

March 28, 1962

Major General William F. Cassidy  
Director of Civil Works  
Office of the Chief of Engineers  
Department of the Army  
Washington 25, D.C.

Dear General Cassidy:

This is to acknowledge with thanks the receipt of copies of proposed reports of the Chief of Engineers on the following subjects:

The Water Quality Study, Arkansas-Red River Basins;  
The Hugo Reservoir, Kiamichi River, Oklahoma; and  
The Broken Bow Reservoir, Mountain Fork River, Oklahoma.

Your courtesy in keeping me informed on these matters is deeply appreciated.

Sincerely yours,

CARL ALBERT, M.C.  
Third District, Oklahoma

CA:mj



HEADQUARTERS  
DEPARTMENT OF THE ARMY  
OFFICE OF THE CHIEF OF ENGINEERS  
WASHINGTON 25, D.C.

IN REPLY REFER TO  
ENGCW-PD

27 March 1962

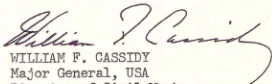
Honorable Carl Albert  
House of Representatives

Dear Mr. Albert:

There is furnished for your information a copy of the proposed report of the Chief of Engineers, together with a copy of the report of the Board of Engineers for Rivers and Harbors, on an interim report on the Broken Bow Reservoir, Mountain Fork River, Oklahoma.

This report is now being furnished the Executive Director, Oklahoma Water Resources Board, State Capitol Building, Oklahoma City, Oklahoma, and the Secretary of the Interior, for review and comment, in accordance with existing law, prior to transmission of the report to Congress. Copies of the report are being furnished other interested Federal agencies for review and comment also.

Sincerely yours,

  
WILLIAM F. CASSIDY  
Major General, USA  
Director of Civil Works

2 Incls  
1 Cy rept CofEngrs  
2 Cy rept R&H Bd



HEADQUARTERS  
DEPARTMENT OF THE ARMY  
OFFICE OF THE CHIEF OF ENGINEERS  
WASHINGTON 25, D. C.

IN REPLY REFER TO

ENGCW-PD

SUBJECT: Broken Bow Reservoir, Mountain Fork River, Oklahoma

TO: THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress the report of the Board of Engineers for Rivers and Harbors, accompanied by reports of the District and Division Engineers, concerning Broken Bow Reservoir, Mountain Fork River, Oklahoma, in partial response to a resolution adopted 6 January 1961 by the Committee on Public Works of the United States Senate. This resolution requests a review of prior reports on the general plan for flood control on Red River, Texas, Oklahoma, Arkansas, and Louisiana, below Denison Dam, to determine the advisability of modifying such plan to provide for the production of hydroelectric power. The report is concerned with the advisability of including hydroelectric-power facilities at the authorized Broken Bow Reservoir.

2. The District and Division Engineers recommend that the project for Broken Bow Reservoir, now authorized for flood control and water supply, be modified to provide for hydroelectric-power facilities in the initial construction and to include fish and wildlife conservation as a project purpose, at an increase in construction cost of \$23,800,000 over the presently estimated construction cost of the authorized project. The total estimated cost of the project is now \$39,600,000 for construction, and \$367,000 annually for operation, maintenance, and replacements. Local interests would be required to bear the costs allocated to water supply, in accordance with the Water Supply Act of 1958, as amended.

3. The Board of Engineers for Rivers and Harbors concurs in general in the recommendations of the reporting officers, but includes general recreation as an added project purpose. The total cost of the project would remain unchanged. Local repayment costs for the water-supply function are estimated at \$2,970,000 for construction, and \$6,500 annually for operation, maintenance, and replacements. The net costs to the United States

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SUBJECT: Broken Bow Reservoir, Mountain Fork River, Oklahoma

would be \$36,630,000 for construction, and \$360,500 for operation, maintenance, and replacements.

4. I concur in the recommendations of the Board.

W. K. WILSON, JR.  
Lieutenant General, USA  
Chief of Engineers



CORPS OF ENGINEERS, U. S. ARMY  
BOARD OF ENGINEERS FOR RIVERS AND HARBORS  
WASHINGTON 25, D.C.

ENGBR

25 January 1962

SUBJECT: Broken Bow Reservoir, Mountain Fork River, Oklahoma

TO: Chief of Engineers  
Department of the Army

1. Authority.--This report is in partial response to the following resolution adopted 6 January 1961:

Resolved by the Committee on Public Works of the United States Senate, That the Board of Engineers for Rivers and Harbors, created under Section 3 of the River and Harbor Act, approved June 12, 1902, be, and is hereby, requested to review the reports of the Chief of Engineers on the general plan for flood control on the Red River, Texas, Oklahoma, Arkansas, and Louisiana, below Denison Dam, Texas and Oklahoma, contained in House Documents Numbered 602, Seventy-ninth Congress, 2nd session, and any other appropriate reports on such plan, with a view to determining the advisability of modifying such plan at this time for the purpose of providing additional facilities for the production of hydroelectric power.

The study considers the advisability of providing storage and facilities for generation of hydroelectric power at Broken Bow Reservoir only. The reservoir is presently authorized for flood control and water supply,

2. Physical description.--The Broken Bow Reservoir is authorized for construction on Mountain Fork River, a tributary of Little River in southeastern Oklahoma. The total drainage area of Mountain Fork is 842 square miles with 754 square miles above the Broken Bow dam site. The topography is mountainous.

3. Existing improvements.--The Broken Bow Reservoir was authorized for flood control and water supply by the Flood Control Act of 1958. Construction has been initiated on the basis that power facilities upon authorization will be installed either initially or in the future. The authorized project is about 5 percent completed and its cost without power is estimated at \$15,800,000.

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SUBJECT: Broken Bow Reservoir, Mountain Fork River, Oklahoma

4. Improvements desired and proposed.--Local interests believe power-generating facilities should be included in the project in order to develop the full potential of the site.

5. The District Engineer finds that the most economical and suitable development at the Broken Bow site would include hydroelectric power in addition to the present authorization for flood control and water supply. He finds further that if power facilities are installed initially, rather than deferred, a saving of \$2,900,000 in construction costs would result. Pertinent physical data for the existing project and the project with hydroelectric-power facilities added and to be built initially follows:

Item	Flood control and water supply (Authorized)	Flood control, water supply and power (Proposed)
Dam site, river mile	20.3	20.3
Drainage area, square miles	754	754
Reservoir storage, acre-feet:		
Flood control	450,700	450,000
Water supply	80,600	
Power and water supply		470,100
Inactive	9,800	448,700
Gross storage	541,100	1,368,800
Spillway	Uncontrolled	Gated
Outlet works	Tunnel	None
Re-regulating structure, river mile	None	13.1
Water supply, dependable: yield, million gallons per day	175	175
Power:		
Installed capacity, kilowatts (2 units, 42,500 kilowatts each)		85,000
Energy, average annual over 100 years, kilowatt-hours		129,000,000

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SUBJECT: Broken Bow Reservoir, Mountain Fork River, Oklahoma

Economic evaluation:

Annual economic charges	\$2,126,500
Average annual benefits	\$3,844,200
Benefit-cost ratio	1.8

Reimbursable and recoverable amounts:

Hydroelectric power, annually	\$1,093,000
Municipal and industrial water supply:	
Construction costs	\$2,970,000
Annual operation, maintenance, and replacement cost	\$ 6,500

11. Recommendations.--The Board accordingly recommends that:

a. The existing project for Broken Bow Reservoir be modified to provide for hydroelectric power, flood control, water supply, fish and wildlife, and general recreation; generally in accordance with the plan of the District Engineer, and with such modifications thereof as in the discretion of the Chief of Engineers may be advisable, at an estimated cost of \$39,600,000 for construction, and \$367,000 annually for operation and maintenance including major replacements; and

b. Modification of the project, as recommended above, be subject to the provision that local interests furnish assurances satisfactory to the Secretary of the Army that they will pay the United States in accordance with the Water Supply Act of 1958, as amended, the entire amounts of the construction costs and the operation, maintenance, and replacement costs allocated to water supply, these amounts being presently estimated at \$2,970,000 and \$6,500 annually, respectively, for the project as modified, the final amounts to be determined by allocation after actual construction costs are known.

FOR THE BOARD:

KEITH R. BARNEY  
Major General, USA  
Chairman



CORPS OF ENGINEERS, U. S. ARMY  
BOARD OF ENGINEERS FOR RIVERS AND HARBORS  
WASHINGTON 25, D.C.

ENGBR

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The study considers the advisability of providing storage and facilities for generation of hydroelectric power at Broken Bow Reservoir only. The reservoir is presently authorized for flood control and water supply,

2. Physical description.--The Broken Bow Reservoir is authorized for construction on Mountain Fork River, a tributary of Little River in southeastern Oklahoma. The total drainage area of Mountain Fork is 842 square miles with 754 square miles above the Broken Bow dam site. The topography is mountainous.

3. Existing improvements.--The Broken Bow Reservoir was authorized for flood control and water supply by the Flood Control Act of 1958. Construction has been initiated on the basis that power facilities upon authorization will be installed either initially or in the future. The authorized project is about 5 percent completed and its cost without power is estimated at \$15,800,000.

*Sncl 2*

ENGBR

SUBJECT: Broken Bow Reservoir, Mountain Fork River, Oklahoma

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5. The District Engineer finds that the most economical and suitable development at the Broken Bow site would include hydroelectric power in addition to the present authorization for flood control and water supply. He finds further that if power facilities are installed initially, rather than deferred, a saving of \$2,900,000 in construction costs would result. Pertinent physical data for the existing project and the project with hydroelectric-power facilities added and to be built initially follows:

Item	Flood control and water supply (Authorized)	Flood control, water supply and power (Proposed)
Dam site, river mile	20.3	20.3
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Flood control	450,700	450,000
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Inactive	9,800	448,700
Gross storage	541,100	1,368,800
Spillway	Uncontrolled	Gated
Outlet works	Tunnel	None
Re-regulating structure, river mile	None	13.1
Water supply, dependable: yield, million gallons per day	175	175
Power:		
Installed capacity, kilowatts (2 units, 42,500 kilowatts each)		85,000
Energy, average annual over 100 years, kilowatt-hours		129,000,000

ENGBR

SUBJECT: Broken Bow Reservoir, Mountain Fork River, Oklahoma

6. Costs and feasibility.--The estimated costs and the economic feasibility based on a 100-year period of analysis, for the Broken Bow Reservoir as authorized for flood control and water supply, and as proposed with power facilities incorporated with the initial construction are as follows:

Item	Flood control and water supply (Authorized)	Flood control, water supply and power (Proposed)
First cost, all Federal: (March 1961 prices):		
Construction, dam, reservoir and power features	\$15,238,500	\$38,495,500
Public-use and access facilities:	555,000	1,098,000
Preauthorization studies	6,500	6,500
Total first cost	\$15,800,000	\$39,600,000
Annual economic charges: (excludes public-use: and access facili- ties):		
Interest and amorti- zation	\$ 455,300	\$ 1,149,900
Operation and main- tenance	74,700	263,200
Major replacements	3,400	56,200
Taxes foregone	--	578,000
Total annual charges	\$ 533,400	\$ 2,047,300
Average annual economic benefits:		
Power		
Capacity and energy		\$ 1,932,000
Fish and wildlife; downstream channel		27,000
Water supply	\$ 442,600	369,700
Flood control	305,500	305,500
Fish and wildlife recreation	190,000	460,000
Totals	\$ 938,100	\$ 3,094,200
Ratio of benefits to economic costs:	1.8	1.5

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SUBJECT: Broken Bow Reservoir, Mountain Fork River, Oklahoma

7. Costs are allocated to the flood control, water supply, power, and fish and wildlife functions using the separable costs-remaining benefits method. The construction cost allocated to water supply as well as the operation, maintenance, and replacement cost so allocated would be repaid in accordance with the Water Supply Act of 1958, as amended. These costs are currently estimated by the District Engineer at \$3,512,000 and \$6,700, respectively. The annual cost allocated to power, less taxes foregone, is \$1,107,000 to be recovered from power revenues. The Southwestern Power Administration believes that it can market the power so as to recover these costs.

8. Recommendations of reporting officers.--The District Engineer finds that the construction of Broken Bow Reservoir for flood control, water supply, hydroelectric power, and fish and wildlife development is economically justified. He therefore recommends that the existing project be modified to include hydroelectric power in the initial construction. The Division Engineer concurs.

9. Public notice.--The Division Engineer issued a public notice stating the recommendations of the reporting officers and affording interested parties an opportunity to present additional information to the Board. Careful consideration has been given to the communications received.

Views and Recommendations of the Board of Engineers for Rivers and Harbors.

10. Views.--The Board of Engineers for Rivers and Harbors concurs in general in the views and recommendations of the reporting officers. It finds that the recommended improvement is economically feasible and should be constructed by the United States. However, the Board believes that general recreation should be added to the project functions. With this change, economic evaluation and estimates of reimbursable and recoverable costs are as follows:

ENGR

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Reimbursable and recoverable amounts:

Hydroelectric power, annually	\$1,093,000
Municipal and industrial water supply:	
Construction costs	\$2,970,000
Annual operation, maintenance, and replacement cost	\$ 6,500

11. Recommendations.--The Board accordingly recommends that:

a. The existing project for Broken Bow Reservoir be modified to provide for hydroelectric power, flood control, water supply, fish and wildlife, and general recreation; generally in accordance with the plan of the District Engineer, and with such modifications thereof as in the discretion of the Chief of Engineers may be advisable, at an estimated cost of \$39,600,000 for construction, and \$367,000 annually for operation and maintenance including major replacements; and

b. Modification of the project, as recommended above, be subject to the provision that local interests furnish assurances satisfactory to the Secretary of the Army that they will pay the United States in accordance with the Water Supply Act of 1958, as amended, the entire amounts of the construction costs and the operation, maintenance, and replacement costs allocated to water supply, these amounts being presently estimated at \$2,970,000 and \$6,500 annually, respectively, for the project as modified, the final amounts to be determined by allocation after actual construction costs are known.

FOR THE BOARD:

KEITH R. BARNEY  
Major General, USA  
Chairman