

HARDY CROXTON WATER TREATMENT PLANT BEAVER WATER DISTRICT, LOWELL, ARKANSAS

MWY, in conjunction with another engineering firm, completed the preparation of plans and specifications in 1991 for the construction of a new 40-MGD water treatment facility for the Beaver Water District. This facility consists of:

- Raw-water flow splitter box
- Powdered activated carbon and influent meter facility
- Flocculation and sedimentation basins
- Lime addition facilities
- Deep-bed mono-media filter complex
- Finished water clearwell
- One treated-water high service pump station to four separate system users
- Filter waste washwater basin and recycle pump station,
- Three sludge lagoons,
- Various administrative, laboratory, operations and maintenance buildings

As a part of this improvement, a complete microprocessor-based distributed instrumentation control and telemetry system was provided. This system provides for central monitoring of all pumping and process functions in the various facilities listed above as well as remote monitoring of the four water distribution systems that belong to the member cities of the district.

The system hardware, software, and special applications were bid as a part of the plans and specifications and subsequently furnished by Fischer & Porter, Inc. The equipment provided included the central processor units, peripherals, man-machine interface devices, support and interface equipment, and process control units, operating on a distributed control system fiber optic "Ethernet" data highway.

System telemetry is accomplished via a combination of digital radio and telephone telemetry channels. The control system provides for continuous compound loop chemical feed pacing. Trending and historical storage are maintained at each control site. The system was also equipped with color monitors and interactive graphic screens. The system was designed around Digital Equipment Corporation's "Micro VAX" Computers.

Additionally, an administrative computer network was designed and built. The "Novell" system enables the staff to perform all of the operational reporting, maintenance management functions, laboratory test reporting, and the administrative accounting functions.

PINEY BAY WATER SUPPLY AND TREATMENT FACILITIES CLARKSVILLE LIGHT AND WATER, CLARKSVILLE, ARKANSAS

MWY completed plans and specifications for a new water supply and treatment facility for the city of Clarksville. The project consisted of construction of an intake facility on Piney Bay and an impoundment created by the Arkansas River Navigation Project, along with approximately 40,000 feet of 30-inch diameter raw water pipeline and an advanced 8-MGD water treatment facility.

In order to monitor and control both the raw water intake, pumping facilities and potassium permanganate feed from the main plant, MWY provided a radio telemetry system with a central processing unit with microprocessor-based supervisory control and data acquisition system. Monitoring at each raw-water pump station includes wetwell levels, raw water turbidity, pacing of potassium permanganate feed pump, control of three raw water pumps, monitoring pump status and power failure condition, and monitoring of pump station intrusion for security.

In addition, an ozone generation control system was designed and provided, consisting of a microprocessor-based system to supervise operation of all ozone gas supply trains, generators, and emissions control systems. The system includes numerous analog signals, discrete dry contacts for local and remote indication, and performed math calculations using analog signals compatible with data logging. The filter controls include a single unit four-cell operating console with remote electromagnetic control provided by a programmable logic controller.

Recently, as a part of the main plant renovation, a distributed control system was designed and constructed. Programmable logic controllers were added to the chemical feed building, the ozone feed building, and to the main system operations building. The programmable logic controllers and the main plant human-machine-interface computer communicate over a fiber optic cable using Ethernet protocol. The plant is now only manned about 50 hours per week, but the distributed control system is capable of treating water on a 24-hour, 7-days a week basis by monitoring reservoirs in the distribution system and restarting the treatment systems as needed. The distributed control system monitors the treatment systems, and if any part of the plant treatment systems fails to operate correctly, the distributed control system will shut the plant down and alert the on call operator that the plant has shut down and needs his attention. The alarming system communications is accomplished with cell phone technology, which enables the operator to be free while he is on call. The alarms that are sent to the operator are preprogrammed voice alarms that tell the operator what the specific problem is before he reaches the plant.

WATER TREATMENT FACILITIES BATESVILLE WATER UTILITY, BATESVILLE, ARKANSAS

MWY completed the plans and specifications for expansion and upgrading of the existing water supply and treatment facilities to 12-MGD, including additional raw and finished water pumps, a new solids contact clarifier, upgrading of the existing clarifiers, new chemical feed building and associated equipment and reworking of existing filters (including new instrumentation and controls.)

The filter control system consists of a PC-based operator station specifically designed for use in a process control environment with all control and monitoring functions carried out in real time. The supervisory control station incorporated all of the functional capabilities required to communicate with a distributed system network, consisting of 32 control and monitoring instruments.

The supervisory control station is capable of generating application-specific CRT color displays. Data management functions include data logging, data archiving, point trending and interface to a host computer. Supervisory control station provided is Fischer & Porter

FREEMAN-RANEY WATER TREATMENT PLANT CARROLL-BOONE REGIONAL WATER DISTRICT, EUREKA SPRINGS, ARKANSAS

In the late 1970s, MWY completed the detailed design of the Carroll-Boone regional water supply and treatment facilities, which consists of a 24-MGD intake structure on Beaver Lake, a 4-MGD water treatment plant, 50+ miles of 30-inch and 24-inch treated water transmission pipelines, and 10-MG of system storage in three separate locations. The facilities also provide rate-of-flow and metering stations at five locations to the member cities. MWY expanded the treatment facilities in 1998 to 8-MGD and has designed a further expansion to 12-MGD, which was recently completed.

The system telemetry was updated in 1996, and is accomplished via combination of several digital radios and hardwire linked telephone telemetry channels. The 55-mile radio communication system is “line of sight” and includes a 160-foot radio tower at the treatment plant, and communicates with remote telemetry units at numerous other locations. The purpose of the system is to monitor tank levels, flow rates, and pressures across the district’s transmission facilities. The system is designed around “Zetron” remote terminal units and Siemens programmable logic controllers with a “Wonderware” man-machine-interface software system. The system monitors for alarm conditions and logs the distribution system information. The system enables the district’s staff to make timely operational decisions because the information that is displayed on the computer monitor is only seconds old. The historical data logging features of the system enable MWY to review and analyze the water system dynamics to make better decisions in continuing facility expansion projects.

A project was recently completed for modifications to the SCADA system to control and monitor the new booster pump station at the Pine Mountain Tank Facility that was built to increase the capacity of the transmission main which is serving the city of Harrison.

KIMZEY REGIONAL WATER DISTRICT HOT SPRINGS COUNTY, ARKANSAS

MWY designed the water supply and treatment system for the Kimzey Regional Water District, including a 12-MGD raw water intake and a 2-MGD water treatment plant. This work was done in conjunction with Summerford Engineers, Inc., which developed the design of the district’s storage and distribution system. The system used digital radio telemetry for monitoring tank levels and secondary booster station pump status. The improvements at the water treatment plant also include a PLC-based filter control system.

BENTONVILLE WATER SYSTEM BENTONVILLE, ARKANSAS

MWY designed an expansion of the ground storage and pumping facilities for the city of Bentonville, including a 6 million-gallon ground storage tank, a 10-MGD pump station, and a radio supervisory and data acquisition system.

The system is designed around “Zetron” remote terminal units with a “Wonderware” man-machine-interface software system. The system monitors for alarm conditions and logs the distribution system information. The system monitors the water distribution system’s pressure gradient and automatically controls a variable frequency driven pump to maintain an operator set pressure. The system is designed to keep the water in the ground storage facilities fresh while at the same time supply Bentonville customers with water at a more constant pressure.