Process for Establishing Reservoir Pre-Draft Targets in the Reference Operation

NOAAF asked BPA to provide them with hydro-system modeling support using the HYDSIM computer model for the purpose of establishing the Reference Operation. Initial attempts showed that without flood control rule curves limiting the amount of water stored in reservoirs at the beginning of the spring freshet, large amounts of spill occurred at lower Snake (LSN) and lower Columbia (LCOL) river dams. The spill levels often exceeded dissolved gas standards. NOAAF asked BPA to develop a means of pre-drafting FCRPS reservoirs when it could be anticipated that dissolved gas would be a concern. The following is a description of the process BPA developed and used in the modeling of the Reference Operation.

The objective was to establish reservoir content draft targets for each month from January through April to reduce the potential for spill in excess of the dissolved gas limits at all LSN and LCOL dams. Using an EXCEL spreadsheet, the process began by summing up the total volume of water spilled in excess of dissolved gas caps at each project during the April-August period from an initial HYDSIM modeling result. The largest volume of such spill at a LCOL project and at a LSN project was then compared to the <u>observed</u> April-August volume runoff for each year for each river. The observed volume for the year with the least amount of such spill (but greater than 200 kaf for the LSN and 500 kaf for the LCOL) established the lower end of the range of <u>forecasts</u> that could be expected to cause such spill. The observed volume for the year with the largest amount of such spill (but not in excess of the total storage capability of the applicable reservoirs) was used to establish the upper end of the range of forecasts that could be expected to cause such spill. This range of observed volumes then was used to establish the total amount of pre-draft needed (from zero to total storage capability of the applicable reservoirs) by interpolating from the monthly forecasts. To allow for forecast variations through the January-April period, a draft distribution was established: January – 33% of the total January 1 forecast pre-draft required; February – 40% of the total February 1 forecast pre-draft required; March – 60%; April 1-15 – 70% and April 16-30 – 100%. The distributed total pre-draft needed for each month was then divided equally (by percentage of their maximum storage capability) among the applicable reservoirs. This established end-of-month target contents for each of the reservoirs that were then used as input to the next HYDSIM run.

HYDSIM attempted to meet the target contents, spill amounts changed and were input to the spreadsheet and the whole process described above was completed again. The iteration of the spreadsheet analysis, recomputed pre-draft targets for HYDSIM, rerun of HYDSIM, etc. continued until the maximum spill in excess of dissolved gas caps had been minimized as no further change could be accomplished.