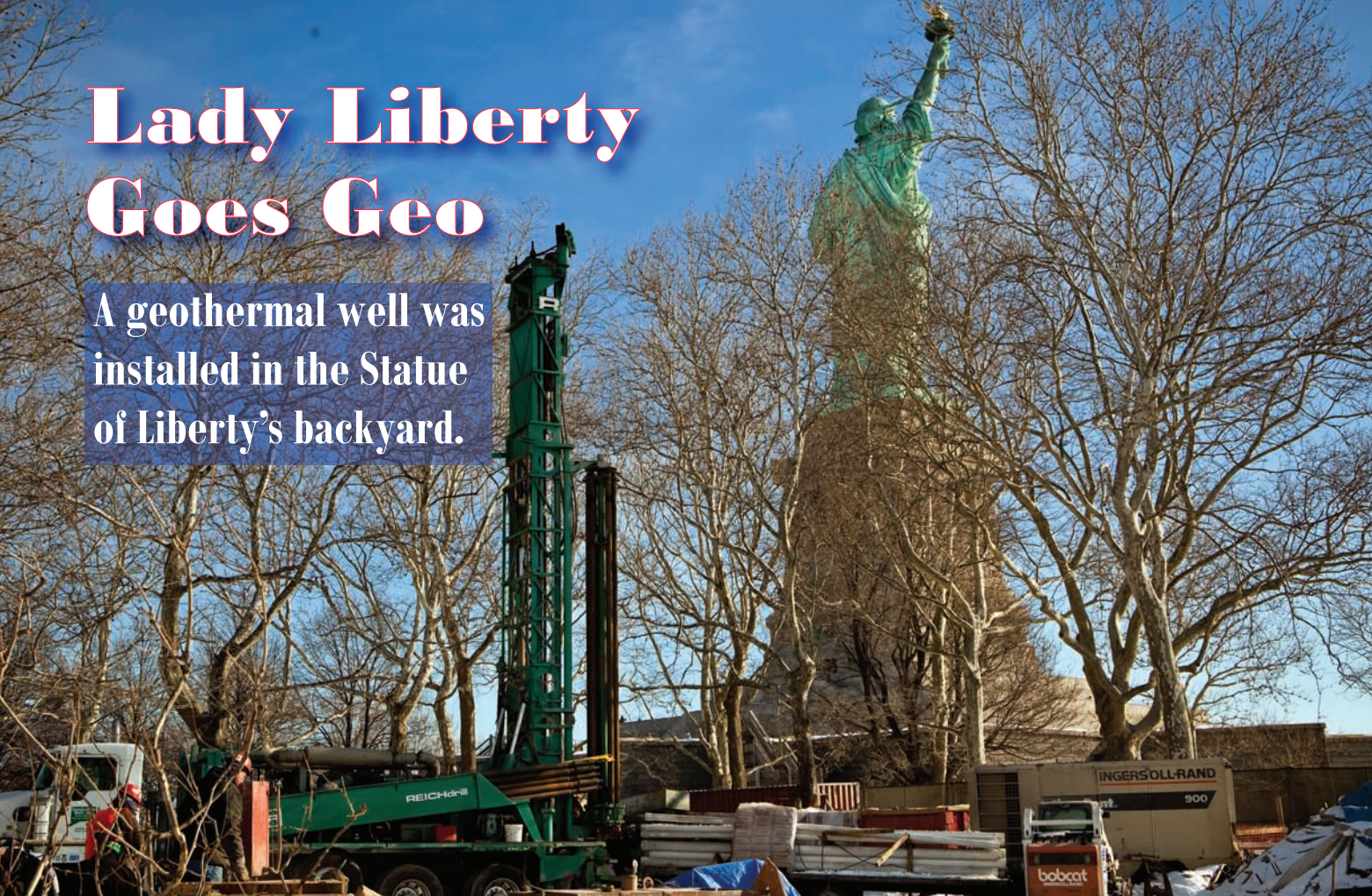


Lady Liberty Goes Geo

A geothermal well was installed in the Statue of Liberty's backyard.



By John M. Coogan

With the U.S. government's ongoing campaign to promote energy efficiency to homeowners and building owners across the nation, it's only natural that it would follow suit with buildings located on government-owned sites.

And so, for this reason last December, alternative energy made its first appearance on New York's Liberty Island, as Lady Liberty received a geothermal well in her backyard.

Using the earth as a heat source, geothermal wells provide renewable

energy and reduce greenhouse gas emissions. According to the U.S. Environmental Protection Agency, geothermal technology is the most energy-efficient, environmentally clean, and cost-effective space controlling system available.

The U.S. National Parks Service hired P.A. Collins P.E. Consulting Engineers, a firm located in New York City, last year to design the well for the Liberty Island Retail Pavilion. The pavilion is located next to the Statue of Liberty. The well's purpose is to provide energy-efficient geothermal power for the heating and air conditioning of the facility, which will conserve energy and reduce operational expenses.

The National Parks Service also selected Connecticut Wells Inc. of Bethlehem, Connecticut, to drill the well.

For the application, P.A. Collins designed a 1550-foot-deep, 10-inch-diameter standing column well. For dip tube and drop pipe materials, the engineers specified durable, corrosion-resistant PVC, allowing the contractor to select the specific products. (Dip tubes, also known as porter shrouds, act

as a separator between supply and return water within the wellbore.) Connecticut Wells chose CertainTeed Certa-Lok PVC well casing and Certa-Lok PVC drop pipe, products they'd had much success with in the past.

Certa-Lok PVC well casing and PVC drop pipe uses a field-proven spline-locking design to form a full-strength joint instantly in all weather conditions. The assembly of pipe lengths requires no solvents, arc welding, or reinforcement screw attachments—saving time in the field.

"Certa-Lok usually helps us shave about 60 percent off the installation time when compared to traditional belled-end PVC well casing and drop pipe," says Anthony Ganio, president of Connecticut Wells. "You don't have to glue and prime both ends, put screws in, and wait for it all to set during joint assembly like you do with normal PVC pipe. The Certa-Lok assembles as fast as you can put the splines in."

The biggest challenge Connecticut Wells encountered was figuring out how

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Connecticut Wells Inc. of Bethlehem, Connecticut, drilled the geothermal wells on Liberty Island next to the Statue of Liberty. The geothermal system is for the Liberty Island Retail Pavilion.



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to move all of their drilling equipment from the mainland to Liberty Island without disturbing the flow of tourists.

Fortunately, they were able to load the machinery and materials onto tug-boat-pulled barges the night before the project began and ferry them across New York Harbor to Liberty Island before 6 a.m.

Each day, the four-person crew was in place at the work site by 8 a.m. when the park opened to keep out of the way of Statue of Liberty visitors. After the equipment was in place, the work crew traveled back and forth on the Liberty Island Ferry.

“Luckily, we didn’t have any conflicts,” Ganio says. “With proper planning, everything went smoothly.”

Once everything was in place, Connecticut Wells began drilling, using a REICHdrill T-650-W drill rig. The upper part of the bore consisted of 17 feet of sand and gravel, and solid bedrock was encountered at 18 feet. The crew installed 10-inch steel casing to a depth of 80 feet to seal off the unconsolidated materials and cemented it in place.

Using an air percussion hammer, the crew drilled through the bedrock in 9 $\frac{7}{8}$ -inch diameter to a depth of 260 feet. The hole was advanced in 8-inch diameter to 1150 feet and 6-inch diameter to 1550 feet. The crew encountered groundwater

at depths ranging from 690 feet to 1330 feet.

To help keep the drilling rate up and the hole cleared of cuttings, the crew used an auxiliary compressor and a Hurricane booster compressor, in addition to the air package mounted on the drill rig.

The drilling of the Liberty Island geothermal well took five working days. After the drilling was complete, Connecticut Wells removed the tools from the wellbore. The crew then installed 260 feet of 6-inch Certa-Lok PVC well casing and 1290 feet of 4-inch Certa-Lok PVC well casing for the well’s dip tube. Next, the crew installed a submersible pump within the dip tube and connected 200 feet of 3-inch Certa-Lok PVC drop pipe to it to provide a return line, finishing the job.

As the new well operates, the groundwater beneath the Statue of Liberty travels at a rate of 120 gallons per minute down the wellbore and enters the dip tube through perforations at 1500 feet. It then flows up to the pump and circulates back into heat pumps within the Liberty Island Retail Pavilion.

The heat pumps will pull temperature from the 55°F water and return cold water back to the ground. During the warmer months, the system will reverse, meaning the pump will transfer heat in

Connecticut Wells Inc. drilled a 1550-foot-deep, 10-inch-diameter standing column well designed by P.A. Collins P.E. Consulting Engineers of New York City.



the building to the water being used and return it back underground. This type of geothermal well is typical in commercial installations where a large system is present, but the surface area will not allow for a larger wellfield.

The project was a success, and Connecticut Wells is pleased with the results.

“I feel honored that we were chosen to do this project, and I am proud because I know my crew worked hard,” Ganio says. “They went out there, got the job done in as little time as possible, and came back home.

“They did a great job.” *WWJ*

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