

The Fossil Report

Oak Ridge National Laboratory Fossil Energy Program

Spring 2003

Energy Technology for the Future...and for the World

IN THIS ISSUE

Efroymsen Wins Distinguished Scientific Achievement Award

Lara-Curzio Receives Fulrath Award

Fly Ash Tested for Use in Carbon Sequestration
Fossil Energy Program Annual Report in Preparation

Armstrong Named Manager
Correction

Work At ARC Focuses on Improved Refractory
for Slagging Gasifiers

Hearings Held on Arctic Leasing Program

Efroymsen Wins Distinguished Scientific Achievement Award

[Rebecca Efroymsen](#), a member of the Oak Ridge National Laboratory Environmental Sciences Division, was the recipient of the 2002 ESD Distinguished Scientific Achievement Award.

Rebecca was recognized “for her significant contributions to advancing the science of ecological risk assessment.”



Efroymsen has been a member of the Fossil Energy Program for several years. Her work has focused on improvement of tools and methods for ecological risk assessment at petroleum-contaminated sites.

The development of an ecological framework for evaluation of the effects of the size and distribution of exploration and production disturbances on vegetation communities and on wildlife populations is an important part of her current activities.

Lara-Curzio Receives Fulrath Award

The [American Ceramic Society](#) Richard Fulrath Jr. Award for 2003 is being awarded to [Edgar Lara-Curzio](#) for “outstanding contributions to ceramic science and engineering.”



The award was presented at the American Ceramic Society annual meeting in Nashville, Tennessee, in late April.

Lara-Curzio is the lead investigator on the Fossil Energy Program project, [Reliability of Materials and Components for Solid Oxide Fuel Cells](#).”

He is also the head of the Mechanical Properties and Mechanics group in the Oak Ridge National Laboratory Metals & Ceramics Division.

The Fossil Report is published quarterly by [Paul T. Carlson](#), Oak Ridge National Laboratory Fossil Energy Program



UNITED WE STAND

Fly Ash Tested for Use in Carbon Sequestration

By Anthony V. Palumbo
Oak Ridge National Laboratory

Collaborative work at [Oak Ridge National Laboratory](#) and [Pacific Northwest National Laboratory](#) is investigating the use of fly ash amendments to soils to increase carbon sequestration.

Tony Palumbo, Suzanne Fisher, and Jizhong Zhou are the investigators at ORNL.

James Amonette and Jana Tarver are pursuing this research at PNNL.

As there is concern that toxic metals may be released from fly ash and biosolid amendments, a series of experiments, designed to address this concern, were conducted through laboratory column leaching procedures.

Fly ash samples from five different sources were tested.

The focus of the experiments was to determine if leaching of potentially toxic materials was influenced by mixing of fly ash with soil and biosolids and if the biosolids could be a concern for release of metals.

Results from the simulated leaching were examined using a standard biosensor-based measurement technique for testing toxicity of water and soil.

The tests showed there was little potential for leaching of toxic metals from the mixtures.

For more information on this activity, please contact [Tony Palumbo, Oak Ridge National Laboratory](#).

This work is sponsored by the [DOE Office of Fossil Energy, National Energy Technology Laboratory](#).

Correction

Recognition of the authors of two articles in the Winter 2002 issue of *The Fossil Report* was inadvertently omitted. It had been intended that bylines would be placed under each of the titles.

The story on Page 1, entitled "[New Work Focuses on Materials Needs for USC Steam Cycle Turbine](#)," was written by [Ian Wright](#), Oak Ridge National Laboratory.

The story on Page 4, entitled "[New Technique For Applying Thermal Barrier Coatings Under Development At ORNL](#)," was written by [Ted Besmann](#) and [Ian Wright](#), both of Oak Ridge National Laboratory.

The editor sincerely apologizes to the authors for the oversights.

Armstrong Named Manager

Fossil Energy Program Annual Report in Preparation

The annual report of Oak Ridge National Laboratory Fossil Energy Program is in preparation and will be posted to the [Fossil Energy Program Web site](#) within the next month.

This annual report presents will provide detailed summaries of the Program's research activities over the past twelve months.

[Tim Armstrong](#) has joined the Oak Ridge National Laboratory [Energy Efficiency and Renewable Energy Program](#) office as Program Manager for Hydrogen, Fuel Cells, and Infrastructure Technologies.

In this capacity, Armstrong will be responsible for program development and management of ORNL's

R&D in hydrogen production and storage, infrastructure technologies, and fuel cell science and technology for both mobile and stationary applications.

Armstrong will continue to manage the [Fuel Cells and Functional Materials](#) research for the Oak Ridge National Laboratory [Fossil Energy Program](#).

Work At ARC Focuses on Improved Refractory for Slagging Gasifiers

By Cindy Dogan
Albany Research Center

Proof-of-concept characterization of the [Albany Research Center](#)'s improved refractory for slagging gasifiers is continuing, with expanded exposure and property analyses.

Results from recent rotary kiln exposure tests predict improved performance by the ARC-developed brick, as compared with commercial brick currently used by the gasifier industry.

In the rotary kiln test, a barrel, lined with the test refractory materials, is rotated around its horizontal axis, exposing the brick to a dynamic pool of molten coal slag. The kiln is heated to a temperature of 1670° C.

Four types of high-chromium oxide refractories—three commercial materials and

the ARC-developed material—were exposed to this environment for a total of five hours.

Post-test evaluation of the refractory materials indicated little or no cracking in the ARC material, as compared to extensive fracture in each of the commercial materials, as shown below.

Slag penetration was also minimized in the ARC material, to less than 20% of that observed in the commercial refractories.

Although the exposure conditions in the rotary kiln do not exactly mimic those found in a working gasifier, the test does simulate the same type of failure mechanisms

found in spent materials removed from gasifier service.

Thus, performance in this test may be considered indicative of performance in a commercial gasifier system.

The results of these tests, along with tests of the material's mechanical and thermal stability, are being used to ensure satisfactory

performance of the ARC refractory prior to placing test panels of the material in work-

ing gasifiers.

For more information on this activity, please contact [Cindy Dogan](#), [Albany Research Center](#).

This work is sponsored by the [DOE Office of Fossil Energy](#), [National Energy Technology Laboratory](#).



Extensive cracking seen in commercial materials.



Little or no cracking observed in ARC-developed material.

Hearings Held on Arctic Leasing Program

The House Committee on Resources held hearings in early April on the Arctic Coastal Plain Domestic Energy Security Act of 2003, introduced in the House in January 2003 by Rep. Don Young of Alaska.

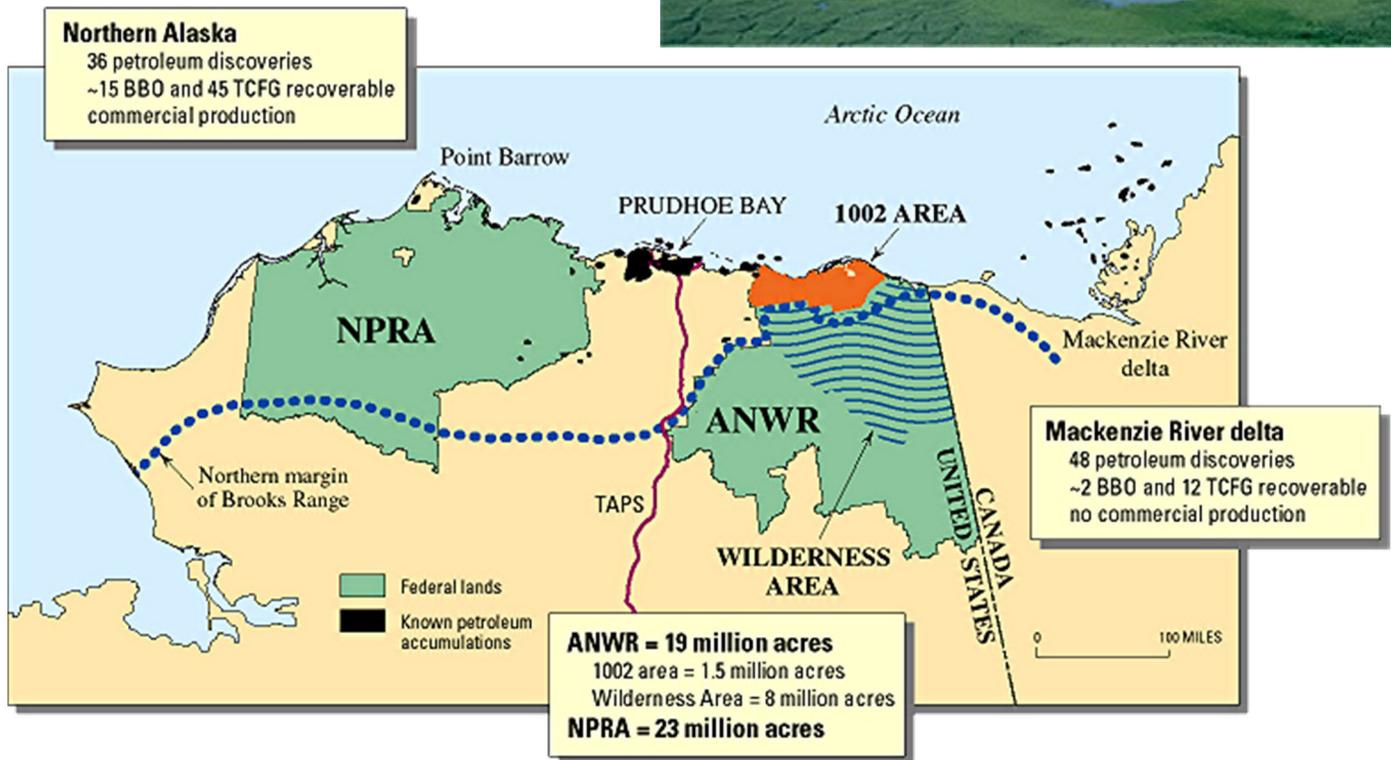
The area of interest is the 1.55-million-acre coastal plain, known as Area 1002, of the Arctic National Wildlife Refuge, or ANWR.

The intent of the act is to establish and implement a competitive oil and gas leasing program for environmentally sound exploration, development, and production of the oil and gas resources of the Arc-

tic Coastal Plain.

Specifically, the legislation stipulates that oil and gas exploration and production activities will result in “no significant adverse effect on fish and wildlife, their habitat, subsistence resources, and the environment.”

Typical view of the ANWR 1002 area coastal plain. Courtesy of the [U.S. Geological Survey](#).



Map of northern Alaska and nearby parts of Canada showing locations of the Arctic National Wildlife Refuge (ANWR), the 1002 area, and the National Petroleum Reserve—Alaska (NPRA). Locations of known petroleum accumulations and the Trans-Alaska Pipeline System (TAPS) are shown, as well as summaries of known petroleum volumes in northern Alaska and the Mackenzie River delta of Canada. BBO, billion barrels of oil (includes cumulative production plus recoverable resources); TCFG, trillion cubic feet of gas recoverable resources. Caption and image courtesy of the [U.S. Geological Survey](#). [Click for more information](#).