



U.S. Department of Energy

Categorical Exclusion Determination Form

Program or Field Office: Advanced Research Projects Agency – Energy

Project Title: (25A5208) Foro Energy, Inc. - Low-contact drilling technology to enable economical EGS wells

Location: Colorado

Proposed Action or Project Description:

American Recovery and Reinvestment Act:

Foro Energy is developing a hybrid thermal-mechanical drilling technology to enable rapid and sustained penetration of ultra-hard rock formations that are economically prohibitive to drill with mechanical drill bits.

Foro Energy received funding under DE-AR-0000065 to perform research, design, and prototype testing to assess the operability of the hybrid drilling technology. Work proposed in this stage of the project consists of outdoor drill tests at maximum depths of approximately 500 ft. and 3,000 ft. below the Earth's surface to assess the developmental progress, quality, and reliability of the hybrid drilling technology, as well as its functionality in an ultra-hard rock, underground environment. Outdoor testing will be completed at an active surface mine. In addition, Foro Energy will continue to perform laboratory-based research and development activities to enhance the hybrid drilling technology.

Categorical Exclusion(s) Applied:

X - B3.11 Outdoor tests, experiments on materials and equipment components, no source, special nuclear, or byproduct materials involved

X - B3.8 Outdoor ecological/environmental research in small area

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

*-For the complete DOE National Environmental Policy Act regulations regarding categorical exclusions, see Subpart D of 10 CFR1021 [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:

Matt Dunne

Date Determined: Mar 15, 2011

Comments:

Webmaster:





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

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

Digitally signed by William J. Bierbower
DN: cn=William J. Bierbower, o, ou,
email=william.bierbower@hq.doe.gov, c=US
Date: 2010.01.15 13:11:49 -05'00'

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 CO₂ 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.