

MEMORANDUM

October 24, 1975

To: Rhys Sterling

From: Phil Williams

Subject: Spokane River Temperature Survey
October 8, 1975

On October 6, 1975 Ron Pine and I traveled to Spokane for a temperature survey of the Spokane River in response to a request by Rhys Sterling, District Supervisor. Rhys had wanted the survey during the low flow, high temperature period in August but manpower limitations forced a postponement.

The two industries of particular concern were Kaiser Aluminum at Trentwood and Inland Empire Paper Co. at Millwood.

Kaiser Aluminum (Trentwood)

At the outfall location the river was too turbulent to allow a profile analysis. We were able to get only an upstream temperature above the intake and a downstream temperature below the rapids. The temperature and instantaneous discharge of the outfall were obtained with the cooperation of plant officials. The river discharge was taken from the Washington Water Power Co. Post Falls gaging station corrected for ground water infiltration. With this information we can calculate the theoretical resulting temperature.

River flow above intake	=	2651 cfs (1712 MGD)
River temperature above intake	=	13.2°C (55.8°F)
Effluent temperature	=	19.0°C (66.2°F)
Effluent flow	=	41.5 cfs (26.8 MGD)

$$2651 - 41.5 = 2610 \text{ cfs at } 13.2^{\circ}\text{C}$$

$$+ 41.5 \text{ cfs at } 19.0^{\circ}\text{C}$$

$$(2610 \times 13.2) + (41.5 \times 19.0) = (2651 \times ?)$$

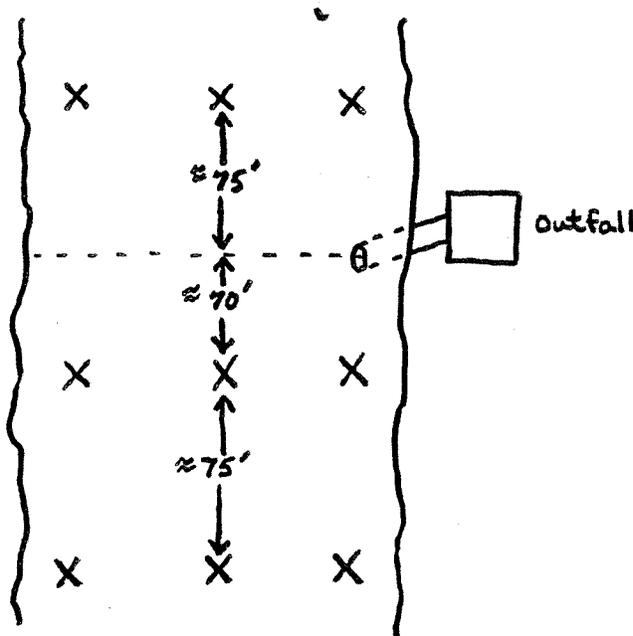
$$T = 13.29^{\circ}\text{C}$$

The observed downstream temperature was 13.3°C. Therefore the effect of the effluent was negligible. At these river temperatures and flows the effluent temperature would have to be above the boiling point to exceed river standards ($\Delta T = 2.69^{\circ}\text{F}$).

Under extreme conditions of 300 cfs river flow and 20°C (68°F) river temperature it would take an effluent temperature in excess of 21.1°C (70°F) to exceed the allowable increase. It is a shame we couldn't have done the study in August as planned but some data is available. WWP listed the low flow this summer as 800 cfs average for the week August 12-19 at Post Falls. To this we must add approximately 375 cfs ground water infiltration for a total of 1175 cfs at Trentwood. Ray Soltero at EWSC listed the river temperature during this period as about 15.2°C (59.4°F). Kaiser's average that week was 40.9 cfs at 20°C (68°F). This would result in a river temperature of 15.4°C - well within standards.

Inland Empire Paper Co. (Millwood)

Three locations were selected to monitor the physical effects of the Inland Empire Paper Co. effluent on the Spokane River, one above and two below the outfall.



Three sampling sites were selected at each location - one at Mid-channel and one at the left and right quarters. Each site was sampled at 5 foot intervals top to bottom. No discernable changes in either temp, pH, conductivity or dissolved oxygen were found. Attached are copies of the raw data from both the Kaiser and Inland Empire surveys.

ORANGE RIVER TEMP SURVEY SEPT 8 1975

DESCRIPTION (INLAND EMBAKE)

UPSTREAM OF ALL DISCHARGE LINES

OPPOSITE SANDHURST PILE

DOWNSSTREAM OF LAST DISCHARGE LINE

APPROX 70'

DOWNSSTREAM APPROX 75' FROM

LAST DISCHARGE PIPEL OPPOSITE

PINE TREE ON RT BANK

ARGONNE RD BRIDGE @ MILLWOOD

(# 4 NOT NEEDED)

Oct. 8, 1975												
SPOKANE RIVER			TEMP.	SURVEY	AROUND	KRISER @	RENTWOOD &	INLAND EMPIRE				
STA #	TIME	TEMP °C	DO mg/l	COND µmhos	PH	STA #	TIME	TEMP °C	DO mg/l	COND	PH	
INLAND EMPIRE						Z-R 1/4 S	1204	12.8	10.3	78	7.16	
1-1/2 S	1105	12.5	10.2	75	7.10	5	}	12.8	10.4	79	7.20	
5'	}	12.7	10.3	76	7.15	10		12.9	10.4	79	7.21	
10'		12.7	10.3	76	7.17	BOT 14		12.08	12.8	10.4	79	7.21
15'		12.7	10.3	75	7.17							
20'		12.7	10.3	76	7.16	Z-L 1/4 S		1214	12.9	10.4	79	7.12
BOT 23		1123	12.7	10.4	75	7.19	5'	}	12.9	10.4	79	7.20
						10'	12.9		10.5	79	7.20	
						15'	12.9		10.5	79	7.20	
1-L 1/4 S	1130	12.6	10.3	76	7.22	BOT 20'	1220	12.9	10.4	78	7.20	
5'	}	12.7	10.4	78	7.20							
10'		12.7	10.3	78	7.20							
15'		12.8	10.3	78	7.20	3-1/2 S	1225	12.7	10.4	80	7.20	
BOT 18.5	1135	12.8	10.3	78	7.20	5	}	12.8	10.4	79	7.21	
						10		12.9	10.5	79	7.21	
						15		12.9	10.5	79	7.21	
1-R 1/2 S	1140	12.9	10.3	78	7.19	20	}	12.9	10.5	79	7.20	
5'	}	12.8	10.3	78	7.19	BOT 23		1232	12.9	10.5	79	7.21
10'		12.8	10.4	78	7.20							
BOT 15'		1146	12.7	10.4	78	7.19						
2-1/2 S	1154	12.7	10.3	79	7.25	3-R 1/4 S	1233	12.9	10.4	79	7.21	
5'	}	12.7	10.4	79	7.22	5	}	12.9	10.5	79	7.21	
10'		12.8	10.4	79	7.21	10		12.9	10.5	79	7.22	
15'		12.8	10.4	79	7.20	BOT 12.5		1237	12.9	10.5	79	7.22
BOT 19'		1158	12.8	10.4	79	7.20						

SPOKANE RIVER TEMP SURVEY

Oct 8, 1975

STA #	TIME	TEMP °	DO mg/l	COND	pH	STA	DESCRIPTION - KAISER				
(IN AND EMPIRE CONT)											
3-L 1/4 S	12:34	13.0	10.5	79	7.22	1	JUST ABOVE WATER INTAKE				
5	}	13.0	10.6	79	7.22	2	TRENT ROAD BRIDGE				
10		13.0	10.6	78	7.23						
BOT 15	12:44	13.0	10.6	78	7.23						
KAISER PLUM						SPOKANE RIVER STP BYPASS SURVEY 10/9/75					
						STA #	TIME	TEMP °	DO mg/l	COND	pH
1	1400	13.2		73	7.4	1	0940	11.7	9.5	79	7.10
2	1411	13.3	10.2	78	7.65	3	1020	11.7	9.7	93	7.21
effluent	1530	19.0	-	-	6.8	6	1040	11.7	10.6	112	7.40
18,600	GPM					8	1105	11.7	10.4	130	7.26
						9	1130	11.6	10.2	133	7.21
						10	1147	12.1	8.8	147	7.22
						10A MARY ANN PHILLIPS	1305	12.4	8.05	157	7.39
						10b	1240	12.2	9.3	143	7.35
						abnve LSR					
						LONG LK STA 4-5	1300	12.0	8.8	155	7.34
						+ 15'	-	-	8.6	-	-