Safety, End to End

HIDDEN LAKE PLANT’S DESIGN HELPS SAFEGUARD PUBLIC AND EMPLOYEE HEALTH

PAGE 42

TECH TALK: The right approach to pump fixes
PAGE 28

SUSTAINABLE OPERATIONS: Targeting zero in Montpelier, Vermont
PAGE 26

HOW WE DO IT: Creative bypassing in Punta Gorda, Florida
PAGE 50
fees are $100 to $150 a ton, as in places like Massachusetts. In a dump container and hauling it to a landfill?

volatile fatty acids, such as acetic acid, which is the building block for pro-

tile-solids-to-alkalinity ratio in line. Food waste slurry does increase the a slurry that is pumpable and suitable for anaerobic digesters.

a port that material through the sewer. Grind2Energy uses 1 to 2 gpm to create a poser requires the use of up to 7 or 8 gpm of water while grinding to trans -

that's quite a bit of material. Generally, using a commercial food waste dis-

...
Safety, End to End

THE DESIGN OF THE AWARD-WINNING HIDDEN LAKE WATER TREATMENT FACILITY IS AIMED AT SAFEGUARDING PUBLIC HEALTH AND LIMITING THE RISK OF WORK ACCIDENTS

STORY: Jim Force | PHOTOGRAPHY: Amy Voigt
IT’S PUBLIC AND EMPLOYEE SAFETY FIRST AT THE new Hidden Lake Water Treatment Facility and distribution system serving Warsaw and Winona Lake, Indiana.

The new facilities, owned and operated by Indiana American Water, ensure an adequate supply of safe water for the communities’ customers, which include Warsaw’s growing orthopedic appliance industry.

Improvements in disinfection are designed to protect the safety of plant operators. Emergency generators guarantee power in the event of storms or other outages. And modifications to the supply system give the community more than adequate pressures for firefighting and new development. The project was commissioned in October 2011.

“From the initial design stage, our highest priority was safety — to eliminate injuries to our staff, protect our community and make our operation disaster-resistant,” says Chris Harrison, operations superintendent. All three objectives have been met.

NOT-SO-GOOD OLD DAYS
The good old days weren’t exactly that where Warsaw’s water treatment was concerned. The previous system owner operated four water treatment plants, which at one time drew raw water from an area lake. “These were old iron and manganese filters, dating to the late 1950s and 1960s,” says Harrison. “They were way past their useful service life.”

Not only that, the former facilities failed to produce the high-quality finished water needed for the community’s orthopedic industry, let alone other users. “Warsaw is the orthopedic capital of the world,” says Harrison. “Manufacturers need clean water to wash down parts and implants like artificial hips and knees. Our water is treated further in their on-site reverse osmosis and ion exchange systems. With the old system, the iron and manganese suspended in the water created all kinds of havoc in their operations.”

In addition, the distribution system was not capable of reliable pressures to meet the demands of fire service and further community development. Oddly, the system was segregated into four separate pressure zones, even though the terrain in the service area is relatively flat.

Hidden Lake Water Treatment Facility (serving Warsaw and Winona Lake, Indiana)

| COMMISSIONED: | 2011 |
| POPULATION SERVED: | 17,500 |
| SOURCE WATER: | St. Joseph and Wabash River tributary outwash aquifer |
| PLANT PROCESS: | Pressure filtration |
| CAPACITY: | 6 mgd (upgradable to 9 mgd) |
| SYSTEM STORAGE: | 2 million gallons |
| DISTRIBUTION: | 2 booster stations, 90 miles of water main |
| GPS COORDINATES: | Latitude: 41°16'1.42"N; longitude 85°51'36.61"W |
| WEBSITE: | www.amwater.com |
Finally, some of the old facilities were in the floodplain.

The first thing Indiana American Water did was conduct a comprehensive planning study to identify the water needs of the growing community and its industries. The study team conducted flow modeling and developed the details of needed distribution system improvements. Then, an in-house design team visited four other American Water facilities, including design-build projects, to gather design ideas.

“Our engineers and the design team walked through the process and came up with a design that is sustainable, disaster resistant and upgradable,” Harrison says. The design accounted for anticipated growth, which is averaging 70 to 120 new service connections a year.

“Proper planning up front helps with infrastructure solutions,” says Harrison. “We looked at the demand, analyzed the water-quality issues and came up with a resolution.”

The $25 million treatment facility and distribution improvements were constructed under a design-build contract, led by the engineering firm of Hazen and Sawyer and contractor River City Construction. The project took just one year from groundbreaking to completion and received a Water/Wastewater National Award of Merit from the Design-Build Institute of America. The treatment plant is also LEED-certified.

**UPGRADED TREATMENT**

In the new treatment process, raw water is drawn from six wells in a new wellfield constructed with environmental impact top-of-mind. At the plant, the water is aerated and then pumped through four new two-cell pressure filters, designed by American Water, to remove iron and manganese. The design includes multiple options for chemical feeds if necessary.

The filter train is expandable to six units, according to Harrison, and the piping arrangement can also be expanded to bring plant capacity to 9 mgd from the current 6 mgd. Actual flow at present is just under 3 mgd.

The filters are equipped with automatic backwash systems controlled by the plant’s new SCADA system, designed by Langtech. “Before, the old filters were backwashed manually,” says Harrison. “Now we’re seeing runtime of up to 120 hours between backwashes. That cuts down on the amount of non-revenue water. The new SCADA system automatically starts the backwash cycle according to the setpoints we establish in the programming.”

The plant’s safety theme carries over to the disinfection process, which uses on-site generation of sodium hypochlorite (Process Solutions) in place of chlorine gas. “In opting for on-site generation, we anticipated an increase in chemical costs,” says Harrison. “So far, though, we haven’t really seen an increase.” Finished water is stored in a 1.1-million-gallon clearwell (DN Tanks).
In the distribution system, variable-frequency drives (VFDs) efficiently maintain pressure, and the impact shows up in low energy costs and improved operational control. When compared to the old system, Hidden Lake sees an average electric bill reduction of $1,500 per month by staying within the pump curve, and controlling the tower height using the VFDs.

“We reduced the number of needed pressure zones from four to two,” Harrison says. “Warsaw is basically a swampy area. There originally were four different gradients in the system, and with the changes we made, there was no need to continue that. With proper planning, we were able to combine three existing zones into one, tear down one elevated tower and raise the west tower by 32 feet.

“The VFDs on our pump motors (US Motors – Nidec Motor Corporation) run according to the height of the water in the tower. We were able to maximize our resources by operating at seasonal fill rates.” Stag-
ing of the levels in the towers is based upon meeting daily demands and maintaining the fire flow requirements in the system. In addition, by combining three pressure gradients into one main zone, pressure has increased by 13 to 15 psi throughout the distribution system. “That enhances our fire flow, which helps meet our design criterion of 3,500 gpm for three hours of continuous fire flow to our industrial and commercial customers,” Harrison says.

“That is a boon to efficiency and security. "It's a very useful tool," Harrison says.

Some of the new mains have been looped, providing redundancy to ensure pressure in areas where water was historically supplied from a single direction. Finally, Warsaw has upgraded its metering system to all radio reads, replacing a system of manual readings and touch pads.

**SAVY STAFF**

The staff at Hidden Lake is small, but skilled in a variety of areas. Harrison’s team includes Brenda Sumpter, operations support representative, and Carl Slone, John McConnell and Adam Hudson, field service representatives. “This is a high-tech facility,” says Harrison, who started in the clean-water field 33 years ago, as a 17-year-old painting curbs. “Our employees are trained in both plant and distribution system operation, with expertise in mechanics and computers. The learning curve was short once they became familiar with the operation.”

Besides being computer-savvy, operators need to know how to run the equipment in case the control system should fail. That's one of the reasons Harrison holds weekly “splash” meetings, as well as tailgate talks each morning. “We show up with a cup of coffee and go over what actions are required for that day, what problems we foresee,” he says. “The talks help us communicate. The priority is safety. We haven't had a lost-time accident here in 13 years.”

And the new facility actually helps the communications process. “Before we upgraded, operations were dispersed throughout the community. The office was in one place, the distribution center was across town and treatment was at four different plants.”

Now everything is under one roof, enhancing teamwork, time management and water quality. And, of course, safety.

**FEATURED PRODUCTS**

<table>
<thead>
<tr>
<th>Company</th>
<th>Phone</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Water</td>
<td>856/346-8200</td>
<td><a href="http://www.amwater.com">www.amwater.com</a></td>
</tr>
<tr>
<td>DN Tanks</td>
<td>800/826-8306</td>
<td><a href="http://www.natgun.com">www.natgun.com</a></td>
</tr>
<tr>
<td>Hach Company</td>
<td>800/227-4224</td>
<td><a href="http://www.hach.com">www.hach.com</a></td>
</tr>
<tr>
<td>Hazen and Sawyer PC</td>
<td>800/856-9876</td>
<td><a href="http://www.hazenandsawyer.com">www.hazenandsawyer.com</a></td>
</tr>
<tr>
<td>Langtech Systems Consulting</td>
<td>800/460-8488</td>
<td><a href="http://www.langtech.com">www.langtech.com</a></td>
</tr>
<tr>
<td>Nidec Motor Corporation</td>
<td>888/637-7333</td>
<td><a href="http://www.usmotors.com">www.usmotors.com</a></td>
</tr>
<tr>
<td>Process Solutions, Inc.</td>
<td>888/774-4536</td>
<td><a href="http://www.4psi.net">www.4psi.net</a></td>
</tr>
<tr>
<td>River City Construction</td>
<td>309/894-3120</td>
<td><a href="http://www.rccllc.com">www.rccllc.com</a></td>
</tr>
</tbody>
</table>