PMC-ND
(1.08.09.13)

U.S. DEPARTMENT OF ENERGY
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY
NEPA DETERMINATION

RECIPIENT: GE Global Research **STATE:** NY

PROJECT TITLE: A MEMS Gyroscope for Reliable Long-Duration Measurement While Drilling at 300°C

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001880	DE-EE0008604	GFO-0008604-001	GO8604

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Policy 451.1), I have made the following determination:

CX, EA, EIS APPENDIX AND NUMBER:
Description:

A9 Information gathering, analysis, and dissemination	Information gathering (including, but not limited to, literature surveys, inventories, site visits, and audits), data analysis (including, but not limited to, computer modeling), document preparation (including, but not limited to, conceptual design, feasibility studies, and analytical energy supply and demand studies), and information dissemination (including, but not limited to, document publication and distribution, and classroom training and informational programs), but not including site characterization or environmental monitoring. (See also B3.1 of appendix B to this subpart.)
B3.6 Small-scale research and development, laboratory operations, and pilot projects	Siting, construction, modification, operation, and decommissioning of facilities for smallscale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to GE Global Research (GEGR) to design, fabricate and test a gyroscope for geothermal applications, which would incorporate microelectromechanical systems (MEMS), a multi-ring gyroscope transducer (MRGT) and high temperature silicon-on-insulator (SOI) based electronics. The integrated MEMS, MRGT and electronics module would be designed and tested for use at temperatures up to 300C and a functional life of more than 1,000 hours of use. The project would be divided into two Budget Periods (BPs) with a Go/No-Go Decision Point in between each BP.

Proposed project activities during BP1 would focus on demonstrating performance feasibility of the MRGT and electronics design at elevated temperatures. Proposed activities would include specifications and performance requirements analyses, design development of the MRGT (e.g. electronics design, system level requirements), fabrication of the MRGT, component characterization, and MRGT testing (e.g. electronics performance validation, application specific integrated circuit testing over temperature, gyroscope system functionality testing). BP2 activities would center on demonstrating integrated gyroscope performance (e.g. lifecycle testing). Proposed activities would include sensor evaluations, azimuth-seeking performance testing, and preliminary reliability testing.

All project activities would be completed by GEGR and/or its sub-recipient, Inertial Wave, Inc. MEMS design and fabrication, as well as final integration testing, would be performed at GEGR's corporate research facility in Niskayuna, NY. Electronics design and component testing would be conducted at Inertial Wave's facilities in Portland, OR and Manhattan Beach, CA. Inertial Wave's facilities are each dedicated office spaces that are also set up for laboratory analysis of electronics systems. No change in the use, mission or operation of existing facilities would be required, nor would any additional licenses or permits need to be obtained.

The project would include the use and handling of industrial solvents, metals and electronics components. Any risks associated with the handling of these materials would be mitigated through adherence to established health and safety policies. Protocols would include employee training, the use of personal protective equipment, monitoring,

and oversight. All chemicals would be stored in appropriately marked containers. Procedures for handling, storing or transporting chemicals or other hazardous materials would be followed. All hazardous materials would be disposed of at a certified Treatment, Storage and Disposal facility. Electronics fabrication would be conducted exclusively at GEGRs facilities, within designated electronics cleanrooms. Both GEGR and Inertial Wave would observe all applicable Federal, state and local health, safety and environmental laws and regulations.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Geothermal Technologies Office
This NEPA determination does not require a tailored NEPA provision.
Review completed by Jonathan Hartman, 01/07/2019

FOR CATEGORICAL EXCLUSION DETERMINATIONS

The proposed action (or the part of the proposal defined in the Rationale above) fits within a class of actions that is listed in Appendix A or B to 10 CFR Part 1021, Subpart D. To fit within the classes of actions listed in 10 CFR Part 1021, Subpart D, Appendix B, a proposal must be one that would not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, or similar requirements of DOE or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities (including incinerators), but the proposal may include categorically excluded waste storage, disposal, recovery, or treatment actions or facilities; (3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that preexist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources, including, but not limited to, those listed in paragraph B(4) of 10 CFR Part 1021, Subpart D, Appendix B; (5) involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, unless the proposed activity would be contained or confined in a manner designed and operated to prevent unauthorized release into the environment and conducted in accordance with applicable requirements, such as those listed in paragraph B(5) of 10 CFR Part 1021, Subpart D, Appendix B.
There are no extraordinary circumstances related to the proposed action that may affect the significance of the environmental effects of the proposal.
The proposed action has not been segmented to meet the definition of a categorical exclusion. This proposal is not connected to other actions with potentially significant impacts (40 CFR 1508.25(a)(1)), is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1508.27(b)(7)), and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211 concerning limitations on actions during preparation of an environmental impact statement.
The proposed action is categorically excluded from further NEPA review.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Casey Strickland Date: 1/7/2019

NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

☑ Field Office Manager review not required
☐ Field Office Manager review required

BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :

Field Office Manager's Signature: _____ Date: _____

Field Office Manager