.57)	100 400	38 270
21	51.8	2.78 (1.54)	210 600	50 496
22	52.5	2.73 (1.51)	283 400	67 258
23	53.2	2.66 (1.42)	401 400	75 871
24	55.0	2.57 (1.42)	452 800	70 661
25	56.7	2.47 (1.37)	437 100	71 944
26	57.9	2.41 (1.34)	423 000	59 137
27	59.5	2.32 (1.29)	552 500	48 332
28	59.7	2.31 (1.28)	520 000	36 843
29	61.3	2.24 (1.24)	251 800	29 169
30	62.6	2.18 (1.21)	264 300	24 589
31	64.0	2.18 (1.18)	176 600	17 251
32	64.2	2.12 (1.18)	163 900	

~~CONFIDENTIAL~~~~ROUGH DRAFT~~

Frank Knight
 2/15/67
 Willie Curran

ROUGH DRAFT

ALLOWABLE
 DISBURSE - MHI

ACTUAL
 DISBURSE - Q

ALLOWABLE
 AT-1

AT-1

93	66.2	2.05	(1.14)	111	420	14	985
94	66.8	2.05	(1.14)	111	600	15	012
95	65.8	2.07	(1.15)	99	510	13	475
96	65.5	2.08	(1.16)	81	800	11	196
97	64.2	2.12	(1.18)	80	020	11	139
98	64.4	2.11	(1.17)	82	200	11	348
99	64.8	2.10	(1.17)	84	020	11	597
100	61.9	2.21	(1.23)	71	420	10	363
101	61.3	2.24	(1.24)	74	920	10	959
102	59.7	2.21	(1.28)	76	000	11	479
103	59.4	2.44	(1.36)	73	200	11	586
104	55.8	2.53	(1.41)	66	900	11	130
105	53.4	2.67	(1.48)	73	000	12	748
106	53.1	2.69	(1.50)	67	420	11	929
107	51.4	2.20	(1.52)	72	200	13	290
108	49.1	2.98	(1.66)	87	720	17	178
109	47.5	3.10	(1.72)	86	200	17	495
110	45.5	3.28	(1.82)	95	520	20	509
111	43.0	3.50	(1.94)	96	600	22	113
112	43.0	3.50	(1.94)	92	210	18	817

DECLASSIFIED

ROUGH DRAFT

[REDACTED]

DECLASSIFIED

~~REDACTED~~ ROUGH DRAFT

Assume 7% Heat Loss

Reactor - To - Burn @ 15-c

C 80 % TOE

35. 11502 = 10 697

36. 11506 10 701

11523 10 716

11521 10 715

11516 10 710

11531 10 742

11538 10 749

11578 10 768

11606 10 794

11625 10 811

11634 10 838

11638 10 842

11678 10 861

~~REDACTED~~ ROUGH DRAFT

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~ ROUGH DRAFT

N - WPPSS

860 MW taken 3995 MWt

Operating Unit Heat Load = 385 MWt

$$\begin{array}{r} 3995 \\ - 385 \\ \hline 4380 \text{ MWt total reactor power} \end{array}$$

N

385 MWt

WPPSS

$$\begin{array}{r} 3995 \text{ MWt} \\ - 860 \text{ MWt} \\ \hline 3135 \end{array}$$

Total

$$\begin{array}{r} 3135 \\ + 385 \\ \hline 3520 \text{ MWt} \end{array}$$

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~~CONFIDENTIAL~~ ROUGH DRAFT

@ 80 %

35-

$$94.5 - T (103 \times 10^{-6}) (0.264) = 2058$$

12660

2058

14058

$$T = 65.8 - 32 (\frac{1}{9}) : 33.8 (\frac{1}{9}) = 188$$

14062

$$94.5 - 18.6 (103 \times 10^{-6}) (0.264) = 2062 + 12000 =$$

14084

$$94.5 - 17.9 (27.2) = 2084 + 12000 =$$

14081

$$94.5 - 18.0 (27.2) : 2081 + 12000 =$$

14075

$$94.5 - 18.2 (27.2) = 2075 + 12000 =$$

14119

$$94.5 - 16.6 (27.2) = 2119 + 12000 =$$

14127

$$94.5 - 16.3 (27.2) = 2127 + 12000 =$$

14152

$$94.5 - 15.4 (27.2) = 2152 + 12000 =$$

14187

$$94.5 - 14.1 (27.2) = 2187 + 12000 =$$

14211

$$94.5 - 13.2 (27.2) = 2211 + 12000 =$$

14247

$$94.5 - 11.9 (27.2) = 2247 + 12000 =$$

14252

$$94.5 - 11.7 (27.2) = 2252 + 12000 =$$

14277

$$94.5 - 10.8 (27.2) = 2277 + 12000 =$$

14312

$$94.5 - 9.5 (27.2) = 2312 + 12000 =$$

14336

$$94.5 - 8.6 (27.2) = 2336 + 12000 =$$

14362

$$94.5 - 7.5 (27.2) = 2362 + 12000 =$$

14404

$$94.5 - 6.1 (27.2) = 2404 + 12000 =$$

14414

$$94.5 - 6.1 (27.2) = 2404 + 12000 =$$

DECLASSIFIED

ROUGH DRAFT

George [redacted] Name

[redacted]

~~CONFIDENTIAL~~
~~ROUGH DRAFT~~

ROUGH DRAFT

Maximum Power
(That Load To Run)

<u>Watt K</u>	<u>C</u>	<u>K</u>	<u>N</u>	<u>(24N)</u>	<u>W/PIPS</u>	<u>80%</u>	<u>Total</u>
35	2058	8800	385	(11243)	3135	11502	14 378
36	2062	"	"	(11247)	"	11506	14 382
37	2084			(11269)		11523	14 404
38	2081			(11266)		11521	14 401
39	2075			(11260)		11516	14 395
40	2119			(11304)		11551	14 439
41	2127			(11312)		11558	14 447
42	2152			(11337)		11578	14 472
43	2187			(11372)	-	11606	14 507
44	2211			(11396)		11625	14 531
45	2247			(11432)		11654	14 567
46	2252			(11437)		11658	14 572
47	2272			(11462)		11678	14 597

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ROUGH DRAFT

	<i>Richmond</i>	RG	Rich	AT PA-RG	AT RG-R	AT PA-R
JAN	5.91	7.48	7.36	+1.57	-0.12	+1.45
FEB	5.24	7.01	6.98	+1.77	-0.03	+1.74
MAR	4.99	6.55	6.43	+1.56	-0.12	+1.44
APR	6.80	8.72	8.80	+1.92	+0.08	+2.00
MAY	10.84	11.81	12.02	+1.77	+0.21	+1.99
JUN	13.26	13.75	13.87	+0.49	+0.12	+0.61
JUL	16.07	16.88	17.0	+0.81	+0.12	+0.93
AUG	18.54	20.07	20.21	+1.53	+0.14	+1.67
SEP	18.19	19.58	19.59	+1.19	+0.51	+1.20
OCT	15.51	16.29	16.05	+0.78	-0.24	+0.54
NOV	11.33	12.22	11.96	+0.89	-0.26	+0.63
DEC	7.16	8.03	7.82	+0.87	-0.21	+0.66

+1.26 +0.057 +0.111

1.21

1.54

1.35

ROUGH DRAFT

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~~ROUGH DRAFT~~

MAX Tower Generator
(1975)

$$K = 8800$$

$$N = 385$$

$$WFASS = \frac{5135}{12320}$$

$$C = 94.5 - T_1 (Q \times 0.264)$$

$$Q = 103 \times 10^6 \text{ GPM}$$

MONTH	C	K's	N	WFASS	- 385	TOTAL
1	2368	8800	385	5135	14303	14688
2	2435				14370	14755
3	2455				14390	14775
4	2450				14385	14770
5	2387				14322	14707
6	2306				14241	14626
7	2251				14186	14571
8	2159				14094	14479
9	2088				14023	14408
10	2051				14026	14411
11	2145				14080	14465
12	2249				14124	14569
						(170604)

	@7%	@7%				
1	2202	8184	385	5135	13527	13906
2	2265				13584	13969
3	2283				13602	13987
4	2278				13598	13983
5	2220				13539	13924
6	2145				13462	13848
7	2093				13412	13797
8	2058				13327	13712
9	1942				13261	13646
10	1945				13262	13648
11	1995				13314	13699
12	2092				13411	13796
						(141295)

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~~ROUGH DRAFT~~

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ROUGH DRAFT

Canadian Treaty Reservations

Drift Rigids Temperature

		<u>Week</u>	<u>T_c</u>	<u>T_F</u>	<u>Q_{CPS}</u>	<u>DT_F</u>	<u>ATC</u>	<u>ALLOWABLE P</u>
		1	9.2					
		2	8.3					
		3	7.3					
		4	6.5					
J	<u>7.4</u>	5	5.7	45.3	138.6	3.29	1.83	29.929
		6	5.6					
		7	5.1					
		8	4.6					
F	<u>5.0</u>	9	4.5	41.0	114.8	3.70	2.10	28.147
		10	4.4					
		11	4.3					
		12	4.1					
M	<u>4.2</u>	13	3.9	39.6	104.9	3.84	2.13	26.366
		14	3.8					
		15	3.2					
		16	4.7					
A	<u>4.4</u>	17	5.0	39.9	132.0	3.81	2.12	23.021
		18	5.7					
		19	6.1					
		20	7.0					
M	<u>6.7</u>	21	7.7	44.1	146.4	3.40	1.89	22.650
		22	8.5					
		23	9.1					
		24	10.2					
J	<u>9.7</u>	25	10.8	49.5	131.7	2.94	1.63	25.531
		26	11.5					
		27	12.3					
		28	12.9					
J	<u>12.6</u>	29	13.6	54.7	125.2	2.60	1.44	21.274
		30	14.1					
		31	14.7					
		32	15.5					

ROUGH DRAFT

~~SECRET~~ ROUGH DRAFT

	$\sqrt{2}k$	T_c	T_F	Q_{CRS}	ΔT_F	ΔT_c	P
A 15.1	53	16.1	59.2	105.0	2.34	1.30	16 107
	* 54	16.8					
	55	17.4					
	56	17.8					
	57	18.3					
S 17.7	53	18.3	63.9	95.6	2.13	1.18	13 311
	55	18.0					
	56	17.6					
	57	17.6					
	58	17.5					
O 17.6	45	17.3	63.7	89.2	2.14	1.18	12 420
	46	16.7					
	47	16.0					
	48	15.3					
N 15.6	* 47	14.5	60.1	86.9	2.30	1.28	13 125
	48	13.6					
	49	12.7					
	50	11.8					
	51	10.9					
3 11.8	52	9.9	53.2	105.4	2.69	1.49	13 531

(270512)

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~~SECRET~~ ROUGH DRAFT

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I. $RIVER(Q) = 36000 \text{ cf}$

$GW(Q_1) = 940 \text{ cf}$

$\Delta T^{\circ}C = 0.356$

$T_1 = 4.0^{\circ}C = 39.2^{\circ}F$

$\therefore P = \Delta T(Q + Q_1 \times K) = 1551.775$

II. $\Delta T = 0.25^{\circ}C$

$T_1 = 8.0^{\circ}C = 42.4^{\circ}F$

$\therefore P = \Delta T(Q + Q_1 \times K) = 1089.730$

III. $\Delta T = 0.10^{\circ}C$

$T_1 = 14.0^{\circ}C = 57.2^{\circ}F$

$\therefore P = \Delta T(Q + Q_1 \times K) = 435.892$

IV. $RIVER(Q) = 50000 \text{ cf}$

$GW(Q_1) = 940 \text{ cf}$

$\Delta T^{\circ}C = 0.258$

$T_1 = 4.0^{\circ}C = 39.2^{\circ}F$

$\therefore P = \Delta T(Q + Q_1 \times K) = 1550.817$

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V. $\Delta T = 0.18^{\circ}C$

$T_1 = 8.0^{\circ}C = 42.4^{\circ}F$

$P = \Delta T(Q + Q_1 \times K) = 1082$

~~CONFIDENTIAL~~ ROUGH DRAFT

~~ROUGH DRAFT~~

VI. $\Delta T = .073$

$T_1 = 14.0^\circ\text{C} = 57.2^\circ\text{F}$

$P = \Delta T (Q + Q_1) K = 438.797$

VII. $\Delta T = 0.0185$

$T_1 = 17.0^\circ\text{C} = 62.6^\circ\text{F}$

$P = \Delta T (Q + Q_1) K = 108.186$

$T_1 = 16.6^\circ\text{C} = 61.9^\circ\text{F}$

$\Delta T = 0.277$

$Q = 100 \text{ units}$

$\Delta T = .1304$

$\frac{12040.0000}{118}$

104820

13040

13040

1538.720

~~ROUGH DRAFT~~

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DECLASSIFIED ~~SECRET~~ **ROUGH DRAFT**

JANUARY 1967

DAY	Ti - C	Ti - F	ALLOWABLE		G	P
			AT - F	AT - C		
1	6.7	44.1	3.40	1.89	53.5	11932
2	6.6	43.9	3.42	1.90	69.6	15664
3	6.4	43.5	3.46	1.92	102.1	23132
4	6.5	43.7	3.45	1.92	107.0	24642
5	6.2	43.2	3.49	1.94	99.3	22732
6	6.0	42.8	3.52	1.96	97.4	22527
7	6.0	42.8	3.52	1.96	65.8	11756
8	6.2	43.2	3.49	1.94	106.7	9317
9	6.0	42.8	3.52	1.96	103.0	23222
10	6.2	43.2	3.49	1.94	84.1	19252
11	6.2	43.2	3.49	1.94	66.1	15132
12	6.1	42.0	3.51	1.95	82.6	19697
13	6.0	42.8	3.52	1.96	82.0	18965
14	6.0	42.8	3.52	1.96	69.7	15120
15	6.2	43.2	3.49	1.94	57.8	15232
16	6.0	42.8	3.52	1.96	88.6	20491
17	5.9	42.6	3.54	1.97	85.3	19529
18	5.8	42.4	3.56	1.98	74.4	17383
19	5.9	42.6	3.54	1.97	76.9	17376
20	5.9	42.6	3.54	1.97	70.0	16272
21	5.8	42.4	3.56	1.98	57.3	15288
22	5.8	42.4	3.56	1.98	42.2	11261
23	5.7	42.3	3.57	1.98	93.1	21752
24	5.5	41.9	3.61	2.01	75.2	17836
25	5.4	41.7	3.64	2.02	55.1	20284
26	5.3	41.5	3.65	2.03	76.1	18230
27	5.3	41.5	3.65	2.03	59.3	14205
28	5.4	41.7	3.64	2.02	57.1	13610
29	5.6	42.1	3.60	2.00	48.1	11352
30	5.4	41.7	3.64	2.02	90.8	31643
31	5.5	41.9	3.61	2.00	65.7	15505

K = 8100 @ 7% Hest Sun
C = K(8100 @ 67%) 67%

ROUGH DRAFT

JANUARY 1967
(ACTUAL)

DAY	C	Ka	N	WPRS	TOTAL
1	2220	7533	385	5135	13273
2	2223	"	"	"	13276
3	2228	"	"	"	13271
4	2225				13278
5	2233				13226
6	2230				13291
7	2230				13291
8	2235				13286
9	2238				13291
10	2233				13226
11	2233				13226
12	2236				13229
13	2238				13291
14	2238				13291
15	2233				13226
16	2238				13291
17	2241				13294
18	2243				13296
19	2241				13294
20	2241				13294
21	2243				13296
22	2243				13296
23	2246				13299
24	2251				13304
25	2253				13306
26	2256				13309
27	2256				13309
28	2253				13306
29	2248				13301
30	2253				13306
31	2251				13304

DECLASSIFIED

ROUGH DRAFT

~~CONFIDENTIAL~~

~~SECRET~~ ROUGH DRAFT

DECLASSIFIED

February 1967

Allowable

DAY	T-C	T-F	DT-F	DT-C	Q	T
1	5.4	41.7	3.64	2.02	54.8	13062
2	5.4	41.7	3.64	2.02	62.3	16280
3	5.6	42.1	3.59	1.99	52.1	12234
4	5.8	42.4	3.58	1.99	46.0	10802
5	5.7	42.3	3.57	1.99	46.4	10896
6	5.5	41.9	3.61	2.01	83.6	19828
7	5.6	42.1	3.59	1.99	86.1	18809
8	5.5	41.9	3.61	2.01	86.7	20564
9	5.5	41.9	3.61	2.01	90.0	21346
10	5.5	41.9	3.61	2.01	86.8	20587
11	5.5	41.9	3.61	2.01	72.5	17196
12	5.6	42.1	3.59	1.99	64.6	15169
13	5.4	41.7	3.64	2.02	96.5	21572
14	5.3	41.5	3.65	2.03	108.0	25870
15	5.2	41.4	3.66	2.03	73.4	12780
16	5.2	41.4	3.66	2.03	69.6	16672
17	5.2	41.4	3.66	2.03	63.3	21151
18	5.0	41.0	3.70	2.06	69.5	16991
19	5.0	41.0	3.70	2.06	61.9	15047
20	4.5	40.6	3.74	2.08	94.8	23268
21	4.8	40.6	3.74	2.08	88.9	21820
22	4.8	40.6	3.74	2.08	91.1	22360
23	4.8	40.6	3.74	2.08	95.5	25440
24	4.8	40.6	3.74	2.08	94.0	23071
25	5.1	41.2	3.69	2.05	55.4	13522
26	5.1	41.2	3.69	2.05	49.1	11877
27	4.9	40.8	3.71	2.06	90.2	21926
28	4.9	40.8	3.71	2.06	87.5	21270

~~CONFIDENTIAL~~

~~SECRET~~ ROUGH DRAFT

K-81N @ 7% Half Bu
C: K(AT x 100 x 0.25) 1%

27, 192

Elmwood 1967
(A. 1967)

~~SECRET~~ ROUGH DRAFT

1/1/51

N

7533

585

3135

13306

13306

13301

13296

13299

13304

13301

13304

13304

13304

13304

13301

13306

13309

13311

13311

13311

13316

13316

13316

13321

13321

13321

13321

13321

13314

13314

13319

13319

13319

DECLASSIFIED

~~SECRET~~ ROUGH DRAFT

28	28
27	27
26	26
25	25
24	24
23	23
22	22
21	21
20	20
19	19
18	18
17	17
16	16
15	15
14	14
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6	6
5	5
4	4
3	3
2	2
1	1
DAY	C

DECLASSIFIED

March 1967

CONFIDENTIAL

ROUGH DRAFT

(Unclassified)

DAY	T-C	T-F	AT-F	AT-C	Q	P
1	4.9	40.8	3.71	2.06	92.1	22.588
2	4.8	40.6	3.74	2.08	28.9	21.820
3	4.8	40.6	3.74	2.08	28.9	21.820
4	4.9	40.8	3.71	2.06	52.3	14.172
5	4.8	43.6	3.74	2.08	64.5	15.831
6	4.9	43.2	3.71	2.06	99.1	24.089
7	4.8	46.6	3.74	2.08	144.0	21.544
8	4.3	46.6	3.74	2.08	94.1	23.096
9	4.8	46.6	3.74	2.08	113.0	29.507
10	4.7	48.5	3.77	2.09	92.0	23.715
11	4.9	46.2	3.71	2.06	66.0	16.043
12	5.0	41.0	3.76	2.06	54.2	13.175
13	4.7	40.5	3.77	2.07	166.0	26.142
14	4.6	46.3	3.78	2.10	106.0	26.267
15	4.7	48.5	3.77	2.09	130.3	21.756
16	4.5	43.6	3.74	2.08	151.0	24.789
17	4.8	46.6	3.74	2.08	48.4	24.274
18	5.0	41.0	3.70	2.06	73.5	17.137
19	5.0	41.0	3.70	2.06	73.5	17.137
20	5.1	41.2	3.69	2.05	84.5	20.441
21	5.2	41.4	3.66	2.03	101.0	18.540
22	5.2	41.4	3.66	2.03	94.3	14.194
23	5.2	41.4	3.66	2.03	94.3	22.589
24	5.2	41.4	3.66	2.03	72.2	17.391
25	5.3	41.5	3.65	1.99	65.4	15.357
26	5.4	41.7	3.64	2.02	96.0	22.223
27	5.5	41.5	3.65	2.03	52.6	21.223
28	5.5	41.5	3.65	2.03	52.6	21.223
29	5.5	41.5	3.65	2.03	94.4	22.613
30	5.2	41.4	3.66	2.03	115.0	28.211
31	5.2	41.4	3.66	2.03	113.0	27.028

27.19

$K = 8140 @ 7\%$ $K = 8140$
 $C = K(AT \times 100 \times 10^{-4}) @ 7\%$

~~CONFIDENTIAL~~

WOOD DRAFT

March 1967
 (Actual)

DAY	C	K'a	N	WPKS	TOTAL
1	2266	7533	285	5125	13319
2	2268	"	"	"	13321
3	2268				13321
4	2266				13319
5	2268				13321
6	2266				13319
7	2268				13321
8	2268				13321
9	2268				13321
10	2271				13324
11	2266				13319
12	2263				13316
13	2271				13324
14	2273				13326
15	2271				13324
16	2268				13321
17	2262				13321
18	2263				13316
19	2263				- 13316
20	2263				13316
21	2261				13314
22	2258				13311
23	2258				13311
24	2258				13311
25	2256				13309
26	2248				13301
27	2253				13306
28	2256				13309
29	2256				13309
30	2258				13311
31	2258				13311

DECLASSIFIED

~~CONFIDENTIAL~~
~~SECRET~~
 DECLASSIFIED
 ROUGH DRAFT

QTRIL-1967

Allowable

JAY	Ti-C	Ti-F	AT-F	AT-C	Q	P
1	5.8	42.4	3.56	1.98	42.9	10023
2	5.9	42.6	3.54	1.97	47.5	11042
3	5.8	42.4	3.56	1.98	97.0	22663
4	6.0	42.8	3.52	1.96	103.0	23822
5	6.1	43.0	3.51	1.95	114.0	26231
6	6.2	43.2	3.49	1.94	103.0	23579
7	6.4	43.5	3.46	1.92	91.3	20625
8	6.8	44.2	3.40	1.89	77.1	17195
9	7.0	44.6	3.36	1.87	69.0	15226
10	6.9	44.4	3.37	1.87	94.6	21095
11	6.8	44.2	3.40	1.89	105.0	23417
12	7.0	44.6	3.36	1.87	104.0	22949
13	6.9	44.4	3.37	1.87	83.5	18425
14	7.0	44.6	3.36	1.87	77.2	17035
15	7.2	45.0	3.32	1.84	64.5	14004
16	7.0	44.6	3.36	1.87	53.2	11739
17	6.9	44.4	3.37	1.87	92.1	20323
18	6.8	44.2	3.40	1.89	102.0	22748
19	6.6	43.9	3.42	1.90	116.0	26007
20	6.7	44.1	3.40	1.89	106.0	23640
21	6.6	43.9	3.42	1.90	96.1	21546
22	6.5	43.7	3.45	1.92	103.0	23336
23	7.0	44.6	3.36	1.87	88.6	19550
24	7.1	44.8	3.33	1.85	110.0	24013
25	7.3	45.1	3.31	1.84	114.0	24752
26	7.4	45.3	3.29	1.83	109.0	23538
27	7.5	45.5	3.28	1.82	109.0	23409
28	7.5	45.5	3.28	1.82	89.6	19242
29	7.6	45.7	3.26	1.81	72.7	15527
30	7.9	46.2	3.21	1.78	41.7	8759

~~CONFIDENTIAL~~
~~SECRET~~
 DECLASSIFIED
 ROUGH DRAFT

27.182

K: 1.1% E 7% H&L
C: K (0.5 x 100 x 10) @ 7%

NOBIS UNIT

APRIL 1937
Actual

WPS

N

K

C

DAY

13296

3135

385

2553

2243

1

13294

2241

2

13296

2243

3

13291

2238

4

13289

2236

5

13286

2233

6

13281

2228

7

13271

2218

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13266

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13268

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13261

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13266

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2218

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13276

2223

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13273

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20

13276

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21

13278

2225

22

13266

2213

23

13263

2210

24

13258

2205

25

13256

2203

26

13253

2200

27

13253

2200

28

13251

2198

29

13243

2190

30

DECLASSIFIED

NOBIS UNIT
[REDACTED]

DECLASSIFIED

CONFIDENTIAL

CONFIDENTIAL

MAY 1987

Alameda

DAY	T-C	T-F	AT-F	AT-C	Q	P
1	7.8	46.0	3.3	1.79	91.8	19 390
2	8.2	46.8	3.16	1.76	80.4	16 697
3	8.4	47.1	3.13	1.74	85.0	17 452
4	8.4	47.1	3.13	1.74	25.3	17 574
5	8.7	47.7	3.09	1.73	94.5	19 180
6	9.4	48.9	2.98	1.66	59.3	11 616
7	9.5	49.1	2.97	1.66	49.0	9 598
8	9.6	49.3	2.95	1.64	74.7	14 456
9	7.5	49.1	2.97	1.66	93.4	18 295
10	9.3	48.7	3.60	1.67	106.0	19 963
11	9.2	48.6	3.61	1.67	82.2	16 198
12	9.4	48.9	2.98	1.66	73.4	14 378
13	9.7	49.5	2.94	1.63	65.8	12 656
14	10.2	50.4	2.88	1.60	55.5	10 478
15	10.2	50.4	2.88	1.60	96.1	18 144
16	10.4	50.7	2.86	1.59	107.0	20 075
17	10.6	51.1	2.82	1.57	105.0	19 452
18	10.6	51.1	2.82	1.57	96.3	17 841
19	10.5	50.9	2.84	1.58	113.0	21 068
20	10.7	51.3	2.81	1.56	138.0	23 930
21	10.9	51.6	2.79	1.55	154.0	28 167
22	11.0	51.8	2.77	1.54	174.0	31 619
23	11.2	52.2	2.75	1.53	190.0	34 303
24	11.1	52.0	2.76	1.53	228.0	41 163
25	10.9	51.6	2.79	1.55	248.0	44 262
26	10.9	51.6	2.79	1.55	289.0	41 824
27	10.8	51.4	2.80	1.56	357.0	47 309
28	10.9	51.6	2.79	1.55	375.0	50 298
29	11.1	52.0	2.76	1.53	429.0	46 394
30	11.1	52.0	2.76	1.53	528.0	48 385
31	11.3	52.3	2.74	1.52	540.0	50 938

27,192

~~CONFIDENTIAL~~

ROUGH DRAFT

MAY 1967

(Actual)

DAY	C	R's	N	N/PSS	TOTAL
1	2193	7533	385	3135	13 246
2	2182	"	"	"	13 235
3	2177				13 230
4	2177				13 230
5	2170				13 223
6	2152				13 205
7	2150				13 203
8	2147				13 200
9	2150				13 203
10	2155				13 208
11	2157				13 210
12	2152				13 205
13	2144				13 197
14	2132				13 185
15	2132				13 185
16	2127				13 180
17	2122				13 175
18	2122				13 175
19	2124				13 177
20	2119				13 172
21	2114				13 167
22	2112				13 165
23	2107				13 160
24	2109				13 162
25	2114				13 167
26	2114				13 167
27	2117				13 170
28	2114				13 167
29	2109				13 162
30	2109				13 162
31	2104				13 157

DECLASSIFIED

~~CONFIDENTIAL~~

ROUGH DRAFT

DECLASSIFIED

JUNE 1967

ROUGH DRAFT

SECRET

ROUGH DRAFT

SECRET

DAY	T.C	T.F	AT.F	AT.C	Q	T
1	11.5	52.7	2.72	1.51	290.0	51.672
2	12.1	53.8	2.65	1.47	317.0	54.987
3	12.1	53.8	2.65	1.47	336.0	58.283
4	12.2	54.0	2.64	1.47	373.0	64.701
5	12.7	54.9	2.58	1.43	382.0	64.459
6	12.8	55.0	2.57	1.43	406.0	68.508
7	13.3	55.9	2.51	1.39	432.0	70.257
8	13.6	56.5	2.48	1.38	436.0	70.998
9	13.7	56.8	2.53	1.41	454.0	75.537
10	13.8	57.0	2.57	1.43	466.0	77.620
11	14.6	57.7	2.59	1.44	474.0	77.143
12	14.5	57.5	2.60	1.44	478.0	76.203
13	12.6	54.7	2.59	1.44	419.0	76.294
14	12.8	55.0	2.57	1.43	445.0	75.089
15	12.9	55.2	2.56	1.42	467.0	72.251
16	13.1	55.6	2.54	1.41	466.0	77.533
17	13.5	55.9	2.51	1.39	462.0	75.777
18	13.5	56.3	2.50	1.39	469.0	72.005
19	13.7	56.7	2.48	1.38	436.0	70.998
20	13.8	56.8	2.47	1.37	436.0	70.484
21	13.8	56.8	2.47	1.37	446.0	71.130
22	13.7	56.7	2.46	1.37	445.0	71.939
23	13.7	56.7	2.46	1.37	438.0	69.837
24	13.6	56.5	2.49	1.38	436.0	70.998
25	13.9	57.0	2.45	1.36	458.0	73.500
26	14.1	57.4	2.43	1.35	482.0	76.783
27	14.3	57.7	2.42	1.34	471.0	74.475
28	14.5	58.1	2.40	1.33	460.0	72.192
29	14.6	58.3	2.39	1.33	462.0	72.506
30	14.7	58.5	2.38	1.32	434.0	67.600

JUNE 1967
(Actual)

DAY	C	R'a	N	W/PSS	Total
1	2099	2533	385	3/35	13 152
2	2084	"	"	"	13 137
3	2084				13 137
4	2081				13 134
5	2069				13 122
6	2066				13 119
7	2053				13 106
8	2046				13 099
9	2056				13 109
10	2066				13 119
11	2071				13 124
12	2074				13 127
13	2071				13 124
14	2066				13 119
15	2064				13 117
16	2058				13 111
17	2053				13 106
18	2048				13 101
19	2043				13 096
20	2041				13 094
21	2041				13 094
22	2043				13 096
23	2043				13 096
24	2046				13 099
25	2038				13 091
26	2033				13 086
27	2028				13 081
28	2023				13 076
29	2021				13 074
30	2018				13 071

DECLASSIFIED

~~CONFIDENTIAL~~~~CONFIDENTIAL~~ ROUGH DRAFT

JULY 1967

DECLASSIFIED

DAY	T.C	T.F	Allowable		Q	P
			AT-F	AT-C		
1	14.9	58.8	2.36	1.31	425.0	65.697
2	15.1	59.2	2.34	1.30	419.0	64.275
3	15.4	59.7	2.31	1.28	425.0	64.192
4	15.5	59.9	2.30	1.28	380.0	57.395
5	15.6	60.1	2.29	1.27	378.0	56.647
6	15.4	59.7	2.31	1.28	390.0	58.906
7	15.2	59.4	2.33	1.29	372.0	56.626
8	15.0	59.0	2.35	1.31	356.0	55.030
9	14.9	58.8	2.36	1.31	360.0	55.649
10	15.0	59.0	2.35	1.31	342.0	53.021
11	15.2	59.4	2.33	1.29	328.0	49.928
12	15.4	59.7	2.31	1.25	324.0	48.937
13	15.7	60.3	2.28	1.27	302.0	45.258
14	15.8	60.4	2.28	1.27	291.0	43.609
15	16.1	61.0	2.25	1.25	292.0	43.070
16	16.1	61.0	2.25	1.25	274.0	40.415
17	16.2	61.2	2.24	1.24	267.0	39.067
18	16.2	61.2	2.24	1.24	267.0	39.067
19	16.2	61.2	2.24	1.24	250.0	36.580
20	16.3	61.3	2.24	1.24	246.0	35.995
21	16.4	61.5	2.23	1.24	233.0	34.093
22	16.4	61.5	2.23	1.24	226.0	33.068
23	16.2	61.2	2.24	1.24	219.0	32.044
24	16.7	62.1	2.20	1.22	214.0	30.807
25	16.9	62.4	2.19	1.22	213.0	30.663
26	17.3	63.1	2.16	1.20	203.0	28.745
27	17.1	62.8	2.17	1.21	194.0	27.699
28	17.3	63.1	2.16	1.20	203.0	28.745
29	17.4	63.3	2.15	1.19	181.0	25.837
30	17.7	63.9	2.13	1.18	174.0	24.228
31	17.7	63.9	2.13	1.18	176.0	24.506

~~CONFIDENTIAL~~~~CONFIDENTIAL~~

27.192

~~CONFIDENTIAL~~
ROUGH DRAFT

JULY 1967
(Actual)

DAY	C	K'a	N	WAFSS	TOTAL
1	2013	7533	385	3135	13 066
2	2008				13 061
3	2000				13 053
4	1998				13 051
5	1995				13 048
6	2000				13 053
7	2005				13 058
8	2010				13 063
9	2013				13 066
10	2010				13 063
11	2005				13 058
12	2000				13 053
13	1993				13 046
14	1990				13 043
15	1983				13 036
16	1983				13 036
17	1980				13 033
18	1980				13 033
19	1980				13 033
20	1978				13 031
21	1975				13 028
22	1975				13 028
23	1980				13 033
24	1967				13 020
25	1962				13 015
26	1952				13 005
27	1957				13 010
28	1952				13 005
29	1950				13 003
30	1942				12 995
31	1942				12 995

DECLASSIFIED

~~CONFIDENTIAL~~
ROUGH DRAFT

DECLASSIFIED

~~SECRET~~ ~~SECRET~~

AUGUST 1967

DAY	Observable					T
	T ₁ C	T ₁ F	AT ₁ F	AT ₁ C	G	
1	17.7	63.7	2.13	1.18	183.0	25.471
2	17.8	64.0	2.13	1.18	177.0	24.645
3	18.0	64.1	2.11	1.17	182.0	25.187
4	18.0	64.1	2.11	1.17	182.0	25.187
5	17.9	64.2	2.12	1.18	182.0	22.525
6	17.8	64.0	2.13	1.18	182.0	20.633
7	17.5	63.5	2.15	1.19	184.0	19.371
8	17.6	63.7	2.14	1.19	185.0	20.501
9	17.5	64.4	2.11	1.17	185.0	20.501
10	17.5	64.4	2.11	1.17	185.0	14.501
11	17.1	64.6	2.11	1.17	187.0	14.501
12	17.1	65.5	2.07	1.15	184.0	14.113
13	17.4	66.0	2.06	1.14	182.7	14.476
14	17.4	66.0	2.06	1.14	181.0	14.501
15	17.1	66.1	2.05	1.14	180.0	15.201
16	17.3	66.7	2.04	1.13	181.0	15.201
17	17.1	66.1	2.05	1.14	182.0	15.201
18	17.1	66.0	2.05	1.14	185.0	15.170
19	17.1	66.0	2.05	1.14	182.0	14.521
20	17.0	66.2	2.05	1.14	180.7	15.201
21	17.0	66.4	2.05	1.14	186.0	16.750
22	17.1	66.4	2.05	1.14	180.0	15.701
23	17.2	66.6	2.04	1.13	185.0	15.701
24	17.1	65.8	2.06	1.14	184.0	16.000
25	17.1	66.0	2.06	1.14	180.0	16.001
26	17.0	66.2	2.05	1.14	181.4	16.201
27	17.0	66.2	2.05	1.14	181.0	16.401
28	17.0	66.2	2.05	1.14	182.0	16.401
29	17.1	65.7	2.07	1.15	184.0	15.008
30	17.5	65.3	2.08	1.16	180.0	16.426
31	17.6	65.5	2.07	1.15	185.0	15.606

~~SECRET~~ ~~SECRET~~

27.142

ROUGH DRAFT

AUGUST 1967
(Actual)

DAY	C	K _h	N	WIPPS	Total
1	1942	7533	385	3135	12 995
2	1940	"	"	"	12 993
3	1935				12 928
4	1935				12 938
5	1937				12 940
6	1940				12 993
7	1947				13 000
8	1945				12 998
9	1935				12 928
10	1935				12 928
11	1932				12 925
12	1919				12 972
13	1912				12 965
14	1912				12 965
15	1967				12 965
16	1962				12 965
17	1967				12 966
18	1912				12 965
19	1912				12 965
20	1969				12 962
21	1967				12 960
22	1967				12 960
23	1964				12 957
24	1914				12 967
25	1912				12 965
26	1969				12 962
27	1909				12 962
28	1969				12 962
29	1917				12 970
30	1922				12 975
31	1919				12 972

DECLASSIFIED

ROUGH DRAFT

DECLASSIFIED

ROUGH DRAFT

SEPTEMBER 1967

DAY	T ₁ -C	T ₁ -F	Pikwable		Q	P
			AT-F	AT-C		
1	18.5	65.8	2.06	1.14	84.6	11.380
2	18.9	66.0	2.06	1.14	149.7	6.686
3	18.9	66.0	2.06	1.14	52.8	7.910
4	12.6	65.5	2.07	1.15	59.6	5.374
5		65.5	2.07	1.15	84.6	11.480
6	12.5	65.3	2.05	1.16	91.5	12.525
7	18.4	65.1	2.09	1.16	102.0	13.962
8	12.5	65.3	2.08	1.16	105.0	14.572
9	12.4	65.5	2.07	1.15	86.4	11.724
10		64.9	2.10	1.17	117.2	6.216
11	12.1	64.6	2.11	1.17	86.2	11.901
12	17.8	64.0	2.13	1.18	95.1	12.963
13	17.7	63.9	2.13	1.18	100.0	13.924
14	17.7	63.9	2.13	1.18	71.7	12.768
15	17.7	63.9	2.13	1.18	86.9	12.100
16	17.0	64.0	2.13	1.18	124.4	7.644
17	16.2	64.8	2.10	1.17	152.2	7.206
18	17.8	64.0	2.13	1.18	92.6	12.894
19	17.7	63.9	2.13	1.18	102.0	14.202
20	17.7	63.9	2.13	1.18	101.0	14.063
21	12.2	64.8	2.10	1.17	82.0	12.702
22	12.1	64.6	2.11	1.17	66.7	9.609
23	12.1	64.6	2.11	1.17	69.1	9.540
24	12.1	64.6	2.11	1.17	66.2	9.181
25	12.1	64.6	2.11	1.17	99.0	13.668
26	12.1	64.6	2.11	1.17	83.5	11.569
27	12.3	64.9	2.10	1.17	71.4	10.548
28	12.4	65.1	2.09	1.16	80.4	11.005
29	18.3	64.9	2.10	1.17	105.0	14.496
30	17.9	64.2	2.12	1.18	76.7	10.680

ROUGH DRAFT

DECLASSIFIED

~~CONFIDENTIAL~~

~~SECRET~~ MOON DRAFT

OCTOBER 1967

Albuquerque

DAY	T ₁ -C	T ₁ -F	AT-F	AT-C	G	F
1	17.1	62.8	2.17	1.21	39.2	5.568
2	16.8	62.2	2.20	1.22	62.1	8.940
3	16.4	61.5	2.23	1.24	75.0	10.974
4	16.4	61.5	2.23	1.24	21.1	12.159
5	16.6	61.9	2.21	1.23	29.6	13.005
6	16.4	61.5	2.23	1.24	21.2	12.174
7	16.6	61.9	2.21	1.23	62.1	9.284
8	16.7	62.1	2.20	1.22	62.0	8.926
9	16.6	61.9	2.21	1.23	75.5	10.958
10	16.5	61.7	2.22	1.23	11.1	11.425
11	16.5	61.7	2.22	1.23	74.5	10.813
12	16.1	61.0	2.25	1.25	75.6	11.151
13	16.0	60.8	2.26	1.26	64.7	12.593
14	15.6	60.4	2.28	1.27	73.4	11.000
15	15.6	60.1	2.29	1.27	21.1	9.426
16	15.6	60.1	2.29	1.27	11.1	13.607
17	15.6	60.4	2.28	1.27	21.2	13.532
18	15.5	59.9	2.30	1.28	11.6	12.778
19	15.1	59.2	2.34	1.30	72.8	11.168
20	15.0	59.0	2.35	1.31	79.3	12.258
21	15.0	59.0	2.35	1.31	50.6	7.822
22	14.7	58.5	2.38	1.32	62.5	9.735
23	14.4	57.9	2.41	1.34	69.6	11.005
24	14.3	57.7	2.42	1.34	27.1	13.283
25	14.0	57.2	2.44	1.36	79.0	12.672
26	14.0	57.2	2.44	1.36	11.1	13.480
27	13.9	57.0	2.45	1.36	79.4	12.614
28	13.6	56.5	2.49	1.38	11.1	7.132
29	13.6	56.5	2.49	1.38	11.7	6.465
30	13.7	56.7	2.46	1.37	29.4	10.443
31	13.7	56.7	2.46	1.37	1.1	10.472

7451

27.192

DECLASSIFIED

October 1967
(Actual)

DAY	C	K ₂	N	W.P.R.	TOTAL
1	1957	7533	325	3135	13 010
2	1965	"	"	"	13 018
3	1975	"	"	"	13 023
4	1975	"	"	"	13 028
5	1970	"	"	"	13 023
6	1975	"	"	"	13 028
7	1970	"	"	"	13 023
8	1967	"	"	"	13 020
9	1970	"	"	"	13 023
10	1973	"	"	"	13 026
11	1973	"	"	"	13 026
12	1963	"	"	"	13 036
13	1985	"	"	"	13 032
14	1990	"	"	"	13 043
15	1995	"	"	"	13 043
16	1945	"	"	"	13 048
17	1990	"	"	"	13 043
18	1998	"	"	"	13 051
19	2008	"	"	"	13 061
20	2010	"	"	"	13 063
21	2010	"	"	"	13 063
22	2018	"	"	"	13 071
23	2026	"	"	"	13 079
24	2028	"	"	"	13 081
25	2036	"	"	"	13 089
26	2036	"	"	"	13 089
27	2038	"	"	"	13 091
28	2046	"	"	"	13 099
29	2046	"	"	"	13 099
30	2048	"	"	"	13 096
31	2043	"	"	"	13 096

DECLASSIFIED

ROUGH DRAFT

NOVEMBER 1967

allowable

DAY	Ti-C	Ti-F	AT-F	AT-C	Q	P
1	13.5	56.3	2.50	1.39	71.0	12.137
2	13.0	55.4	2.55	1.42	75.7	14.360
3	12.8	55.0	2.57	1.43	78.5	13.246
4	12.4	54.3	2.61	1.45	60.2	10.403
5	12.1	53.8	2.65	1.47	66.2	11.483
6	12.0	53.6	2.66	1.48	77.6	15.298
7	11.9	53.4	2.67	1.48	65.5	14.932
8	11.9	53.4	2.67	1.48	68.7	14.093
9	11.8	53.2	2.69	1.49	76.3	13.415
10	11.8	53.2	2.69	1.49	63.1	11.694
11	11.7	53.1	2.69	1.49	46.8	8.228
12	11.7	53.1	2.69	1.49	55.3	9.371
13	11.7	53.1	2.69	1.49	75.0	13.127
14	11.8	53.2	2.69	1.49	74.3	13.063
15	11.9	53.4	2.67	1.48	1.1	14.163
16	11.7	53.1	2.69	1.49	71.0	12.473
17	11.5	52.7	2.72	1.51	65.3	11.635
18	11.4	52.5	2.73	1.52	51.7	9.369
19	11.0	51.8	2.77	1.54	56.6	9.558
20	10.9	51.6	2.79	1.55	87.6	16.022
21	11.0	51.8	2.77	1.54	71.1	15.223
22	10.9	51.6	2.79	1.55	76.8	14.847
23	10.8	51.4	2.80	1.56	54.0	9.940
24	10.6	51.1	2.82	1.57	74.0	13.709
25	10.1	50.2	2.89	1.61	76.5	14.533
26	9.9	49.8	2.91	1.62	75.1	13.974
27	9.6	49.3	2.95	1.64	97.0	18.771
28	9.6	49.3	2.95	1.64	96.4	17.194
29	9.7	49.5	2.94	1.63	96.8	17.849
30	9.4	48.9	2.98	1.66	91.1	17.845

27.192

NOVEMBER 1967
(Continued)

Day	C	K	N	WPPS	TOTAL
1	2048	7533	325	3135	13 101
2	2061				13 114
3	2066				13 119
4	2076				13 129
5	2084				13 137
6	2086				13 139
7	2089				13 142
8	2089				13 142
9	2091				13 144
10	2091				13 144
11	2094				13 147
12	2094				13 147
13	2094				13 147
14	2091				13 144
15	2089				13 142
16	2094				13 147
17	2099				13 152
18	2101				13 154
19	2112				13 165
20	2114				13 167
21	2112				13 165
22	2114				13 167
23	2117				13 170
24	2122				13 175
25	2134				13 187
26	2139				13 192
27	2147				13 200
28	2147				13 200
29	2144				13 197
30	2152				13 205

DECLASSIFIED

~~CONFIDENTIAL~~

DECLASSIFIED

~~CONFIDENTIAL~~ DRAFT

DECEMBER 1967

allowable

<u>I+Y</u>	<u>Ti-C</u>	<u>Ti-F</u>	<u>AT-F</u>	<u>BT-C</u>	<u>Q</u>	<u>F</u>
1	9.3	48.7	3.00	1.67	91.0	17.932
2	9.0	48.2	3.04	1.69	78.5	15.624
3	9.2	48.6	3.01	1.67	51.6	10.168
4	8.8	47.8	3.08	1.71	91.2	18.102
5	8.6	47.5	3.10	1.72	106.0	21.514
6	8.5	47.3	3.11	1.73	95.1	19.557
7	8.5	47.3	3.11	1.73	92.1	18.801
8	8.3	46.9	3.15	1.75	87.4	17.543
9	8.1	46.6	3.16	1.77	79.2	15.512
10	8.3	46.9	3.15	1.75	69.3	14.310
11	8.0	46.4	3.19	1.77	76.3	20.113
12	7.5	45.5	3.22	1.82	107.0	22.979
13	7.4	45.3	3.27	1.85	110.0	23.753
14	7.2	45.0	3.32	1.84	96.6	20.974
15	7.1	44.8	3.33	1.85	107.0	23.358
16	6.9	44.4	3.37	1.87	76.2	17.130
17	6.7	44.1	3.40	1.89	69.2	15.133
18	6.3	43.3	3.48	1.93	100.0	24.140
19	6.3	43.3	3.48	1.93	120.0	28.695
20	6.1	43.0	3.51	1.95	100.0	24.391
21	5.6	42.1	3.60	2.00	109.0	25.724
22	5.8	42.4	3.56	1.98	100.0	23.231
23	5.9	42.6	3.54	1.97	58.1	13.506
24	6.4	43.5	3.46	1.92	37.7	8.541
25	5.9	42.6	3.54	1.97	46.9	10.902
26	5.9	42.6	3.54	1.97	101.0	23.478
27	6.2	43.2	3.49	1.91	98.7	22.594
28	6.3	43.3	3.48	1.93	92.3	22.387
29	6.1	43.0	3.51	1.95	119.0	27.582
30	6.0	42.8	3.52	1.96	73.9	17.892
31	6.0	42.8	3.52	1.96	51.3	12.559

DRAFT

DECLASSIFIED

Unclassified

Time Not in Compliance

With FIVE STANDARDS

CY 1967

J F M A M J J A S O N D

5 5 1 4 4 - - 3 25 27 12 4 = 85

Weekly General 1961-1967

12 Wks = 84

Unclassified

Unclassified

Heat Loss Factors

- A. Conduction - to river Heat Losses
- B. Solar Exposed
- C. Ground Water Exposed
- D. Evaporation
- E. Smoke Tower
- F. Water Vapor Loss

Course

I. Calculate thermal efficiency

II. Measure down stream river temperature at:

A. F. Creek

B. C. Creek

C. D. Creek

D. T. Creek - Keweenaw River

E. Indian Creek near Long Island

F. Keweenaw River

Unclassified

355-155
217410
5775
11631

(1)

ALL	ACT	A
17088	21161	41243

147840
4660
143220

(2)

ALL	ACT	A
129083	143220	14137

1642012
4650
159922

(3)

ALL	ACT	A
129083	159922	30839

(4)

ALL	ACT	A
129013	152110	20027

(5)

ALL	ACT	A
50016	53225	3509

Calculate as Actual MIN's

for Case (1) - (2), Exhibit III

DECLASSIFIED

-5-

DUN-5326

DECLASSIFIED

DUN-5326

EXHIBIT III

ALLOWABLE THERMAL
DISCHARGE V.S.
REACTOR OPERATING
MODES

DECLASSIFIED

-10-

DUN-5326

DECLASSIFIED

-11-

DUN-5326

DECLASSIFIED

-13-

DUN-5326

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INFLUENCING FACTORS						
CASE	1	2	3	4	5	6
I						
II-A						
B						
C						
D						
E						
F						

CASES

- I. CALCULATE THERMAL DISCHARGE TO RIVER
- II. MEASURE DOWNSTREAM RIVER TEMPERATURE AT:

A. 100 F AREA

B. RINGOLD

C. RICHLAND

D. NEW PASCO-KENNEWICK BRIDGE

E. BELOW CONFLUENCE OF SNAKE AND COLUMBIA RIVERS

F. UMATILLA BRIDGE

INFLUENCING FACTORS

1. REACTOR-TO-RIVER HEAT LOSSES

2. SOLAR EFFECTS

3. GROUND WATER EFFECTS (NON-PLANT CONNECTED)

4. YAKIMA RIVER

5. SNAKE RIVER

6. WALLA WALLA RIVER

⊕ SUBSEQUENT TO INITIATION OF WAHUKU SLOPE IRRIGATION

PRIEST RAPIDS DAM
DISCHARGE
CY-1975
FLOW & TEMPERATURE

EXHIBIT VI

UNCLASSIFIED

DECLASSIFIED

UNCLASSIFIED

DELTA T:

PRIEST RAPIDS TO RINGOLD

PRIEST RAPIDS TO RICHLAND

UNCLASSIFIED

**DATE
FILMED**

11 / 2 / 94

END