



# U.S. Department of Energy

## Categorical Exclusion Determination Form

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

**Project Title:** 25A2936 - Carbon nanotube membranes for energy-efficient carbon sequestration

**Location:** California

**Proposed Action or Project Description:**

American Recovery and Reinvestment Act:

This work will develop high flux/selectivity membranes for efficient separation of CO<sub>2</sub> from the industrial emission streams. Current commercial operations manage CO<sub>2</sub> from the power station emissions using chemical absorption, which is inherently expensive, energy-intensive, and produces negative environmental impact of its own. Membranebased CO<sub>2</sub> separations could potentially deliver better efficiency, cheaper sequestration, and low energy consumption, but the development of this technology has been hampered by the lack of membranes that combine sufficiently high CO<sub>2</sub> selectivity with high flux. Unique structure of sub-2-nm carbon nanotube-based membranes pores results in gas permeation fluxes that are two orders of magnitude higher than any other membrane of comparable pore size. In this work we will develop and demonstrate a comprehensive set of chemical and physical modifications of CNT membranes that enhance their CO<sub>2</sub> selectivity to a level that enables a new membrane-based paradigm for industrial CO<sub>2</sub> management.

**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

\*-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

Digitally signed by William J. Bierbower  
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 Date: 2009.12.15 16:14:32 -05'00'

Date Determined: 12/15/2009

Comments:

Webmaster:

