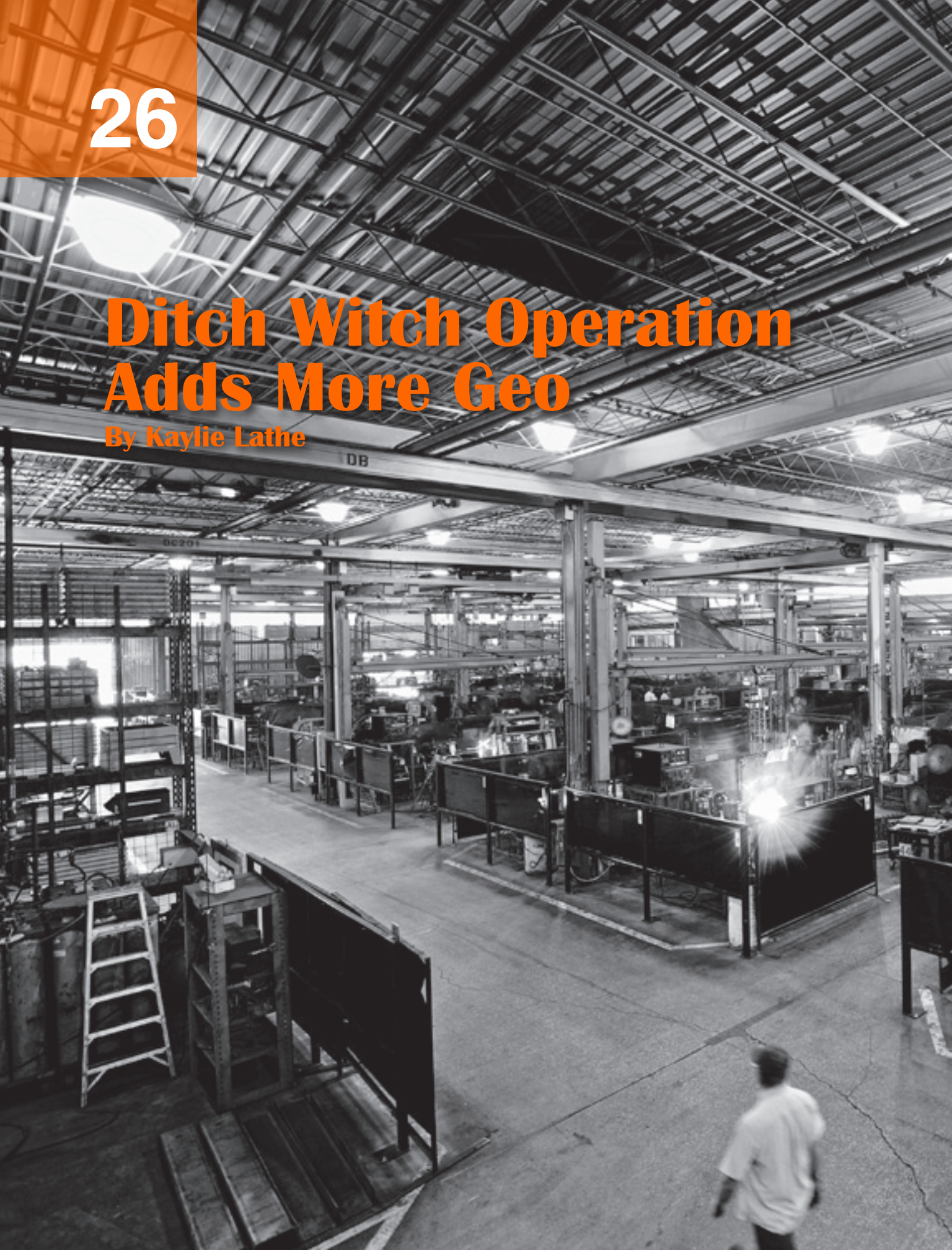
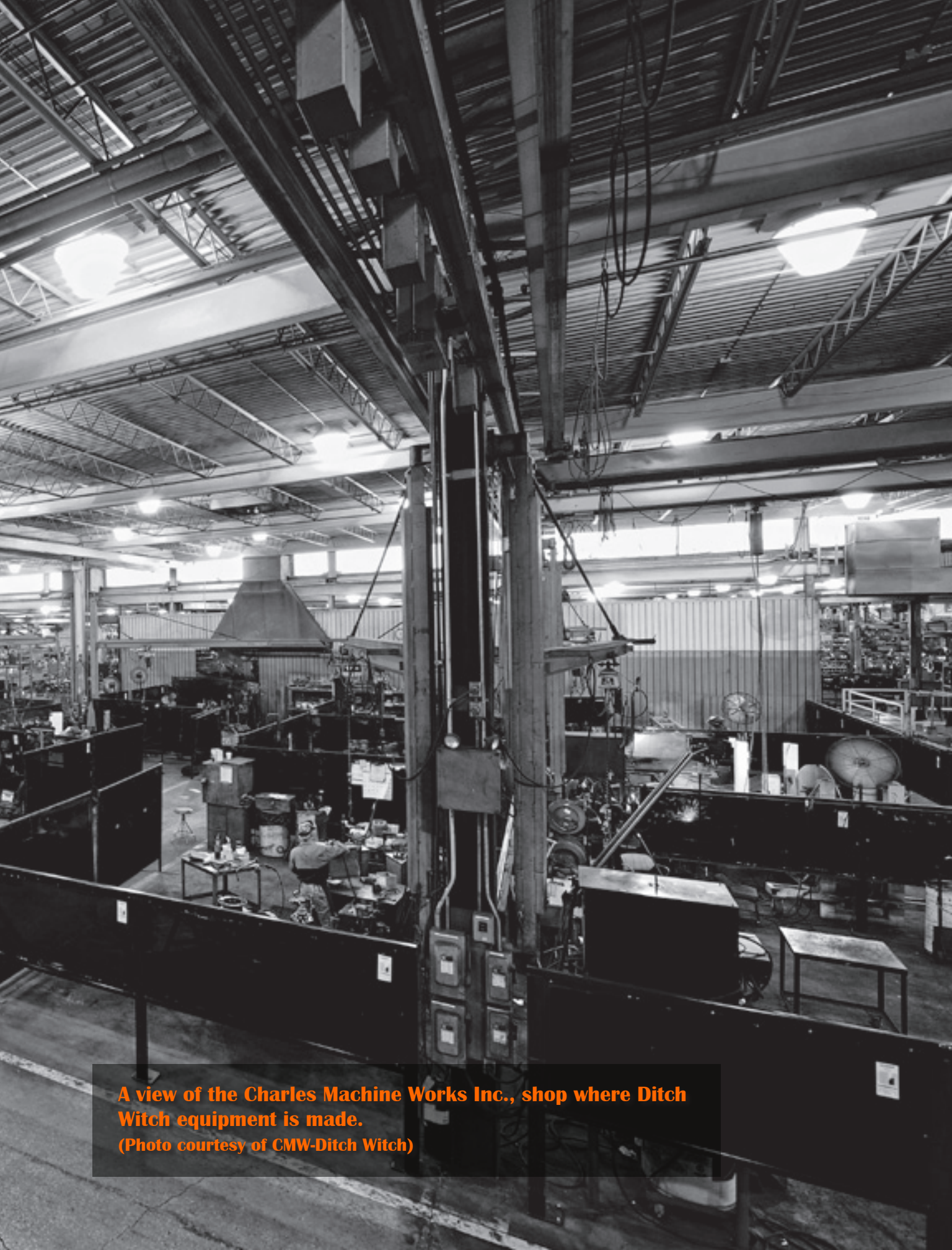
Ditch Witch Operation Adds More Geo

By Kaylie Lathe





A view of the Charles Machine Works Inc., shop where Ditch Witch equipment is made.
(Photo courtesy of CMW-Ditch Witch)

Perry, Okla., may not be where you would expect to find the headquarters for a global company, but it is there Ditch Witch® equipment manufacturer, The Charles Machine Works Inc., began and still operates today.

Walking into the front office, a row of flags representing all the countries CMW does business with greets you. When you first enter the plant, you see the machine displayed that started it all and a large wall collage. As you look at the many photographs that make up the collage, you begin to get a sense of the family and community values the company was built on.

The Charles Machine Works, Inc., also known by the brand name Ditch Witch®, is a leader in manufacturing high-quality underground construction equipment. In addition to revolutionizing the way underground utility services were installed, Ditch Witch® also formed a strong relationship with the geothermal industry.

A long shot of the Product Development Center shows the extensive glass used and the relation of the heat-exchange field behind it near the facility's water tower.
(Photo courtesy of CMW-Ditch Witch)

The horizontal drilling and vacuum equipment are frequently used in geothermal installations, including those on the CMW campus. The Ditch Witch® Training Center, built in 1992, was the company's first geothermal project, followed by the Subsite® Electronics Building in 1997.

CMW's third and newest geothermal project involved a retrofit of its Product Development Center. The 28,800-square-foot structure was built in 1978 and is the campuses' only retrofit.

An experienced crew from B&H Construction works on fusing some of the 8-inch pipe used for the project.
(Photo courtesy of CMW-Ditch Witch)

Inside the massive vault, connections are made to bring the boreholes together into a manifold system to take the piping to the ClimaCool® units.
(Photo courtesy of CMW-Ditch Witch)

The Product Development Center was unlike the other projects due to the large, open space that would need to be cooled and heated and the lack of space available for equipment. Principal Plant Engineer, Tony Guinn, knew single units would not be plausible.

"Our first units were individual classrooms made up of individual units with individual fields, kind of like residential," Guinn said. "We didn't have the space to do individual units for this project so we were looking to condense."

Darrel Stolhand of Stolhand Heating and Air of Ponca City, Okla., found the solution with ClimaCool's SHC onDEMAND® Modular Chiller.

A four-pipe system comes from the mechanical area to serve the Product Development Center.
(Photo courtesy of CMW-Ditch Witch)


Chilled Water S
Chilled
Hot Water Return
Chilled Water Supply
Chilled Water Return
Unit # 1
COOL
ON DEMAND

"I'd been to training with Air Products Supply and was highly impressed with the unit's ability to generate heating and cooling simultaneously," Stolhand said. "Also, the comfort level of this type of system is exceptional, especially when considering the design of the building, which includes two levels of an open floor plan and a south-facing wall made entirely of windows."

Three of the 50-ton units take up little space, while cooling and heating the space efficiently. The units are forced air and utilize R-410A refrigerant. A small, exterior metal building was built near where the chillers once stood to house the units, piping and controls. A cooling fan runs in this area to keep the units from overheating in the confined space.

With CMW always looking to expand its 23-acre campus, the borefield location had to be chosen with care. The area around the water tower was the perfect location and use of the space. B&H Construction of Goldsby, Okla., drilled 126 vertical boreholes at 400 feet and 42 at 300 feet. One-inch U-bend pipes were placed in each of the 400-foot boreholes, while U-bend pipe of different size and construction was placed in each of the 300-foot boreholes for testing purposes. The building is now running on half of the borefield while the remainder is still being used for testing.

B&H Construction has been using Ditch Witch equipment for 35 years, but this was their first project on the campus. Senior Project Manager, Scott Munday, recalls how smooth the project went.

"The borefield was laid out and designed when we got there and the engineers at Ditch Witch did it very well," Munday said. "They were great to work with."

The biggest benefit CMW has seen from its geothermal retrofit of its Product Development Center is the low maintenance.

"Maintenance wise, I've done nothing," Guinn said. "That other unit always had something wrong with it. I don't have any problems now. That's been the biggest benefit."

Chilled and hot water supply and return piping runs from the units in the mechanical building out to the Product Development Center.
(Photo courtesy of CMW-Ditch Witch)

B&H Construction out of Goldsby, Oklahoma, handled the grouting for the project.
(Photo courtesy of CMW-Ditch Witch)

Simple adjustments made in controls of the system early on were the only "problems" that have been experienced, Guinn explained.

"The system would shut down," Guinn said. "It was looking for pressure differential and if it didn't see a pressure differential it was thinking the pumps weren't running so it wouldn't start. The pumps were reacting too fast. We added some delay time so when the valves opened up, the pump revved and the units said 'ok now there is flow'."

CMW's own Ditch Witch® trenching and vacuum equipment was used in their geothermal installation.

A new building was constructed next to the old chiller location to contain the mechanical system for Ditch Witch's latest geothermal expansion.
(Photo courtesy of CMW-Ditch Witch)

A massive vault was needed to bring the borefield together and create the manifolding system needed.
(Photo courtesy of CMW-Ditch Witch)

Three 50-ton ClimaCool SHC onDEMAND® Modular Chiller units handle the heating and cooling in a minimum amount of space.
(Photo courtesy of CMW-Ditch Witch)

Their equipment is commonly used for other geothermal installations around the world.

CMW has expanded beyond the compact trencher that started it all. Today, the product line of underground construction equipment is extensive including, trenchers, vibratory plows, pneumatic piercing tools, backhoes, electronic guidance and locating tools, horizontal directional drilling systems, drill pipe, downhole tools, vacuum excavation systems, excavator-tool carriers, and mini-skid steers.

Ed Malzahn, only 28 at the time, developed the first compact trencher for laying underground water lines in residential areas. The invention led to the compact trencher industry.

Today that industry manufactures equipment for underground utilities including water, sewer and gas lines, telecommunications, CATV and fiber-optic cables.

CMW was built on the values Malzahn learned from his grandfather, Carl Frederick Malzahn, who moved his family to Perry in 1902 and started a blacksmith business. Today, CMW still embodies those values, placing a high importance on family and community.

Malzahn also learned how to adapt business to changing demand as his grandfather's blacksmith business transformed into a repair shop called Charles Machine Shop to serve nearby oil fields. Malzahn saw a need and with a degree in mechanical engineering and family background of hard work, he created a company that continues to be a pioneer and leader in the industry he created.

Chairman of the Board, Malzahn has seen his granddaughter, Tiffany Sewell-Howard, become CEO of the family enterprise. Even though Malzahn no longer wears the title of CEO, he still keeps a close eye on his company, arriving before anyone else and leaving long after everyone else has gone.

The expanding campus of The Charles Machine Works Ditch Witch operation is contained in an attractive acreage that often includes a herd of longhorn cattle.
(Photo courtesy of CMW-Ditch Witch)

For a company that values innovation, geothermal fits perfectly. For years, CMW has worked with IGSHPA to promote geothermal and Malzahn still recognizes the importance of geothermal to the Ditch Witch brand today.

"The industry has been good to us," Malzahn said.

Editor's note: Charles Machine Works has a long and important history with IGSHPA. One of seven charter members to start the association, CMW's Ditch Witch® equipment grew its geothermal interest alongside the new association. Phil Albertson, an OSU graduate in industrial engineering, and engineer for CMW, worked closely with Dr. James Bose in developing IGSHPA. Albertson was the original designer of the increasingly popular slinky pipe configuration. He was named an IGSHPA Ambassador in 2005.