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***Evaluation of Physics-Based Drilling and Alternative Bit Design at The Geysers***

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**Lead Organization/Applicant: Geysers Power Company, LLC (GPC)**

**Principal Investigator: Justin Wriedt**

**Other Major Participants: Sandia National Laboratories (Sandia), University of Utah's Energy & Geoscience Institute (EGI), Texas A&M University (TAMU)**

**Project Objectives:**

The goal of the program is to safely implement oil and gas industry drilling best-practices, particularly with respect to limiter-redesign, improve efficiency, and reduce the high costs of drilling geothermal wells. As a geothermal developer, operator, and power producer, GPC is uniquely positioned to implement fundamental changes to the way Geothermal traditionally operates. To meet the long-term goal, the program will focus on the following objectives:

- *Understanding process limiters from historical drilling data*
- *Establishing workflows for implementing limiter redesign for upcoming drilling campaigns*
- *Adopt modern bit technology and utilize in upcoming drilling campaign*
- *Implement advanced control strategies to reach limits based on electronic drilling records (EDR) data analytics.*
- *Promote diversity, equity, inclusion, and growth in the broader Geothermal industry*

**Project Description:**

The proposed project seeks to leverage advances in oil and gas drilling along with techniques championed in drilling campaigns at the Geysers Geothermal wells to improve drilling rates by at least 25% and decrease overall on-bottom time. Drilling demonstrations will be conducted in fluid-drilled and air-drilled (fractured) zones to assess the effectiveness of the methodologies and tools in the disparate zones.

GPC will partner with Sandia, EGI, TAMU, and drill bit vendor partners to meet the project goals and deliverables. The project will span 24 months, with research and development work conducted in four states including California, Utah, New Mexico, and Texas and drilling demonstrations at the Geysers. The work will integrate diversity, equity, and inclusion initiatives to engage underrepresented groups and raise awareness about geothermal and clean energy opportunities.

**Potential Impact:**

The drilling rates achieved at Utah FORGE were nearly 20 times faster than historical rates seen at the Geysers. However, the results were obtained in a controlled, experimental environment. The proposed work is unique and challenging in both the formation conditions (fractured, lost circulation), temperature, and the application to a power-producing reservoir. The potential cost savings from reduced drill rig day rates will have direct impact on the costs of developing geothermal power production and support industry growth. The learnings from the drilling demonstration will be applicable to the entire industry thus driving down costs for development and making geothermal energy available to more people across the country and around the globe.