UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

January 12, 2005

Reply To
Attn Of: OEA-095

MEMORANDUM

Subject: Natural Temperatures in the Snake River near Lewiston

From: Ben Cope, Environmental Engineer
Office of Environmental Assessment

To: Brian Nickel, Environmental Engineer
Office of Water

This is a follow-up to a my previous memo to Kristine Koch regarding Snake River temperatures (dated September 23, 2004). Using the three analytical approaches described in the previous memorandum, I have generated 10^{th}, 50^{th}, and 90^{th} percentile estimates of natural temperatures near Lewiston for the summer months (July, August, and September). I have also estimated the percentage of days in these months when the daily average temperature exceeds 19 deg C.

I did some additional evaluation work on the RBM10 model for this analysis, and this has had a minor effect on the estimates using this tool. I ran the model with the dams included and compared the results to measured temperatures for 1994 near the Washington border (River mile 168). This enabled me to adjust ("calibrate") the evaporation coefficients for the heat budget to achieve better agreement between measured and simulated temperatures. These coefficients were then used in the simulation of un-impounded conditions. I have included a graph of the 1994 simulation results for the impounded and un-impounded river in July and August.

The basic information from the other two analytical approaches remains unchanged from the September 23 memorandum.

The results on this analysis are as follows:

Table 1: Natural River Temperature Estimates by Month

Analytical Approach	July		
	10th Percentile	Median	90th Percentile
Screening model (2000)	24.4	25.3	25.6
Hells Canyon Measurements with Salmon River Effect	21.0	24.0	25.7
RBM10 model	19.8	24.2	26.1

Analytical Approach	August		
	10th Percentile	Median	90th Percentile
Screening model (2000)	20.5	21.7	24.1
Hells Canyon Measurements with Salmon River Effect	20.9	23.4	24.7
RBM10 model	22.1	23.3	25.3

Analytical Approach	September		
	10th Percentile	Median	90th Percentile
Screening model (2000)	14.8	17.8	20.8
Hells Canyon Measurements with Salmon River Effect	14.3	17.7	19.3
RBM10 model	16.1	18.1	20.8

Notes:

- For the 2000 analysis, daily model outputs were obtained for the first three years of simulation (1975-77) were used
- The measurements were taken over the period 1996-2000; for the Salmon River effect, the years 1992-1999 were analyzed.
- RBM10 was run using 1994 meteorology and tributary conditions; boundary conditions are Mile 345 average daily temperatures (same average values as measurement approach). Previous model (Cope, 2003) boundary conditions for Salmon River temperatures were improved using Idaho Power observations.

Table 2: Percent of Days Exceeding a Daily Average Temperature of 19 deg C

Analytical Approach	July	August	September
Screening model (2000)	100 %	100 %	30 %
Hells Canyon Measurements with Salmon River Effect	100 %	100 %	17 %
RBM10 model	97 %	100 %	33 %