

READY FOR GROWTH

Automation, high-end technology and a dedicated staff have the Burnt Store reverse osmosis treatment plant prepared for the next boom in local construction

STORY: **JIM FORCE**
PHOTOGRAPHY: **ARMANDO SOLARES**

Paul Sugg, plant operator C, and teammates benefit from process automation at the Burnt Store Water Treatment Plant and Water Reclamation Facility.



Growth has slowed in Charlotte County, Fla., but when it resumes, the folks at the Burnt Store Water Treatment Plant will be ready.

“Whenever things start kicking back into gear in the Burnt Store corridor this plant is ready to go,” says Ben Jacobson, chief operator. Even though new construction in the area had come to a halt, Charlotte County Utilities expanded the Burnt Store plant to 3.61 mgd capacity and added new technology.

Dating to 2010, the improvements included two production wells, two prefiltration units, three reverse osmosis (RO) units, chemical feed systems, two degasifiers, a high-service pump system, three clearwell transfer pumps and an additional 500,000 gallons of storage, increasing total capacity to 1.5 million gallons.

Before the 2008 recession, “One big development was moving ahead rapidly,” Jacobson recalls. “A golf course, single family homes, condos — we were looking to supply a good share of the produced water to that project. Then, crash, the whole project came to a standstill. We wondered if we should go forward or hold, but the architectural design prints were complete and approved and money

was available, so we went ahead with the plant expansion.”

Due to low demand on the plant, exercising of plant equipment is priority. No device remains idle. A routine equipment alternating schedule has been in place since the expansion, and the plant’s Wonderware operating program (Invensys) can switch most equipment automatically. “This is a nice feature in this plant’s computer program,” says Jacobson. “We still have equipment we alternate manually, but the computer handles most of this task for us.”

“Distribution and billing department personnel can review the data from each meter or from the system each hour and detect usage trends. It will also alarm on a leak if it shows continuous high flows and tell us if someone tries to tamper with the meter.”

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Expanded often

Sharing a 75-acre site near the Charlotte-Lee County line with the community’s water reclamation facility, the Burnt Store plant serves a population of 6,915 with 2,395 service connections. The distribution system



The Burnt Store crew includes, from left, Kevin French, Tod Avers, Paul Sugg and Ben Jacobson.

Burnt Store Water Treatment Plant, Charlotte County, Fla.



BUILT:	1970s; multiple expansions
TREATMENT CAPACITY:	3.61 mgd
SERVICE AREA:	9 square miles
CUSTOMERS:	6,915
SOURCE WATER:	Hawthorne and Floridian aquifers
TREATMENT PROCESS:	Reverse osmosis
INFRASTRUCTURE:	57 miles of distribution piping, 387 hydrants, 415 in-line valves
SYSTEM STORAGE:	1.5 million gallons
OPERATOR:	Charlotte County Utilities
ANNUAL BUDGET:	\$368,000 (operations)
WEBSITE:	www.charlottecountyfl.gov

includes 57 miles of 2- to 16-inch piping, 387 hydrants and 415 in-line valves.

Raw water is drawn from seven brackish wells, six in the Hawthorne Aquifer (600 feet deep) and one in the Floridian Aquifer (1,050 feet deep). The Burnt Store plant has been expanded considerably since it was built 40 years ago, but RO has always been the technology of choice.

“The original water treatment plant went online in the early 1970s using reverse osmosis to treat 36,000 gallons a day,” Jacobson says. “In the mid-1970s, it was expanded to 160,000 gallons a day and was equipped with hollow-fiber membranes.”

The plant was expanded again in 1994, 1996 and 2000; additional RO units were installed, using spiral wound membranes. The 2009-2010 expansion, designed by Malcolm-Pirnie with Wharton Smith as the general contractor, included three new 750,000 gpd RO trains, bringing the design capacity to 3.61 mgd.

Incoming well water first receives a dose of 93 percent sulfuric acid to lower the pH from 7.3-7.4 to 6.7-7.0. It is injected with anti-scalant to pre-

vent mineral scaling on the RO membranes. Then the water passes through five prefiltration units, each housing 40 1-micron cartridge filters (Tri-Dim Filter Corp., GE Water & Process) to remove large impurities. High-pressure pumps deliver the water to the five primary RO units, used for demineralization (Aerex Global Corp. designed and installed the newer RO units).

“We have a good team that works well together. We support each other, and everybody on the team keeps things humming along. Our distribution folks get right on any line breaks, so not a lot of water is wasted.”

BEN JACOBSON

Depending on which RO units are online (older or newer), water pressure is increased to 120 to 160 psi, allowing the units to perform at their design capacity. All RO units are two stage; the older units consist of 12 membrane vessels, the newer units 20. Each vessel contains seven membrane elements.

The impurities removed by the membranes (concentrate or brine) are sent to two Class 1 industrial waste injection wells drilled into rock formations 3,000 feet deep. The second well was drilled as part of the 2010 expansion and receives the bulk of the concentrate. “The new well is larger than the old one, and we use it as the primary well,” says Jacobson. “But we don’t want the smaller injection well just sitting there, so we switch the valving at least once a month and send the concentrate down it.” It’s also a backup if problems arise with the new well. The wells are closely watched with dual-zone monitoring systems and sample collection and analysis, in compliance with state regulations.

The RO product water (permeate) is blended with filtered bypass well water and flows to a Dual three-tower degasification system (Met-Pro Environmental Air Solutions) for hydrogen sulfide removal. It passes to a 20,000-gallon clearwell, where it receives sodium hypochlorite for disin-

WHY 'BURNT STORE'?

Water treatment plants are often named for local public officials or some natural feature. But Burnt Store Water Treatment Plant? Where does that come from? Was there a fire?

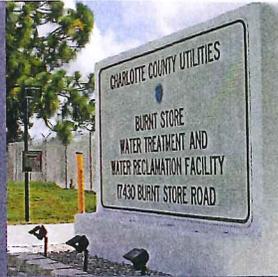
Apparently so, according to the legend cited on the menu at the Burnt Store Grille on the Tamiami Trail in Punta Gorda. As you enjoy the restaurant's fried seafood platter or Hulk Burger, you can read of how the area was originally home ground for the Calusa band of Indians. They survived the Spanish explorations of Ponce de Leon and co-existed on the land with early settlers until a troop of U.S. surveyors arrived in the mid-1800s.

The surveyors managed to alienate the Calusa and destroy their property to the point where the Indians decided they weren't leaving and set fire to the trading post the settlers had built — burning down the store.

Tribal leader Billy Bowlegs is said to have described the incident: "If we are going to lose our land, we won't do it without a fight."

According to the menu account, "The Trading Post was never rebuilt, but from that day on the road leading to it was known as Burnt Store Road."

Today the facilities at Burnt Store Marina & Country Club supply more needs than those who shopped the old Trading Post ever thought possible. With the splendor of a secluded 425-slip marina, 27 holes of golf, Athletic Club, pool and tennis courts, the legend more than continues.



fection, sodium hydroxide for pH adjustment and a corrosion inhibitor (chemical feed pumps by Lutz-JESCO America Corp.).

From the clearwell, treated water is pumped into three 500,000-gallon above-ground storage tanks (Crom Corp.) where a high service pump draws water for distribution to customers. "The high-service pump system consists of a 25 hp jockey pump for low water demands, two 75 hp pumps for intermediate water demands, and one 125 hp pump for large water demands, such as fire suppression," explains Jacobson. Total high service pump capacity is 4,950 gpm at 70 psi.

A Wonderware SCADA system (Invensys) controls the entire system with two stations in the water plant control room and one in the facility's motor control center.

Close cooperation

Jacobson and three to four operators staff the Burnt Store plant 16 hours a day, seven days a week, running two eight-hour shifts. During the unmanned times, the SCADA system alarms Jacobson automatically by phone if problems arise with the treatment process or distribution pump system.

"We have a good team that works well together," Jacobson says. "We support each other, and everybody on the team keeps things humming along. Our distribution folks get right on any line breaks, so not a lot of water is wasted."

A maintenance management system supports Jacobson and his staff: "We use an enterprise asset management system software program, which allows our maintenance personnel to track time and materials more efficiently and use electronic data storage rather than paper." That results in cost savings.

The Burnt Store team has upgraded the membrane cleaning system valving to divert cleaning waste to the deep injection well instead of the Water Reclamation Facility, helping protect the treatment process from acidic membrane cleaning solutions. The staff also manages the mem-

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Paul Sugg and teammates staff the Burnt Store plant 16 hours a day, seven days a week. (ChemScan process analyzer from ASA Analytics; universal controllers from Hach.)



Reverse osmosis production trains, pumps and motors at the Burnt Store plant. (PROTEC membrane pressure vessels from Bekaert.)

THE BURNT STORE TEAM

It takes a team of professionals to keep things running smoothly at the Burnt Store facilities. Team members include:

Charlotte County staff: Terri Couture, utilities director; Bernie Milosky, regulatory liaison; Jamie Huish, operations manager; Steve Kipfinger,

superintendent of Water Distribution and the water distribution team; Steve Bozman, superintendent of treatment facilities and the Eastport operations team; Bruce Bullert, engineering services manager and team; Drew Johnson, maintenance foreman; Frank Muscato and Harold Routzong, instrument control technicians; Jerry Steimle, Charlie Oram and Dennis Woody, maintenance mechanics; Sandra Lavoie,

laboratory manager; Elizabeth Robling, Shelanda Kregghe and Wanda Hall, laboratory technicians.

Burnt Store Water Treatment Plant staff: Ben Jacobson, chief operator; Claudel Leonard, Tod Avers and Kevin French, plant operators.

Burnt Store Water Reclamation Facility staff: John Thompson, chief operator; Paul Sugg, Dave Brooks and Harry Kuzel, plant operators.

brane system to conserve electricity to the trains by monitoring the amount of turnover water in the tanks before producing new water. That way, the plant produces only enough water to keep the storage system full: “We only make as much as they take,” Jacobson says.

To further improve the water system, the staff performs semi-annual valve exercising. The team has also upgraded the treated raw water blend system, including larger-diameter piping, a new flowmeter and a new actuator valve. In addition, they rehabilitated three production wells.

In August 2012, the Burnt Store water distribution team completed a changeout of all the water meters in the distribution system to smart meters that collect data continuously and upload it to the cloud, where it can be brought back to the billing system. “Distribution

and billing department personnel can review the data from each meter or from the system each hour and detect usage trends,” says Jacobson. “It will also alarm on a leak if it shows continuous high flows and tell us if someone tries to tamper with the meter.”

Training and safety are major priorities. Charlotte County uses the University of California-Sacramento study books to help staff obtain and advance their operator licenses. “I liked using the Sacramento courses also to obtain my required CEUs for my operator license,” says Jacobson. “They’re a nice tool to have at my disposal.”

All Charlotte County employees must complete at least two hours of safety training each year. In addition, all field employees continuously train for certification and recertification in a number of safety areas, such as first aid, lockout/tagout, confined-space entry, personal protective equipment and trenching and excavating safety.

Performance and awards

Capacity expansion, high-end technology, operational improvements, automation — it all adds up to solid performance and recognition from peers for the Burnt Store plant. In a typical month, the plant reduces total dissolved solids from 1,800-1,900 ppm in the raw water to 227 ppm in the finished water, chlorides from 1,000-1,100 to 160, total hardness from 700-800 to 72, and conductivity from 3,600 to 521.

These removal rates have helped the plant earn prestigious awards. In 2012, the Florida Department of Environmental Protection honored Burnt Store with its annual Plant Operations Excellence Award. The plant won the same award in 2008. In 2010, the utility’s water distribution division was honored for outstanding distribution service by the Florida Section AWWA. Last year, the water distribution system employees were recognized by Charlotte County with a



Ben Jacobson,
water treatment
plant chief operator

special award for their prompt response to a line break on Christmas Eve.

For Jacobson, who came to Florida from Kentucky in 1980 and got into the water treatment profession in the mid-90s on a tip from his foreman at an underground cable business, it has been challenging. The plant and storage capacity expansion came close on the heels of his accepting the chief operator position at Burnt Store in December 2006. "I'd never been through anything like it before," he says. He's happy it's over, but he must be just as happy with the results. **wro**

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