APPENDIX L

Transmission Restriction Between Libby and Hungry Horse Dams

Appendix L TRANSMISSION RESTRICTION BETWEEN LIBBY AND HUNGRY HORSE DAMS

L.1 Issue

Although Libby and Hungry Horse dams are located on two different rivers and are operated independently for hydrologic purposes, they share a common transmission grid that provides power primarily for the Flathead Valley. Power in excess of that needed within the valley must be transmitted out of the valley over the transmission grid. Because power can not be stored, the two dams can not generate more power than that which can be used in the Flathead Valley or carried out of the valley over the transmission grid.

The full combined generating capacity of both dams is about 1,028 MW (600 MW at Libby and 428 MW at Hungry Horse). Prior to 2001, the Columbia Falls Aluminum plant, the largest power user in the Flathead Valley, consumed up to 400 MW of power, or almost all of the power generated by Hungry Horse Dam. In 2001, the aluminum plant reduced production by about 80 percent. This decrease in power demand in the valley has led to corresponding increases in the potential amount of excess power that must be transmitted out of the valley. The current 944 MW transmission capacity (to be raised to 950 by April 2006) out of the valley, which is less than the combined generating capacity of both dams, was designed with the consideration that most of the power was being used locally.

In analyzing the local hydrologic impacts, the Corps performed daily hydrologic modeling of Libby Dam operations and Reclamation performed daily hydrologic modeling of Hungry Horse Dam operations.

As both dam operations were modeled independently, there are times when model results show that the combined generation of both dams would exceed the transmission limit of 944 MW. There are 133 days in the 52 year period between 1949 and 2001 where models indicate that the combined generation of Libby and Hungry Horse would be higher than the transmission capacity of 944 MW. In these cases, one or both projects would have to either (1) reduce releases which would impact flood control operations (2) pre-draft the reservoirs, or (3) bypass the turbines and release water either over the spillway or through the outlet works, which would increase the total dissolved gas (TDG)

in the river below the dams and would possibly exceed the state of Montana maximum water quality standard of 110 percent.

In 7 out of 19 years, model simulations showed generation in excess of the 944 MW transmission capacity occurred in January during flood control draft. During January, Hungry Horse was operated according to Variable Draft Limits; see Appendix H for details on the Hungry Horse modeling) and the period of time that combined generation exceeded transmission capacity typically lasted from one to five days. Reclamation is able to relax the Hungry Horse operation as they are below the URC, so this overlap can be resolved through coordinating operations between the two dams.

In the remaining 12 out of 19 years, generation in excess of the 944 MW transmission capacity occurs during refill of the projects (May, June and July). For these 12 years, this study looked only at impacts to spilling past the dams, when transmission limitations are exceeded. Even with considerable planning, it would be difficult to predict when both projects would be at full power plant capacity during flood control operations and pre-drafting; although it could potentially eliminate the spill concerns, it would likely increase the risk of refill failures.

If the combined generation of Hungry Horse and Libby dams were to exceed 944 MW during actual operations, flows in excess of that needed to generate 944 MW would be spilled past the dams. Spill would be increased at Hungry Horse Dam first up to a maximum of about 15 percent of total flow, at which point Libby would begin spilling up to a maximum of about 880 cfs or about 21 MW. Analysis of the model results indicates that limiting spills to the above levels would prevent TDG from exceeding the Montana State TDG limits of 110 percent in 107 of the 133 days (16 of 19 years). There are 26 days (spread over three different years) where both dams are at their generating capacity, and one or both are spilling enough to generate TDG in excess of 110 percent. For simulation purposes, Libby would spill up to 110 percent TDG and, if necessary, Hungry Horse would spill in excess of the 110 percent TDG. Hungry Horse typically does not gas the river to the extent that Libby would under similar spill amounts. Libby is on the mainstem of the Kootenai and Hungry Horse is on the South Fork of the Flathead, 5 miles upstream of the confluence with the mainstem. Gas generated from Hungry Horse dam tends to dissipate and mix more easily than gas generated from Libby dam.

Table L-1 shows the magnitude and duration by which the TDG exceeds the Montana State maximum dissolved standards in the South Fork Flathead River below Hungry Horse Dam.

Table L-1. Magnitude and duration of TDG levels above Montana State Maximum, Hungry Horse Dam.

Years	No. of days	Spill as Percent of total discharge	Percent TDG levels
1948	1	22 ≤x≤ 30	110 - 113
	8	30 ≤x≤ 45	113 - 115.5
1961	4	32≤ x ≤ 36	113 - 114
	10	23 ≤x≤ 24	110-111
1986	3	22	110 - 110.5
Total	26		