

## **Reducing the Environmental Impacts of Oil and Gas Development**

**OST-32-06**

### **Goal**

This proposal is directed at reducing environmental impacts associated with the development of U.S oil, gas, and coal bed natural gas (CBNG) reserves. This will involve assessing and evaluating the environmental impacts of produced water, conducting research and developing techniques to reduce the environmental impact of produced water, and initiating research on reducing the environmental impacts of drilling and extraction operations associated with oil, gas, and CBNG development.

### **Performer**

National Energy Technology Laboratory  
Pittsburgh, PA

### **Results**

Based on project analyses, a roadmap of environmental R&D needs will be developed. The roadmap will prioritize those R&D needs and assess which components can be addressed by NETL in-house versus being handled more cost-effectively others. Where possible, appropriate agencies or R&D institutions will be suggested for additional R&D work.

### **Benefits**

The primary benefit is reduced environmental impacts as a result of oil and gas development.

### **Background**

The fate and transport work in the Powder River Basin has demonstrated how important the impoundment basin location is to the environmental impacts of produced water. An offshoot of that research has produced a potential method of locating impoundment basins to minimize the environmental impacts on surface and groundwater, based on assessments of soil and water quality in the area. The researchers propose to develop that method into a useful tool that can be used by producers and regulatory agencies to identify optimal locations for these basins and to have that tool publicly available during FY 2006. In addition, they will investigate R&D needs related to the development and modification of other technologies to reduce the environmental impacts of produced water associated with oil, gas, and CBNG production activities; this will likely include assessing R&D needs associated with the beneficial use of treated produced waters.

In addition, the project intends to begin addressing other environmental impacts associated with oil, gas, and CBNG development. Part of this will involve evaluating Alaskan North Slope technologies for potential application in the Lower 48 states.

### **Summary**

The researchers' assessment of the environmental impacts of produced water will involve learning what has been and is being done in this field. Work conducted on fate and transport of produced water issues in the Powder River Basin already has provided some familiarity with the issues involved, but this perspective will need to be significantly broadened. Based on preliminary analysis, the researchers will develop a roadmap of R&D needs. This roadmap will prioritize those R&D needs and assess what components can be addressed effectively by NETL's in-house component versus R&D that would be (more cost-effectively) handled by others, and, where possible, the researchers will recommend appropriate agencies or R&D institutions to address these R&D needs.

In addition, the researchers intend to begin addressing other environmental aspects associated with oil, gas, and CBNG development. Part of this effort will involve assessing the potential use of technology developed to minimize the environmental impact of drilling and producing in the pristine environment associated with Alaska's North Slope. The project performer will evaluate the state-of-the-art environmental technologies that have been employed in the North Slope region for potential low-cost applications (either directly or modified) in the Lower 48 states. This work will require learning much more about legal limitations, regulatory barriers, and economic aspects associated with conventional exploration, drilling, and production as well as the specialized technology developed for the North Slope.

### **Current Status (July 2006)**

A field investigation supporting airborne electromagnetic data collected from the Powder River Basin Study area was conducted in June 2006. The field study was designed to verify and explain airborne conductivity anomalies at the Powder River Arvada site. Preliminary data analysis indicates the ground based data agrees with the airborne collected data. Data analysis will continue throughout the summer. In addition to surface field readings, researchers are partnering with ALL Consulting on a drilling program to obtain subsurface data. The drilling program was started in May 2006, and 15 wells have been completed with induction logs run. Lithologic data is being recorded and water samples are being collected as well. The drilling program has been designed to verify

airborne data, improve inversion modeling, and provide improved subsurface conductivity data for a GIS-based model used to aid in locating CBM water impoundments.

Efforts to evaluate the feasibility of using technology developed for the North Slope of Alaska to reduce the environmental impacts in the rest of the US were initiated during the first half of 2006. Researchers felt that North Slope technologies which could be transferred to the lower 48 states for reducing environmental impacts were considered rather limited compared to the reverse.

#### **Funding**

This project was selected through the NETL In-House Research Program.

**Project Start:** October 1, 2005

**Project End:** September 30, 2006

**Anticipated DOE Contribution:** \$550,000

**Performer Contribution:** \$0

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Deer in the Powder River Basin, locale of extensive oil, gas, and CBNG development and related produced-water concerns.