David Peterson

PMC-EF2a
(2.06.02)

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

RECIPIENT: University of South Dakota **STATE:** SD

PROJECT TITLE : USD Catalysis Group for Alternative Energy

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
	EE0000270	GFO-10-019	0

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:

University of South Dakota (USD) and South Dakota School of Mines and Technology (SDSM&T) would demonstrate the feasibility of hydrogen production and fuel cells. The locations of the laboratory work would be at the USD, Churchill-Haines Laboratory in Vermillion, South Dakota and SDSM&T Chemistry and Physics Buildings in Rapid City, South Dakota. This project is divided into four tasks:

Task 1.0 [Personnel and resources]
The project would mobilize significant personnel and material resources. Already, several faculty members at USD and SDSMT operate as a collaborative unit. The group would recruit undergraduate students, graduate students, and postdoctoral scientists into the project. The group would acquire a high temperature graphitization furnace and a Langmuir-Blodgett trough.

Task 2.0 [Photocatalysis]
The task is to develop the methodology for the synthesis of highly functionalized nanostructures, incorporation into thin films, deposition of thin films onto capillaries, and fabrication of a prototype capillary reactor for photocatalytic water splitting using visible light
Subtask 2.1 [Synthesis of inorganic photocatalyst]
Chemists would synthesize inorganic photocatalyst materials that incorporate semiconductor nanorods.
Subtask 2.2 [Develop nanorod thin films]
Use LB methods to incorporate nanorods as membrane-spanning units to form thin films.
Subtask 2.3 [Develop and test a prototype capillary reactor]
The task is to deposit nanorod thin films onto capillary supports that would be assembled to produce a prototype capillary reactor.

Task 3.0 [Fuell Cell Catalysis]
The task is to develop fuel cell prototypes that exhibit high activity and long lifetime.
Subtask 3.1 [Synthesize Carbon Nanofelt]
Electrospun carbon nanofibers have been developed, and this method would be used to develop nanofibers with novel morphological properties. The nanofibers would be woven into a mesh as component for the fuel cell.
Subtask 3.2 [Synthesize Nanocrystal Catalyst]
Metallic nanocrystals active as hydrogen fuel cell catalysts would be synthesized, with particular attention to control of particle morphology.
Subtask 3.3 [Develop and test prototype fuel cell]
In this task, catalyst nanocrystals would be deposited on carbon nanofelt as the active component of a fuel cell. Prototypes would be fabricated and tested with a laboratory fuel cell test station.

Task 4.0 [Project Management and Reporting]
Reports and other deliverables would be provided in accordance with the Federal Assistance Reporting Checklist following the instructions included therein. Additionally, an external advisory board consisting of three distinguished scientists would evaluate the project.

The universities claims no additional permits are needed and there would be no generation of air emissions associated with this work. Vented gas cabinets and fumehoods are used with scrubbers to prevent release of air pollutants. The universities claim that all hazardous/toxic/effluent waste is disposed of according to university, local, state, and federals regulations. According to the universities, a Chemical Hygiene Plan (including nanomaterials), waste disposal, and safety protocols are in place monitored by the each university Environmental Health and Safety office.

In addition to the safety measures listed above, the DOE Hydrogen Program mandates that a draft Hydrogen Safety Plan be submitted within 90 days after the award is approved. Subsequently, the revised Safety Plan is due 30 days after DOE has provided comments on the draft plan.

Based on the information discussed above and provided supporting documentation, the DOE deems this project's impacts to the human and natural environment less than significant and this project qualifies for Categorical Exclusion CXB3.6.

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: 11/19/2009
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