



# U.S. Department of Energy

## Categorical Exclusion Determination Form

**Program or Field Office:** Advanced Research Projects Agency - Energy (ARPA-E)

**Project Title:** 25A5208 - Low-contact drilling technology to enable economical EGS wells

**Location:** Colorado

**Proposed Action or Project Description:**

American Recovery and Reinvestment Act:

Foro Energy is a stealth-mode company developing a revolutionary drilling technology to enable rapid and sustained penetration of ultra-hard rock formations that are economically prohibitive to drill with mechanical drill bits. Mechanical drill bits cut softer rocks with shear stresses created by rotating a cutting surface with high weight-on-bit (WOB). For ultra-hard rocks, excessive WOB, rapid bit wear, and long tripping times result in an economically inviable <1 ft/hr of "effective" (rotating plus tripping) rate of penetration. The MIT Geothermal Study highlights that resource bases for ultra-hard crystalline basement rock EGS are 130X and 2200X larger than sedimentary EGS and hydrothermal, respectively.

The technology is a hybrid thermal-mechanical bit resembling a two-cone conventional hard rock roller cone bit. This rotating design was executed by our VP Engineering who previously led engineering for both bits and motors at a top oilfield company. Our development plan moves us from the current lab demonstration system to a 4000' field demonstration well after 2 years and a 15000' geothermal demonstration well after 3 years which poises us to directly enable 1 of 2 critical technology breakthroughs necessary to achieve the DOE's goal of economical EGS development by 2015. To rapidly transition to market, we leverage the existing rig infrastructure in anchor partnerships with existing resource developers with an experienced management team, investors, and Chairman of Development directing our strategy with over 25 years on the Schlumberger Board of

**Categorical Exclusion(s) Applied:**

X - B3.6 Siting/construction/operation/decommissioning of facilities for bench-scale research, conventional laboratory operations, small-scale research and development and pilot projects

\*\*please see "comments" section below

\*-For the complete DOE National Environmental Policy Act regulations regarding categorical exclusions, see Subpart D of 10 CFR10 21 [Click Here](#)

This action would not: threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, including DOE and/or Executive Orders; require siting, construction, or major expansion of waste storage, disposal, recovery, or treatment facilities, but may include such categorically excluded facilities; disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases; or adversely affect environmentally sensitive resources (including but not limited to those listed in paragraph B.(4)) of Appendix B to Subpart D of 10 CFR 1021). Furthermore, there are no extraordinary circumstances related to this action that may affect the significance of the environmental effects of the action; this action is not "connected" to other actions with potentially significant impacts, is not related to other proposed actions with cumulatively significant impacts, and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211.

Based on my review of information conveyed to me and in my possession (or attached) concerning the proposed action, as NEPA Compliance Officer (as authorized under DOE Order 451.1B), I have determined that the proposed action fits within the specified class(es) of action, the other regulatory requirements set forth above are met, and the proposed action is hereby categorically excluded from further NEPA review.

NEPA Compliance Officer: /s/ William J. Bierbower Date Determined: 01/15/2010

Digitally signed by William J. Bierbower  
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**Comments:**

**Webmaster:**

A NEPA review has been completed by ARPA-E, and the Phases I, II and III (Tasks 1- 7) - stated in Attachment 3, Technical Milestones and Deliverables - have been determined to qualified for a categorical exclusion (B3.6) under DoE NEPA regulations.

For Phase III, Tasks 8 and greater (involving drilling of wells to depths of between 10 and 15,000 feet depth from surface), an additional ARPA-E NEPA determination is required. The determination must be completed by ARPA-E before any work on these Tasks may begin, and before any funding commitment by Foro Energy. Six months before such work or funding commitment is scheduled to begin, Foro Energy will submit a completed ARPA-E Environmental Questionnaire concerning these Tasks, for a determination by ARPA-E of whether a categorical exclusion applies, or whether an EA or EIS must be prepared.

25A5208 – Proposed Action or Project Description (Continued)

experienced management team, investors, and Chairman of Development directing our strategy with over 25 years on the Schlumberger Board of Directors and Technical Advisory Board. By enabling 100 GWe of geothermal electricity production, our technology plays a key role in offsetting 532 million metric tons of CO<sub>2</sub> per year and the equivalent of 95.9 million light-duty gasoline vehicles while creating 400,000 construction jobs and 167,000 operations and maintenance jobs.