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**Brighter Water to the James Valley**

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Bringing Water to the James Valley

When water is brought into the James Valley, the resulting irrigation will benefit the entire area. The majority of the water supply for the unit will be supplied from the Oahe Reservoir. It has a storage capacity of 22½ million acre-feet at its conservation storage level. An additional million acre-feet of exclusive flood control storage is available. The average yearly diversion from Oahe Reservoir for irrigation would be 796,300 acre-feet.

Total depletion of the flow of the Missouri River for irrigation of 482,000 acres and other multiple uses of water will be 553,000 acre-feet annually because about 240,000 acre-feet returns to the river. The average flow of the Missouri River past Pierre is about 21 million acre-feet per year. This would be 2.6% depletion from the river flow.

The pumping plant at the Oahe Reservoir is being planned for four pumping units. Each pumping unit produces 800 cfs (cubic feet per second) or 360,000 gallons per minute. The pumps will be installed as irrigation needs require more water. To get the water from the reservoir to the Pierre Canal will require an average lift of 122 feet.

The Pierre Canal will extend from the Oahe pumping plant to Blunt Reservoir, a distance of 37 miles. It will have a width of 60 feet at the bottom and 120 feet at the top. Its normal depth will be 14.4 feet. This will make necessary an average canal right-of-way width of 220 feet. It will require 1,035 acres of land for right-of-way of this canal.

BLUNT RESERVOIR

The Blunt Reservoir will be created by the Blunt Dam, which will be an earthfill structure with a height of 88 feet and a length of 7,300 feet. It is located on North Medicine Knoll Creek. Total storage in the reservoir will be 631,000 acre-feet. The reservoir will flood about 21,000 acres, and will have a maximum depth of 72 feet. The right-of-way purchase will be about 29,000 acres.

The Blunt Reservoir is needed to provide storage for the varying demands for irrigation water and other uses. This will make it possible to keep pumping plants and canals operating at a nearly constant rate. It will have a near constant level which will make it useful for recreational facilities.

The Missouri Slope Canal will be 37 miles in length and serve 37,000 acres. The average right-of-way width will be 145 to 100 feet. Approximately 370 acres will be taken out of production. The right-of-way will require 450 acres.

Water will flow by gravity from Blunt Reservoir into the Highmore Canal for a distance of 38 miles. This canal will require a right-of-way purchase of 1,240 acres. The average canal right-of-way width will be 240 feet. The canal will have a bottom width of 65 feet and a top width of 130 feet. The water in the Faulkton Canal will flow by gravity into the Cresbard Reservoir, a distance of 24 miles. It will have a bottom width of 50 feet and a water depth of 11 feet. It will require 625 acres for right-of-way construction.

CRESBARD RESERVOIR

The Cresbard Reservoir will be created by Cresbard Dam, which will be an earthfill structure about
4,500 feet long and about 55 feet high. The dam site is located across Cresbard Creek, a tributary of Snake Creek, a natural drainage course in the West Lake Plain. Normal storage will be 31,500 acre-feet, and maximum depth about 40 feet. It will require about 3,000 acres for construction and flooded land. The right-of-way purchase area will be about 6,000 acres. This reservoir will fluctuate, being at high level before heavy water use and low during winter months.

The Cresbard Canal will be 12 miles long with an average right-of-way width of 210 feet. The right-of-way purchase will take 340 acres.

The West Main Canal will be 37 miles in length and have an average right-of-way width from 125 to 175 feet. The right-of-way purchase will be 840 acres.

The Redfield Canal will be 22 miles long and the right-of-way width from 130 to 90 feet. The right-of-way will require 355 acres. The West Main Canal will serve the northern portion and the Redfield Canal will serve the southern portion of the West Lake Plain.

The Beadle Canal will flow by gravity for 53 miles to the James Canal leading to Lake Byron. It will have a bottom width of 42 feet and water depth of 9.4 feet. The average right-of-way width will be 165 feet. A total fall of 207 feet will be provided by means of 13 drop structures. A concrete siphon will be built across the James River. The canal will require 1,245 acres for right-of-way construction.

The James Diversion Dam will be a concrete overflow-type structure in the channel of the James River. It will be 125 feet long. This dam is to create a pool from irrigation return flows and flood waters on the James River to be pumped into the James Canal for storage in Byron Reservoir.

The James Canal will be 3 miles long and will connect the James River siphon with Byron Reservoir. Its 3,400 cfs capacity is designed to carry the flow of the Beadle Canal plus the discharge of the James pumping plant. It will require 80 acres for construction.

These waters will be picked up by the James pumping plant which will consist of four electrically-driven pump units, each with a capacity of 500 cfs and with an average lift of 33 feet. This water is to be used for irrigating the East Lake Plain.

**BYRON RESERVOIR**

The Byron Reservoir will be created by Byron Dam, an earthfill structure with a maximum height of 41 feet and a length of 7,600 feet. The Byron Reservoir will have a capacity of 64,000 acre-feet. The reservoir right-of-way will be about 7,000 acres. It will be used as a regulating device to irrigate 271,000 acres on the East Lake Plain.

The East Main Canal, which will be about 76 miles long, will serve the East Lake Plain area. It will require about 2,345 acres of land for right-of-way construction, and the right-of-way width will vary from 170 to 240 feet. Two pumping stations, one at Byron and the other at Conde will lift the water as it flows northward to serve the East Lake Plain.

The James River divides the Oahe Unit into the East and West Lake Plain area as it will be used for irrigation purposes.

Main canals and reservoirs outside of the irrigation district boundaries will require for right-of-ways approximately 50,575 acres. These lands will be removed from the tax base of the various counties. About 19,575 acres will remain in productive purposes.

Laterals and drains in the irrigated area will require 50,425 acres for right-of-ways. However, because of the increase in irrigated land value and increased tax base, this will be an advantage to counties having irrigated land.

The government will negotiate with the landowners for right-of-way purchase.

Canals, bridges, dams, and fences will be built as project construction costs. However, the bridges after being constructed will be turned over to the respective county or state highway agency for maintenance. The maintenance of the canals, dams, fences, and weed control on right-of-way will be a part of Operations and Maintenance costs in operating the project.

Farmers who live close to the main canals outside of the irrigation project may want to consider the possibility of buying water service from the canal for either irrigation purpose, replenishing water supply in stock dams, or other uses.

**JAMES RIVER CHANNEL**

The Corps of Engineers in cooperation with the Bureau of Reclamation have made plans for James River channel improvement. This includes irrigation return flow disposal from the Oahe irrigation unit and flood waters. Because of the lack of slope and the meandering nature of the James River from Columbia to Redfield, it was decided that straightening and deepening of the channel would be beneficial. By using cutoffs the existing river miles will be reduced 119.6 to 54.4 miles. Estimates show that by using cutoffs there will be a 35% saving in cost over enlarging the existing stream pattern. No raising of existing bridges would be necessary, although some bridges will have to be extended in order to span the new channel.

The channel improvement is planned to convey maximum drainage at 4 feet below the top of the channel bank to avoid water logging and backing water up into irrigated fields.

Sixty-six per cent of the water for multiple purpose
uses will come from the Missouri River, 29% from return flows of the James River, and the balance from natural flows of the James River.

Electrical energy for irrigation pumping will be obtained from the Missouri River Basin power system. For ultimate development, 288,172,000 kw-hrs. of electricity will be needed annually.

Irrigators and electrical power users of the Missouri River Basin can benefit by the development of both because of the way the cost for Missouri River Basin development was allocated. The repayment costs for construction of power features of the Oahe Dam was allocated so that 78% will be paid by power consumers, repayable at 3% per annum interest. The remaining 22% of power feature construction costs are considered as investments in the irrigation project repayable without interest by the power system. Thus, it will be beneficial to power to have the irrigation project developed. If irrigation is not developed, then power consumers would have to pay this 22% of construction costs of Oahe Dam at a 3% annual interest rate.

It is proposed that the Oahe irrigation unit be developed over a period of years in several stages. Construction of the supply works to supply irrigation districts with water will depend on the allocation of money by the Federal government for this purpose and the negotiation of contracts between Irrigation districts, the Conservancy Sub-district, and the Federal government.