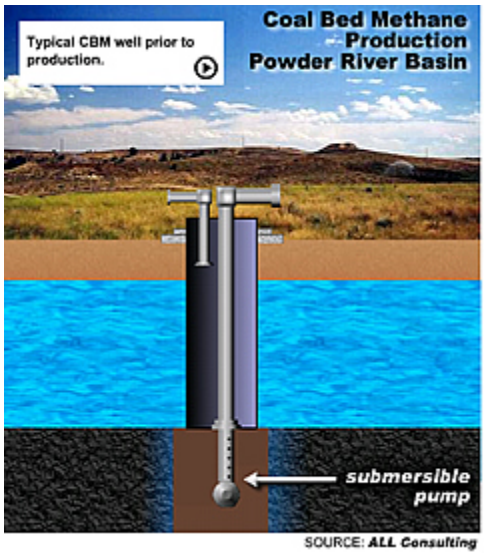
Handbooks for Preparing, Evaluation Development, Environmental Plans and Background Development Pertinent to Coal Bed Methane Production

DE-FG26-02NT15380

Program
The project was selected under the 2001 DOE Broad Based Announcement - Environmental Section, solicitation DE-PS26-02NT41422. The Oil and Gas Environmental program focuses on maximizing domestic oil and gas production by reducing the cost of effective environmental protection. Most oil and gas production in the U.S. is from mature fields, and many wells are nearing their economic limit. As income from these wells declines, many of the operating costs, such as environmental compliance, remain static or increase, forcing the operator to abandon the wells even though a substantial amount of recoverable oil remains. This program works to reduce the costs associated with complying with state and federal environmental regulations.



Click here to view a flash animation of CBM well completion.
After the animation loads, use the black arrow button, in the white box, to move through the screens.
Animation courtesy ALL Consulting LLC, Tulsa, OK

Project Goal
The goals are: 1) Develop a Primer which reviews the development and mitigation practices employed in various coalbed methane (CBM) regions. 2) Prepare a Handbook encompassing existing Environmental Impact Statements (EISs) and other NEPA planning documents relevant to CBM areas.

Performers
Arthur Langhus Layne, LLC (ALL Consulting)
Tulsa, OK

Montana Board of Oil & Gas Conservation
Billings, MT

Project Results
Research for the project has resulted in publication of three volumes: 1) Handbook on Best Management Practices and Mitigation Strategies for Coalbed Methane in the Montana Portion of the Powder River Basin, 2) Handbook on Coalbed Methane Produced Water: Management and Beneficial Use Alternatives, 3) Coalbed Methane Primer - New Source of Natural Gas-Environmental Implications.

Benefits
Publication of the three handbooks has made readily available valuable information on development of coal bed methane plays, national and regional location of plays, technologies for treating CBM produced water, alternative beneficial uses for CBM produced water, environmental issues and regulatory guidelines. The three publications are available from the U.S. Department of Energy, and have been

distributed widely at national and regional conferences where CBM issues were on the agenda. The information provided in the handbooks has been useful to answer the many questions arising from the general public and concerned parties on coalbed methane development.

Background

Private and government emphasis in recent years has stressed the growing importance of natural gas as a prime source of energy for industrial, power and residential heating needs in the U.S. CBM is of vital interest in the search for new natural gas resources. CBM resources in the Rocky Mountain states have generated an industry drilling boom during the past decade. CBM represents 9% of all natural gas produced in the U.S. Interest is high, particularly in Wyoming, Montana and New Mexico. However, development brings with it a growing concern about how to handle the produced water. Over 14 billion bbl/year of produced water was generated in the U.S. in 2002, according to a recent Argonne National Laboratory study.

Project Summary

- Performed analysis of Best Management Practices for CBM development in southeastern Montana.
- Prepared a broad overview of coal and coalbed methane resources in the United States
- Summarized the federal and state regulations pertaining to water rights in states with significant CBM resources.
- Made a study of available technologies for treatment of water, and evaluated them in relationship to their usefulness for treatment of CBM produced water.
    - Reverse osmosis
    - Ion Exchange
    - Freeze thaw evaporation
    - Artificial Wetlands
    - Rapid spray distillation
- Summarized the various alternative beneficial uses for produced water, with comments on application of water with varying degrees of salinity and mineral contents.
- Summarized the regulatory framework of state and federal laws governing CBM development in the western United States with regard to: water use, Endangered Species Act, Antiquities Act, National Historic Preservation Act, Tribal Resources and Split Estates.
- Reviewed the U.S. demand needs for natural gas and provided information on the differences in production means and affects on CMB and conventional natural gas.

Best Practices are identified as a suite of techniques, procedures, measures or practices which are site specific, economically feasible and are used to guide, or may be applied to, management actions to aid in achieving desired outcomes. As applied to CBM development best practices to not constitute state or federal regulations, but may aid the operator in fulfilling the regulations.

The key to low-cost CBM produced water management is to make beneficial use of the water, as an alternative to reinjection. Produced water uses can be grouped into surface discharge, impoundments, agricultural and industrial uses. Surface discharge includes releasing the produced water directly to the land surface, into a flowing stream or into an impoundment. Impoundments constructed by earthen dams provide water for wildlife watering and habitat, fisheries and fishing ponds, recreation, wetlands, and recharge for subsurface aquifers. Waters managed by the states and federal agencies provide long-term public benefits.

Local ranchers, industries and municipalities make use of produced water directly for agriculture and industrial pursuits. Agricultural uses include livestock watering, irrigation, and soil remediation. Industrial uses include dust control, drilling and development fluids for coal, oil and natural gas recovery, cooling water for power generation and chemical plants, and to provide a ready source of water for rural and urban fire protection.

The Handbooks and Guidebooks written for this project summarizes the knowledge of CBM development, produced water disposal and related environmental issues. Economics of natural gas production from coal beds depends on reducing the cost of handling produced water. These three volumes fill a need for the public to be more informed about CBM issues, and offer useful suggestions for best practices for CBM development, and beneficial uses of produced water.

Current Status (August 2004)

Three volumes of handbooks and Primer Economics of natural gas production from have been published and distributed. Technology transfer of the information continues through the workshops in the Follow-up contract, DE-AP26- 03NT30403. A final report to DOE summarizing activities under the contract will be submitted following the closing date for the project.

Publications
Publication of three volumes: 1) Handbook on Best Management Practices and Mitigation Strategies for Coal Bed Methane in the Montana Portion of the Powder River Basin, 2) Handbook on Coal Bed Methane Produced Water: Management and Beneficial Use Alternatives, 3) Coal Bed Methane Primer - New Source of Natural Gas- Environmental Implications are available on Coalbed Natural Gas CD, June 2004, from NETL at 918-699-2000.

Project Start: September 30, 2002
Project End: May 31, 2005

Anticipated DOE Contribution: $283,831
Performer Contribution: $80,487 (22% of total)

Other Government Organizations Involved: State of Montana

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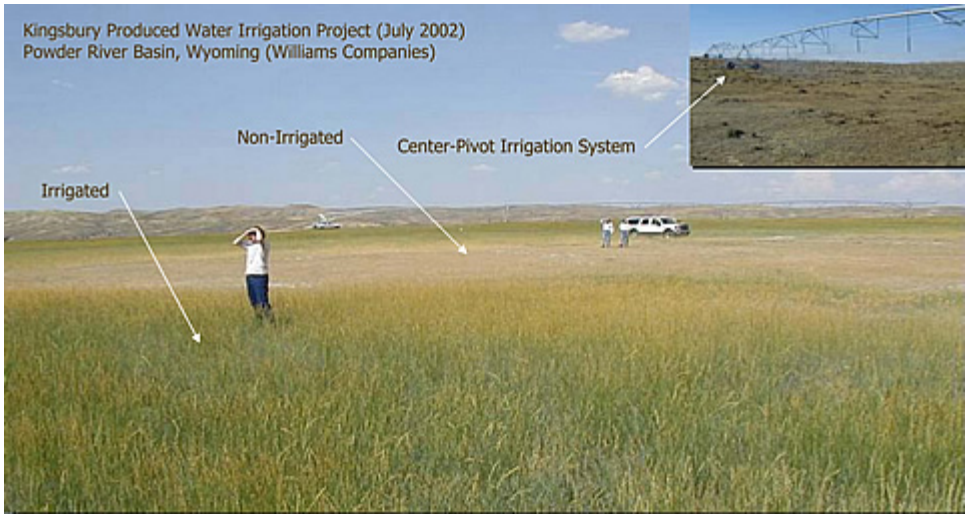
Produced water pond provides recreational opportunities



Irrigated versus non-irrigated areas are contrasted.

View of a standard watering tank. Produced water flows from the central pipe to fill the small impoundment.