



This commode planter sits near the entrance to the administrative office building and symbolizes the function of the plant, to turn waste into water that is clean enough to nourish vegetation.



Effluent discharged into Buck Creek is of higher quality than the water upstream of the plant.

Job Report



Plant Expansion Serves Municipal Growth



Growth. Many cities want it, but not all are prepared for its impact on their infrastructure, particularly their wastewater treatment capacity. Alabaster, Alabama, is a city that recognized the impact of expected growth and planned ahead.

Alabaster is one of the fastest growing communities in Shelby County, the fastest growing county in the state and regularly ranked among the 20 fastest growing counties in the US. With a 2000 census count of 24,936, a 2005 estimate of 26,100, and a 2010 projection of 27,900, the city is expanding at a pace



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equal to approximately 300 homes per year. Additionally, business growth efforts by the city's administration over the past five years have netted new commercial developments totaling about 750,000 square feet, with another 450,000 square feet of development underway.

Recognizing the need for corresponding growth in wastewater treatment capacity, the City approved a major expansion to the existing 3 mgd facility, built in 1990 along Buck Creek in the city's center. The expansion added 4.6 mgd of capacity with two aeration ditches, two clarifiers, filters, a new sludge press, and replacement of the old UV disinfection system.



Director of Environmental Services Kenny Hill can monitor and control all plant functions from the central operator position for his plant's control system.

Along with the expansion in plant capacity came an expansion in staff size. Alabama Department of Environmental Management rules state that when a plant's capacity reaches 5 mgd, the plant is required to have a certified operator on duty 24 hours a day, 7 days a week. A Grade 4 operator must be present during the day, and a Grade 2 or better must be present at night, with a Grade 4 available on call. This resulted in implementing three operator shifts.

At the heart of the expansion is a plant-wide SCADA system, provided by Revere Control Systems of Birmingham, Alabama. This system consists of two operator monitor stations (PCs) running Wonderware HMI software, five Allen-Bradley SLC 505E PLCs, and numerous field instruments to monitor level and flow. There are six Allen-Bradley VFDs to control the motors for the two plant lift stations.



Aerial view of the Alabaster wastewater treatment plant with the expansion portion of the plant highlighted (center).

Back-up bubbler panels are provided for each lift station in case the ultrasonic level detectors were to fail. In addition to providing for the new treatment train, PLC panels are provided for the original train to allow all of that equipment to be included in the new control system.

With the control system providing constant monitoring of performance of each stage of operation, aerators and mixers can be automatically turned on and off. It is also possible from the operator positions to override automatic operations if necessary.

"Overall, the SCADA system provides us with better knowledge and control of plant performance, yielding a more consistent performance than our old method of manually checking instruments periodically and manually making adjustments," says Director of Environmental Services Kenny Hill. Prior to the new system, operators had to physically walk across the plant, rain or shine, to monitor indicator lights and analyzers, and then manually make necessary adjustments.

Revere also coordinated with the plant's filter and UV system suppliers to integrate these operations



Pneumatic valve compressors (foreground) with Revere panels in the background.

into the SCADA system, expanding its benefit to the operators.

Treated water from the plant is discharged into Buck Creek, a small waterway that winds through the city and runs adjacent to the plant. Regular monitoring and testing of discharge demonstrates the consistent quality achieved by the plant, as the water discharged to the creek is a better quality level than the water upstream of the plant.



SCADA system main screen provides overview of entire plant operation. Separate screens provide monitor and control functions for each of the plant's equipment sections, such as clarifiers, pump stations, headworks, etc.

The \$10 million project was bid April 30, 2002, and was started a couple months later. The project took 18 months to complete. Through the entire project, the City experienced only one change order, and that was initiated by the City when they asked for a new lab building that would allow for more testing in order to reduce outside test expenses.

Says Hill, "In a project of this size, that absence of change orders is nearly unheard of and is

testimony to the quality of work done by both Revere Control Systems and the contractor, P.F. Moon of West Point, Georgia. Both firms did an excellent job of coordinating the timing throughout the project, producing a very smooth project from start to finish. The Revere project people in particular were excellent to work with. They often put in long hours working with our plant employees to assure that everyone was fully trained on how to operate the system."

One example of the long hours had to do with a problem with lift station #1. The originally



PLC panel (at right) automates the new treatment train, including pump station #1, oxidation ditch surface aerators, and submersible mixers. The panel is wired directly to the motor control center (remaining panels) which contains the motor starters for this equipment).

specified ultrasonic was picking up noise. It turned out that the particular unit specified was susceptible to noise from the VFDs. After analyzing the situation and identifying the cause, a different manufacturer's unit was selected to replace the specified unit.

If project success is defined as finishing on schedule, within budget, and without change orders, then the Alabaster wastewater treatment plant expansion certainly qualifies as a complete success. Continued Hill, "I'm very proud of the quality of the plant's output and expect it to continue. By recognizing the demands of growth and taking appropriate action, we are now easily able to handle the treatment needs of the city for at least another ten years."