

Environmental Management Technology Demonstration and Commercialization

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Introduction

The Energy & Environmental Research Center (EERC) is a nonprofit, contract-supported research, development, demonstration, and commercialization unit of the University of North Dakota. The EERC has an established record of developing partnerships with industry, government, and academia focused on commercializing cost-effective, practical energy and environmental technologies. An example of this is the Cooperative Agreement with the U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL) and the EERC. This Cooperative Agreement has resulted in numerous accomplishments for the Environmental Management (EM) Program over the last six years. Future work will build on the experience of the Cooperative Agreement and be conducted through the newly initiated Environmental Technology Acceptance (ETA) Project.

EERC Background

The EERC features a multidisciplinary staff of more than 120 full-time science and engineering professionals and a dedicated 169,000-ft² facility, which houses offices as well as a broad range of analytical, testing, and demonstration capabilities. Tests and demonstrations representative of a wide range of conditions are undertaken at the laboratory to pilot scale. The EERC currently has major programs in mercury control and

remediation, water and waste treatment, air toxics sampling and control, site characterization and remediation, and sampling and analytical methods development.

Originally established in 1951 as a federal laboratory specializing in coal-related research and development, the EERC was defederalized in 1983 and became a nonprofit, contract-supported research, development, demonstration, and commercialization center affiliated with the University of North Dakota. Currently, the EERC is recognized internationally for developing, field-testing, and demonstrating technologies to meet real-world needs in the areas of energy conversion, pollution prevention, emissions control, waste treatment, site evaluation and remediation, and waste utilization. The EERC's several multiclient consortia and government/industry joint ventures ensure that risks and rewards are shared and that common concerns can be addressed in a cost-effective manner. Competitive advantage is protected through focused projects and proven confidentiality agreements.

The EERC offers the following in response to commercialization needs:

- Leading programs and capabilities to support technology commercialization in mercury control and remediation, water and waste treatment, air toxics sampling and control, and site characterization.

- Access to a diverse field demonstration sites through a variety of industry partners.
- Systems engineering for performance and costing assessments.
- Demonstrated track record in brokering multiclient partnerships and joint ventures with varied clients, including major corporations, government agencies, and small business technologies.
- State-of-the-art chemical and physical testing facilities, advanced analytical capabilities, and a multidisciplinary staff of science and engineering professionals.

NETL–EERC EM Cooperative Agreement

Successful implementation of the DOE EM Program’s 2006 Plan requires the timely deployment of cost-effective, efficient, and safe cleanup technologies within the DOE complex. The EERC has completed its sixth year of a Cooperative Agreement with DOE NETL designed to expedite technology deployment through a combination of services, including technical support, demonstrations, and brokering.

Through the Cooperative Agreement, the EERC has repeatedly demonstrated the ability to efficiently enhance and accelerate the development of innovative technologies. Focusing primarily on providing key technical assistance and real-world know-how for small business technologists, the EERC has significantly advanced several innovative technologies at an average cost of less than \$0.5 million per technology.

Overall, the EERC EM Program has:

Accelerated the Deployment of Innovative Technologies

- Aided in the development of 16 innovative technologies.
- Participated in several technology demonstrations.
- Been involved in four deployments in progress (two technologies with existing site contracts, two that are finalizing contracts).

Enhanced Existing Technologies

- Worked effectively with 12 industrial organizations (two organizations have participated for two different technologies) to enhance and demonstrate their technologies.
- Served as a technical consultant for small businesses.

Developed Innovative Technologies

- Initiated six basic science projects. Four of these projects have led to industry involvement and participation, and a fifth is anticipating near-term site activities at Los Alamos National Laboratory.

Integrated Innovative Technologies into the EM Program

- Developed integration strategies for seven technologies
- Comprehensively reviewed three engineering studies for focus areas and headquarters
- Developed a deactivation and decommissioning model to link site, focus area, and industrial goals to optimize funding strategies.

Under the NETL–EERC EM Cooperative Agreement, the EERC is able to provide up to \$150,000 annually to each technology participant for services geared toward minimizing commercialization barriers through focused technical assistance, partnership brokering, and demonstrations. In order to accomplish this mission, the EERC matched its core capabilities with the needs of promising technologies (i.e., technologies at a minimum of Gate 3 with the potential for wide application within the complex). Once a candidate activity was identified, the EERC worked with the technologist to develop a proposal for services, which was submitted for NETL approval.

In order to meet the needs of the 2006 Plan, technologies must be successfully deployed at EM sites. Under the Cooperative Agreement, the EERC worked as an active partner to understand site issues and technology needs, to support development of the information packages required by client sites for the evaluation and deployment of technologies, and to support deployment-brokering activities.

Environmental Technology Acceptance (ETA) Project

Technology commercialization can be hampered by many factors, including limited capital, limited capabilities for testing and demonstration and, specific to the EM Program, a limited knowledge of DOE and EM site needs. Deployment of any technology in the highly competitive EM marketplace requires sound data from field tests that clearly demonstrate the superior capabilities of the technology, knowledge of site plans and personnel, and the potential to incorporate the technology into the ongoing site cleanup activities with minimal disruption.

Recognizing that commercialization also hinges on the successful resolution of technical

issues outside the traditional focus of the technology developer, the ETA project builds on the experience and expertise gained by the EERC through the EM Cooperative Agreement to continue to enhance and accelerate the commercialization of environmental technologies for the EM Program.

The objectives of the ETA project are to advance development, commercial acceptance, and timely deployment of selected private-sector technologies. Through the ETA project, the EERC will work with technology developers, DOE end users, and NETL personnel with the ultimate goal of increasing technology deployments at EM sites.

Two types of partnerships will be developed in the ETA project. The EERC will provide expertise and technical resources to private sector companies for technology commercialization, and the EERC will develop new technologies using in-house research, development, and demonstration that will lead to commercialization partnerships with the private sector.

As with the EM Cooperative Agreement, there will be two primary emphases for the types of projects to be conducted under the ETA: detector design enhancement and performance testing and treatment process development, modification, and predictive modeling for optimization.

Summary

The EERC's full-time, multidisciplinary professional staff and state-of-the-art testing and laboratory facilities work to minimize commercialization barriers through customized programs of technical support, partnership brokering, systems engineering, and field demonstrations.

Under an EM Cooperative Agreement with NETL, the EERC has instituted “hands-on” focused technical support, partnership brokering, and field demonstrations that provide a vehicle for rapid commercialization and deployment.

Building on the experience and expertise gained from the Cooperative Agreement, the ETA will allow the EERC to continue to assist industry partners to help DOE meet its 2006

goals through the development of safe, cost-effective, and efficient technologies. The search for additional candidate technologies and commercial partners is ongoing.

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