



# Handling Hardness

Indiana community builds additional plant to accommodate growth

By Amy McIntosh

**Name:** Bargersville Water Treatment Plant No. 2  
**Location:** Bargersville, Ind.  
**Size:** 6 million gal per day  
**Infrastructure:** Well pumps; fluidized bed reactors; gravity filters; intermediate pumps; storage tanks; high-service pumps; and caustic soda, carbon dioxide, fluoride and chlorine feed systems



Top: The plant's four high-service pumps use high-efficiency motors.

Bottom: Each glass-lined storage tank holds 1 million gal of water.

The Bargersville, Ind., water utility serves approximately 30,000 people in central Indiana. The original water treatment plant was built in the 1950s, and, because the town itself lacked sufficient water resources, it was built several miles to the north. The plant was upgraded once in the early 1980s, and, in recent years, it had been operating at 90% above its rated capacity for extended periods, resulting in strain on equipment.

## New Plant Necessity

"For most of the year things would be OK, but when they hit a dry patch in the summer and water demand went up, the existing plant would run 24 hours a day, seven days a week, with no downtime for any kind of maintenance," said Matt Smith, project manager for Strand Associates Inc. "On top of that, this area is experiencing quite a bit of growth, especially toward the western part of the area."

The Indiana Department of Environmental Management issued a warning to the town, stating that if the town did not remedy the capacity problem, it would limit new connections to the existing water treatment plant. Because the town was experiencing rapid growth, a limit on new connections was not a viable option, so action needed to be taken.

Due to its location and limited groundwater resources, the original plant could not accommodate an expansion, so the town chose to build a new plant near the Waverly community in the western portion of the service area. Smith led the design efforts for the project, which was completed at the end of 2012.

The new plant, known as Bargersville Water Treatment Plant No. 2., has a capacity of 4,160 gal per minute, or 6 million gal per day (mgd). A well field is located 3,000 ft east of the plant and contains three well pumps. Within the water treatment plant, four fluidized bed reactors treat the raw water. The treatment process also includes four gravity filters, three intermediate pumps, two 1-million-gal

glass-lined storage tanks and four high-service pumps. Caustic soda, carbon dioxide, fluoride and chlorine feed systems also are in operation at various points throughout the process.

## Sustainable Softening

The incoming raw water has high calcium hardness and iron levels. Rather than using a traditional lime softening method, the Bargersville plant employs a fluidized bed reactor to reduce the calcium and iron buildup.

Raw water enters the cone-shaped reactors, along with caustic soda and sand. The water's pH rises, causing the calcium and iron to precipitate and stick to the sand granules. Carbon dioxide is fed into the high-pH water, turning it into carbonic acid and bringing the pH of the water down to an acceptable level. The water then enters the gravity filters to remove any particulates. Finally, fluoride and chlorine are added, and the treated water leaves the plant.

In addition to the treated water, the fluidized bed reactor process also produces solids that are easier to handle than those from a traditional lime softening process.

"The main advantage is that the amount of sludge that's produced is significantly less than traditional softening technologies. A lime softening system will produce a lot of lime sludge that is wet, and there's a high volume of it. It can be difficult to deal with," Smith said. "By comparison, this plant produces a very small amount of sludge. It's dry, and farmers can land-apply it easily. There's a lot less material that needs to be handled for this type of process."

While there currently are no plans to expand the plant, Smith said it is designed to be mirror imaged. With the addition of a building, four additional fluidized bed reactors, four filters and some pumps, the plant's capacity can be doubled to 12 mgd if necessary. **w&wd**

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