

THE JOURNAL OF THE INTERSTATE OIL & GAS COMPACT COMMISSION

# groundwork

SPECIAL EDITION

## INSIDE: RISK-BASED DATA MANAGEMENT SYSTEM

*Adaptable technology.  
More efficient resource management.  
First-hand experiences.*



*Collectively Representing the States.*

*Funded by the U.S. Department of Energy.*



## About the IOGCC

The Interstate Oil and Gas Compact Commission is a multi-state government agency that promotes the conservation and efficient recovery of our nation's oil and natural gas resources while protecting health, safety and the environment. The IOGCC consists of the governors of 38 states (30 members and eight associate states) that produce most of the oil and natural gas in the United States.

Chartered by Congress in 1935, the organization is the oldest and largest interstate compact in the nation. The IOGCC assists states in balancing interests through sound regulatory practices. These interests include: maximizing domestic oil and natural gas production, minimizing the waste of irreplaceable natural resources, and protecting human and environmental health. The IOGCC provides an effective forum for government, industry, environmentalists and others to share information and viewpoints, to allow members to take a proactive approach to emerging technologies and environmental issues. For more information visit [www.iogcc.state.ok.us](http://www.iogcc.state.ok.us) or call **405-525-3556**.

### Special edition for Anchorage, Alaska meeting, 5/11/09

This material is based upon work supported by the United States Department of Energy National Energy Technology Laboratory, and the Interstate Oil and Gas Compact Commission, under Cooperative Agreement Number DE-FC26-06NT15567

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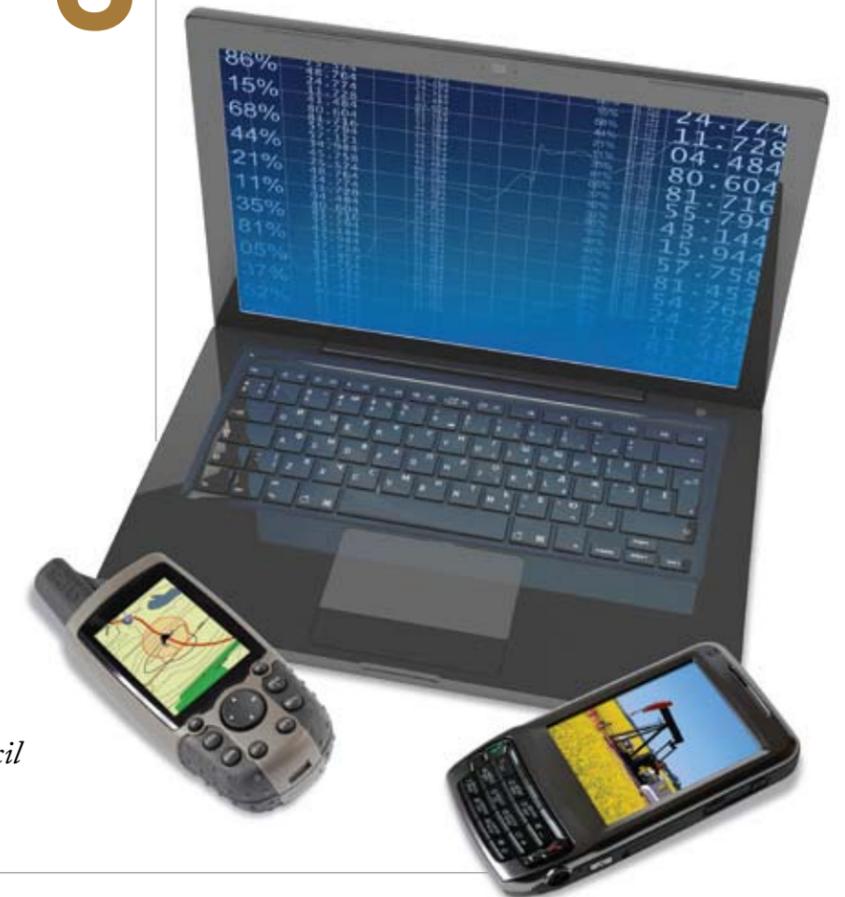
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“RBDMS is emerging as the mission critical tool for environmental protection and resource management in the country...”

– *Ground Water Protection Council*

## INTRODUCTION

Any job, no matter how large, is easier to complete with the **right tools** at hand. The Ground Water Protection Council (GWPC) created a tool that helps state and federal regulatory agencies, citizens' groups, and the oil, natural gas, and mining industries to do a better job of protecting this country's precious natural resources. This tool is a web-based information-sharing platform that users can adapt to meet their individual requirements.

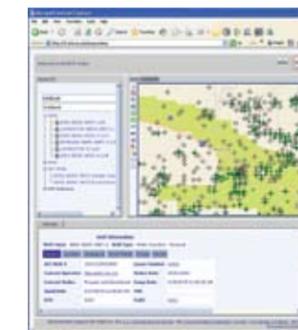
The original concept of RBDMS was development of a program that regulators could use to guide them in making informed decisions about managing Class II UIC wells and groundwater protection. The project has evolved into a collaborative platform that 23 states, the Department of Energy (DOE), the Environmental Protection Agency (EPA), the Bureau of Land Management (BLM), the public, and industry members nationwide use as a tool to access information, share data and ideas, and manage processes to maximize energy production while protecting the environment.



Developers of the RBDMS project asked themselves a simple question: "Can we develop a baseline data system to support informed decision-making and to protect and manage critical resources?" The driving force behind the question was the need to efficiently manage groundwater resources and protect the environment in the face of energy development and geologic disposal of waste.

**RBDMS is a PC- and Client/Server-Based, fully-relational and normalized information management system**

that was specifically designed for use by state oil and gas regulatory agencies responsible for oil and gas production and associated injection. The system is now used by several state oil and gas regulatory agencies in the United States and has since been expanded for use by private industry and other types of state and federal regulatory agencies.

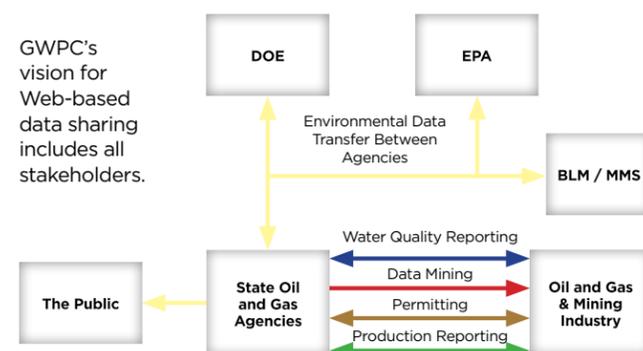


**IN 1992, THE GWPC CONDUCTED A NATIONAL NEEDS ASSESSMENT OF 25 STATE OIL AND GAS REGULATORY AGENCIES.**

The results include:

- All oil and gas producing states share basic operating procedures including issuing permits, inspecting wells, and complying with federal UIC (Underground Injection Control program) regulations under the Safe Drinking Water Act.
- In addition to the federal requirements, each state has operating procedures that are specific to geology and rules developed by state lawmakers and oil and gas commissions.
- Funding for information technology varies among states.

Based on the results of the needs assessment, the GWPC and pilot states recommended developing a data management system for UIC and oil and gas wells that would meet 85% of the needs of all oil and gas regulatory agencies. States could then take the Core System and customize it to meet their individual needs. One of the underlying features that continues to make RBDMS a success is the principle that this is a system designed by the states and built to state specifications. While the funding comes from the Department of Energy, the details of the system are left up to the states.



**RBDMS (Risk-Based Data Management System)**

is a modular system that includes data for oil, gas, UIC (Underground Injection Control program) and water quality, and online permitting, reporting, and data mining. CERA (Cost Effective Regulatory Approach), another GWPC initiative, focuses on creating "effective and efficient policies and environmental program improvements that participating state regulatory agencies can adopt."

In 1993 RBDMS was installed in **four pilot states:** Alaska, Nebraska, Montana, and Mississippi. This early version of RBDMS was a system designed for internal use by state agencies to manage injection and production information.

RBDMS has since expanded to 22 states and one Indian tribe and is now used by states, federal agencies, oil companies and consultants. The GWPC and the Department of Energy hold an annual training event where the new features of RBDMS are demonstrated. Attendees learn how to implement and customize RBDMS at these sessions.

Funded by the DOE, and matched with in-kind and state donations, the GWPC formed a task force from among its members to assist with the project. This task force is composed of a steering committee and technical advisory committees. The Steering Committee provides project direction and policy decisions. The RBDMS technical advisory group provides input to the steering committee on programmatic and information technology needs. Over the past six years, the states have contributed nearly half of the total funding for the project. Since

2000, more than \$14 million has been invested in RBDMS nationwide. Other significant funding has come by way of grants from organizations such as the New York State Energy Research and Development Authority (NYERDA).

The result of the collaboration between these stakeholders is an e-commerce-type platform that 23 states have adapted to their requirements. Nebraska, for example, runs its entire agency's regulatory activities on RBDMS. The state uses it to monitor underground injection wells, record production data, and manage the oil and gas development permitting and reporting processes. Colorado, on the other hand, has developed its own system, which the Colorado Oil and Gas Conservation Commission (COGCC) uses. Even though Colorado doesn't rely on the RBDMS system, the COGCC has contributed critical early and ongoing work to assist in RBDMS development.

Operating similar to an open-source or shareware community, the platform system is a project that GWPC task force members continue to expand against an ever-changing backdrop of issues. For example, when the project started, hydraulic fracturing was not regarded as a significant regulatory issue. Increased development of unconventional oil and gas from tight-sands, shales, and natural gas from coal seams, which all require hydraulic fracturing, has created a need for additional oversight in regions that are experiencing rapid new development. Similarly, some states are working to establish processes to handle the supervision of geologic sequestration of CO<sub>2</sub> as the nation moves toward reducing greenhouse gases. Users are adapting RBDMS to respond to changes as they occur.

Beyond constantly shifting industry and environmental issues, technologies continue to be created and enhanced at an unprecedented pace. "Five or six years ago the tech committee tried to work with a GIS-type app. But the technology wasn't there to do mapping and web-based applications. Now the technology is catching up," notes Stan Belieu, task force steering committee member from Nebraska. "It is really important not to get too cutting edge. Exxon might be able to work with it, but states with small funding and a lack of programming staff can't. This has to work for all users to be effective." The committee also has

## Adaptability of RBDMS Between States

### NEBRASKA

1. Runs entire agency regulatory activities on RBDMS
2. Uses RBDMS to monitor underground injection wells, record production data, and manage the oil and gas development permitting and reporting processes

### COLORADO

1. Does not use RBDMS
2. Has developed its own system used by the Colorado Oil and Gas Conservation Commission
3. COGCC contributed ongoing work to assist in RBDMS development

### RBDMS Steering Committee:

Stan Belieu, NE  
Mark Bohrer, ND  
Tom Richmond, MT  
Don Drazan, NY

### RBDMS Technical Advisory Group:

Jim Lindholm, ND  
Jim Halverson, MT  
Dan Jarvis, UT  
Marc Fine, CO  
Chuck Borchert, NE  
Dan Pearson, AR  
Bob Griffith, OK  
Lloyd Favor, OK  
Bill Adkins, KY  
Rick Sims, MS  
Jimmy Hall, AL  
Gregg Miller, OH  
Amanda Trotter, NY

## State Contributions:

NEARLY  
**\$7,000,000**

*Over the past six years, the states have contributed nearly half of the total funding for the project.*

*A data management system would meet 85% of all state's technical needs.*

*Individual states can work with open source code to refine the system to specific needs.*

*Since 2000, more than \$14 million has been invested in RBDMS nationwide.*

to factor in the changing political and regulatory environment, which responds to public concerns, economic shifts and other influences. As Marc Fine, IT manager at the Colorado Oil and Gas Conservation Commission, observes, “It is a challenge to know how to deal with emerging technology and rulemaking when you are developing the system to facilitate administration of rules and activity at the same time.”

The work proceeds in modules, led by task force members who are supported by technical work groups from member states. The work groups include experts in IT systems, programming, web interfaces and other critical specialties. The project is governed by the principles that it must be user-friendly and web-based, cost effective and adaptable. As Fine put it, “You want to build it once and reuse it multiple times. So you develop a basic framework with the proper requirements so that the same pages the operator will use to submit data are the same pages the agency will review to approve or monitor.”

Nebraska was keen on the integration of the GIS (geographical information system) capability, because staffers use it to overlay water wells and aquifers on oil and gas activity. On the first pass, five years ago, the challenges for integrating this application were overwhelming. Since that time, technology has evolved and Nebraska has been a champion of module development.

Colorado has remained active on the task force tech committee even though it did not use the entire RBDMS system. So three years ago, when the project committee needed an e-permitting application developed, it approached the COGCC. The concept was to have something portable and implementable in any state without difficulty, hence a browser-based application. Colorado agreed to pilot the module and received a grant to help support the development.

Bob Griffith, from Oklahoma, has participated in the tech committee for the past three years. Many times state technical staff will shift and change as the particular modules under development require different or additional expertise. Over the past 18 months, Griffith has been working on the rollout of an ITD (intent to drill) permit module. The ITD module is in the testing and installation phase and work is underway on another module that will track completion reports and operational changes. The end goal is to enable field inspectors to access the database with a mobile wireless-enabled laptop and to enter inspection information at the site. But, Griffith already is looking

ahead to the next module – addressing UIC monitoring,

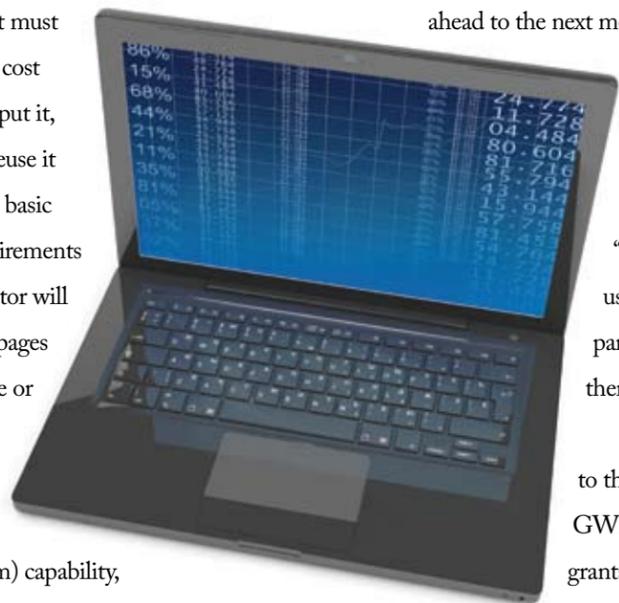
which includes EPA reports, GIS review, and compliance testing.

An enthusiastic supporter of the RBDMS program, Griffith says, “I call this ‘freeware’. You can get it, use it, customize it, get training. You’re part of a community that is always there for you.”

That community support was put to the test a few years ago when the GWPC’s access to federal funds and grants dwindled significantly. Rather than pull out of the project, the states

have forged ahead to continue development of this unique data sharing system. And, as pressures mount on regulatory agencies, the states get more involved in developing the system.

In 2006, GWPC reported fielding 10 projects that were expected to be rolled out in 2009. Four of the projects, modules for data mining, eReports, ePermits, and water quality tracking, have been developed and tested in one to four pilot states. The remaining modules include hydraulic fracturing, CO<sub>2</sub> geosequestration, field inspection modules, public education and outreach, application upgrades and re-release cycles, MIT study and national Class II report, partial primacy, and Class II peer review. RBDMS is being upgraded to incorporate .NET

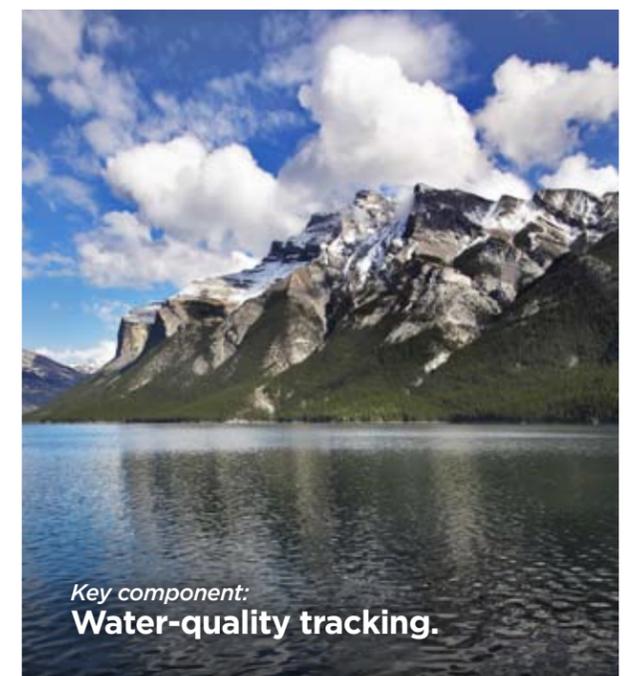


“You want to build it once and reuse it multiple times. So you develop a basic framework with the proper requirements so that the same pages the operator will use to submit data are the same pages the agency will review to approve or monitor.”

Marc Fine,  
IT manager, Colorado Oil and Gas  
Conservation Commission

technology, which will be installed in Mississippi and Oklahoma.

The water-quality tracking project required the integration of GIS data, customization for coal mines, and an application for tracking produced water quality related to production of natural gas from coal seams. Development work for ePermits included developing a national schema, coordination with the BLM for data transfers, and development of web services with the addition of batch submittal to existing installs. Colorado, Kentucky, Alabama and Alaska piloted the single-submittal web forms. The application enables an operator to submit all the information necessary to permit a well, from environmental impact, to well design, and so forth in one submittal. It enables the recipient agency to parse and accept the file and process it as needed. The work on eReports is dependent on the work of ePermits, because it adopts the same data model.

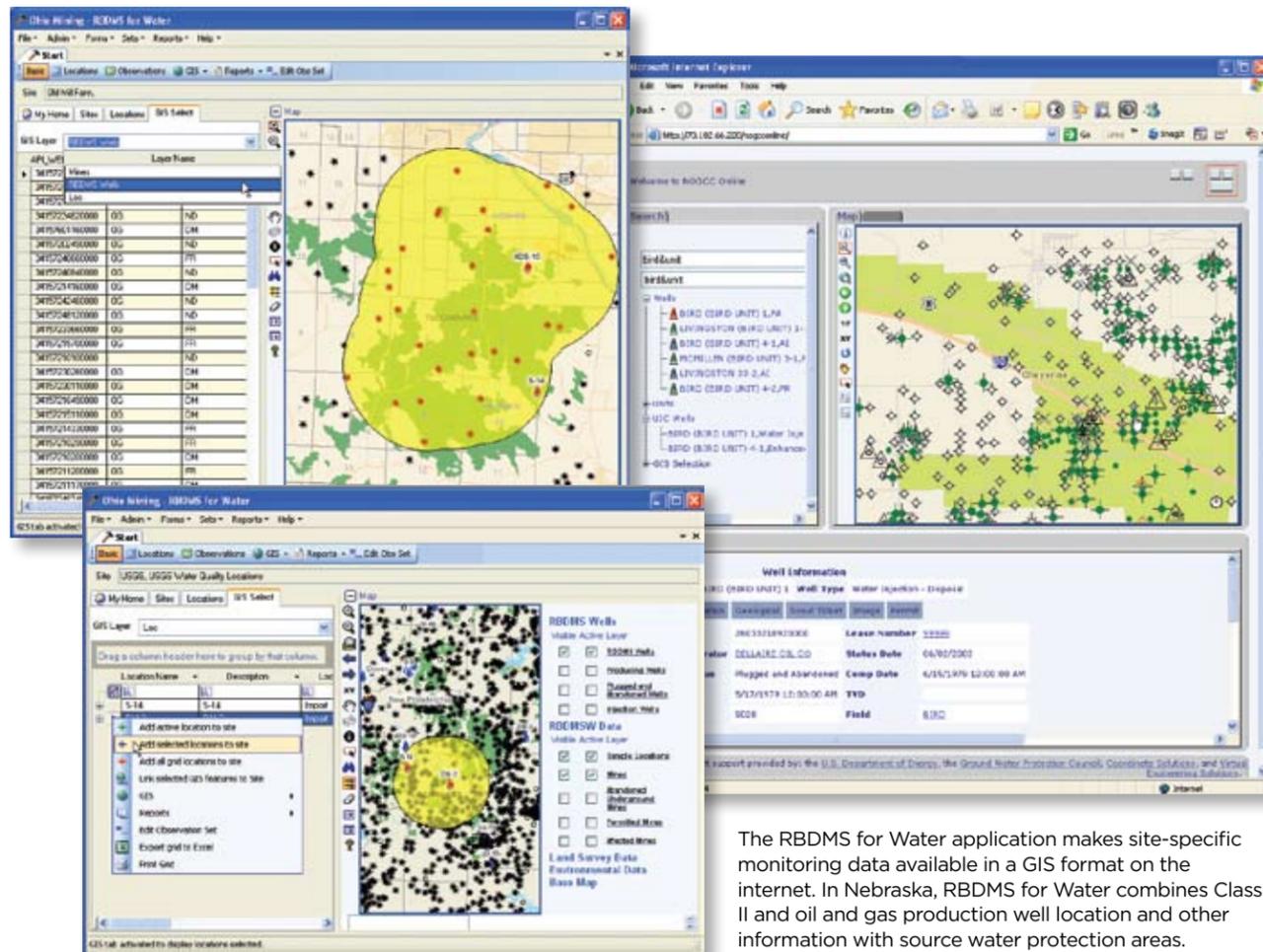


Key component:  
**Water-quality tracking.**

Technology enables operators to submit all the information necessary to permit a well, from environmental impact to well design, in one step. This same technology also creates efficiency for the permit agency, with each report adopting the same data model.

## ANTICIPATED USES OF A GEOGRAPHICAL INFORMATION SYSTEM (GIS) INCLUDE:

- Agencies' ability to track baseline water quality and quantity data to evaluate permit applications and application revisions.
- Agencies' ability to overlay source water protection areas on oil and gas well, UIC well, and mine data in an online GIS format to identify priority inspection needs.
- Oil and gas operators and mine owners will be able to query the database through the Web to track compliance with water information reporting requirements.
- Operators' contracting laboratories will be able to submit their water quality reports to agencies through the Web service application in EPA-mandated formats.



The RBDMS for Water application makes site-specific monitoring data available in a GIS format on the internet. In Nebraska, RBDMS for Water combines Class II and oil and gas production well location and other information with source water protection areas.

As Stan Belieu noted, the project embraces states at all levels of involvement. There are some states just running in place with very basic systems, somewhat apprehensive of the viability. Others have used a few of the applications, but in states where oil and gas activity is minimal the need for more robust applications isn't there. Some states, like Pennsylvania, suddenly found themselves in need of rapid adoption with the increase in new unconventional development in the Marcellus Shale.

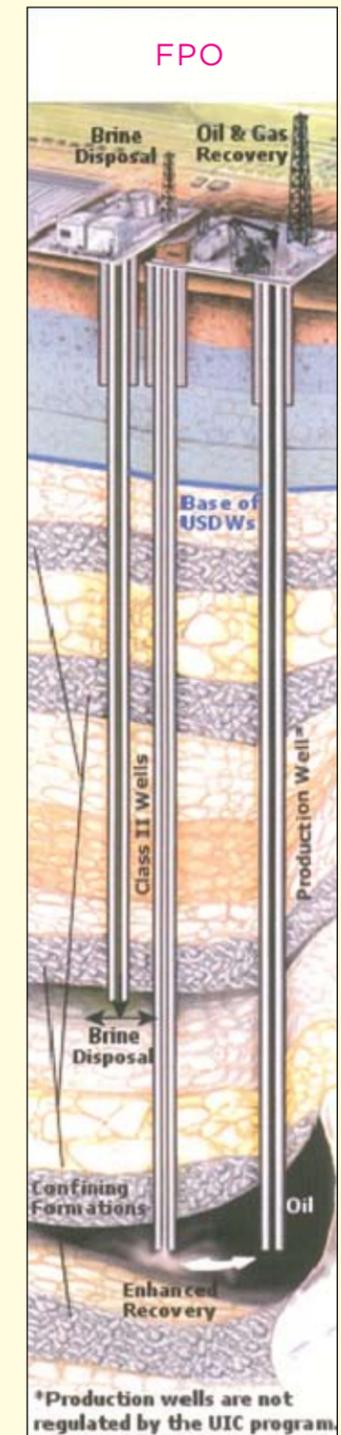
RBDMS is based on the development of concepts or templates that address the well lifecycle. It thrives on technology transfer and information exchange with regulatory agencies, both state and federal, and an industry user base. Work group meetings involving all parties have been successful in meeting the needs of industry and regulators. A case in point is the issuance of permitting and monitoring Class II injection wells. Where states have primacy from the EPA, they assume this responsibility. As more injection wells come online, more responsibilities and costs are incurred, but not necessarily more budget. RBDMS enables the state regulatory agency to use source water overlays against a map of injection wells referenced to the geologic database from oil and gas activity. This information can be used to prioritize inspections for sensitive wells. Instead of trying to inspect all wells once or twice a year, the agency can focus on more frequent inspections of sensitive wells.

As the environmental issues associated with our energy and water needs and uses intersect at accelerated levels of complexity, RBDMS provides comprehensive and flexible tools for informed decision making and quality resource management. The GWPC made the following statement in its 2006 report, "Projects scheduled for rollout over the next four years will reshape the way agencies, industry and the public think about and manage water and energy resources."

The GWPC is very proud of their work on the RBDMS program and believes that the tool has broad implications for future use: "It changes every notion we have about collaborative effort, the effectiveness of state-driven regulatory capability for energy development and resource protection, and funding consortiums in the public sector. RBDMS is emerging as the mission critical tool for environmental protection and resource management in the country, and with it the ratification of the role and capability of the states in directing this tool."

RBDMS enables the state regulatory agency to use source water overlays against a map of **injection wells** referenced to the geologic database from oil and gas activity to help prioritize inspections of sensitive wells. Creating more efficient processes allows agencies to be more cost effective.

## SUMMARY





*Collectively Representing the States.*

**INTERSTATE OIL AND GAS COMPACT COMMISSION**  
900 NE 23RD STREET, OKLAHOMA CITY, OK 73105