

**Project Title:** Geothermal Limitless Approach to Drilling Efficiencies (GLADE)

**Principal Investigator:** Darien G. O'Brien

**Applicant:** Occidental Petroleum Corporation (Oxy)

**Team Organizations:**

Particle Drilling Technologies

Scientific Drilling International, Inc.

NOV Reed Hycalog

Intellicess Inc.

Drill Cool Systems, Inc.

Turbo Drill Industries, Inc.

Los Alamos National Laboratory

National Renewable Energy Laboratory

Louisiana State University

Texas A&M University Engineering Experiment Station

Colorado School of Mines

**Abstract:**

Our diverse research and engineering team aims to surpass the limits of current geothermal drilling technology by safely drilling two adjacent (i.e., twin) high-temperature geothermal wells, and demonstrating an increase in daily drilling rate well above 25%, using existing and novel drilling technologies. These wells will be drilled in the Denver-Julesburg Basin, Colorado with a target total true vertical depth (TVD) of up to 6 km (~20,000 ft) drilled with temperatures approaching 300 °C (572 °F). The well construction project limit for this budget is to be held at sixty (60) total days for each wellbore and approximately 2.7 km (~9,000 ft) of these wells will be drilled through the hard granitic basement rock. This will be achieved by evaluating several cutting-edge high-temperature downhole tools and applying advanced cloud-based real-time drilling optimization and non-productive time reduction technologies, while ensuring the safety of operations. Our twin wells allow for the comparison of drilling speeds within each well as well as between wells, for a more reliable evaluation of geothermal drilling equipment and practices. Furthermore, our twin wells allow optionality between enhanced or advanced geothermal systems (EGS or AGS) for the eventual completion and validation of the thermodynamic heat transfer. This project will be achieved through a collaboration of a very diverse team, whose members will bring together the best knowledge and technologies from different areas and backgrounds. The Diversity Equity Inclusion plan proposed will ensure that underserved communities will be engaged in the execution of the project and benefit from the outcomes.