

**Water and Environmental Programs
Engineering Success Stories**

State: Arkansas

Borrower Name: Benton/Washington County Water Association

Engineering Firm: Engineering Services, Inc. (ESI)

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Congressional Information: Rep. Asa Hutchinson

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BENTON/WASHINGTON COUNTY WATER ASSOCIATION

Description of Problem/Issue:

Several small communities in Benton County and Washington County located in Northwest Arkansas have struggled for years to develop and maintain an adequate supply of water for their communities. The new federal safe drinking water regulations have made it increasingly difficult and expensive to meet the drinking water standards. In addition, the rural areas of the two counties were experiencing rapid growth and development, creating a need for a safe, dependable source of public water.

Solution:

The solution to the water supply problem for the small cities and rural areas of Benton and Washington Counties in Northwest Arkansas was the formation of a regional water system (Benton/Washington County Water Association) to supply high quality treated water to the existing and rural areas. The Association consists of twelve member entities. When completed, the Association will sell treated water to the twelve member entities through master meters. Each member entity will then be responsible for the distribution of the water to their individual customers.

A new raw water intake structure is being constructed on the north shore of Beaver Lake in Benton County. The reinforced concrete structure will have three intake ports at different levels with an ultimate capacity of fifty million gallons of water per day. Approximately four miles of thirty-six inch diameter raw water transmission main will transport the lake water to the water treatment plant.

The central element of the new regional water system will be a new ultra-modern water treatment plant incorporating the latest technology in potable water treatment. The new treatment plant will replace the existing outdated treatment systems currently being used by the member entities. The water treatment plant is currently under construction

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on a twenty acre site located approximately two miles east of the Town of Avoca in Benton County. The treatment plant will have an initial rated capacity of eight million gallons per day with the capability to produce twelve million gallons per day without modification. The treatment plant will be fully automated and capable of functioning with only minimal operator attention.

The treatment process consists of chemical treatment, coagulation, sedimentation, filtration, and disinfection. There are two (2) solids contact upflow clarifiers. The filters consist of eight (8) individual dual media filter cells utilizing sand and anthracite as the filter media. The arrangement of the filters allows control of the in fluent and effluent through a central valving arrangement, thus eliminating the traditional expensive “pipe gallery”. Backwashing of the filters is accomplished using a combination of air and water to achieve the ultimate in filter efficiency and requiring less water for backwash than conventional water only systems. The backwash water troughs are equipped with a unique baffling system that prevents loss of filter media during the vigorous backwashing cycle. Another innovative feature of the filtration system is the ability to backwash on filter cell using filtered water from the other seven cells without the need for a separate backwash pump. From the filters, the treated water flows into a two million gallon clearwell where it is stored prior to pumping into the transmission system. The high service pumps that pump the finished water from the clearwell into the transmission system are equipped with variable speed drives to allow economical operation over a wide range of pumping conditions. Chemicals used in the treatment process include alum and polymer for coagulation, lime for pH adjustment and corrosion control, and chlorine for disinfection.

As mentioned above, the plant has been designed to produce up to twelve million gallons of water per day without modification by increasing the flow rate through the filters. All pipes and treatment units are sized for the increased flow. The plant was designed and constructed so that additional units can be constructed in the future to “mirror” the existing plant and increase the capacity ultimately to twenty-four million gallons per day. This is very important due to the rapid growth that is occurring in northwest Arkansas.

The total cost of the project is approximately forty million dollars with the water treatment plant costing approximately seven million dollars.
