

**2012 REPORT TO THE  
WATER QUALITY CONTROL COMMISSION  
and  
WATER QUALITY CONTROL DIVISION  
of  
THE COLORADO DEPARTMENT OF  
PUBLIC HEALTH AND ENVIRONMENT**

**by  
THE COLORADO OIL AND GAS CONSERVATION COMMISSION**



**of  
THE DEPARTMENT OF NATURAL RESOURCES**

**IN ACCORDANCE  
WITH**

**THE AUGUST 28, 1990 MEMORANDUM OF AGREEMENT  
and  
THE IMPLEMENTING PROVISIONS OF SENATE BILL 181**

**JANUARY 2012**

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## 1.0 INTRODUCTION

The Colorado Oil and Gas Conservation Commission (COGCC) is an implementing agency for water quality standards and classifications adopted by the Water Quality Control Commission (WQCC) for ground water protection. This authority was provided by SB 89-181, and is restated and clarified by a Memorandum of Agreement (MOA) that was adopted by the agencies on August 8, 1990.

Section 5.1 of the MOA specifies that the COGCC must report annually to the WQCC about how its programs assure compliance with WQCC water quality standards and classifications for the activities, that are subject to the jurisdiction of the COGCC.

This 21<sup>st</sup> annual report includes a summary of COGCC activities and changes in ground water protection programs that were made during the preceding year. Major issues concerning the implementation of water quality standards and classifications are also reported.

## 2.0 COGCC ORGANIZATION AND FUNCTIONS

### Public Outreach and Communication

The COGCC employs the following strategies for effective communication with the public and the regulated industry:

- Staff reports are prepared prior to each hearing for the COGCC Commissioners. Ongoing staff activities such as compliance and enforcement actions, environmental and landowner issues, and other topics relevant to the mission of the COGCC are summarized in these reports. They are distributed widely to interested parties and they are posted on the COGCC website [www.cogcc.state.co.us](http://www.cogcc.state.co.us).
- A toll free telephone number (888-235-1101) to the Denver office has been established as a complaint hotline for citizen use.
- In 2012, the COGCC held one of its regular hearings (nine total) outside of Denver; in Steamboat Springs, Routt County.
- The COGCC continues to solicit participation on all levels from stakeholders, including the oil and gas industry, local governments, citizens, other regulatory agencies, agriculture interests, and the environmental community. During 2012, COGCC staff participated in over 85 meetings at the request of municipal, county, and other local governments, EPA, BLM, and trade organizations, and in numerous meetings initiated by COGCC.
- Two new full-time employees (FTE) were added this year as Local Government Liaisons (LGLs). The LGLs provide an important communication role through their service, support, and outreach to Local Governmental Designees (LGDs), local government staff, various state agencies, the public, operators, and others.
- The COGCC continues to expand our internet presence. In addition to accessing oil and gas well data, internet users are able to access information regarding pits, spills/releases, complaints, and remediation projects and reports from numerous baseline ground water quality studies and environmental monitoring and investigation projects. The queries by which users access these data continue to be modified and refined to make them more “friendly”. Please visit our website at [www.cogcc.state.co.us](http://www.cogcc.state.co.us).

- On Wednesday, September 19, 2012, the COGCC water sample database went live on the COGIS system, available on the COGCC home page ([cogcc.state.co.us](http://cogcc.state.co.us)). The water sample database allows the public to view water quality for specific sample locations throughout Colorado.

## **COGCC Commissioners**

The Colorado Oil and Gas Conservation Act, as amended by HB 07-1341, specifies the number and composition of the Commission. HB 07-1341 requires nine Commissioners, seven of whom are appointed by the governor with the consent of the senate, and two ex officio voting members who are the Executive Directors of the Department of Natural Resources and the Department of Public Health and the Environment. At least two members are appointed from west of the continental divide and the other members are appointed taking into account the need for geographical representation of other areas of the state with high levels of oil and gas activity or employment. Of the seven, three members are to have substantial experience in the oil and gas industry and at least two of these must have college degrees in petroleum geology or petroleum engineering; one member must be a local government official; one member must have formal training or substantial experience in environmental or wildlife protection; one member must have formal training or substantial experience in soil conservation or reclamation; and one member must be actively engaged in agricultural production and also be a royalty owner. A chart showing in more detail the makeup of the COGCC Commission is included in Appendix 1.

## **COGCC Staff**

The COGCC has 71 FTE positions, with Information Technology (IT) support provided by four employees of the Office of Information Technology. The current organization chart is included in Appendix 2.

The Engineering Unit includes eight professional engineers, one engineers-in-training (EIT) and two engineering/environmental technicians. One engineer and the EIT are located in Rifle and one engineer is located in Durango. The others are located in the Denver office.

The Environmental Unit includes 13 environmental protection specialists; one of the environmental protection specialists positions (Rifle) is currently vacant. Five of the environmental protection specialists (EPS II) are located in field offices in Brighton, Durango, Rifle, and Trinidad, which helps to minimize their complaint response time and maximize their ability to identify and address other potential environmental issues related to oil and gas development. The others are located in the Denver Office. The Oil and Gas Location Assessment (OGLA) group, which is part of the Environmental Unit, consists of five EPS that conduct a thorough review of the potential environmental impacts from the surface disturbance associated with oil and gas operations, including waste management. The OGLA staff can apply site specific conditions of approval to the Form 2As that address additional precautions that need to be taken to protect public health, safety, welfare, and wildlife. They also facilitate consultation with CDPHE and CDPW.

The Field Inspection Unit has 17 FTE including one manager, three supervisors, ten engineering technicians and two environmental protection specialists who bring additional expertise related to reclamation and other environmental issues. The supervisors, field inspectors, and the environmental protection specialists are located in Arvada, Broomfield, Cheyenne Wells, Durango, Fort Lupton, Grand Junction, Lafayette, Parachute, Pueblo West, Battlement Mesa, Steamboat Springs, Sterling, Trinidad, and Whitewater, which helps to

maximize their time for field inspections and helps to minimize their response time for complaints and incidents. The COGCC is in the process of hiring an additional inspector who will be based in Rifle, Colorado.

## **COGCC Environmental Unit**

The COGCC environmental staff all have professional experience and expertise in environmental issues associated with oil and gas operations, hydrogeology, geology, and geochemistry. We continue to handle questions, concerns, problems, programs, and issues relating to the oil and gas industry's impact on the environment, including wildlife, and public health safety and welfare. The environmental staff works closely with the COGCC engineering staff and the field inspectors. Incidents resulting in environmental impacts are typically referred to the environmental staff for investigation, remediation as necessary, and enforcement. The primary responsibilities of the environmental staff are discussed below.

### **Spill/Release Response**

Operators are required to report spills and releases that occur as a result of oil and gas operations, in accordance with COGCC Rule 906. Produced oil, gas, and water are the substances most commonly spilled or released. These substances fall under the exploration and production (E&P) waste exemption to regulation as hazardous wastes under Subtitle C of the Resource Conservation and Recovery Act (RCRA); therefore, they are subject to COGCC jurisdiction. In most cases, impacts from these events are limited to soils and are limited in scope.

Spill response by the environmental staff includes onsite inspections, sample collection, remediation oversight, and review of reports, remediation plans, analytical data, and operating practices, to ensure protection of surface and ground water, in accordance with COGCC rules and WQCC standards and classifications. Spills are tracked in COGCC's Master Records Database (MRDB) and can be accessed via the COGCC website ([www.cogcc.co.us](http://www.cogcc.co.us), select Database, then Inspection/Incident, then Spill/Release). In 2012 approximately 380 spills and releases were reported and have been remediated or are in the process of being remediated.

An eForm version of the spill/release reporting form (Form 19) is being developed and will likely be released for statewide usage in early 2013. The eForm will improve reporting consistency and increase COGCC's efficiency in reviewing and responding to spills.

### **Complaint Response**

The COGCC responds diligently to complaints received from individuals and other agencies. Complaints are tracked in the COGCC's MRDB and can be accessed via the COGCC website. In 2012, COGCC received approximately 200 complaints related to water issues. Landowner complaints alleging damage to their land or water wells are most common. The environmental staff follow up where appropriate and collect samples for laboratory analysis when necessary. Operators are required to perform additional investigation, remediation, and mitigation, as needed, to bring sites into compliance with soil and ground water standards.

### **Remediation Projects**

Operators are required to remediate significant adverse environmental impacts that occur as a result of oil and gas activities. Situations requiring remediation often result from spills and releases of produced water and hydrocarbons discovered at the time of occurrence, during due

diligence investigations, during the upgrading of production facilities and replacement of older equipment, during the plugging of wells and abandonment of locations, or during pit closures. The environmental staff reviews and approves remediation plans, evaluates analytical data, monitors the progress of the remediation, and ensures cleanup standards and other remediation requirements are met through verification sampling and other measures.

Remediation projects are tracked in the COGCC's MRDB database and can be accessed on the COGCC website. During 2012, COGCC received approximately 600 new remediation plans, and closed approximately 570 remediation projects.

Where ground water has been impacted, operators are required to: eliminate any continued release; investigate the extent of contamination; remove the source of contamination (such as the impacted soils in contact with ground water or free hydrocarbon product); remediate; establish points of compliance; and monitor contaminant levels.

## **Pit Program**

Industry operators employ pits at oil and gas locations for a variety of purposes, most commonly to contain drill cuttings, produced water and flow back, and reuse and recycling of produced water. The COGCC is responsible for permitting pits (Form 15), inspecting their operation to ensure compliance, and overseeing their closure. COGCC Staff review pit permits for construction and operational details, and evaluate the environmental setting to ensure that the pit can be used without causing adverse environmental impacts. The Director may apply conditions of approval with additional provisions to protect waters of the state, public health or the environment (Rule 903.e.). In 2012, COGCC staff approved permits for approximately 65 new pits and approved the closure of approximately 106 pits.

COGCC released a new eForm Form 15 for pit applications in early 2012. The eForm improves consistency among applications and increases COGCC's renew and processing efficiency.

Statewide, applications for new pits are down over the previous year reflecting both a decrease in new O&G activity in areas that traditionally have used pits for produced water disposal and widespread industry acceptance of "pit-less" drilling and completion activities. As an alternative to drilling pits, many operators are implementing "closed loop" drilling systems, which contain and circulate fluids in a series of tanks. Use of closed-loop systems has increased dramatically in Weld County, where approximately 90% to 95% of new wells used closed loop systems in 2012. The Form 2A permitting process allows operators to specify whether closed loop systems will be used for wells on a location; however, COGCC staff may also require the use of closed loop systems in areas where site specific conditions, such as shallow groundwater, warrant additional precautions.

## **Permitted Centralized Waste Management Facilities**

Non-commercial centralized exploration and production (E&P) waste management facilities are permitted by COGCC under Rule 908. Generally these facilities are larger than a typical tank battery that might handle wastes from only one or a few wells. These larger facilities handle wastes from many wells and wastes that may be from more than one field or lease and may include lined pits, land farms, drill cuttings solidification facilities, or tank batteries. A permit is required for these facilities and, as part of the approval process, staff evaluates the proposed site, operation, financial assurance, and preliminary closure plans. These facilities are currently required to have financial assurance in an amount equal to the estimated cost for proper closure, abandonment, and reclamation. During 2012, the COGCC permitted two new

centralized E&P waste management facility. Permits for three new centralized E&P waste management facilities are under review. Staff closed one facility in 2012. There are 31 active permitted centralized E&P waste management facilities in the state.

### **Disposal and Reuse of Produced Water**

Approximately 50% of the water co-produced with oil and gas is disposed of or used for enhanced recovery by underground injection. Most produced water that is not injected is disposed in evaporation and percolation pits or discharged under Colorado Discharge Permit System (CDPS) permit. A small amount of produced water is used for dust suppression on oil and gas lease roads. In addition, to minimize waste and the use of fresh water, more operators are reusing and recycling produced water and other fluids for drilling and well completion activities including hydraulic fracture treatment (“fracing”).

### **Onsite Inspections**

In January 2005, COGCC adopted a policy to conduct onsite inspections where oil and gas wells are proposed on lands where the surface owner did not execute a lease or is not party to a surface use agreement. Under COGCC Rule 306, an operator is required to use its best efforts to consult in good faith with the affected surface owner with regard to locations of proposed wells and surface facilities, access roads, and final reclamation and abandonment. If the COGCC Rule 306 good faith consultation between the operator and the surface owner does not resolve operational issues related to the proposed well, the surface owner may request that the COGCC conduct an onsite inspection under the policy.

During the onsite inspection, the surface owner, operator, and COGCC staff meet at the location and discuss issues related to the proposed well and associated surface facilities. The local government designee may also attend if requested by the surface owner. Following the inspection, the COGCC may apply appropriate site specific drilling permit conditions, if necessary to avoid potential unreasonable crop loss or land damage, or to prevent or mitigate health, safety and welfare concerns, including potential significant adverse environmental impacts. Any such conditions of approval must be consistent with applicable Commission spacing orders and well location rules, and must take into account cost-effectiveness, technical feasibility, protection of correlative rights, and prevention of waste. The COGCC cannot require an operator to use an exception location, directional drilling techniques, or otherwise compromise its reasonable geologic and petroleum engineering considerations.

Since January 2005, the COGCC has received a total of 148 requests for onsite inspections under the Policy For Onsite Inspections On Lands Where The Surface Owner Is Not A Party To A Surface Use Agreement Policy. There were two onsite inspections in 2012.

In addition to the Onsite Inspection Policy, onsite inspections are being conducted in the San Juan Basin under Cause 112, Order Nos. 156 and 157. These are cases where an onsite inspection was required because an APD was submitted without a surface use agreement.

### **Oil & Gas Location Assessment (OGLA)**

Operators are required to submit an Oil and Gas Location Assessment (OGLA) Form 2A for any “new oil and gas location.” Most operators are taking advantage of the COGCC’s eForm process and more than 95% of the Form 2As are submitted, reviewed, modified, and approved electronically.

The Form 2A requires site specific environmental information about surface locations and provides for consultation by the Colorado Department of Public Health and Environment (CDPHE) and Colorado Division of Parks and Wildlife (CPW) with the surface owner in some circumstances. OGLA specialists review and evaluate Form 2A applications, as well as publicly available information, to determine whether the proposed oil and gas operations have the potential to negatively impact public health, safety and welfare, including the environment and wildlife resources. Site-specific conditions of approval can be required to prevent or mitigate potential impacts.

One critical part of the evaluation is the sensitive area determination and the evaluation of water resources. OGLA specialists consider proximity to surface and ground water, terrain, topography, local geology and soil types to determine whether the proposed location is situated in a sensitive area. Once the sensitive area determination is made, appropriate protective measures are considered and applied. The Form 2A process allows the COGCC to work cooperatively with operators to protect water resources by advanced planning and proactive operational measures.

The OGLA group facilitates the consultation process with CDPHE and CPW. In 2012 COGCC staff consulted with CDPHE on 3 proposed oil and gas location - Form 2As. In addition the COGCC consulted with CPW on approximately 181 proposed Form 2As.

### **Oil and Gas Conservation and Environmental Response Fund (Fund 170)**

The COGCC receives an annual appropriation of \$312,033 that is used primarily by the environmental staff to respond to and investigate complaints alleging impacts from oil and gas operations, and an appropriation of \$325,000 that can be used to conduct special environmental projects such as baseline ground water testing, gas seep investigations, and regional investigations of potential impacts from oil and gas operations. Because of the COGCC's need to respond to emergency situations related to oil and gas operations, the COGCC has been appropriated \$1,500,000 for emergency response activities. In addition, the COGCC continues to receive an appropriation of \$220,000 for plugging, abandoning, and reclaiming orphaned wells.

In 2012 the COGCC used the \$312,033 appropriation to respond to and investigate complaints and spills/releases, and to ensure compliance with COGCC rules. In addition, Special Environmental Projects conducted by the COGCC environmental staff included: ongoing monitoring of methane impacts to ground water from an orphaned gas well in Bondag; oversight of required environmental monitoring for gas wells drilled in the vicinity of the Project Rulison and Project Rio Blanco nuclear test sites; third party review of engineering, ground water, and geologic data related to concerns in Garfield County regarding potential impacts from oil and gas activity; ongoing investigation of ground water and surface water impacts from leaking pits in Garfield County; ongoing investigations of gas seeps associated with orphaned oil and gas wells in Fremont County; and ongoing monitoring, investigation, and remediation oversight related to ground water and water well impacts from gas development in Huerfano County.

The COGCC engineering staff used appropriated funds and claimed financial assurance to plug and abandon and to reclaim orphaned oil and gas sites in Cheyenne, Fremont, La Plata, Mesa, and Morgan Counties. In FY 2012-2013, the engineering staff plans on plugging, abandoning and reclaiming orphaned oil and gas wells in Archuleta, Fremont, Garfield, Logan, Mesa, Moffat, and Washington Counties.

## **Data Management and Geographical Information Systems (GIS)**

To implement new rules adopted in April of 2009, COGCC made changes to applications to improve electronic tracking and processing of permits and other data. Major modifications were made to the following systems along with their associated databases:

- Permit processing – eForm was implemented;
- COGIS Database – Many new tables and queries to support eForm and other applications;
- Imaging System – Migration from Content Manager to LaserFiche
- GIS- Addition of several new map layers.

A brief description of the changes for each system is provided below:

### **Permit Processing and eForms**

The eForm application allows Operators to submit forms electronically. eForms currently in use are:

- Form 2 – Application for Permit to Drill
- Form 2A – Oil and Gas Location Assessment
- Form 5 – Drilling Completion Report
- Form 5A – Completed Interval Report
- Form 6 – Well Abandonment Report
- Form 15 – Earthen Pit Report/Permit
- Form 17 – Bradenhead Test Report
- Form 41 – Trade Secret Claim of Entitlement
- Form 42 – Notice of Notification (Notice of Hydraulic Fracturing)

With eForms, COGCC staff is able to review the forms and attachments electronically. Each staff member involved in the process then approves their portion of the form (i.e. spacing, engineering, etc.) online. Paper files are not generated for these new permits. Multiple approvals are required on each form. As a form is working its way through the COGCC review process, the public is able to track the status of the form through the use of the public user interface. The IT staff is currently converting additional COGCC Forms to the electronic format.

### **Environmental Database**

COGCC developed and maintains a publicly-available, searchable database of groundwater and soil sample analytical results from throughout the state. The environmental database was developed in 2011 and 2012, and went “live” in September 2012. Historic sampling data received from several sources dating back many years is being migrated to the new database. We anticipate the data migration will be complete in early 2013. Once complete, data for over 12,000 sample locations and 27,000 individual samples will be available to the public. New data will be continuously added to the database.

The data can be accessed through the GIS Online map. Sample locations with available water quality data appear as blue triangles when the Water-Gas Sample layer is turned on. The user can double click on a sample site and gain access to the analytical data for that site. An example analytical report is shown below:

**COGIS - Environmental Sample Site Information**

**#752138 Information**

Sample Site ID: 752138  
 Facility Type: GW  
 County: ARAPAHOE - #005  
 Elevation:  
 DWR Receipt #: 3654356

Proj Number:  
 Location: SESE 27 4s 64w  
 Lat/Long: 39.6674/-104.53084  
 Well Depth: 700

**COGCC Water Quality Database Disclaimer:**  
 The analytical data and other information in this database are a compilation of data collected by COGCC staff, data submitted to COGCC from a variety of third parties, and historical data. All analytical data collected by or submitted to the COGCC is public information and COGCC posts the data to this database as a public service. The data is provided for informational purposes only. COGCC does not conduct a detailed review of quality control/quality assurance protocols, chain of custody procedures, or field or laboratory methodologies on data received from third parties. The level of review performed on historical data is unknown. COGCC does not regularly perform formal data validation for any of the data posted to this database. **The COGCC makes no warranties or representations of any kind, express or implied, regarding the quality, accuracy, reliability, merchantability, or fitness for a particular purpose of the data provided herein.**

Sample(s)

All

Sample ID: 530426 Sample Date: 9/7/2012 Matrix: WATER Lab:

Sample Results for Sample # 530426 - Minimize					
Methodcode	ParamDescription	ResultValue	Units	DetectionLimit	Qualifier
E300.0	BROMIDE	0.25	mg/L	0.2	
E300.0	CHLORIDE	13	mg/L	3	
E300.0	FLUORIDE	0.85	mg/L	0.5	
E300.0	SULFATE	53	mg/L	25	
E353.2	NITRATE/NITRITE	ND	mg/L	0.1	<
RSK175	METHANE	16000	ug/L	10	
SAR-FA029R1	SODIUM ADSORPTION RATIO	3.1	No Unit	0.4	

The current dataset is comprised of water quality data received since the beginning of 2007; data for 7,800 samples from wells and other sampling locations such as springs is available. The database allows for electronic data deliverables to be used for input. New samples from COGCC staff sampling efforts, current COGCC baseline sampling rules, and the COGA Voluntary Baseline Sampling Program are currently being uploaded.

## Document Imaging

LaserFiche allows for improving functionality with respect to uploading and indexing images. The system provides users with tools to sort and query the image repository in ways that were not previously possible.

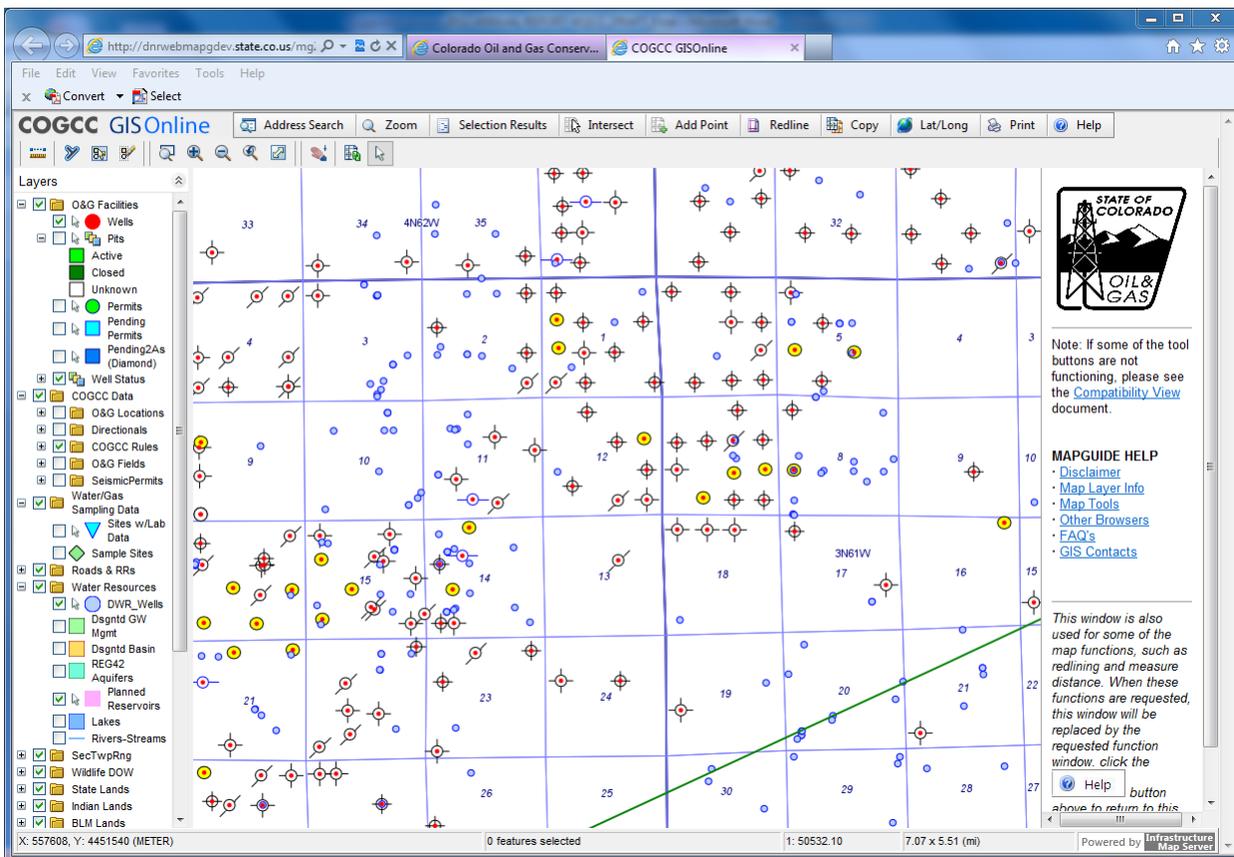
## GIS

The GIS Online map continues to be a critical application that staff, industry, other agencies, and the general public depend on to process permits, create reports and to view information that can assist in exploration programs, or address environmental concerns. Additionally, certain rules require industry to view the online map to determine if a proposed location falls within a CDPHE 317B Buffer Zone, a Sensitive Wildlife Habitat (SWH), and/or a Wildlife Restricted Surface Occupancy (RSO) Area.

The GIS Online map contains over 150 map layers including oil and gas wells, permits, spacing orders, field boundaries, and a number of base layers such as cities, rivers, roads, sections, land ownership, etc. Aerial photos, topographic quads, and geologic maps are displayed as

images in the map.

A new build of the mapping application (GIS Online 2012) will be deployed in January 2013. The new version allows a user to zoom to a street address, has improved printing functionality, and includes a live connection to the environmental database sample sites. A screen shot of the new map is provided below:



## Online Access to Baseline and Special Studies Reports

The written reports for COGCC managed baseline sampling projects and other special environmental studies, such as the Water Well Booklet and Water Quality Trend and Data Analysis for the San Juan Basin are posted on the website under the “Library” tab where they are primarily organized by basin. Many of these reports are in PDF format and can be downloaded. COGCC is in the process of redesigning the website so that these documents can be more easily located and reviewed.

## Industry Services

The COGCC continues to promote its mission to foster the responsible development of Colorado’s oil and gas natural resources by providing information and assistance in complying with the COGCC rules and requirements. Our expanded website and GIS capabilities support this mission.

## **Industry Compliance/Violations/Penalties**

In 2012, the COGCC continued efforts to reduce a backlog of enforcement matters. The Commission assessed penalties totaling approximately \$287,600 against 10 operators for violations of rules and orders. Another \$5,500 worth of bonds were called.

## **Underground Injection Control (UIC)**

COGCC staff continues to work with WQCD and EPA staff to ensure that operators of Class II injection wells in Colorado are in compliance with ground water standards and classifications, and that points of compliance are established. In addition, the Colorado Geologic Survey is consulted on site specific matters, such as the occurrence of faults and potential seismic issues. Current injection operations in the Raton Basin are being studied to evaluate how injection of produced water may relate to local seismicity.

COGCC approved 24 Class II UIC well permits during 2012. One permit was denied because staff concluded that protection of the overlying underground sources of drinking water (USDW) could not be assured. The applicant appealed staff's denial to the Commission, which upheld staff's decision unanimously. The COGCC staff was supported in this hearing by assistance of WQCD staff.

## **Voluntary Baseline Groundwater Quality Sampling Program**

The Colorado Oil and Gas Association (COGA), in cooperation with COGCC, developed a Voluntary Baseline Groundwater Quality Sampling Program that went into effect January 1, 2012. It is open to all oil & gas operators throughout the state and provides a standardized program for baseline and post-drilling and completion sampling and analysis of domestic water wells and other groundwater features such as seeps and springs. COGCC acts as custodian of the data generated from the sampling program. This voluntary program does not exempt oil and gas operators from the mandatory groundwater monitoring required in the Greater Wattenberg Area by Rule 318A.e.(4), or the Rule 608.b. requirements for coalbed methane wells or other existing field-wide orders.

During 2012, several oil and gas operators performed voluntary baseline ground water sampling and provided analytical data to COGCC. These operators are actively developing the Niobrara Formation in northern Weld County and collected samples from over 300 domestic water wells in this area.

## **Pending Rulemaking - Statewide Groundwater Baseline Sampling and Monitoring**

The COGCC, through numerous orders, rules and conditions of approval, has required water well sampling and monitoring in various parts of the State. In November, the Commission initiated rulemaking upon the staff's recommendation to consider adopting a statewide groundwater baseline and monitoring rule. The proposed sampling rule will provide the COGCC with a mechanism to obtain data consistently across the state. The data will be used to establish pre-drilling groundwater quality. Subsequent monitoring data will assist in determining whether oil and gas operations have had any impact on groundwater quality and that impacts, should they occur, are quickly identified and mitigated. A copy of proposed Rule 609 is available on the COGCC Internet homepage.

## **How Well Do You Know Your Water Well**

The brochure, *How Well Do You Know Your Water Well*, has been updated and revised to include information about mitigating methane in water wells, current contact information for various agencies, and water well maintenance and record keeping. COGCC provides this useful brochure to water well owners when water samples are collected from their wells by COGCC, operators, or third party contractors. The update project was initiated by the Colorado Oil and Gas Association (COGA) with support from the COGCC and cooperation of CDPHE and DWR. An electronic version of the brochure is available in the Library section of the COGCC website.

### **3.0 COGCC COORDINATION WITH WQCD/WQCC**

In 2012 the COGCC, WQCD, and WQCC staff and commission representatives met 4 times (quarterly). Craig Wiant is the WQCC representative at these meetings.

### **4.0 OIL & GAS EXPLORATION & PRODUCTION ACTIVITY IN COLORADO BY REGION/FIELD**

This section summarizes oil and gas activities within Colorado by region, and highlights COGCC studies, issues and concerns relating to ground water. In each region there are remediation projects of various sizes and types in which impacted soils and/or ground water are being investigated or cleaned up by operators. Not all of the projects are described in this report. The COGCC environmental staff directs and monitors these projects, as described in Section 1.

#### **4.1 SOUTHWEST COLORADO**

##### **Oil and Gas E&P Activity**

Most of the gas produced in the southwestern part of Colorado comes from coalbed methane (CBM) wells. Drilling activity has decreased in response to lower gas prices throughout the region. In 2012 approximately 107 permits for new wells and recompletions of existing wells were approved. Currently there are approximately 3,343 active wells in La Plata County. These wells produce approximately 1.02 billion cubic feet (bcf) of natural gas per day, which is approximately 25% of the total gas production in the state. Also, there are approximately 485 active oil, gas, and carbon dioxide wells in five other southwestern Colorado counties: San Miguel, Dolores, Montezuma, Montrose, and Archuleta. Approximately 270 bcf of carbon dioxide is produced from wells in Montezuma and Dolores Counties. This is approximately 96% of total carbon dioxide production in the state.

##### **Public Involvement**

In 2000, the COGCC established the Gas and Oil Regulatory Team (GORT) to provide a forum for meaningful dialogue between operators, citizens, county and local governments, the Southern Ute Indian Tribe, the Bureau of Land Management (BLM), the US Forest Service (USFS), and the COGCC. Members of this group continue to fund and provide technical support for the ongoing monitoring and mitigation of methane seeps along the Fruitland Coal outcrop.

In July 2006 the USFS and BLM issued the final Environmental Impact Statement (EIS) for the Northern San Juan Basin. As an outgrowth of the EIS process, the USFS and BLM established the Northern San Juan Basin Stakeholders Group to provide a forum similar to the GORT group,

but one that more directly addresses issues relating to oil and gas development within the EIS geographic area.

### **Ground Water and Other Environmental Issues**

As a result of COGCC Orders 112-156 and 112-157 and numerous subsequent orders related to CBM development in the San Juan Basin, operators have collected more than 7,000 water samples from more than 2,128 water wells. The analytical results have been submitted to the COGCC and to the land owners. To date, no systemic impacts to groundwater quality related to drilling and production from CBM wells has been detected. As a result of the December 2008 rulemaking, water well sampling in advance of CBM development is now required statewide by COGCC Rule 608.

### **Citizen Complaints, Spills and Other Issues Regarding Ground and Surface Water**

The COGCC received 11 complaints alleging impacts from oil and gas operations in La Plata, Rio Grande and Montezuma Counties. Four complaints alleged impact to water wells or requested baseline sampling. Of these, three were determined to be unrelated to oil and gas activities and one is still under investigation.

The COGCC received five complaints regarding other environmental damage or operational issues. Of these, four were noise complaints and one was a livestock mortality issue. Of the four noise complaints, three were closed with no violation noted and one resulted in a Notice of Alleged Violation (NOAV). The livestock death was not linked to any oil & gas activity.

Nineteen spills/releases of E&P waste were reported in La Plata, Montezuma, and Dolores Counties during 2012. Of these, three were releases to surface water; two into dry channels and one into an irrigation ditch. Both of the releases to dry channels were investigated and closed with no impact identified. The release to the irrigation ditch is currently under assessment and remains open. Four of the remaining spill cases were on SUIT land and were addressed by the SUIT; one was on BLM surface and has been addressed by the BLM. Three spills resulted from truck spills, all which were assessed, cleaned up and closed. One spill involved non-E&P waste at a compressor site and assessment and cleanup was addressed through the CDPHE.

COGCC received over 50 requests for baseline water well testing near a proposed well pad in Rio Grande County. These requests are being catalogued and a testing program will be conducted in advance of the proposed drilling activities. The APD was approved by COGCC in 2012, is currently under review for a Federal (BLM) permit, and still requires a County permit. Rio Grande County implemented a drilling moratorium in 2012 pending results of a regional hydrogeologic study that is in progress.

COGCC staff in southwest Colorado continues to work with area operators to systematically assess the status of "pits" in the COGCC database throughout the region. In 1995 operators were required to submit an inventory of all of the "pits" they operated. In addition to pits, some operators reported containment vessels, including partially buried steel and fiberglass tanks, and these were entered into the database as "pits". The intent of this assessment is to update the database to accurately reflect waste management facilities previously and currently used in the San Juan Basin.

## **4.2 NORTHWEST COLORADO**

### **Oil and Gas E&P Activity**

Northwest Colorado continues to experience a high level of oil and gas activity, especially in Garfield, Mesa, and Rio Blanco Counties. Northwest Colorado drilling permits account for approximately 35% of the state total (27% in Garfield County, 5% in Mesa County, and 3% in Rio Blanco County). The driving force behind this active development continues to be the extensive natural gas reserves in the Piceance Basin, and an expanding pipeline infrastructure that enables improved marketing of natural gas from the area.

### **Public Involvement**

The Northwest Colorado Oil and Gas Forum (NWCOGF) meets quarterly. The NWCOGF is an important forum for the discussion of oil and gas issues and concerns at the local level. The participants include the COGCC, other State, Federal, and local government agencies, the oil and gas industry, and concerned landowners and citizens. Meetings are well attended by the various stakeholders.

### **Environmental Issues**

COGCC staff investigated citizen and other agency's complaints and responded to requests for baseline sampling, processed and tracked spill/release reports submitted by operators, followed up on the findings of COGCC field inspections, and conducted other environmental studies in northwestern Colorado. In accordance with the MOA for Response to Spills/Releases to Surface Water, the COGCC notifies the CDPHE of releases impacting waters of the state. In all cases where ground water was impacted, operators were required to conduct a site investigation and perform appropriate remediation to comply with COGCC requirements.

### **Groundwater and Surface Water**

The COGCC investigated a number of complaints about releases of exploration and production (E&P) waste that either impacted or threatened to impact ground water in northwestern Colorado. COGCC staff and third party contractors collected water samples from 11 water wells and four surface water bodies for laboratory analysis. COGCC staff determined the water wells and surface water body had not been impacted by oil and gas operations.

There were three spill/releases of E&P waste fluids that impacted either surface water or dry drainages leading to surface water. CDPHE was notified by the COGCC in accordance with the MOA for Response to Spills/Releases to Surface Water.

### **Enforcement Related to Impacts to Ground Water, Surface Water, and Springs**

In 2008, spills and releases of E&P waste at several locations on the Roan Plateau impacted springs, ground water, and surface water. Investigation, remediation, and enforcement have continued since then. During 2012, enforcement actions were taken against three operators related to impacts to surface and ground water and springs. These matters were resolved by Administrative Orders by Consent. COGCC staff consulted with WQCD Enforcement Group during the resolution of these matters. Total fines in the amount of \$133,000 were provided to the Middle Colorado River Watershed Partnership to help fund a watershed assessment and to support an application by the Colorado River Conservation District to the EPA for matching funds pursuant to Section 319(h) of the Clean Water Act.

## **Drilling Near Project Rulison Test Site**

In 1969, the Atomic Energy Commission, a predecessor to the U.S. Department of Energy (DOE), conducted three experiments on the use of nuclear devices to enhance natural gas production from wells. One of those projects, known as Project Rulison, was conducted in Garfield County. The well in which an approximately 40-kiloton nuclear device was detonated is located on Battlement Mesa. The device was detonated at a depth of 8,426 feet, the deepest nuclear detonation ever performed in the United States.

In 2005, Presco Corporation (PRESCO) submitted APDs for, and began drilling, a number of wells in Garfield County in the vicinity of Project Rulison, but outside the 0.5 mile buffer zone established by the COGCC. To address concerns regarding the potential for new gas wells to intercept materials impacted by the nuclear test, PRESCO agreed to conduct a monitoring program to test for radionuclides. This monitoring program included background monitoring of non-impacted gas and water from the Williams Fork Formation and overlying formations, surface and ground water in the vicinity, and monitoring of drilling mud, cuttings and gas brought to the surface during drilling, completion, and production at selected locations. Reports summarizing the results of the 2004 Baseline and the 2005 and 2006 Annual Water Sampling activities conducted by PRESCO were submitted to the COGCC. PRESCO also submitted reports summarizing the results of Gas Well Drilling Monitoring activities to the COGCC.

In 2008, Noble Energy, Inc., Williams Production RMT, and EnCana Oil & Gas USA agreed to voluntarily prepare and submit a consolidated Rulison Sampling and Analysis Plan (RSAP) to monitor gas wells whose bottom-hole locations are within a three-mile radius of the detonation site. Compliance with the RSAP became a condition of approval for Applications for Permit to Drill (APDs) issued within a three-mile radius of the detonation site. To date, samples have been collected for laboratory analysis from 16 Tier I wells and 63 Tier II wells. There have been a total of 244 samples from Tier I locations and 265 samples from Tier II locations. Various media including produced water, natural gas, drilling mud, flowback fluid, drill cuttings, and frac fluid have been sampled and analyzed. Rulison related constituents have not been detected in any of the samples.

Quarterly and annual reports from 2006 to the present have been submitted by Noble Energy, Inc., EnCana Oil & gas (USA), Inc., Williams Production RMT, Inc., and Laramie II, LLC. These reports, as well as the PRESCO reports are available on the COGCC website, [www.cogcc.state.co.us](http://www.cogcc.state.co.us) under Library.

In June 2010, The U.S. Department of Energy – Office of Legacy Management (DOE-OLM) completed a Final Rulison Path Forward report. DOE developed the path forward report as guidance for their discussions with Colorado state regulators and other interested stakeholders in response to increased drilling for natural gas reserves in the vicinity of the Project Rulison test site. COGCC and CDPHE staff reviewed the report and their comments are being incorporated by DOE-LM. The Draft Path Forward Report is available on the DOE-LM website at <http://www.lm.doe.gov/land/sites/co/rulison/rulison.htm>.

In July 2010, Noble Energy, Inc., EnCana Oil & Gas (USA), Inc., and Williams Production RMT, Inc. prepared revision 3.0 of the RSAP. The current RSAP, review comments from COGCC, CDPHE, DOE, and other interested parties, quarterly monitoring reports, annual monitoring reports, and annual audits done by the COGCC are available on the COGCC website ([www.cogcc.state.co.us](http://www.cogcc.state.co.us)) under Library, Piceance Basin.

In calendar year 2012, 70 spring, surface water, and water well samples were collected as part of the annual Rulison environmental sampling performed by Noble. Rulison related constituents

were not been detected.

### **Drilling Near Project Rio Blanco Test Site**

Project Rio Blanco is the site of the detonation of three  $30 \pm 3$ -kiloton nuclear devices at depths of 5,838, 6,230, and 6,689 feet below ground that occurred on May 17, 1973. The oil and gas operators, in consultation with other affected working interest owners, have voluntarily agreed to a drilling moratorium within the area between the 600-foot Department of Energy (DOE) exclusion zone and a ½-mile radius of Project Rio Blanco until additional radiological data have been collected outside of this zone to demonstrate that gas drilling, completion, and production can be safely accomplished.

The operators also agreed to a voluntary drilling exclusion zone around the Fawn Creek Government No. 1 (FCG No. 1) well where radioactively-contaminated water produced from the Rio Blanco test well was injected into an interval between 5,360 and 6,072 feet below the ground surface. Although the federal government did not implement a drilling exclusion zone around FCG No. 1, the voluntary drilling exclusion zone around this well will be maintained until sufficient radiological data have been collected to confirm that radionuclides at the FCG No. 1 well have not migrated to producing gas wells outside this zone. Under the voluntary drilling exclusion zone, the operators propose to limit drilling and gas production within a 600-foot radius of the FCG No. 1 well to a true vertical depth of 6,500 feet below ground surface. FCG No. 1 is also within the ½-mile voluntary drilling moratorium area discussed above.

The COGCC has adopted special procedural requirements regarding APDs in the Project Rio Blanco area. The COGCC collaborated with the CDPHE, BLM, DOE, Rio Blanco County, operators and surface owners in the preparing and releasing version 1.0 of the Rio Blanco Sampling and Analysis Plan (RBSAP). The SAP and related information and correspondence are available on the COGCC website, [www.cogcc.state.co.us](http://www.cogcc.state.co.us) under Library. Additionally, an email address has been set up to convey Project Rio Blanco related information. That address is: [RioBlanco.submittal@state.co.us](mailto:RioBlanco.submittal@state.co.us). In the calendar year 2011, there was no drilling near Project Rio Blanco; however, one well is scheduled to be plugged and abandoned in 2012.

## **4.3 NORTHEAST COLORADO**

### **Oil and Gas E&P Activity**

Oil and gas activity in the northeastern portion of the state remains high with continued interest in oil production from the Niobrara Formation using horizontal wells. In 2011, approximately 48% of the total well permits approved by the COGCC were issued to operators in Weld County, which has the largest number of active wells (approximately 19,000) in the State. Smaller oil and gas fields with lower levels of activity are located in other counties throughout northeast Colorado. In 2012, approximately 250 billion cubic feet (BCF) of gas were produced in northeast Colorado (approximately 20% of the total gas production for the state) and approximately 26 million barrels (bbls) of crude oil were produced (approximately 72% of the total crude oil production for the State).

### **Public Involvement**

COGCC staff continues to receive and follow up on complaints and requests for presentations and participation in public meetings from local governments and the public throughout northeastern Colorado.

One example of public involvement was a presentation provided to members of the Colorado Environmental Crimes Task Force by Engineering Manager, Stuart Ellsworth and Environmental Protection Specialist John Axelson. The presentation provided information on hydraulic fracturing, the life cycle of an oil and gas well and covered COGCC regulations, enforcement and environmental issues.

### **Enforcement Issues**

COGCC staff discovered an unreported release at an oil well in Washington County. After contacting the operator to notify them of appropriate reporting and cleanup requirements, the operator still failed to take appropriate actions. The failure to properly report and cleanup the spill resulted in a Notice of Alleged Violation (NOAV) that ultimately led to an Administrative Order by Consent, Cause No. 1V, Order No. 1V-398. The operator was ordered to pay a \$25,000 fine and complete all corrective actions to properly remediate the location. As part of the agreement, the operator also closed unlined earthen skim pits at four leases in Washington County and is in the process of remediating all impacts associated with those pits. COGCC staff continues to work with operators in northeast Colorado to voluntarily bring unlined earthen skim pits into compliance.

COGCC staff is currently pursuing enforcement measures against several other operators in northeast Colorado for a variety of environmental violations such as failure to report releases, improper management of E&P waste and failure to properly remediate impacts from spills and releases. In addition, COGCC staff continues to issue NOAVs for a variety of rule violations and are generally successful in resolving corrective actions without any additional enforcement measures beyond the NOAV.

### **Environmental Issues**

COGCC staff investigated citizen and other agency's complaints and responded to requests for baseline sampling, processed and tracked spill/release reports submitted by operators, and followed up on the findings of COGCC field inspectors. In accordance with the MOA for Response to Spills/Releases to Surface Water, the COGCC notifies the CDPHE of releases impacting surface water. COGCC staff and third party contractors collected water samples from 39 water wells and one surface water body for laboratory analysis.

### **Groundwater**

In all cases where groundwater was impacted, operators were required to conduct site investigations and perform appropriate remediation to comply with COGCC requirements. In addition, the COGCC continues to oversee the investigation and remediation of contaminated soil and ground water associated with gas plants and compressor stations throughout northeast Colorado.

## **4.4 SOUTHEAST COLORADO**

### **Oil and Gas E&P Activities**

Southeastern Colorado produces conventional gas, CBM gas, carbon dioxide and crude oil from several basins, including the Raton Basin, the southern portion of the D-J Basin, the Cañon City Embayment, and the Hugoton Embayment. There are approximately 4295 active wells within the nineteen county region. Approximately 2,905 and 311 of the active wells are located in Las Animas and Cheyenne Counties, respectively. Approximately 115 billion cubic feet (bcf) of

natural gas, 11 billion cubic feet of carbon dioxide and 2,300,000 bbls of oil were produced in this region during 2012. Approximately 83% of the gas was produced from the 2,905 CBM wells in Las Animas County and approximately 53% of the oil was produced from wells in Cheyenne County. The 11 billion cubic feet of carbon dioxide was produced from wells in Huerfano County. This is approximately 4% of the total amount of carbon dioxide produced in the state.

A total of 120 drilling permits were issued for oil and gas wells in southeastern Colorado in 2012. Approximately 68% of the 164 were issued in four counties (25% in Lincoln County, 20% in Cheyenne County, 14% in El Paso County and 9% in Kiowa County).

Approximately 81,000,000 barrels of produced water were generated in southeast Colorado during 2012. Eighty-four percent of the produced water was generated from CBM wells in Las Animas County. Produced water is managed by underground injection, CDPS permitted surface water discharge, and in evaporation/percolation pits. There are 93 active injection (UIC) wells in this region; 40 in Cheyenne County, 22 in Las Animas County, 14 in Baca County, nine in Kiowa County, and eight additional UIC wells in other counties in Southeastern Colorado. There are also 57 UIC wells in Baca County used as part of an active gas storage field.

### **Public Involvement**

COGCC staff participated as a stakeholder in the Colorado Water Quality Forum Agricultural Diversion Work Group held in previous years. The work group consisted of representatives from the oil and gas industry, the Colorado Water Quality Control Division (WQCD), irrigators, the agriculture community and wastewater treatment facilities. Permits, including narrative standards that were discussed by this group to protect agricultural interests, have been issued to four operators in the Raton Basin. Norwest Applied Hydrology (on behalf of Pioneer Natural Resources) installed and maintains continuous monitoring stations in the Apishapa River drainage in an attempt to better define possible impacts from WQCD permitted discharges of CBM produced water into the waters of the state. Temperature, conductivity and pressure are monitored at 3 locations in the watershed. Local irrigators have access to data collected from these stations ([www.apishapawatershed.org/](http://www.apishapawatershed.org/)).

The measurement of pressure can be used to estimate flow. The conductivity of the water can be used to calculate sodium adsorption ratio (SAR) by comparison with laboratory measured sodium, calcium and magnesium concentrations collected on a monthly basis. Three oil and gas operators installed a similar nine station continuous monitoring network in the upper Purgatoire River drainage as part of an effort to gather information that might aid them in understanding whether there are impacts from discharging produced water from CBM wells under CDPS permits issued by the WQCD ([www.purgatoirewatershed.org/](http://www.purgatoirewatershed.org/)).

### **Environmental Issues**

COGCC staff investigated citizen complaints and followed up requests for baseline water sampling, investigated the findings of COGCC field inspections, and conducted special projects and emergency response actions. The citizen complaints included investigating water wells, sampling produced water, investigating pit overflows and leaks, sampling springs and soil. The special projects included two ground water monitoring projects, soil sampling at an abandoned pit, and gas sampling at two leaking orphaned gas wells.

### **Groundwater**

Forty-two water wells were sampled during 2012. Two water wells were sampled twice as part

of continuing investigations of impacts from CBM operations in Huerfano County. These Huerfano County water wells were also sampled by U.S. EPA and operators as part of the EPA's national study of potential impacts from hydraulic fracture well completion practices.

### **Springs**

No impacts to springs were observed in the 2012.

### **Surface Water**

There were three spill/release events in which E&P waste entered surface water. E&P waste spilled was mainly CBM produced water. These three events occurred within the Raton Basin. WQCD staff was notified as required under the MOA between WQCD and COGCC. There were six additional spills that reached dry arroyos that were reported as spills impacting waters of the state. One spill from a leaking lined pit may have impacted groundwater nearby as discussed above.

### **Stormwater and Surface Water Complaints**

One complaint alleging inadequate implementation and maintenance of stormwater best management practices along a lease road was investigated. In this case, the operator had installed and maintained sediment traps and other filtering BMP's and successfully performed interim reclamation and maintained the installed BMPs following issuance of a Notice of Alleged Violation.

### **Alleged Impacts from Hydraulic Fracture Stimulation (Fracing)**

The Raton Basin in southeastern Colorado was one of several areas chosen by the U.S. EPA for a retrospective study of hydraulic fracture well completion practices and possible impacts. COGCC is working with EPA staff and operators on the Colorado portion of the study. Samples of groundwater, produced water and surface water were collected from approximately 20 sites by EPA staff in May and again in November 2012.

### **Baseline Sampling**

Thirteen water wells in Fremont County were sampled at the request of landowners to establish baseline conditions prior to drilling. A baseline sampling and analysis report for 25 water wells in Elbert County was prepared in 2012 and is available on the COGCC website library pages for the Denver-Julesburg Basin.

### **Huerfano County Methane in Water Wells**

As part of the ongoing investigation, monitoring, and mitigation efforts conducted by a CBM operator in response to impacts to water wells. The operator's CBM wells were plugged and abandoned this year after remaining shut-in since July, 2007. The remediation system consisting of three removal wells and eight injection wells was also shut down this year. The operator has installed and tested passive mitigation systems at three homes in accordance with orders adopted by the Oil and Gas Conservation Commission in September 2011. Installation and testing of an active methane mitigation system at one home is still underway.

## **Orphaned Wells and Sites**

Five orphaned wells in Fremont County were plugged by the COGCC in 2012. Several other orphaned oil wells have been identified for future plugging by the COGCC. COGCC staff will be developing a program to systematically search for additional orphaned wells that may pose a threat to public health, safety, and welfare.

**APPENDIX 1**

**COGCC COMMISSIONERS**

### Colorado Oil & Gas Conservation Commission Statutory Requirements

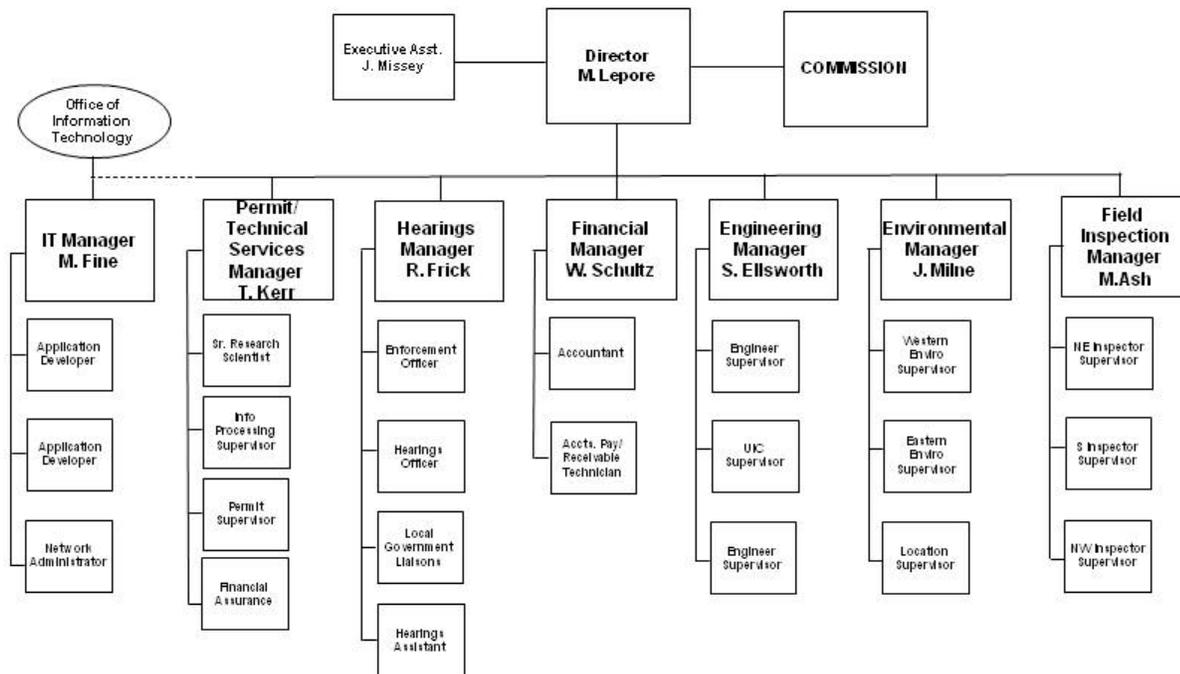
\*Please note that information within parentheses is additional background information and not a statutory requirement

Commissioner (Officer)	2 Executive Directors (ex-officio voting members) (Current Employment)	2 West of Continental Divide (Resident County)	3 with Substantial Oil & Gas Experience (Employed by Oil & Gas Industry) (Current Employment)	2 Out of 3 Must Have a College Degree in Petroleum Geology or Petroleum Engineering	1 Local Government Official (Current Employment)	1 with Substantial Environmental or Wildlife Protection Experience (Current Employment)	1 with Substantial Soil Conservation or Reclamation Experience (Current Employment)	1 engaged in Agricultural Production and a Royalty Owner (Current Employment)	Maximum of 4 from Same Political Party (excluding Executive Directors)	Current Term Expires
Richard Alward		X (Mesa)					X (Ecologist)		D	7/1/2015
Tom Compton Chairman		X (La Plata)						X (Rancher)	R	7/1/2015
Tommy Holton		(Fort Lupton)			X				R	7/1/2015
John Benton		(Littleton)	X	X					R	7/1/2015
W. Perry Pearce Vice Chair		(Denver)	X						D	7/1/2015
DeAnn Craig		(Denver)	X	X					R	7/1/2012
Andrew Spielman		(Denver)	X			X			D	7/1/2015
Mike King	X (Department of Natural Resources)	(Denver)								
Chris Urbina	X (Department of Public Health and Environment)	(Denver)								

Commissioner requirements are set by statute in the Oil and Gas Conservation Act at §34-60-104 (2) (a)(1), C.R.S. (Current as of 09-19-2011)

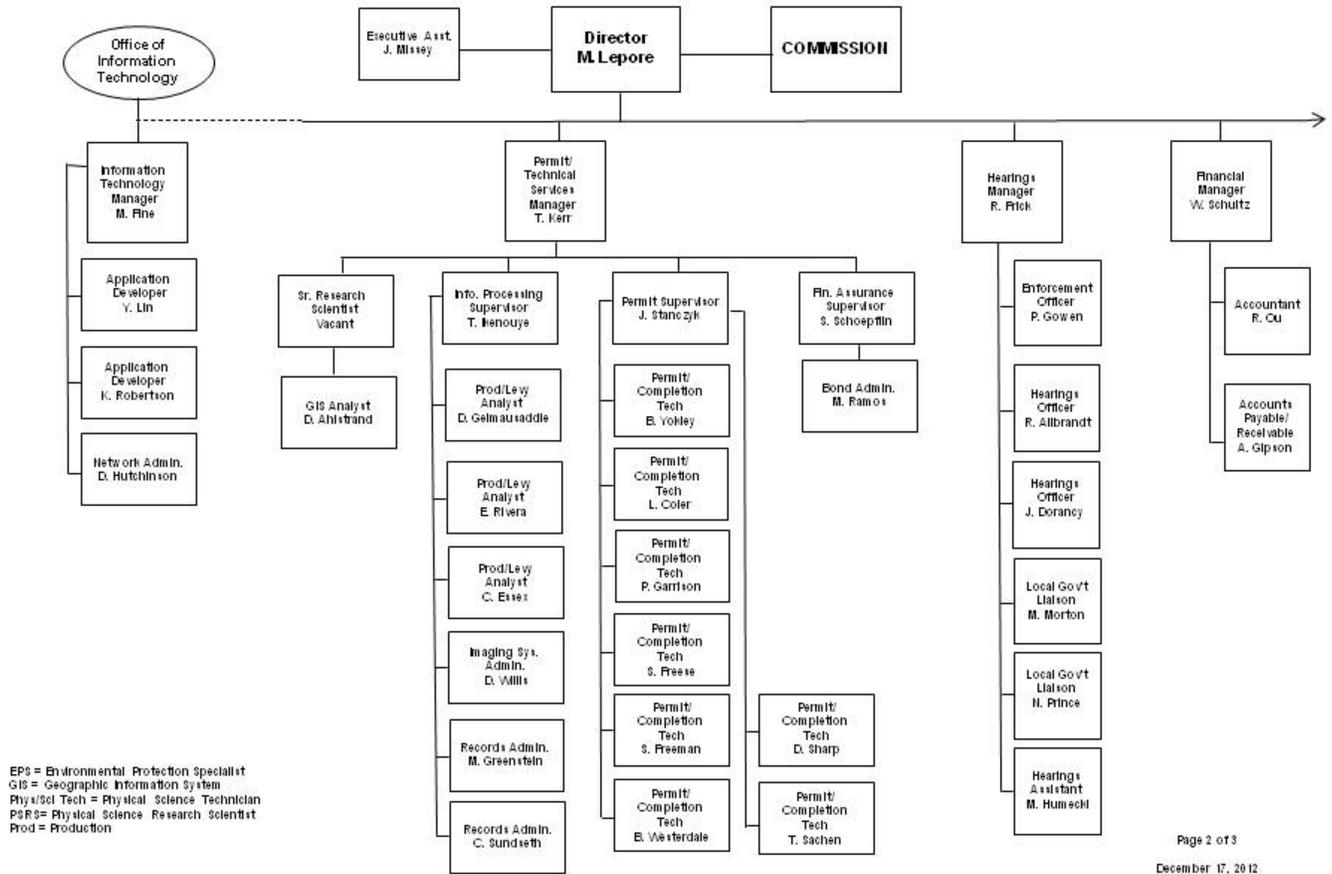
**APPENDIX 2**  
**COGCC ORGANIZATION CHART**

**COLORADO OIL & GAS CONSERVATION COMMISSION**



**See the next two pages for details**

# COLORADO OIL & GAS CONSERVATION COMMISSION ORGANIZATION



# COLORADO OIL & GAS CONSERVATION COMMISSION ORGANIZATION

