

Paper #2-20

REGULATORY DATA MANAGEMENT

Prepared by the Technology Subgroup
of the
Operations & Environment Task Group

On September 15, 2011, The National Petroleum Council (NPC) in approving its report, *Prudent Development: Realizing the Potential of North America's Abundant Natural Gas and Oil Resources*, also approved the making available of certain materials used in the study process, including detailed, specific subject matter papers prepared or used by the study's Task Groups and/or Subgroups. These Topic and White Papers were working documents that were part of the analyses that led to development of the summary results presented in the report's Executive Summary and Chapters.

These Topic and White Papers represent the views and conclusions of the authors. The National Petroleum Council has not endorsed or approved the statements and conclusions contained in these documents, but approved the publication of these materials as part of the study process.

The NPC believes that these papers will be of interest to the readers of the report and will help them better understand the results. These materials are being made available in the interest of transparency.

The attached paper is one of 57 such working documents used in the study analyses. Also included is a roster of the Subgroup that developed or submitted this paper. Appendix C of the final NPC report provides a complete list of the 57 Topic and White Papers and an abstract for each. The full papers can be viewed and downloaded from the report section of the NPC website (www.npc.org).

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EXECUTIVE SUMMARY

State oil and gas regulators are required to enforce regulatory requirements, properly track oil and gas activities throughout the well life cycles and provide data to local governments, other state and federal agencies as well as the regulated industry and public.

The majority of oil- and gas-producing states currently operate data systems that allow commercial developers to make online reports and also allow stakeholder to make online queries of permit and production data. Many of those systems are based on the Risk Based Data Management System (RBDMS) which was developed in the 1990s through a joint effort of the US Department of Energy (DOE) and the American Petroleum Institute (API).

Operational capabilities of RBDMS are complemented by the State Review of Oil and Natural Gas Environmental Regulations (STRONGER) which is a non-profit, compliance-attainment service to state agencies and which resulted from another 1990s collaboration between the Interstate Oil and Gas Compact Commission (IOGCC) and the US Environmental Protection Agency (EPA).

Online data management systems offer many environmental and economic benefits, including reduction of administrative costs, time and errors associated with manual systems and overall reduction of paper work and associated wastes.

Even though progress in data management has been substantial, additional investments both by developers and regulators are necessary to achieve the goal of a national oil and gas data portal. Success of the RBDMS and STRONGER initiatives provide examples of how joint government-industry collaborations can accomplish mutually beneficial goals of improved data management.

HISTORY OF STATE REGULATORY DATA MANAGEMENT

Formal regulation of the oil and gas industry by states dates back to the late 1910s after a period of unregulated petroleum overproduction. States used mainframe computer technologies to track the oil and gas industry dating back to the 1960s. It was not until the early 1980s with the rise of desktop PCs and more flexible computer programs that the majority of states started tracking their oil and gas resources with computer-based management systems.

In 1996 the Interstate Oil and Gas Compact Commission (IOGCC, 2010) completed a Survey of “Guidelines for States: Exploration and Production Data Management.” That report detailed the status of the data management systems of that time. Two levels of compliance were listed as a “Minimum Level” which would allow for a standard reporting needed to meet IOGCC annual data reporting requirements and an “Expanded Level” which tracked more well-level data. In the late 1980s and early 1990s, the IOGCC with the US Environmental Protection Agency (EPA) created the State Review of Oil & Gas Exploration & Production Waste Management Regulatory Programs Review process. Those reviews were peer-based evaluations undertaken voluntarily by states. Part of those reviews looked at data management capabilities of individual states and made suggestions where deficiencies were identified. The evaluation process eventually was turned over to a new organization named, State Review of Oil and Natural Gas Environmental Regulations (STRONGER), which is a non-profit, multi-stakeholder organization whose purpose is to assist states in documenting the environmental regulations associated with the exploration, development and production of crude oil and natural gas (STRONGER, 2011).

In 1989, the Ground Water Protection Council (GWPC) undertook a US Department of Energy (DOE) and American Petroleum Institute (API) research project titled “Evaluation of Injection Well Risk Management in the Williston Basin.” One of the purposes of the study was to develop a methodology to assess the risk of Underground Sources of Drinking Water (USDW) contamination posed by injection well operations. States expressed interests in developing a database to track Underground Injection Control (UIC) wells and analyze potential risks to USDWs. The program was called the Risk Based Data Management System (RBDMS). The first RBDMS kick-off meeting was held on Jan 26, 1992. Four states -- Montana, Alaska, Mississippi and Nebraska -- started the initial UIC well project. That project to track and oversee underground injection wells was found to be a success and the initial four states started to look toward the model as a way to track production wells in addition to the UIC component. By 1995 eight states had started to use RBDMS to track UIC and oil and gas wells.

In 1998, GWPC undertook an expansion of the number of states using the application. By the start of 1999, seventeen oil and gas producing states used RBDMS or a RBDMS utility in tracking and regulating the industry. The DOE has provided multiple grants to GWPC to fund the further development of the application. In particular, the system has migrated from a strictly MS Access application to a full client-server application using SQL Server and either an Access or .Net front-end (RBDMS, 2007). Additionally, online submissions of production data, well permit applications, and completion reports can be accepted by several member states. Non-RBDMS states have also continued to offer expanded services. The Texas Railroad Commission

An additional area where technology has made huge strides is in the area of information available on the Internet. The majority of states now offer some sort of online permitting and production information on a regular basis. Other states offer comprehensive information which ranges from directional survey, digital logs to scanned images of regulatory filings. Table 1 details online offerings from state sources.

Table 1. Summary of regulatory data types and forms by individual state (IHS, 2010)

State	RBDMS (1)	Online Submission	Data Available (2)					
			Production	Permits	Sundry	Completions	Logs	GIS
Alabama	Y	Y	M	D	AA	M	AA	Y
Alaska	Y		M	W	W	W	AA	
Arizona			M	AA	NA	W	AA	
Arkansas	Y		M	D		D	AA	
California			M	W		W	M	
Colorado	P	Y	D	D	D	D	D	
Florida			M	AA		AA	AA	
BLM Offshore		Y						
Idaho								
Illinois	D		M	D		D	AA	
Indiana	Y		AA	W		W		
Iowa		N						
Kansas	Y	Y	M	D		D	D	
Kentucky	Y	N	A	D		D	D	
Louisiana		Y	D	D		D	D	
Maryland		N	AA	AA		AA		
Michigan	Y	N	M	W		W	AA	
Mississippi	Y	Y	M	D		D	AA	Y
Missouri			M	AA		AA	AA	
Montana	Y	Y	M	D	D	D	D	
Nebraska	Y	Y	M	D		D	D	Y
Nevada			BM	AA			AA	
New Mexico	Y		M	D	D	D	D	
New York	Y	Y	A	D		M	M	
North Dakota	Y	Y	D	D	D	D	D	Y
Ohio	Y		W	D		D	AA	
Oklahoma	D		M	D	D	D	D	Y
Oregon			A	AA		AA	AA	
Pennsylvania	D	Y	BA	D		D	D	

State	RBDMS (1)	Online Submission	Data Available (2)					
			Production	Permits	Sundry	Completions	Logs	GIS
South Dakota			M	AA	AA	AA		
Tennessee			M	M		W		
Texas		Y	M	D		D	D	
Utah	Y	Y	D	D		W	AA	
Virginia			M	D		D	AA	
Washington								
West Virginia		Y	M	W		M	M	
Wyoming		Y	D	D	D	D	D	Y
Notes:								
(1) RBDMS	Y: state uses core system							
	D: system under development							
	P: state use a utility but not full system							
(2) Data Available	D: Daily							
	W: Weekly							
	M: Monthly							
	A: Annual							
	AA: As available							
	BM: Bi-monthly							

VARIATIONS BASED ON RESOURCE TYPE AND LOCATION

Regulatory requirements for data tracking are driven in part by the technology used by industry in developing oil and gas resources. States in which offshore, horizontal and multilateral wells are drilled require a higher level of attention for tracking well construction and production activities. States in which shallow onshore vertical wells are the norm do not require the same level of data management. State programs including RBDMS have responded accordingly.

Long-reach horizontal shale wells in particular highlight the variations in data-management requirements and the manner in which states and organizations have responded to information needs. Until the mid-1990s, the use of downhole motors for drilling wells was limited to a small proportion of wells drilled nationally. The rapid growth in the use of downhole-motor technologies in multiple states has forced many regulators to review how they track and regulate the industry. In particular, the amounts of data created by directional (non-vertical) drilling and the use of multi-well pads have created an exponential increase in the amount of information reported to the regulator. The need to track laterals, casing, and well completions has forced regulators to revise how they do business. While the amount of data collected in onshore drilling is large, offshore issues are even more complex. Issues regarding the collection and storage of logs, directional surveys and hydraulic fracturing have driven regulatory programs to provide

additional data and attempt to be more transparent to the public. A current example of those drivers includes the reporting of hydraulic fracturing (HF) procedures. HF has been a common practice going back to the 1950s and with the increase in large scale horizontal fracturing of shales the volume of the fracturing treatments have increased and become a lightning rod of public comment. Regulatory agencies have been tracking HF activities for an extended time. However, due to the increased public attention to HF procedures, states are responding by passing regulations and increasing disclosures. In an attempt to provide a single national point of contact the GWPC is working with the DOE, state partners and industry to provide a website for the reporting of HF activities by company and by state (GWPC and IOGCC, 2011). That voluntary program eventually will be replaced by a national data portal, contingent upon funding, which will provide one-stop information on oil and gas operations nationally.

ENVIRONMENTAL AND ECONOMIC BENEFITS

Environmental Benefits. With the increasing use of advanced information technologies by drilling companies, state regulatory programs are pressured to properly track voluminous data pertaining to oil and gas operations from the permitting process to the ultimate plugging and abandonment of the well. Computerized data management systems are necessary to handle the data but such systems also provide direct and indirect environmental benefits. Online data management systems such as RBDMS offer the following advantages in environmental sustainability:

- Substantial paperwork reduction that directly eliminates paper-related consumption and waste.
- Substantial transportation reduction that indirectly eliminates air emissions associated with transportation of paper documents to or from developers or regulators.
- Rapid availability of key data needed for environmental impacts statements required to comply with the National Environmental Policy Act (NEPA) and related regulations.
- Uniform databases that can be made available to regulatory agencies and public stakeholders as appropriate for environmental research or quality assurance.

Economic Impacts (positive and negative). Numerous states have migrated to an electronic permitting system. Those online systems allow direct data entry by the companies which serves to reduce errors and inefficiencies otherwise attributable to mis-keyed or transcribed data that must be manually moved from paper forms to other repositories. Single-entry online forms streamline the regulatory process by making filings easier and more reliable while also reducing administrative costs both for the producer and the regulator. Colorado currently allows the online submission for most forms. Texas has had in place an online permitting system since the late 1990s.

Naturally, installation of an online, automated data system requires a capital investment by the regulatory agency that receives the data. But when amortized over several years, the initial

investment should be recovered through reduction of recurring administrative costs associated with the less efficient, manual system being replaced.

ACCOMPLISHMENTS AND OUTLOOK

Success in the Field. As noted, most states have data management systems to track wells in their regulatory jurisdictions. One success story is the multi-state consortium called RBDMS which supports the sharing of technology between member states. Annual reports showcase RBDMS and the ever increasing use of the system.

Innovation and Future Use. Public opinion has become polarized on the topic of oil and gas development. Recent successes in shale development have opened resource areas which previously were not affected by oil and gas activities. Residents, regulatory agencies and non-governmental organizations (NGOs) in those new development areas have called into question technologies which have been used routinely in other sections of the country. Procedures such as hydraulic fracturing have been challenged with regard to safety.

Properly designed regulatory data management systems have the ability to provide data to the public and NGOs to help explain the technology and support informed reviews of potential problems brought to the regulators' attention. The potential for a national oil and gas data portal will assist in education and providing information on the industry and regulatory programs.

Long-Term Vision. Oil and gas development in the United States will continue to be a crucial component of our energy future. Recently discovered shale gas resources have helped drive natural gas as being a bridge fuel as we transition to alternate fuel sources. By properly regulating this development we are better able to safely protect our nation's environmental resources. As these resources are developed they will move forward to supporting the nation's energy future and better public awareness. Key to future success will be seamless data systems that will receive online reports and filings from commercial developers and provide for distribution of accurate and timely information to stakeholders. In the long term, all oil- and gas-producing states will operate online data systems and will share common data standards that will support realization of a national oil and gas data portal.

FINDINGS

- The majority of oil- and gas-producing states currently operate data systems that allow commercial developers to make online reports and also allow stakeholder to make online queries of permit and production data. Many of those systems are based on the Risk Based Data Management System (RBDMS) which was developed in the 1990s through a joint effort of the US Department of Energy (DOE) and the American Petroleum Institute (API).
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- Online data management systems offer many environmental and economic benefits, including reduction of administrative costs, time and errors associated with manual systems and overall reduction of paper work and associated wastes.
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