Memoranda concerning the Pensacola Dam project on the Grand River in Oklahoma, April 23, 1938 to June 6, 1938

Tulsa Historical Society
Catalog Number: 1969.001.031

Citing this Resource:

The preferred citation for this manuscript resource is the following:
Memoranda concerning the Pensacola Dam project on the Grand River in Oklahoma, April 23, 1938 to June 6, 1938, [1969.001.031], William Rea Holway Collection, Tulsa Historical Society, Tulsa, OK.

Exhibit VI - 4

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June 6, 1938

Docket Okla. 1097-P-DS
Hydro-electric Power
Grand River Dam Authority
Vinita, Oklahoma
Eng-8-p eh

Major General J. L. Schley
Chief of Engineers
War Department
Washington, D. C.

My dear General Schley:

I have your letter to the Administrator of May 18, 1938, regarding the operating level of the power pool on the Grand River Dam Authority project, PWA Docket No. Okla. 1097-P-DS.

It is noted that in your opinion a maximum power pool elevation of 735 should be maintained in the operation of the project works, in the interest of flood control.

It has been estimated that the reduction of the maximum power pool elevation from 745 to 735 will result in a reduction in the output of the power plant and a corresponding reduction in the gross revenues of the project of approximately 20%. The Revenue Bonds which the Public Works Administration has agreed to purchase as a part of its participation in the cost of the project are secured by a pledge of the revenues derived from the operation of the project. It therefore is to the best interests of the Government to maintain, as nearly as possible, the maximum earning power that the plant can produce.

The third last paragraph of your letter states:

> "While it is possible that experience in actual operation later may indicate that a maximum power pool to elevation 745 may be permitted each year after the spring flood season, I consider such a commitment unwise at this time."

In view of this statement, I believe that at the time actual operations at the site are proven our respective departments will be able to reach an equitable agreement regarding the actual elevation at which the power pool should be maintained in order to secure the maximum benefits from, and security, for the money invested.

Sincerely yours,

(Sgd.) E. W. Clark
Assistant Administrator

COPY

WAR DEPARTMENT
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON

3-B

7495 (Grand River Dam Authority)-5

May 18, 1938

Honorable Harold L. Ickes
Administrator, Federal Emergency
Administration of Public Works
Washington, D. C.

My dear Mr. Administrator:

There is inclosed a copy of a letter from Mr. V. L. Wright, General Manager of the Grand River Dam Authority dated April 23,1938, in which he calls attention to a requirement that the Authority secure in writing from the Chief of Engineers his approval and consent to the tentative plan of operations indicated therein.

Assuming that the Administrator has indicated such action is desired, the following pertinent facts and recommendations are presented.

In connection with this application for a loan and a grant of approximately $20,000,000 for the construction of a dam at the Pensacola site, the Public Works Administration was furnished on June 8, 1937, a partial report on the engineering features of the Pensacola Reservoir for combined flood control and power use in which was contemplated "a maximum power pool of 1,140,000 acre-feet to elevation 735 ft., m.s.l. and on top of that flood control to elevation 760 ft., or a total reservoir capacity of 2,440,000 acre-feet."

During the progress of these studies for the above mentioned report it developed that the practical height of maximum pool, to avoid excessive damages, was elevation 755 instead of 760, and that to put the reduced total capacity of 2,100,000 acre-feet to the best use, it should be divided 1,140,000 acre-feet for power development and 960,000 acre-feet for flood control.

While the agreement dated October 16, 1937, Docket No. Okla. 1097-P-DS between the Federal Emergency Administration of Public Works and the Grand River Dam Authority does not stipulate the exact amount of flood control storage contemplated, the second paragraph of Secretary Ickes' letter to the Acting Chief of Engineers dated November 17, 1937, relative to this question states that -

> "Plans for the construction of this project have not as yet been prepared, but it is intended that this project shall conform as closely as possible to the Engineering Features of Pensacola Reservoir for Combined Flood Control and Power Use, listed in a letter of June 8, 1937, from Major General E. M. Markham, Chief of Engineers, to Colonel Horatio B. Hackett, the Assistant Administrator."

This letter contemplated 1,300,000 acre-feet of flood control storage, which was subsequently cut down to 960,000 acre-feet on account of excessive damages.

With this background relative to the amount of flood control storage in Pensacola Reservoir, it is believed that approval of the method of operation of the reservoir should be on the basis of 960,000 acre-feet the available storage above elevation 735, for flood control and not on the basis of 520,000 acre-feet above elevation 745 as indicated in Mr. Wright's letter of April 23, 1938, in which he states:

> "It is proposed to maintain the maximum power pool at elevation 745 * * * * and the pool will be lowered in advance of floods."

Material reduction in the flood control storage allocation at Pensacola Reservoir would make it quite difficult to provide sufficient reservoir capacity to withhold the flood flow of the Grand River during the critical period in the Mississippi River.

While it is possible that experience in actual operation later may indicate that a maximum power pool to elevation 745 may be permitted each year after the spring flood season, I consider such a commitment unwise at this time.

In my opinion a tentative operating plan providing for a maximum power pool elevation of 735 at this dam is required in the interest of flood control.

The dam is so designed that the normal power pool can be held at elevation 735.

Very truly yours,

(SD) J. L. Schley

J. L. Schley
Major General
Chief of Engineers.

April 23, 1938

Re: Grand River Project
Pensacola Dam

Lt.-Col. Eugene Reybold,
Corps of Engineers, U. S. Army,
Little Rock, Arkansas.

My dear Colonel Reybold:

I believe it was the consensus of opinion as a result of our conference on Thursday, that this Authority's proposed plan of operation on the Pensacola Dam provided sufficient flexibility to conform with the probable flood control requirements of the Army. That this had been your opinion expressed in a conference in Washington with General Tyler, Mr. Holway and Mr. Cone, in December 1937.

The Public Works Administration, which is financing this project through a Loan and Grant Agreement dated October 16, 1937, a copy of which is attached hereto, has required the Authority to secure in writing from the Chief of Engineers, his approval and consent to the tentative plan of operations indicated above and outlined below. It is requested that this letter from the Chief to the Administrator of Public Works be expedited as the Authority has completed plans and specifications for the main dam and power plant structures and set June 3 as the tentative date for receiving bids. Our construction schedule is a very rapid one and, in order to live up to our commitments in this regard, we are exceedingly anxious to proceed with the actual construction within the next sixty days.

Briefly, the structures which we propose and the method of their operation is as follows:

The dam will be located at the approximate location planned by the Corps of Engineers, United States Army, as shown on the second sheet of the drawings.

The lowest elevation of the rock is in the river bed on the west end of the dam. The rock here is at Elev. 615 ft. above sea level. It slopes up gradually across the valley for 5,000 ft., then rises suddenly 40 ft., then is practically level at Elev. 655 for 1,500 ft., then slopes up rapidly to the east end of the dam.

The foundation rock is a uniform, hard, dense limestone in which a great deal of the lime has been replaced by silica. This formation is known as the Boone chert. At the dam site there is 150 ft. of this rock exposed above the river level and approximately 70 ft. of it below the river level. The Corps of Engineers, United States Army, made eight core borings on this site and since the Authority started work in October there have been many cable tool drill holes put down through the rock surface and core borings have been made across most of the valley. The rock surface as found on the final location checks the rock surface elevation as found by the Corps of Engineers.

On the extreme west end of the dam there will be a short non-overflow abutment section. The multiple arch dam will then begin and extend across the valley for a distance of 4,204 ft. The main spillway will be 861 ft. long, built at the end of the arch section on the high rock bench on the east side of the valley. The top of the arch section of the dam will be Elev. 757. The main spillway weir will be at Elev. 730. There will be twenty-one (21) Taintor gates in this section, 36 ft. long x 25 ft. high, which will make the top of the gates Elev. 755. From the end of this spillway section to the east end of the dam will be non-overflow gravity section, 460 ft. long.

There will be a concrete bridge built across the entire length of the dam, with a 20-ft. clear roadway and a 4-ft. sidewalk. The elevation will be 765.5.

Approximately one mile east of the end of the dam, there is to be an auxiliary spillway called the East Spillway, consisting of two sections with a total length of 800 ft. This spillway is to be of the gravity concrete overflow type with the weir at Elev. 740, and will have twenty-one (21) Taintor gates, 37 ft. long x 15 ft. high. A roadway will be built across this section and a highway will connect the main dam with the East Spillway over the intervening ridge. Cranes will be provided for the expeditious operation of the gates and stop-logs, and sufficient personnel will at all times be available for their operation.

At the west end of the dam, immediately below the dam, the power plant will be constructed, with penstocks extending from the power plant through the dam to the intake towers. At present it is planned to have an installed capacity of 60,000 kilowatts divided into four (4) units, with provision for future turbines. With the maximum power pool at Elev. 745, this plant will be able to deliver approximately 200,000,000 kilowatt-hours per year of primary power ninety per cent of the time. It

will also be able to deliver approximately 60,000,000 kilowatt-hours of secondary power forty per cent of the time.

It is proposed to maintain the maximum power pool at Elev. 765. At this elevation the lake will have an area of 46,500 acres and a storage capacity of 1,630,000 acre-feet. It is proposed to utilize a 40-ft. draw-down at the reservoir, which is equivalent to 1,000,000 acre-feet.

The maximum recorded flood in the Grand River at the Pensacola Dam site was approximately 320,000 sec.-ft. in 1895. A study of the possibilities of maximum flood leads us to believe that provision should be made for a future maximum flood of 535,000 sec.-ft. The spillways are designed to discharge 535,000 sec.-ft. with the pool level at Elev. 755. With the gate sections as planned and with the sill of the main spillway at Elev. 730, the pool level will be lowered in advance of a flood and, by proper operation of the gates, a flood as large as that which occurred in 1895 could be controlled by this reservoir so that the Grand River below the dam could be kept within its banks. Provision is made in the operating plan for the receipt of weather data and gauge readings in the drainage area in order to facilitate the forecasting of floods and promote the efficiency of flood control operation.

In addition to the dam and power plant, transmission lines will be built from the power plant to various points yet undetermined.

Several highways will be re-located; the K. C. & G. Railroad will be re-located for five miles of its length and raised for two and one-half miles; and the Frisco Railroad, where it crosses the river at Wyandotte, will have to be raised to clear the proposed lake.

We left in your office a set of tentative plans for the main structures and power plant, and are forwarding you today, under separate cover, a similar set of plans which have been approved and adopted by the Authority, for transmittal to the Chief of Engineers' office if you so desire. I believe it is the thought that it would probably be advantageous to have this set of plans in the Chief's office coincident with your recommendations.

I want to thank you again for your courtesy on Thursday, and to assure you that it is my desire to work in entire harmony in this matter.

Sincerely yours,

GRAND RIVER DAM AUTHORITY

By _____
H. V. L. Wright
General Manager

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