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mission has ordered that a license be issued to the California Oregon Power Company for its proposed Big Bend development, but contingent upon a renewal or extension of the contract between Copco and the Department of the Interior covering storage in Upper Klamath Lake for the 50 year period of the license, on substantially the same terms as the present agreement which still has 13 years to run. The Secretary of the Interior has assured us that he will not enter into a new contract before fully investigating all of the pertinent matters. I think he will take no action prior to the comprehensive report on the Upper Klamath Basin now being prepared by the Bureau of Reclamation and due to be completed about June of this year unless there is a prior agreement reached between Copco and the Bureau which is satisfactory to local irrigation interests.

The statement has been frequently made and denied that there is insufficient unappropriated water for the new Copco project at Big Bend. I think the people of the Basin are interested in the facts as to just how much water is available and therefore propose to give you the record.

Stream flow measurements are available for nearly 50 years, 1905-1953, showing the flow at Keno or Spencer Bridge.

Before presenting figures it will be well to describe the units of water volume and flow. The quantity of water stored, or the volume of water flowing in a stream in a certain period, is expressed in acre feet. An acre-foot of water is enough to cover one acre to a depth of one foot and is equal to 43,560 cubic feet. The storage capacity of Upper Klamath Lake as now regulated is about 480,000 acre-feet which means that it holds enough to cover 480,000 acres to a depth of one foot or 80,000 acres to a depth of six feet.

Rate of flow is expressed in cubic feet per second, usually stated "second-feet." A second-foot is a cubic foot of water flowing past a given point each second. One second-foot flowing 24 hours will discharge roughly two acre-feet of water.

During the 20-year period, 1932-1952 the flow at Keno has averaged 991,000 acre-feet per year, it ranged between a low of 513,000 acre-feet in the water year 1932-33 and a high of 1,919,000 acre-feet in the water year 1951-52. The lowest flow of record was 395,000 in 1930-31. Not all of this water is available for power development because a certain amount, as yet not determined officially, must be allowed to flow at all times to protect the fish life in the stream. Also, the storage capacity in Upper

Klamath Lake is insufficient to fully control the flow. In most years the lake spills considerable water at rates higher than can be used at the existing Copco plants or could be used by the proposed new project at the Big Bend. Such excess water is wasted down the river to the sea.

The project proposed by Copco is designed to be able to utilize 2500 second-feet of water and Copco's application to the Hydroelectric Commission of Oregon is for that amount. Therein lies a source of misunderstanding by the irrigator interests. They fear that if Copco gets a right to that quantity of water there will be insufficient water left for irrigation. Copco has explained that it will use only a uniform flow of 1250 second-feet which will be stored for twelve hours per day and then released at the rate of 2500 second-feet for the remaining twelve hours. We must understand that such use will be flexible, depending on the system demands for electricity. For example, if there is 2500 second-feet in the river and if the system requires the energy, surely the plant would operate 24 hours a day. Again, if there is less than 1250 second-feet available, storage could be for more than 12 hours and use for less than 12 hours. Copco is convinced and apparently the Federal Power Commission believes that there is sufficient water.

But now comes the question: what will be the water situation if and when the irrigated area in the upper basin has been expanded from the present 350,000 acres to some 500,000? If that time comes, and irrigation maintains a preferential use of water, the flow at Keno will be reduced by some 200,000 to 300,000 acre-feet annually. That would mean in a dry year such as 1931, and unless there were storage water held over from previous years, there would be practically no water available for power development.

This brings up the first of the two basic concepts that must be either supported or over-ruled in making the decision on whether or not Copco should obtain the water right for this new plant.

The concept that consumptive use of water for irrigation is a higher and preferred use as compared with use for power development is strongly supported by reclamation interests in the semi-arid west where agriculture is dependent on irrigation. The regional planning and conservation authorities and

high officials of the State of Oregon generally support this view. Clearly, if that concept is to be supported here, Copco would have to accept a water right on condition that it could claim only such water as will not be needed for irrigation, present or future.

The other major issue involved is whether the potential power between Keno and the state line should be developed by a private utility corporation in a series of plants including the Big Bend No. 2 project, or whether the available power should be developed by a federal agency in conjunction with the irrigation of a portion of Butte Valley. The Bureau's project would divert water from the Klamath River above Keno, carry it in a canal to a point south of Indian Lake, pump it 170 feet in elevation to Butte Valley near Dorris, carry it in a canal across Butte Valley to Meiss Lake, and thence by means of a tunnel and penstock return the water through a power plant to Klamath River above the existing power plants at Copco. Water for irrigation of Butte Valley would be taken from the canal in the valley and drainage water would be picked up and carried out of the valley through the power tunnel. This project would utilize the total fall of the river between Keno and Copco Lake but would reduce the low water flow down the channel through Oregon to that necessary for fish life. It would have the disadvantage that it could not utilize the flows at higher stages of the river, because it would not be economical to build the conduits and pumping plant with capacity to handle these large flows. Its feasibility would depend largely upon additional storage in Upper Klamath Lake or at other possible storage sites.

The issue before us now is whether or not the Department of the Interior and Copco should enter into a new agreement providing that for the next 50 years Copco may regulate Upper Klamath Lake in much the same manner as at present, storing and releasing water to best serve its own interests,

subject to the provisions of control by the Bureau of Reclamation to protect the water supply for the Klamath Project. Copco has stated that it cannot proceed to construct the Big Bend project unless the new contract is entered into and, in fact, the order of the Federal Power Commission dated January 28, 1954, granting the license for the project, is conditional upon consummation of the new agreement.

What do the people of Klamath Basin stand to lose or gain by this proposed new agreement? They lose an irrigation development in Butte Valley which although not in Oregon is in the trade area of Klamath Falls and would contribute in some measure to the economy of the County. The Bureau's scheme has the advantage of multiple use, that is, some of the wa-

ter diverted to Butte Valley would be used for irrigation and the drainage water from irrigated lands would be used to develop power to help defray the cost of pumping for irrigation. In addition, the multiple purpose scheme would provide for drainage from Butte Valley of surplus waters which now accumulate in Meiss Lake and periodically flood and damage farm lands bordering the lake. Such drainage waters would be put to good use through the power plant. The Bureau scheme would develop the full head (or fall) between Keno and Copco Lake, nearly 1500 feet, while the Copco Big Bend No. 2 project would develop only 250 feet of this head at what seems to be the reach of the stream offering the most economical possibilities.

If a new contract is entered into, Klamath Basin gains immediately an \$8,000,000 construction project which will provide work and business for local markets during the two-year construction period and a permanent, tax-paying industry. It gains a new block of power for the Basin, probably several years earlier than it would be provided under a Federal project through Butte Valley. Granting of water rights for the Big Bend No. 2 project would throw a block in the way of any person or agency who contemplates out-of-basin diversion for power development in California.

Presumably, if Copco obtains the necessary water rights and builds Big Bend No. 2, it will eventually develop the other sites which include Keno (head 291 feet), Big Bend No. 1 (head 165 feet), Big Bend No. 3 (head 130 feet), Salt Caves (head 425 feet) and Warm Springs (head 150 feet). All the above sites except Warm Springs are in Oregon and the total fall in Oregon available for power development is about 1310 feet.

If the Copco development of Big Bend No. 2 is permitted, it very probably means that diversion of Klamath River water by pumping Project will require something like 130,000 acre-feet. Consumptive uses of water for potential industries

irrigation development, when demand therefor arises, of some 300,000 acres of arable lands in the Klamath Basin in Oregon.

The license granted by the Federal Power Commission gives Copco the right to construct the project on Government lands and in the channel of a navigable stream. Water rights, whatever they may be, must come from the State of Oregon through the Hydroelectric Commission. It is believed that if and when a license for the project is issued by the Hydro-electric Commission of Oregon, it will contain a provision that the right to use of water for power development is inferior to future developments for irrigation in the Basin.

Suppose we look at the question with the long time viewpoint of the over-all benefit to the people, and suppose we decide that irrigation is the highest ultimate use of the water and power must give way when the water is needed for irrigation. Can Copco recognize that concept and still proceed with the construction of its Big Bend project? The answer can not be stated by anyone except Copco's operating people because they are the ones who know how the power to be generated would fit into their energy requirements and what it will be worth to them. They alone must decide whether it would be an economical development or whether it would be possible to develop or purchase the same amount of energy elsewhere at a lesser cost.

If diversion out of the upper basin above Keno is not permitted, future irrigation and industrial uses will not greatly deplete the total water supply. With reclamation and irrigation of all the arable lands above Upper Klamath Basin, principally in the Williamson and Sprague River drainages, the total inflow to the lake may be reduced ten to fifteen per cent in average years. Irrigation of additional lands adjacent to the existing Klamath to Butte Valley will be out of the 130,000 acre-feet. Consumptive uses of water for potential industries

will require negligible quantities. The net result of all depletions during the next fifty years may be on the order of 300,000 acre-feet annually, reducing the average annual flow at Keno to about 700,000 acre-feet. That quantity is equivalent to a uniform flow of 970 cubic feet per second.

Assuming an allowance of 100 cubic feet per second to be left in the river channel for fish, an average flow of 870 cubic feet per second would be available for the power project. That figure is 70 per cent of Copco's figure of 1250 second-feet as the water requirement for the project.

The generating potential of the Big Bend project, and also the Copco plants in California would be greatly increased if there were sufficient storage capacity to com-

pletely control the runoff during average years and provide holdover storage to augment the available runoff during extremely low years such as 1931. Such additional storage, if and when provided, will be solely for the benefit of power, whether developed by the Bureau of Reclamation or Copco. The present storage capacity in Upper Klamath Lake is more than adequate for all present and future irrigation requirements for lands be-

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