

Proposed
AMERICAN FALLS DAM
Replacement Plan

The American Falls dam was constructed in the mid-1920's and first stored water in the 1926-27 period. The irrigators paid about half of the cost of the dam in cash and the balance has been or is being paid for by the irrigators. The Idaho Power Company acquired 45,000 acre-feet of primary storage and 255,000 acre-feet of secondary storage in the reservoir.

In 1929 a chemical reaction in the concrete of the dam was discovered, which has caused the concrete to swell or expand; however, the strength of the structure has declined at a very slow rate. Recently the strength of the structure has been seriously questioned. The relatively small columns supporting the bearings of the spillway gates are showing advanced effects of the chemical reaction. Reservoir operations are now different than planned in the 1920's by the addition of Palisades (1956), Island Park (1938) and Teton (under construction) and ice loading on the dam is an important consideration now, while it was not considered necessary when American Falls dam was designed. The result of these changes as well as data obtained from core drilling is the imposition of a storage limitation by the Bureau of Reclamation in the interest of safety, which limits the storage to about 1,100,000 acre-feet in the reservoir with a capacity when full of 1,700,000 acre-feet.

The storage limitation is an extreme hazard and exposure to the irrigators since about 900,000 acres of land are dependent on American Falls storage for late season irrigation. Historically, with present storage capacity (including full capacity at American Falls), July and August have been below full requirements in 4 years out of 40 years, or on average, 1 year out of 10. With reduced storage capacity this exposure will be increased.

The storage limitation may be corrected by replacing the present dam with a new dam or rehabilitating (repairing) the present dam. The USBR have concluded that the right and proper thing is to replace the dam with a new dam, and have made the following estimated construction cost (July 1972 prices), and have allocated the costs to various functions, as follows:

Construction Cost (July 1972) - \$1,000's

Dam and Reservoir	\$ 22,906
Penstock future power	1,454
Highway Improvement	1,861
Remove old dam	2,100
Permanent operating facilities	143
General service equipment	43
Basic health & safety	88
Fishing mitigation	546
Fish & wildlife enhancement	196
Flood forecasting	<u>131</u>
Total	\$ 29,468
Interest during construction	<u>2,293</u>
TOTAL	<u><u>\$ 31,761</u></u>

Construction Cost Allocation - \$1,000's

		<u>IDC</u>	<u>Total</u>
Irrigation	\$18,971	\$1,477	\$20,448
Flood Control	4,348	338	4,686
F & W Enhancement	1,520	117	1,637
Recreation	1,226	96	1,322
Highway Improvement	1,861	145	2,006
Future Power	1,454	113	1,567
Basic Health & Safety	<u>88</u>	<u>7</u>	<u>95</u>
Total	\$29,468	\$2,293	\$31,761

Repayment planned as follows:

Irrigation by water users	\$18,659
Fish & Wildlife Enhancement - Non-federal body	101.5
Power (deferred)	<u>1,543</u>
Total Reimbursable	<u>\$20,303.5</u>

The probable schedule which might be followed with USBR construction has been estimated to require 8-10 years before the new dam could be completed. Presumably the storage limitation would prevail during this period; however, it might be relaxed slightly one or two years before completion as the elevation of the new dam was raised during construction.

The Idaho Power Company has several interests in the American Falls dam problem, as follows:

1. As a spaceholder - the Company has primary storage in the amount of 45,000 acre-feet,

2. As owner of a power plant downstream from the dam - the Company owns the 27,000 KW power plant below American Falls and has generation from the water entitlement of both the Company and the USBR. The annual energy potential at American Falls site averages about 370 million KWH's; however, a new power plant is required to generate the potential. The Company's present plant and water entitlement would generate only about 55 million KWH which would not be a feasible operation.

3. As the power supplier to practically the entire area depending on American Falls storage in the full amount for late season irrigation - the Company would be adversely affected in the event a crop failure resulted from the storage limitation in any one or more years in the next 8 - 10 years. The economic impact of such a crop failure and the possible loss of \$100 million of farm income in South Idaho would have widespread effects on the total economy of southern Idaho, not only for the year of the crop failure but several years would be required to overcome the effect of the one year loss.

Time is the essence of the solution of the American Falls dam storage limitation. The Company's interests warrant serious consideration of any plan which would reduce the time the

irrigators are exposed to crop failure by the loss of 600,000 acre-feet of storage water in American Falls dam. Minimizing the time required to remove the storage limitation should be the area in which the Company can make substantial contributions because the time to start construction and the construction period should be reduced.

The Company has developed some preliminary information from Bechtel Corporation as a result of a request from the space holders and the American Falls Irrigation District on the manner and time in which the American Falls dam could be replaced or rehabilitated. The estimated cost of a replacement dam and a new power plant is \$51,054,000. The cost of the replacement dam is about \$20,700,000.

The estimated time schedule developed by Bechtel engineers is the same for either a new dam or rehabilitation of the present dam. The closely coordinated time schedule contemplates that a contractor would be selected and would move on the job no later than about January 1 of the year following execution of a contract, and would be able to complete all preliminary diversion work necessary to begin construction of the new concrete dam section at the end of the irrigation season about October 15 of the same calendar year with the reservoir level down to elevation 4310 feet (about 150,000 acre-feet). The construction would progress to the point

so that the reservoir could begin to fill the following February 1.

The water records indicate that there would be a 30% chance of filling the American Falls reservoir to capacity (1,700,000 acre-feet) after February 1 in the flood period and a 60% chance of filling the reservoir to the storage limitation level (1,100,000 acre-feet). The coordinated operation of upstream reservoirs would have a bearing on refilling American Falls.

Approximately 9 months prior to January 1 are required for studies of feasibility, hydrology, exploration, models, design, plans, environmental impact statements, specifications and contracting. The time required for legislation and various governmental approvals is unknown and could delay the contracting date and the January 1 date for the contractor to move onto the job in which case completion would be set back to the following year. Except for this unknown factor, completion of all technical planning and construction could be accomplished for the reservoir in 24 months and 33 months for the power plant, providing the decision to proceed is made around March 1.

The power production and power costs are important factors in the Company's participation of this project. The power production will assume a plant capacity in the area of 100 MW and energy generation will approximate 370,000,000 KWH in an average year. The power plant might become ready for commercial operation not

earlier than January 1, 1976 and more likely in early 1977. Based upon the Company's load projection, this timing would fit the system need for power and would enable purchased power capacity and energy to be reduced from the level heretofore contemplated.

As a measure of how far the Company could go in its financial assistance to the American Falls dam replacement, the costs associated with the Company's portion of the Jim Bridger coal-fired plant have been used. When completed the Jim Bridger plant will be the highest cost plant the Company has constructed; however, a similar plant completed about the same time as a new American Falls plant would be even higher due to estimated cost escalation. Even this higher figure is below the cost the Company would experience if it replaced and financed both the American Falls dam and power plant. Consequently, if Idaho Power Company is to participate, some type of joint venture must be developed.

One possibility is based upon the American Falls Reservoir District assuming the obligations as follows:

1. American Falls Reservoir District would:
 - (a) Obtain by legislation the right to repair or replace the dam and would have the right to contract for the lease or use of the falling water from the dam for a 50-year period with right of renewal.

(b) Upon acceptance of the completed construction work, would provide for continued coordinated operation and maintenance of the dam and reservoir (excluding power facilities) for the mutual benefit of the parties, providing that irrigation rights shall always have priority in the operation hereof, subject to the rights of the Company as a spaceholder.

(c) If it is determined that a roadway is to be constructed on the dam, it shall be the responsibility of the District to obtain payment of the costs necessitated thereby.

2. American Falls Reservoir District would agree with Idaho Power Company:

(a) To finance construction of either the new dam or replacement dam by the sale of tax-free bonds.

(b) To assist the Company in obtaining a 50-year FPC license for the Company to build, own, operate and maintain a power plant to utilize the water released from the dam. Upon issuance of said license, Idaho Power Company would execute an agreement with the District to pay to the District an amount of money equal to the annual requirements for interest and amortization of the District's bonds over a 40-year period. Such amount shall be equal to actual construction

cost of the dam, but shall not exceed \$19,000,000 plus interest. The initial term of the agreement in consideration of the aforesaid payment shall be 50 years. The Company would have the right to renew the agreement without further payment other than operation and maintenance cost of specific power facilities upon extension of the FPC license beyond the initial 50-year period.

(c) To save the Company from additional dam costs over \$19,000,000 for the road, recreation, fish, wildlife, health or safety facilities. The cost of any such facilities shall be at the expense of the District.

(d) To have Company act as District's sole agent in the engineering, purchasing and construction of the dam, in the interest of obtaining the lowest construction cost for the total project. Such engineering and construction shall be in accordance with modern and safe engineering standards as determined by an independent engineering board of three consultants mutually selected by the parties.

The above arrangement will result in the Company's cost being just barely under the cost of similar power from a coal fired plant costing somewhat more than the Jim Bridger plant.

This plan does not provide for any environmental costs.

To give you an idea of the cost of this power in meaningful terms without a lot of details, the likely cost of a coal fired plant in 1976-77 may approximate 17.1 mills per KWH, and the cost of power from American Falls project on the above proposal, based on preliminary estimates, is 16.1 mills per KWH. These numbers compare with residential customers' power cost as of today of about 17.1 mills per KWH and irrigation power of about 10.0 mills per KWH. The power costs reflected here are associated with peaking type of power, which the American Falls plant might supply within limitations of irrigation releases and winter storage requirements; however, the need may develop for a reregulating dam downstream from the power plant to utilize the peaking ability.

This proposal is in broad terms and many details must be developed, but with the cooperative participation of all parties, the exposure of southern Idaho to a severe economic crisis can be minimized.

IDAHO POWER COMPANY

R A Hogg
Presented to Executive Committee
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