

Coalbed Natural Gas Research

DE-AP26-03NT30489

Program

This project was a follow-up to the Best Management Practices (BMP) and technologies developed under Contract DE-FG26-02NT15380. It was a sole-source contract.

Project Goal

The goal of this project is to reduce the costs while increasing the efficiency and maintaining the environmental protection of managing coalbed natural gas (CBNG) produced water through the use of unlined infiltration ponds across the Powder River Basin (PRB). This research is intended to enhance the understanding and use of infiltration systems in the PRB, reducing the reliance on more costly produced water management options such as deep injection and treatment of produced water.

Performer

ALL, LLC
Tulsa, OK

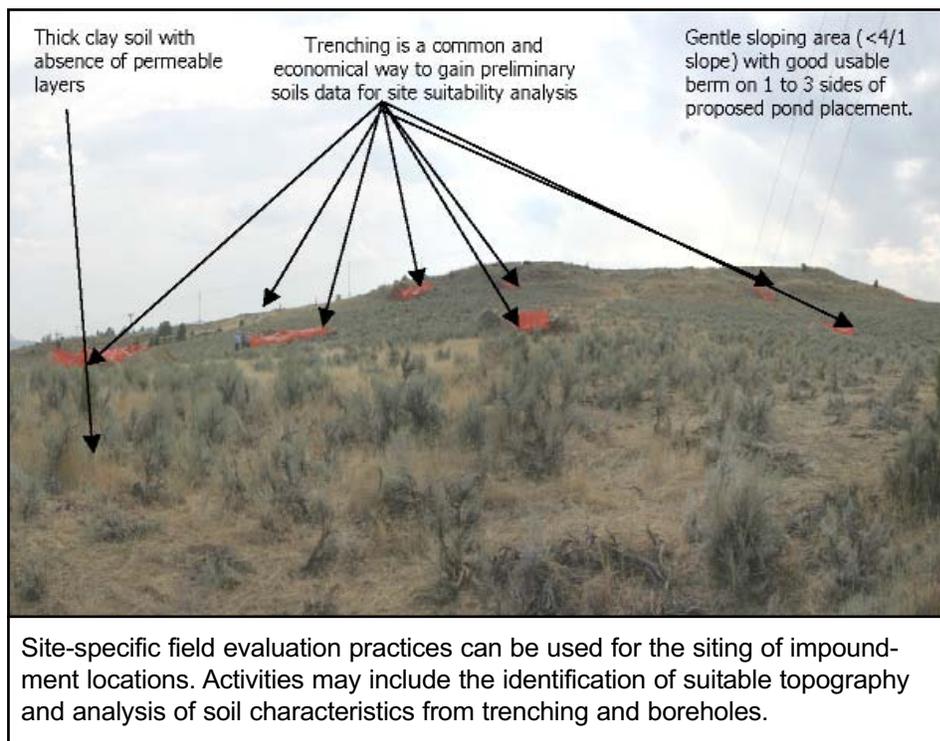
Montana Board of Oil and Gas
Conservation
Billings, MT

Project Results

The research to date has led to the development of several technical papers, technical presentations, and the initiation of an interactive web tool for siting impoundments in the PRB. The papers prepared to date include several draft papers on anticipated impacts from the operation of CBNG produced-water infiltration systems and on siting, design, and construction of CBNG produced-water infiltration systems.

Benefits

The papers completed to date provide scientific and statistical analysis of the hydrologic systems of the PRB related to CBNG produced water and infiltration systems, which can be used to deflate misinformation that is prevalent in news media. The BMP guidebook on infiltration system design and construction and anticipated impacts will help operators, landowners, and regulators. Operators and landowners can consult the guidebook for information on siting infiltration systems with reduced environmental



impact while trying to maximize benefits to both parties. Regulators can use the guidebook to aid in the regulatory decision making process.

In addition to the guidebook, the development of a geographic information system (GIS)-based web tool will further enable operators, landowners, and regulators to assess future infiltration site locations. The web tool could be used to assess a variety of key components of the natural environment to assist in determining potential impacts from infiltration systems and identify locations with more-conducive conditions for the optimization of infiltration systems as a produced-water management technology

Background

The PRB CBNG play is one of the most rapidly expanding gas plays in the United States. Since the late 1990s, more than 12,000 CBNG wells have been installed that produce in excess of 25 billion cubic feet of gas per month. Associated with the production of natural gas from PRB CBNG wells is the production of large volumes of variable-quality produced water that must be managed appropriately. The CBNG industry has struggled to find economic means of managing the produced water in an evolving regulatory environment. The rapid expansion of the PRB CBNG industry has led to a reactionary environment where produced-water management regu-

lations and monitoring guidance are being developed as a result of limited monitoring data and limited investigation into the duration and extent of these changes.

Infiltration systems and impoundments are being used across the more heavily developed Wyoming portion of the PRB as means to economically manage produced water. These systems typically comprise unlined on-channel dams or off-channel pits that retain produced water and allow it to infiltrate into the subsurface. Infiltration systems in their simplest form (unlined pits or dammed drainage ways) are inexpensive means to prevent water from directly discharging into surface waters, allowing the water to evaporate or infiltrate into the subsurface. Regulators and citizens groups have expressed concerns as to the fate of infiltrating produced water.

Project Summary

The following tasks have been accomplished or are anticipated to be completed as the project progresses:

- Data collection to date has been completed relative to size, location, and design of impoundments in the PRB; collection of spatial data for the PRB; summary of the regulatory environment associated with CBNG produced-water management as it relates to infiltration systems; and field visits to various infiltration sites in the PRB.

Data collection is ongoing relative to the collection of water quality-related data from monitoring points in and around infiltration systems.

- Data analysis is ongoing relative to the incorporation of spatial data into a GIS-based web tool, the anticipated impacts of CBNG infiltration systems, and the design, construction, and operations BMPs for CBNG infiltration systems.

- A document has been prepared for submittal for publication by the Ground Water Protection Council (GWPC). The document presents a technical analysis of the potential for reinjection of CBNG produced water using either Class II or Class V wells, with analysis of the effect reinjection would have on future CBNG production. The availability of injection zones is described, as is a discussion of the site-specific evaluations that must be considered with reinjection.

- The development of a summary guidebook with BMPs and a web tool (www.all-llc.com/asp/infiltration) for the siting, design, construction, and operations of CBNG infiltration systems is ongoing. The guidebook provides a summary of the hydrologic and regulatory environment of the PRB relative to CBNG production, outlines the evolution of CBNG produced-water management practices, details the analysis that goes into developing projections of expected impacts from CBNG infiltration systems, presents analytical tools for assessing infiltration systems, and furnishes BMPs for the design, construction, and operations of CBNG infiltration systems.

Current Status (August 2005)

The project is currently in the fourth quarter of its second year.



CBNG impoundment from the PRB in Wyoming located on-channel by means of a simple dam on the downgradient end of a small draw.

Publications

ALL Consulting, Draft Construction, Operation and Modeling of Infiltration Ponds for Managing CBM Water in the Powder River Basin, April 2004.

ALL Consulting, Surface Water and Groundwater Resources of the Powder River Basin and Implications for CBNG Development, SPE submittal, April 2005

ALL Consulting, Feasibility of Re-Injection of Coalbed Natural Gas Produced Water in the Powder River Basin, GWPC submittal, November 2004.

Project Start: July 10, 2003

Project End: July 9, 2006

Anticipated DOE Contribution: \$600,000

Performer Contribution: \$400,000 (40% of total)

Other Government Organizations Involved

Montana Board of Oil and Gas Conservation
Wyoming Department of Environmental Quality
Bureau of Land Management

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