Katie Randolph

PMC-EF2a
(2.06.02)

U.S. DEPARTMENT OF ENERGY
EERE PROJECT MANAGEMENT CENTER
NEPA DETERMINATION

RECIPIENT: SiGNa Chemistry **STATE:** NY

PROJECT TITLE: NaSi and Na-SG Powder Hydrogen Fuel Cells

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FG36-08GO88108	GO88108	GFO-08-136a	GO88108

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

CX, EA, EIS APPENDIX AND NUMBER:
Description:

B3.6 Siting, construction (or modification), operation, and decommissioning of facilities for indoor bench-scale research projects and conventional laboratory operations (for example, preparation of chemical standards and sample analysis); small-scale research and development projects; and small-scale pilot projects (generally less than two years) conducted to verify a concept before demonstration actions. Construction (or modification) will be within or contiguous to an already developed area (where active utilities and currently used roads are readily accessible).

Rational for determination:

SiGNa Chemistry (SiGNa) would demonstrate the feasibility in developing a hydrogen storage technique. This project was previously funded with GFO-08-136 on May 22, 2008 with a CX3.6. Laboratory work would take place at the existing SiGNa laboratories at 1 Deer park Drive Suite C, Monmouth Junction, New Jersey and 720 Olive Drive Suite C, Davis, California. The project is divided into five tasks below:

Task 1.0 Operational / Environmental Testing and System Verification
This task would focus on continued testing of the hydrogen generator system currently under development. The most amount of hydrogen to be dissipated at any one time is less than 5 slpm per experiment. More specifically, this task would include: system operation verification by end fuel cell developers and users. In addition, the system would undergo a range of environmental testing and performance optimization over a range of conditions and operational scenarios.
During the course of the project, prototype canisters are expected to be tested at a separate location. This testing would only occur after a complete Failure Mode and Effects Analysis (FMECA) analysis, satisfactory passing a wide range of experiments, and when designed with significant safety margins. The nominal operating pressure is 30 psi (which is significantly less than high pressured systems). Any prototype cartridges would be returned to SiGNa for appropriate recycling and/or disposal.
Task 2.0 Second Generation Concept Testing and Development
Results from the testing program would be used to generate concepts to improve performance and operational characteristics including energy density and power density. In particular, a core area of research would be that in water minimization. Results in some operating conditions have shown as little as 34% over-stoichiometric water is required. Mechanisms would be explored to minimize water consumption in all operational scenarios. These mechanisms would include temperature control, reaction component mixing, waste product separation and a reactor momentary chamber approach while allows for local temperature / reaction control.

Task 3.0 Second Generation Hardware Design and Manufacturing
Upon development of new control mechanisms and for incorporating performance and reliability attributes, a second generation hardware system would be designed and fabricated.

Task 4.0 Second Generation Testing and Verification
The second generation system would undergo a similar battery of operational, environmental, and performance testing to fully verify the operational characteristics of the SiGNa hydrogen generation technology.

Task 5.0 Materials Production and Advanced Materials Research
This task would focus on developing manufacturing methods for higher volume production of sodium silicide. This

would include working with existing manufacturing partners to develop these methods. In addition, exploratory research would be performed in the manufacturing and operation of advanced silicide materials which are capable of operating at even a lower effective weight for a given quantity of hydrogen production.

SiGNa indicates that no new permits are needed for this proposal; there would be no generation of air emissions or hazardous/toxic waste; a Chemical Hygiene Plan (also incompliance with OSHA and industry standards) is in place. SiGNa claims to have Safety Operating Plans in place for their facitlites.

Based on the information above, this project's impacts to the human and natural environment can be deemed less than significant and this project would qualify for Categorical Exclusions B3.6.

NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

Note to Specialist :

none

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: _____ Date: 11/23/09
NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

☐ Field Office Manager review required

NCO REQUESTS THE FIELD OFFICE MANAGER REVIEW FOR THE FOLLOWING REASON:

☐ Proposed action fits within a categorical exclusion but involves a high profile or controversial issue that warrants Field Office Manager's attention.
☐ Proposed action falls within an EA or EIS category and therefore requires Field Office Manager's review and determination.

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

Field Office Manager's Signature: _____ Date: _____
Field Office Manager