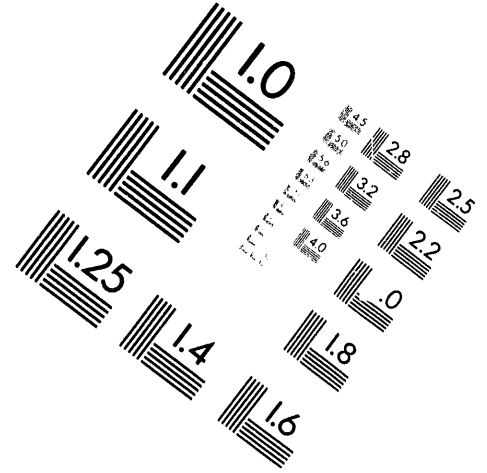
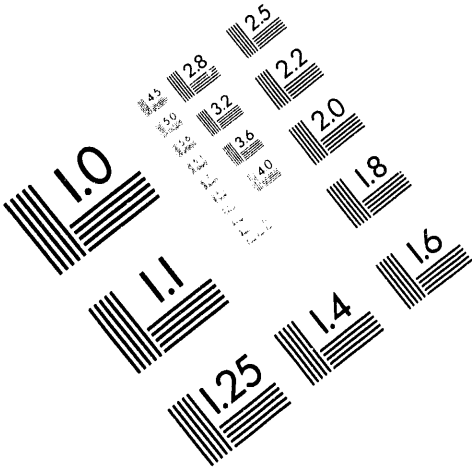




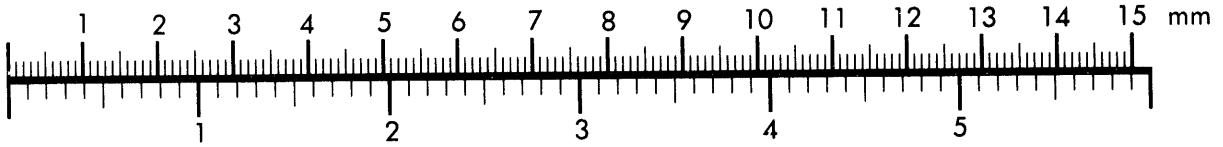
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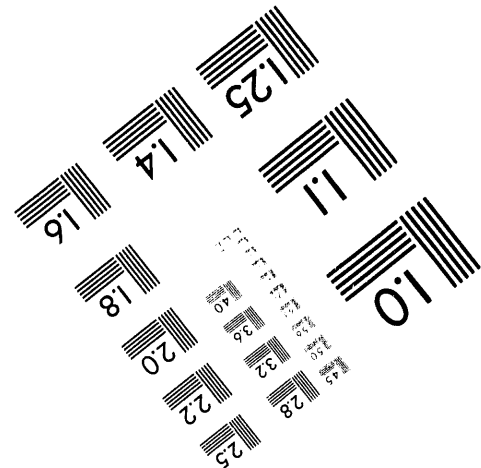
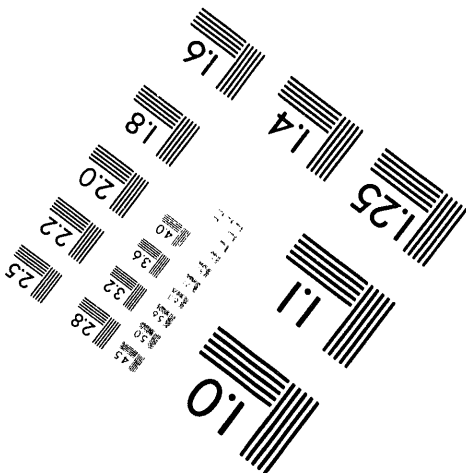
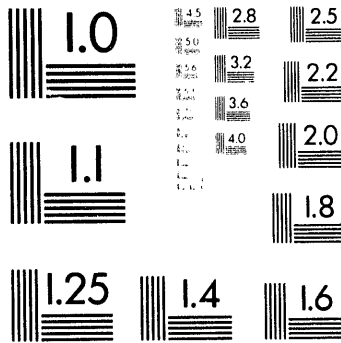
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Traverse Data

River temperature traverse data within and just below the plant boundary are quite limited. Aside from the Tollefson study, only one survey in November, 1960, has been made which includes comparable traverses above and below the plant. The traverses of September, 1958, show comparable data between reactor areas. The data of November, 1950, are given to show the variation between closely-spaced traverses.

Traverse temperatures were calculated by first averaging the depth measurements vertically at each traverse point, and then weighting the average for the cross section by the depth at each point and the span between points. Calculated Δ T's were determined by dividing the total reactor power level above the traverse line by the river flow, with the appropriate factor to obtain the correct units.

No attempt has been made to apply corrections for atmospheric effects or the diurnal cycle. September and March are usually neutral months for upstream reaches in which the mean ^{daily} temperature change is nearly zero. However, individual days will show some heating or cooling effects, and of course the daily temperature cycle will cause differences in temperatures determined at different hours.

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TABLE A 2

Date	Location	Approximate River Miles from Upstream Point	River Flow -cfs	Calculated $\Delta T - ^\circ C$	Upstream T - $^\circ C$	Traverse Mean T - $^\circ C$	Measured $\Delta T - ^\circ C$	Ratio $\frac{\Delta T \text{ Meas.}}{\Delta T \text{ Calc.}}$
8/14-15/62	P. R. Gauge Richland	52	120,000	1.04	17.70	19.14	1.44	1.38
11/3-4/60	Above 100-B Marker #5 - Between K&D Marker #20 - Banford Marker #43 - Richland	6 21 44	73,000 " "	1.3 2.0 2.0	13.3 13.3 13.3	14.3 15.0 14.1	1.0 1.7 0.8	0.8 0.8 0.4
3/15/61	Above 100-B Marker #37 - 300 Area	38	87,000	0	4.5	4.65	0.15	----
9/3-5/58	Above 100-B Above 181-KW Above 181-KE Above 181-D Above 181-H Above 181-F	2 1/2 3 7 11 14	80,000 81,000 80,000	0.14 0.34 0.96-1.0 1.2 1.3	18.0 18.3 18.5 18.7 18.9	18.1 18.45 19.3 20.1 20.4	0.1 0.15 0.8 1.4 1.5	1.0 0.5 0.8 1.2 1.2
11/28/50	Marker #12 - Between E&F Marker #13 - Between E&F Marker #14 - Between E&F	13 14 15	----- ----- -----	----- ----- -----	----- ----- -----	10.2 10.2 9.9	----- ----- -----	----- ----- -----

Average Ratio 0.9

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Point Data

Volumes of point temperature data are available from the 181 buildings. Valid upstream data however is available only since February, 1960, when the Priest Rapids Gauge was put in service. Valid downstream data below the reactor areas are available only since January, 1962, from the continuous temperature monitor at the Pasco water plant. In February, 1962, the temperature monitor of the ACRMS at the 300 Area was placed in service.

Weeks have been chosen at random during the past six months for comparison. In addition, average flows, power levels, and temperatures for the month of September for the past five years have been used to show similar comparisons based on monthly average data. Downstream temperatures through 1961 are at 181-F, with power levels for reactors above F. Upstream temperatures for 1958 and 1959 are from 181-KW temperatures, corrected by 0.3 °C to approximate P. R. Gauge average temperatures. Comparisons of point data with traverse data are also shown by giving shoreline temperatures with average traverse temperatures from the September, 1958 surveys.

The over-all average ratio of 2.0 is probably biased by the time of ^{day and} year.

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ACRMS (Distance = 49 Miles)

<u>Date</u>	<u>River Flow at 12 AM -cfs</u>	<u>Estimated Travel Time -Hours</u>	<u>P. R. Gauge T at 12 AM - °C</u>	<u>Corresponding T at ACRMS - °C</u>	<u>Measured ΔT - °C</u>	<u>Calculated ΔT - °C</u>	<u>Ratio $\frac{\Delta T \text{ Meas.}}{\Delta T \text{ Calc.}}$</u>
3-20-62	55,500	22	4.4	7.5	3.1	2.5	1.2
21	68,000	18 1/2	5.0	7.2	2.2	2.2	1.0
23	66,000	19	3.9	7.6	3.7	2.3	1.6
24	50,000	23 1/2	4.2	7.5	3.3	3.1	1.1
25	60,000	20 1/2	4.4	8.7	4.3	2.6	1.7
						Average Ratio	1.5
4-9-62	63,000	20	6.1	9.0	2.9	1.7	1.7
10	85,000	16 1/2	6.2	9.5	3.3	1.3	2.5
11	64,500	19 1/2	6.0	9.9	3.9	2.1	1.9
13	73,000	18	6.0	9.8	3.8	2.1	1.8
12	85,000	16 1/2	6.0	9.9	3.9	1.8	2.2
14	67,000	19	5.9	10.2	4.3	2.0	2.1
15	80,000	17	6.6	9.9	3.3	1.7	1.9
						Average Ratio	2.0
5-7-62	147,000	14 1/2	8.9	11.0	2.1	0.9	2.3
8	146,000	14 1/2	9.0	10.9	1.9	0.8	2.4
9	158,000	14	9.1	11.2	2.1	0.8	2.6
10	165,000	14	9.3	11.5	2.2	0.8	2.7
11	160,000	14	9.7	11.0	1.3	0.9	1.4
12	166,000	14	9.7	11.5	1.8	0.8	2.2
13	167,000	14	9.8	11.8	2.0	0.8	2.5
						Average Ratio	2.3
7-11-62	228,000	13	15.5	16.1	0.6	0.0	---
12	218,000	13 1/2	16.2	17.1	0.9	0.4	2.2
13	205,000	13 1/2	16.0	17.0	1.0	0.4	2.5
14	199,000	13 1/2	15.9	16.9	1.0	0.7	1.4
15	205,000	13 1/2	16.0	17.3	1.3	0.7	1.9
						Average Ratio	2.0

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ACRMS (cont'd)

<u>Date</u>	<u>River Flow at 12 AM -cfs</u>	<u>Travel Time -Hours</u>	<u>P. R. Gauge T at 12 AM - °C</u>	<u>Corresponding T at ACRMS - °C</u>	<u>Measured ΔT - °C</u>	<u>Calculated ΔT - °C</u>	<u>Ratio ΔT Meas. ΔT Calc.</u>
8-27-62	107,000	15 1/2	17.4	18.9	1.5	0.8	1.9
28	116,000	15	16.8	18.6	1.8	0.9	2.0
29	80,000	17	16.6	19.4	2.8	1.6	1.8
30	80,000	17	16.8	19.6	2.8	1.1	2.7
31	82,000	17	17.1	19.8	2.7	1.1	2.6
9- 1	78,000	17 1/2	17.2	20.2	3.0	1.2	2.5
2	87,000	16 1/2	17.5	20.2	2.7	1.4	1.9
						Average Ratio	2.2
9- 3-62	76,000	17 1/2	17.3	19.9	2.6	1.6	1.6
4	84,500	16 1/2	17.4	20.2	2.8	1.1	2.5
6	70,000	18	18.0	20.5	2.5	1.7	1.5
7	78,000	17 1/2	17.7	19.1	1.4	0.8	1.7
8	70,500	18	17.2	19.2	2.0	1.4	1.4
9	94,000	16	17.1	19.5	2.4	1.3	1.8
						Average Ratio	1.8
						Over-all Average Ratio	2.0

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ACRMS (cont'd)

<u>Month</u>	<u>Average River Flow -cfs</u>	<u>Average Calculated $\Delta T - ^\circ C$</u>	<u>P.R. Gauge Average Up-stream Temp. - $^\circ C$</u>	<u>Average Down-stream Temp. - $^\circ C$</u>	<u>Average Measured $\Delta T - ^\circ C$</u>	<u>Ratio $\frac{\Delta T \text{ Meas.}}{\Delta T \text{ Calc.}}$</u>
9/58	67,000	1.6	18.1	20.1 (F)	2.0	1.3
9/59	118,000	1.0	16.9	18.5 (F)	1.6	1.6
9/60	73,000	1.7	17.4	19.6 (F)	2.2	1.3
9/61	67,000	1.9	17.9	21.1 (F)	3.2	1.7
9/62	69,000	2.2	17.6	19.4 (F)	1.8	0.8
				19.2 (300 Area)	1.6	0.7
				18.7 (Pasco)	1.1	0.5
5/62	182,000	0.9	9.9	11.6 (300 Area)	1.7	1.9
				10.9 (Pasco)	0.7	0.8
4/62	109,000	1.5	6.7	9.3 (300 Area)	2.6	1.7
				8.4 (Pasco)	1.7	1.1
3/62	61,000	2.6	3.6	6.5 (300 Area)	2.9	1.1
				5.7 (Pasco)	2.1	0.8

<u>Date</u>	<u>Location</u>	<u>Shoreline Temp. - $^\circ C$</u>	<u>Average Temp. - $^\circ C$</u>
9/3/58	Above 100-B	18.2	18.0
"	Above 181-KW	18.5	18.1
9/4/58	Above 181-KE	18.4	18.45
"	Above 181-D	20.0	19.3
9/5/58	Above 181-H	20.5	20.1
	Above 181-F	20.6	20.4

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