SAND2017-06940

High Operating Temperature (HOT) Facility

Advanced Percussive Drilling Technology for Geothermal Exploration and Development

FACILITY OVERVIEW

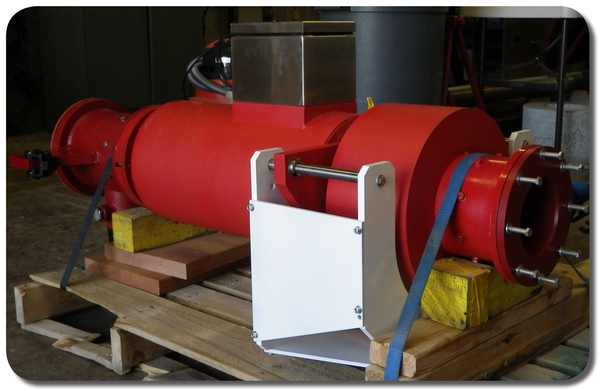
The HOT test facility houses a 20-foot-tall drill rig, heating chamber and process gas heater. Researchers can simulate conditions deep underground and the elevated temperatures affecting the hammer and can drill into different types of rock, like the granite commonly found in geothermal-rich areas. In addition to testing drilling tools at temperature, the facility is also capable of conducting research in drilling automation and control.

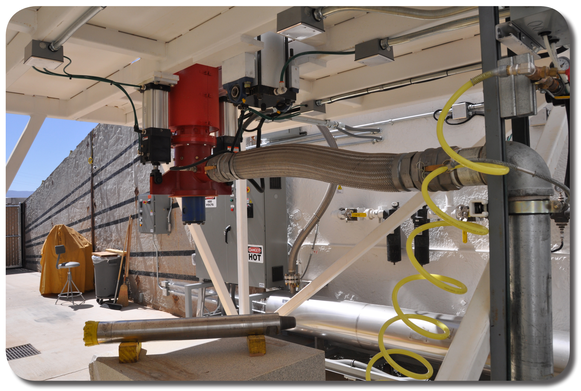
Capacities:

- Weight on Bit to 6000 lbf
- Rotation speed up to 60 rpm
- Rotation torque up to 2500 ft. lbf
- Hammer heater up to 300^{0}C (9kW heater)
- Process gas heater up to 300^{0}C (190kW heater)

Features:

- Simulates high-temperature drilling conditions up to 300^{0}C
- Evaluates effects of thermal shock on hammer components
- Evaluates effectiveness of coatings in simulated geothermal conditions
- Automates the drilling functionality
- Closed-loop control of drilling parameters





The down-the-hole hammer used in high-temperature environments can help increase the drilling rates and the rate of penetration to maybe five to 10 times that of conventional drilling operations.

KEY PARTNERS

The U.S. Department of Energy and Atlas Copco

U.S. DEPARTMENT OF ENERGY
NNSA National Nuclear Security Administration

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