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# MEMORANDUM

TO Mr. D. H. Knight

FROM J. B. O'Hearon

December 13, 1967

## PRELIMINARY REPORT ON BAKER RIVER REGULATION

Some preliminary studies have been made to determine the loss of peaking capability and energy incurred at the Baker River Project if the Baker River flood control space were to be increased by an additional (a) 50,000 acre feet and (b) 84,000 acre feet. Three cases have been analyzed - Case I is a base case with the reservoir at Upper Baker drafted to the present flood control elevation of 720.6 feet (16,000 acre feet) by the end of October. In Case II, the Upper Baker reservoir was drafted to an elevation of 709.8 feet by the end of November (an additional 50,000 acre feet over the present requirement). For Case III, the Upper Baker reservoir was drafted to an elevation 701.3 feet by the end of November (an additional 84,000 acre feet of flood control space). In all three cases, the Lower Baker reservoir operating curve was set at 437.0 feet by the end of October. The Lower Baker plant was assumed to have one unit with a peak capability of 71.4 mw.

The flows used in all three cases were the average monthly natural flows at the plants. In all cases, with the exception of two years in Case III, the Upper Baker reservoir was able to refill by the end of April. Case III shows two years when the Upper Baker reservoir was unable to draft on the rule curve without spilling water in the month of November. The energy figures shown in the tabulations have been adjusted for the water that would have had to have been spilled in these months to bring the reservoir down on the rule curve.

On the attached sheet designated "Peak Comparison" the loss of peaking capability for the months of November through March amounts to 5.3 megawatts, for Case II and 9.7 megawatts for Case III. These differences are based on both Upper and Lower Baker drafting according to the rule curve elevations. Generally in some months Lower Baker was not able to operate on the curve, but was at a higher elevation, and in these cases the loss of peaking capability was somewhat lower than the figures shown on the peak comparison sheet. This variation in peaking capability amounts to approximately .3 of a megawatt.

The attached sheet, titled "Energy Comparison," shows the 39 year output of Upper Baker and Lower Baker for all three cases as a total in megawatt months, an average megawatt months per year, and average megawatts. This shows that the additional 50,000 acre feet of flood control storage space causes a loss of 417.7 megawatt months for the 39 years, which is an average of 892 kilowatts. For the additional 86,000 acre feet of flood control room, the total loss for the 39 years of water is 801.2 megawatt months, which is an average of 1.712 megawatts.

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The energy loss for each water year is shown on the attached sheet, titled, "Annual totals." This sheet shows a minimum loss of 3 megawatt months and 5 megawatt months for Cases II and III respectively for the 1928-29 water year. The maximum energy loss was 24.3 megawatt months for Case II in the 1934-35 water year and 46.7 megawatt months for Case III in the 1954-55 water year. The maximum loss between Cases II and III varies from one water year to another due to the different pattern of flows throughout the year which cause varying amounts of spill at the Lower Baker project.

The energy losses have also been spot checked on a September through April energy basis. The differences agree with the annual differences except for two years when Upper Baker was not able to fill by the end of April. These were in the 1934-35 water year and the 1966-67 water year. This applies only to Case III.

Attach.