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## UTAH FORGE COMPLETES FIRST WELL

by Christopher Katis

Geothermal history was made right here in Beaver County! The Utah Frontier Observatory for Research in Geothermal Energy, or Utah FORGE, has successfully completed its first highly deviated deep well. It was even completed 60 days ahead of schedule. Although more common in other industries, this type of deep, highly deviated well in hot, hard granite is a first for the geothermal industry.

This is the first step in achieving Utah FORGE's primary goal of testing and developing methods to create a geothermal reservoir for energy production in places where natural reservoirs and hot springs do not exist. The results will lead to building what is called an Enhanced Geothermal System (EGS), which will benefit Utah, the nation, and the rest of the world. Indeed, scientists predict that if just 2% of the geothermal energy found between 2 and 6 miles below the earth's surface can be tapped, we'd have more than 2000 times the amount of energy used in the U.S. every year.

Beginning at about 6000 ft below the wellhead, the well was steered to the east until an angle of 65°



Photo by Eric Larson

was reached. Drilling continued until the well ultimately reached a true vertical depth from the surface of 8,559 feet, and a total measured depth of 10,987 feet. Preliminary measurements indicate temperatures at the "toe", or the bottom of the well, are greater than 440°F.

During the drill-

ing, seismic activity was closely monitored by the University of Utah Seismograph Stations (UUSS) and no drilling-related activity was detected. You can follow seismicity across Utah in near real-time at <https://quake.utah.edu>.

EGS resources have heat but lack the connected fractures that

create the permeability found in natural geothermal reservoirs, like those at Blundell, Thermo and Cove Fort. The permeability at the Utah FORGE site will be created by injecting water into the hot rocks, causing existing fractures to open and connect. In the summer of 2021, we will undertake a series of short injection tests to determine the orientation and distribution of the fractures that will form this engineered reservoir. During the tests microseismicity will be carefully monitored.

The recently completed well will serve as the injection well. Next year, the production well will be drilled above and parallel to the first well. Once the two wells are completed, the reservoir will be created, and water will be circulated between the two wells. The heated water will be pumped back to the surface where its thermal energy can be extracted before being reinjected.

Joseph Moore, Ph.D., the Principal Investigator of Utah FORGE, notes "the hot, hard, granite, combined with the high deviation angle resulted in very challenging subsur-

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## UTAH FORGE

face conditions. The successful completion of the well is a major steppingstone for the geothermal community and for commercialization of EGS. The Utah FORGE project will serve as a prototype for EGS development around the world.”

The success of this well was a team effort. Although the Utah FORGE team is based in the Energy & Geoscience Institute at the University of Utah, with funding provided by the U.S. Department of Energy, the success the project has achieved is only possible because of the contributions by local Beaver County businesses, elected officials, and the local community.

Unfortunately, due to the COVID restrictions, opportunities to view the rig and learn more about the project have been greatly limited. To ensure the Beaver County community is able to stay connected with the research being conducted in its own backyard, Utah FORGE is currently working on additions to our website, [utahforge.com](http://utahforge.com), including new videos, presentations and podcasts.

If you are interested in staying-up to date on the latest happenings with Utah FORGE, please follow us on Twitter, Facebook or LinkedIn. You can also sign up for our newsletter and other announcements on our homepage.

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