

Fort Smith Regional Water Supply Project Update

Fall 2001

Highlights:

- Corps issues 404 Permit.
- 404 Permit defines project mitigation requirements.
- Construction of hydraulic models to begin.
- Plant expansion will provide water through the year 2040.
- Expansion to be constructed in phases.

Corps Issues Draft 404 Permit

On September 26, 2001, the Little Rock District Corps of Engineers signed and issued the 404 Permit for the Lake Fort Smith Project. This permit is required by Section 404 of the Clean Water Act before construction of the enlarged dam and reservoir can proceed. Efforts to obtain the permit began with initial studies for the dam in 1992. Actual dam construction is expected to be completed in 2005.

A partial listing of reports and surveys prepared and submitted to the Corps in order to obtain the 404 Permit includes:

- Water System Master Plan Volumes I, III and IV
- Draft Environmental Assessment
- Wetland Determination and Mitigation Plan
- Phase I Archaeological Investigation
- Survey Report for the American Burying Beetle
- Section 106 Evaluation Architectural and Structural Resources
- Survey for Ozark Chinquapin Oak
- Indiana Bat Summer Habitat Survey
- Survey for the Southern Lady's Slipper and Mitigation Plan
- Cave Survey for Federally Listed Bats
- Final Environmental Assessment

The permit defines mitigation that will be performed to compensate for environmental impacts. Mitigation to be performed includes wetland creation, the investigation and possible removal of archaeological and historical resources, the relocation of a rare species of orchid and replacement of Lake Fort Smith State Park.

Scale Models To Be Built

Alden Research Laboratory has been retained to construct scale models of the enlarged dam and reservoir's intake tower and tunnel and principal spillway. The intake tower serves several purposes: to collect and convey raw water to the Mountainburg Water Treatment Plant, to convey low flow augmentation water to Frog Bayou, and to control the lake level during construction of the enlarged dam. The principal spillway will convey the majority of the lake's discharge to Frog Bayou during storm events after the project is completed.

The models serve to reproduce the anticipated forces and motions of various flow condi-

tions that will occur in these structures and verify hydraulic design parameters. The testing program will provide insight on how these forces impact the structures and potential refinement of the overall design parameters.

The intake tower will be built on a scale of 1/16th actual size, and the spillway model will be 1/25th scale.

Construction of models for the intake tower and tunnel is ongoing and final testing is slated for completion in December. The principal spillway model construction and testing is scheduled to be completed this spring.



City of Fort Smith's Old Mountainburg Water Treatment Plant

Treatment Plant Expansion to Provide Water Through 2040

Future Water Demands

Water generated by the enlarged Lake Fort Smith will be treated at the Mountainburg Water Treatment Plant (MWTP). In order to meet the city's future drinking water demands, this plant will need to be expanded from its current capacity of 30 million gallons per day (MGD) to an interim capacity of 50 MGD and an ultimate capacity of 70 MGD. These future capacities are expected to satisfy anticipated demands through years 2020 and 2040, respectively.

Plant Expansion

The use of Lake Fort Smith water for drinking requires the removal of turbidity, naturally occurring organic compounds, iron, manganese, aluminum, and occasional taste and odors caused by algae. These requirements are accomplished at the existing MWTP through conventional treatment, which includes sedimentation, granular-media filtration, and disinfection. The MWTP expansion will also utilize conventional treatment processes, but with new technology called "pulsating clarification." This technology requires a smaller plant footprint because more efficient particle removal is accomplished in the new clarification basins. The expansion of

the MWTP comprises the installation of a pressure reducing station, a powdered activated carbon (PAC) contact basin, a flow splitting structure, rapid mix basins, two clarifiers, four filters, chemical feed systems, chlorination facilities, two clearwells and a new high-service pump station. The project also includes construction of a new building for the plant headquarters.

Water Treatment Process

The pressure reducing station and the PAC contact basin will serve the existing and new facilities. The former is used for reducing the high raw water pressure associated with a high water elevation at Lake Fort Smith to the levels required at the MWTP. The PAC contact basin is used for removing the organic compounds that cause occasional taste and odor problems. After this process, water will be distributed to the existing and new facilities. At the new facilities, lime and coagulants will be added to the raw water to cause particle aggregation to enhance settling capabilities. Aggregated particles of "floc" will be removed in the clarification basins. Settled water from the basins will flow through granular-media filters, which will provide additional parti-

cle removal and polishing. Chlorine will typically be added before and after the filters to kill and remove any pathogenic organisms. Filtered water will be stored in two clearwells. The purpose of these basins is to provide sufficient contact time for the chlorine to disinfect the water, blend the water from the new and existing facilities, and store the water prior to its delivery to the city. The water will be conditioned with pH adjustment and sequestering agents to protect pipes from potential corrosion. This conditioning will be applied to the finished water prior to its delivery to the distribution system. Because of its high elevation relative to the city of Fort Smith, the MWTP can deliver finished water to the city by gravity under low demand conditions. When demands are higher, however, finished water will need to be pumped to Fort Smith by new high-service pumps.



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