

**FY 2006-2007 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**

NOVEMBER 2007

TABLE OF CONTENTS

1. **INTRODUCTION**..... 1

2. **2007 LEGISLATION** 1

2. **COGCC ORGANIZATION AND FUNCTIONS** 1

 Public Outreach and Communication 1

 COGCC Commissioners..... 2

 COGCC Staff..... 2

 COGCC Environmental Unit 2

 A. Spill/Release Response 3

 B. Complaint Response 3

 C. Remediation Projects 3

 D. Pit Program..... 3

 E. Permitted Centralized Waste Management Facilities 4

 F. Disposal and Reuse of Produced Water 4

 G. Onsite Inspections..... 4

 Oil and Gas Conservation and Environmental Response Fund..... 5

 Data Management and Geographical Information Systems (GIS)..... 6

 Industry Services..... 7

 Industry Compliance/Violations/Penalties..... 7

 Underground Injection Control (UIC) 7

3. **COGCC COORDINATION WITH WQCD/WQCC**..... 7

4. **RULEMAKING** 7

5. **OIL & GAS EXPLORATION & PRODUCTION ACTIVITY IN COLORADO BY REGION/FIELD**..... 8

 SOUTHWEST COLORADO 8

 NORTHWEST COLORADO 11

 NORTHEAST COLORADO 14

 SOUTHEAST COLORADO 16

LIST OF APPENDICES

1. Commissioner Biographies
2. COGCC Organization Chart
3. Geographic Areas of Technical Responsibilities

1. 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, which are subject to the jurisdiction of the COGCC.

This sixteenth 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. 2007 LEGISLATION

HB 07-1180: Requires the COGCC to promulgate rules ensuring the accuracy of oil and gas measurement and reporting.

HB 07-1298: Requires the COGCC to minimize adverse impacts to wildlife and promulgate rules in consultation with the Division of Wildlife.

HB 07-1341: Changes the make up of the COGCC commission and requires the COGCC to promulgate rules in consultation with the Department of Public Health and Environment (CDPHE).

SB 7-121 (postponed indefinitely): Proposed to have oversight of commercial oil and gas exploration and production waste management facilities transferred from CDPHE Solid Waste to the COGCC.

SB 07-198: Appropriated funding for coalbed methane monitoring and mitigation projects in La Plata and Archuleta Counties.

HB 07-1252: Concerning the accommodation of the rights of surface owners with respect to oil and gas operators.

3. COGCC ORGANIZATION AND FUNCTIONS

Public Outreach and Communication

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

- Ten staff reports are prepared for submittal to 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.
- A toll free telephone number (888-235-1101) to the Denver office has been established as

a complaint hotline for citizen use.

The Commission is committed to attempting to hold at least three of its 10 hearings outside Denver each year. We continue to be successful in securing funding for these trips as part of our annual budget. In FY 2006-2007 the COGCC held two (2) of its ten (10) hearings outside of Denver: one (1) in Meeker and one (1) in Trinidad. The June 2007 hearing was cancelled because there was not a quorum of Commissioners.

- The COGCC continues to solicit participation on all levels from stakeholders - those representing the oil and gas industry, local government, citizens, other agencies, agriculture, and the environmental community.
- The COGCC continues to expand our internet presence. In addition to being able to access oil and gas well data, users are able to access information regarding pits, spills/releases, complaints, and remediation projects on the web. 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.

COGCC Commissioners

The Colorado Oil and Gas Conservation Act, as amended by HB 07-1341, requires a total of nine (9) Commissioners to represent the COGCC. HB 07-1341 also includes the following requirements for the members on the commission: two (2) 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; three (3) members are to have substantial experience in the oil and gas industry and two (2) of these must have college degrees in petroleum geology or petroleum engineering; one (1) member must have formal training or substantial experience in environmental or wildlife protection; one (1) member must have formal training or substantial experience in soil conservation or reclamation; and one (1) member must be actively engaged in agricultural production and also be a royalty owner. Biographical sketches of the COGCC Commissioners are included in Appendix 1.

COGCC Staff

The COGCC has fifty five (55) employees as shown on the organization chart included in Appendix 2. COGCC staff now includes eight (8) engineers/engineers-in-training, nine (9) field inspectors, one (1) engineering/environmental technician in the Engineering Unit, and nine (9) environmental protection specialists (EPS) in the Environmental Unit. Three (3) of the engineers/engineers-in-training and the nine (9) field inspectors are located in offices in Battlement Mesa, Broomfield, Cheyenne Wells, De Beque, Durango, Greeley, Parachute, Rifle, Sterling, and Trinidad, which helps to maximize their available field inspection time. In addition, one (1) of the environmental protection specialists (EPS II) is located in Brighton, one (1) in Durango, one (1) in Rifle, and one (1) in Trinidad, which helps to maximize their complaint response time and ability to identify and address other potential environmental issues related to oil and gas development. The map included in Appendix 3 shows the geographical areas of responsibility assigned to the engineer/inspector and the environmental staff.

COGCC Environmental Unit

The COGCC environmental staff is comprised of six (6) EPS IIs, two (2) Environmental Supervisors, and one (1) Environmental Manager, all of whom have professional experience and expertise in environmental issues associated with oil and gas operations, hydrogeology and geology. We continue to handle questions, concerns, problems, programs, and issues relating to the oil and gas industry's impact on the environment, and public health safety and welfare. In

addition, one (1) of the EPS II also implements the COGCC's Onsite Inspection Policy, which is discussed in more detail in Part G. The environmental staff works closely with the COGCC engineering staff and in particular with the field inspectors. Incidents resulting in environmental impacts are typically referred to the environmental staff for investigation and enforcement. The primary responsibilities of the environmental staff are discussed below:

A. Spill/Release Response: Operators are obligated 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. Generally, impacts from these events are limited to soils and are relatively small in areal extent.

Spill response by the environmental staff includes onsite inspections, sample collection, remediation oversight, review of reports and remediation plans, as well as 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 relational database (MRDB) and can be accessed via the COGCC website. In FY 2006-2007 approximately 313 spills and releases were reported and remediated or are in the process of being remediated.

B. Complaint Response: The COGCC responds diligently to complaints, which are received from individuals and other agencies. Complaints are tracked in the COGCC's MRDB database and can be accessed via the COGCC website. In FY 2006-2007 approximately 348 complaints were filed and responded to, and approximately 260 complaints were resolved. Often the complaints are from landowners, alleging damage to their land or water wells. The environmental staff follows up where appropriate, taking samples when necessary. Operators often are required to perform additional investigation and remediation, as needed, to bring sites into compliance with soil and ground water standards.

C. 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 plugging of wells and abandonment of locations, and during pit closures. The environmental staff manages remediation projects by approving plans, evaluating analytical data and the progress of the remediation work, and by establishing cleanup standards, points of compliance, and other requirements for operators to meet. Remediation projects are tracked in the COGCC's MRDB database and can be accessed on the COGCC website. During FY 2006-2007, approximately 39 operators submitted approximately 191 new remediation plans for approval and approximately 71 remediation projects were closed. The environmental staff managed a total of approximately 642 remediation projects during FY 2006-2007.

Where ground water has been impacted, operators are required to: mitigate 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.

D. Pit Program: During FY 2006-2007, COGCC staff approved permits for 269 new earthen pits and approved the closure of 48 pits, primarily in conjunction with plugging and abandonment of wells. Most of these new pits are located in Las Animas County and are associated with coalbed methane (CBM) wells. There are approximately 11,934 earthen pits

shown as active in the MRDB. COGCC environmental staff intend to verify this number as time allows.

E. Permitted Centralized Waste Management Facilities: The 900-Series rule modifications that became effective December 31, 1997 included a change to the previous landfarm rule. The rule now applies to all non-commercial centralized exploration and production (E&P) waste management facilities and includes waste treatment methods such as large lined evaporation pits, thermal and centrifuge systems, or waste treatment for beneficial reuse, as well as landfarms. The Colorado Department of Public Health and Environment (CDPHE) Hazardous Materials and Waste Management Division (HMWMD) Solid Waste Unit (SWU) permits commercial E&P waste management facilities, while the COGCC permits non-commercial centralized E&P waste management facilities.

This change allows the operator greater flexibility in waste management methods, and creates a simple approach to regulation of these facilities. The rule requires operators to apply for an operating permit, and as part of the approval process, staff evaluates the proposed site, operation, financial assurance, and preliminary closure plans. 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. These facilities are currently required to have financial assurance of \$50,000. During FY 2006-2007 the COGCC permitted one (1) new centralized E&P waste management facility. There are twenty-three (23) active permitted centralized E&P waste management facilities in the state. There are two centralized landfarms located on federal lands and that are not necessarily under the jurisdiction of the COGCC.

F. Disposal and Reuse of Produced Water: Approximately 85% of the water co-produced with oil and gas is disposed or used for enhanced recovery by underground injection, or reused for drilling and/or well completion activities (fracing). Most produced water that is not injected is disposed in evaporation and percolation pits or discharged under Colorado Discharge Permit System (CDPS) permit, and a small amount of produced water is used for dust suppression on oil and gas lease roads. Three landowners in La Plata County have filed for and obtained the right from Water Court to use produced water for agricultural purposes. Coalbed methane produced water is used by Las Animas County on county roads for dust suppression under a joint agreement with the WQCD, the COGCC and Las Animas County Board of Commissioners.

G. 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 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 can not require an operator to use an exception location, directional drilling techniques, or otherwise compromise its reasonable geologic and petroleum engineering considerations.

As of June 30, 2007, the COGCC has received ninety (90) requests for onsite inspections. Fifty (50) requests were withdrawn, twenty (20) onsite inspections were conducted, and twenty (20) onsite inspections were pending. Of the ninety (90) requests received, forty eight (48) were for locations in Weld County, sixteen (16) in Las Animas County, seven (7) in Adams County, five (5) in La Plata County, three (3) each in Boulder, Garfield and Yuma Counties, two (2) in Archuleta County, and one (1) each in Logan, Kiowa and Morgan Counties. Most surface owner concerns relate to impacts to irrigated land, aesthetic impacts, and effects on current and future land value.

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

The Oil and Gas Conservation and Environmental Response Fund (Fund 170) is funded by a mil levy on oil and gas production. During FY 2006-2007 the legislature approved several changes to the COGCC appropriations from this fund that went into effect in FY 2006-2007. In response to the dramatic increase in oil and gas activities throughout the state, the appropriation used to fund the staff responses to and investigations of complaints alleging impacts was increased to \$312,033. COGCC staff has often asked for additional appropriations to conduct special environmental projects, such as large scale baseline ground water sampling projects. The legislature recognizes the need and value for these kinds of studies and has supported our requests. For FY 2006-2007 and thereafter on an ongoing basis the COGCC has been appropriated \$500,000 for Special Environmental Projects. Because of the COGCC's need to respond to emergency situations related to oil and gas operations, for FY 2006-2007 and thereafter on an ongoing basis 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 and reclaiming abandoned wells.

In 2007 Special Environmental Projects included, \$144,327 for conducting a statewide assessment of orphaned wells that were plugged and abandoned by the COGCC. The program was intended to screen these well locations for methane gas. Soil gas data were collected at each well site, as well as digital photographs and global positioning system measurements of the well pad and at each soil gas sampling point. At four well sites, methane was detected above background concentrations. Additional investigation will be performed at each of these locations.

In response to ever increasing levels of oil and gas development and movement of these activities into other parts of the state, two Special Environmental Projects included baseline ground water studies were conducted in Moffat and Washington and Yuma Counties for \$24,902 (\$4,965 in FY 2006-2007 and \$19,937 in FY 2007-2008) and \$90,979, respectively.

The COGCC and the Division of Wildlife (CDOW) produced a video that demonstrates efforts by the oil and gas industry, the CDOW, and the COGCC to mitigate impacts to the state's wildlife. It was designed to educate the public, operators, and local governments about techniques that can be used by oil and gas operators to protect wildlife habitat and mitigate energy development-related impacts. The video is currently undergoing final editing by the Department of Natural Resources' staff. \$25,000 of Special Environmental Project monies were spent on this video.

In addition, a total of \$561,660 was spent by the engineering staff to plug and abandon

and to reclaim orphaned oil and gas sites in Boulder, Fremont, Garfield, Jefferson, La Plata, Logan, Montezuma, and Weld Counties. Funding was a combination of claimed bonds, Fund 170, and emergency response monies.

Fund 170 Projects proposed for FY 2007-2008 include:

- Plugging, abandoning, and reclamation of abandoned oil and gas wells and associated facilities in various counties. In addition the COGCC Commission approved the use of \$250,000 from the emergency response portion of Fund 170 for plugging an orphaned well in Delta County and an orphaned well in Garfield County, both of which are causing impacts to surface water.
- Complaint and Spill Response.
- Support for ongoing DOW study of the potential impacts on wildlife from oil and gas development.
- Compilation and evaluation of all water and gas analytical data collected from the Raton Basin Studies, complaint response, and operators.
- Support for ongoing investigating and remediation of soil and ground water impacts from the Bryce 1X orphaned well in La Plata County.

Data Management and Geographical Information Systems (GIS)

A major function of the COGCC is the management of records and data related to exploration and production of oil and gas resources, and potentially related impacts. Historically, the majority of these records and data were available to the public as paper records filed in the COGCC Public Room, located in the Denver office. The number of records and volume of data available through the COGCC continues to grow each year. In 1999, a new data system (Colorado Oil and Gas Information System [COGIS]) was developed. COGIS allows staff and Internet users to access COGCC data through a relational database and imaging system. Almost all entries from COGCC permit/reporting forms are stored in the database. Data pertaining to wells, spills, complaints, remediation, and pits are managed in the COGIS database system. In addition, almost all of the paper documents that have been submitted to the COGCC have been scanned, including a relatively complete set of geophysical well logs. Users are currently able to search the COGCC databases on the web, research information on individual wells and other related facilities, call up related scanned documents, and view plotted locations on the COGCC Online map system.

To ensure that local governments are informed, an Internet application has been developed to allow the local government representatives to view new permits and other well information in their respective areas of concern.

Various specific studies in the San Juan,, Raton, D-J, and Piceance Basins are available for review and download via the Internet. The raw data from the Raton Basin Baseline Study are also available for download.

Improvements to the COGCC GIS Internet Map continue to be made. The map contains over 120 map layers including oil/gas wells, facilities (e.g. pits), roads, cities, counties, and CDPHE Regulation 42 Specified Areas. The following new map layers were added in 2007:

- 1) National Resource Conservation Service (NRCS) soil survey data- This layer displays soil map units throughout most of the State. The user can double click on a soil map unit to link to the NRCS website for details such as the soil profile for each map unit.
- 2) Pending Permit Locations- The locations of permit applications that are in process but not yet approved can be viewed.

Several GIS projects are currently underway. One project is focused on displaying all directional well boreholes. The plotting of directional well bores will be accomplished through an automated process. The IT staff is working with other state agencies to develop a national standard for the submission of these data. Another project that is underway will allow for oil and gas field boundaries to be displayed on the GIS Map and updated on a daily basis.

COGIS is currently available on laptop computers that allow the engineering and environmental staff to take the entire COGIS database and GIS Online Map System to the field for quick information queries while conducting investigations.

Industry Services

The COGCC continues to promote its mission to promote the responsible development of Colorado's oil and gas natural resources by providing information and assistance in complying with the COGCC rules and requirements, including our expanded website and GIS capabilities.

Industry Compliance/Violations/Penalties

In FY 2006-2007, the COGCC assessed penalties against 13 operators for violations of rules and orders. The total amount of penalties assessed was approximately \$88,600, \$35,600 of which was associated with COGCC enforcement for violations that resulted in or had the potential to impact ground water or surface water. Other violations included:

- Failure to:
 - prevent unauthorized discharged,
 - obtain APD approval prior to drilling/recompletion,
 - complete interim and final reclamation,
 - keep well site free of unused equipment, weeds, and trash,
 - provide general liability insurance.

Underground Injection Control (UIC)

COGCC staff will continue 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 points of compliance are established. Approximately 44 Class II UIC well permits were approved by the COGCC in FY 2006-2007.

3. COGCC COORDINATION WITH WQCD/WQCC

The COGCC, WQCD, and WQCC continued our semi-annual meetings in FY 2006-2007, Martha Rudolph and Michael Klish served as the commissioner representatives of the WQCC and the COGCC, respectively. Craig Wiant and Mark Cutright will now be representing the WQCC and COGCC Commission, respectively, at future meetings.

4. RULEMAKING

One rulemaking hearing was held reporting FY 2006-2007. The COGCC Commission amended the rule specifying allowable noise levels; amended the rules related to flowlines and gathering lines to reflect ongoing Colorado Public Utility Commission rule making and stakeholder meetings; amended Table 910-1 Allowable Concentrations and Levels and Figure 901-1 Sensitive Area Determination Decision Tree to conform with WQCC's standards for ethylbenzene and total xylenes concentrations in ground water and minor clerical cleanup.

5. OIL & GAS EXPLORATION & PRODUCTION ACTIVITY IN COLORADO BY REGION/FIELD

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

By the end of CY 2007 there will be approximately 33,700 active oil and gas wells in Colorado. These wells produce approximately 3.4 billion cubic feet (bcf) of natural gas and 65,000 barrels (bbls) of oil per day, with a total value, estimated at this time to be, \$11.3 billion dollars for CY 2007.

The activity of the oil and gas industry may be measured in part by the number of drilling and recompletion permits processed by the COGCC. It is estimated that by the end of CY 2007 the COGCC will have approved approximately 6,160 drilling permits, which is an increase of approximately 4% from CY 2006.

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 increased notably in response to increased well density in certain counties. In FY 2006-2007 approximately 359 permits for new wells and recompletions of existing wells were approved. Currently there are approximately 2,867 active wells in La Plata County. These wells produce approximately 1.2 bcf of natural gas per day, which is approximately 35% of the total gas production in the state. Also there is a total of approximately 368 active oil, gas, and carbon dioxide wells in four other southwestern Colorado counties, including San Miguel, Dolores, Montezuma, and Archuleta. In July 2006 the USFS and US BLM issued the final Environmental Impact Statement (EIS) for the Northern San Juan Basin. The Record of Decision (ROD) was released on April 4, 2007 and can be found at www.nsjb-eis.net. These actions will allow for the drilling of additional CBM wells that meet certain conditions specified in the Record of Decision, located on USFS land in Archuleta County.

Public Involvement

La Plata County Gas and Oil Regulatory Team (GORT)

The COGCC established the La Plata County Gas and Oil Regulatory Team (GORT) to provide a forum for meaningful dialogue between operators, La Plata County, the Southern Ute Indian Tribe, the Bureau of Land Management (BLM) and the COGCC. Members of this group continue to fund and provide technical support for the ongoing monitoring of methane seeps along the Fruitland Coal outcrop.

Ground Water and Other Environmental Issues

Conditions for Optional Additional Coalbed Methane Wells

As a result of COGCC Orders 112-156 and 112-157 and other orders related to CBM development in the San Juan Basin, operators have collected approximately 1,739 water samples from 841 water wells. The analytical results have been submitted to the COGCC and to the land owners. To date impacts to water wells from CBM wells drilled under these orders have not been detected.

3M Project

Methane gas has been observed seeping from the outcrop of the Fruitland Formation in many areas along the northern margin of the San Juan Basin, in southwestern Colorado. Some of these seeps were identified prior to the initial development of any Fruitland Coal wells; however, in places the intensity and areal extent of these seeps appears to have increased subsequent to CBM production. In addition, what appear to be new seeps have been identified in some areas. Questions persist about whether gas seepage at the newly identified areas and expanding seeps could be to CBM production.

The COGCC and the US BLM funded the installation of a network of monitoring wells at four locations between the outcrop of the Fruitland Formation and down basin production. The wells are equipped with transducers and data loggers and will be used for the long term monitoring of pressure and water levels in the Fruitland Formation. A total of seven (7) wells, were completed and data are being collected. Pressure monitoring data from these wells are available on the COGCC website.

During FY 2006-2007, approximately \$26,500 in ERF money was used for the operation and maintenance of these wells, and report preparation.

Fruitland Outcrop Study La Plata County and Archuleta County

Industry, La Plata County, BLM, and the COGCC continue to contribute money and/or staff for the ongoing evaluation, maintenance, and monitoring of the 140 permanent soil gas monitoring probes, six flux chambers, and one meteorological station. Aerial surveying with infrared imagery technology is also being used to detect areas of stressed and/or dead vegetation, which can be an indication of methane gas seepage. This detailed work has been expanded to cover the entire Fruitland Formation outcrop in La Plata County and Archuleta County on land north of the Southern Ute Indian Tribe Reservation boundary. The expanded survey includes the mapping of springs discharging from the Fruitland Formation. The 2003, 2004, 2005 and 2006 La Plata County reports are available on the COGCC website www.cogcc.state.co.us Library, Area Reports, San Juan Basin, 3M Project Reports. The 2004, 2005, and 2006 Archuleta County reports are available on the COGCC website www.cogcc.state.co.us Library, Area Reports, San Juan Basin, Archuleta County. The report of the results of the 2007 field work in La Plata and Archuleta Counties will be posted on the COGCC website when they are finalized.

4M Project

Senate Bill 07-198 was approved in 2007 to secure the funding for the Fruitland Formation Seep Mitigation Project in La Plata County and the Fruitland Formation Outcrop Monitoring Project in Archuleta County; collectively known as the 4M Project. SB 07-198 appropriated \$4,452,000 to the COGCC from the Oil and Gas Conservation and Environmental Response Fund over a three year period commencing July 1, 2007, and ending June 30, 2010. The COGCC would use up to \$2,944,000 of this appropriation to determine the most cost-effective methods of mitigating the seepage of methane gas and to expand the existing monitoring network along the outcrop of the Fruitland Formation in La Plata County, and up to \$1,508,000 to install monitoring wells in the Fruitland Formation in Archuleta County. COGCC are in the process of procuring consulting services to conduct installation, monitoring and reporting activities in both counties. The COGCC Commission approved a mill levy increase under §34-60-129 C.R.S. which was required to fund the 4M project.

Bradenhead Testing Program

COGCC and BLM continue to co-fund and share staff responsibility for ensuring that bradenhead tests are routinely conducted on all wells in La Plata County. COGCC or BLM

personnel witness the tests on gas wells located in areas known to have methane in shallow ground water. Test results are evaluated to determine whether well casings are leaking. Since annual testing requirements were instituted, leaking casing has been detected in approximately 125 wells under COGCC jurisdiction on tribal, federal, state, and fee land, with another 125 wells identified under BLM jurisdiction. COGCC has overseen repairs on 94 conventional well and 31 CBM well repairs. Of the 31 CMB repairs, only three wells were installed after 1988 when cementing to the surface was required (Cause 112 Order 160-162 Remediation is also complete on the BLM jurisdiction wells).

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

The COGCC received eight complaints alleging environmental damage. The COGCC received three (3) complaints alleging impacts to water wells and two (2) reports from operators that identified gas in water wells, their during sampling. . COGCC staff investigated all of these complaints and reports. COGCC staff determined that two (2) of the water well complaints were not related to oil and gas activities and one (1) is still under investigation. Both reports of gas in water wells are also still under investigation. COGCC also received five (5) complaints regarding other environmental damage from oil and gas activities; primarily reclamation and surface erosion issues Each of these complaints resulted in a failed inspection or NOAV being issued to the operator, however no surface or groundwater impacts were identified. Approximately \$12,500 of Fund 170 money was used to investigate these eight (8) complaints. Follow-up sampling for three (3) previous water well complaints was also conducted during this fiscal year. In addition, seventeen (17) spills were reported in La Plata, Montezuma and San Miguel counties. Of these, three (3) reported releases to surface water; there were no reported releases to groundwater. All surface water releases were monitored and no impacts were identified.

COGCC staff and 3rd party contractors continue to investigate and monitor soil and ground water impacts associated with methane leakage from a 1930's orphan oil and gas well (Bryce 1-X). COGCC has shown this well and a previously plugged and abandoned orphan well (Nick Spatter Bryce Farm #1) were the sources of the elevated levels of methane in the subsurface soils and in six (6) nearby water wells. Fund 170 money has been used to respond to this emergency situation, install methane monitors and alarms in three homes, a fire station, and a water well house, to continue monitoring of the aerial extent of the gas seepage, and to investigate and identify the source of the gas. In July and August 2006 COGCC staff and a 3rd party contractors successfully plugged and abandoned the Bryce 1-X. This resulted in an, continuing decrease in the concentration of methane in the soil. Methane was essentially not detected at the ground surface in the July and September 2007 soil gas surveys. However, high concentrations of methane persist in the ground water and water wells.

Downhole videos were taken of two impacted domestic wells to try to determine if methane was entering the wells from specific horizons. No evidence of bubbles was identified at any horizon, indicating the methane likely enters the well in a dissolved phase. Single-hole aquifer tests were also conducted in several of the wells to determine the viability of both in-situ and ex-situ groundwater treatment options to remove methane. Results indicated a high degree of anisotropy in the subsurface along with generally low hydraulic conductivities. Preliminary cost estimates to conduct active groundwater remediation were high and success could not be guaranteed. Groundwater in the area is currently being monitored to evaluate if natural attenuation might be a feasible option now that the source of methane has been removed. During FY 2006-2007 \$38,270 of COGCC Fund 170 money was used to help pay for this investigation, aquifer testing, and ongoing monitoring.

Stream Depletion Study

In September 2005, the COGCC, in conjunction with the Colorado Geological Survey (CGS) and the State Engineer's Office Division of Water Resources (DWR), awarded a contract to S.S. Papadopoulos and Associates of Boulder, Colorado to conduct a stream depletion study in the San Juan Basin. The purpose of this joint study was to develop a quantitative assessment of the levels of stream depletion or reduction in formation outflows (spring flows or flowing stream systems gaining from contact with formations), if any, that may be occurring as a result of the removal of water by CBM wells, in addition to defining areas where the ground water in the Fruitland Formation is tributary or non-tributary to the surface water flow system. The study was completed in June 2006 and estimated approximately 155 ac-ft/yr of depletion as of August 2005. This estimate does not differ greatly from depletions calculated in the 2001 3M modeling efforts (95-100 ac-ft/yr). During FY 2006-2007 \$11,500 of COGCC Fund 170 money was used to help pay for this study.

NORTHWEST COLORADO

Oil and Gas E&P Activity

Northwest Colorado continues to experience a high level of oil and gas activity, especially in Garfield and Rio Blanco Counties. Northwest Colorado drilling permits are accounting for 47 percent of the state total with Garfield County now exceeding Weld County as the county with the most new drilling permits. The driving force behind this active development continues to be the extensive natural gas reserves in the Piceance Basin, the gas sales market and overall higher natural gas prices, and an expanding pipeline infrastructure that enables improved marketing of natural gas from the area.

Public Involvement

The Northwest Colorado Oil and Gas Forum

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

Ground Water Issues

Water Well Impact Complaints

COGCC staff and contractors sampled 13 water wells during FY 2007 in response to requests from 13 water well owners in Garfield County. Impacts to ground water quality from oil and gas activities were not detected in any of the water wells.

During FY 2006-2007 COGCC staff spent approximately \$11,003 of Fund 170 money on these investigations.

Hydrogeologic Characterization Study - Garfield County

Money from fines associated with violations of COGCC rules that resulted in impacts to surface water, ground water, and water wells have been used to fund a number of Public Projects in Lieu of Fines in Garfield County. The largest of these is a hydrogeologic study of the ground water and surface water resources in four townships south of Silt and Rifle, Colorado (T6SR92W, T6SR93W, T7SR92W, and T7SR93W). The study focused on the hydrogeology of the Wasatch Formation, in which most water wells are completed, and the surface water resources of West and East Divide, West, Middle and East Mamm, and Dry Creeks, and the

ground water in the alluvium adjacent to these creeks.

URS Corporation (“URS”) conducted this study using the COGCC’s extensive water quality database, which contains data from approximately 464 water resources within the study area, and the oil and gas well information contained in the MRDB. The study, “Hydrogeologic Characterization of the Mamm Creek Field Area in Garfield County, [Phase I Final Report](#)” was completed in early 2006 and the report is available on the COGCC webpage (www.cogcc.state.co.us) Library, Area Reports, Piceance Basin. Based on recommendations made in the Phase I report, Garfield County developed a request-for-proposal (RFP) for a follow-up Phase II study. The RFP was awarded to S. S. Papadopulos, who have collected samples from 66 water wells and will be collecting gas and produced water samples from numerous gas wells in the area. The report of this investigation will be available on the COGCC website once it is finalized.

Piceance Basin Phase IV Baseline Water Quality Study

As part of the FY 2006-2007 budget request, the COGCC received funding to conduct the Piceance Basin Phase IV Baseline Water Quality Study in Garfield County. This is the fourth in a series of baseline water quality sampling projects the COGCC staff has conducted in the Piceance Basin of Colorado. Samples were collected from water wells in a portion of Garfield County between the towns of New Castle and Rifle, north of the Colorado River. This is an area that historically has had little drilling activity and no producing oil and gas wells, although future oil and gas activity is anticipated in this portion of Garfield County.

S.S. Papadopulos & Associates, the selected contractor, started the field data collection portion of this project on July 30, 2006, and completed all sampling activities by August 16, 2006. Seventy domestic water wells were sampled in portions of Township 6 South, Ranges 91 through 93 West, and Township 5 South, Ranges 91 and 92 West, for general water quality, methane, and benzene, toluene, ethylbenzene, and xylenes (BTEX) compounds

Most of the sampled water wells are completed in the Wasatch Formation. In general, water quality in the water wells was similar to the quality observed in previous baseline sampling projects conducted in Garfield County. Of special note, methane was not detected in any of the 70 water wells tested at concentrations high enough for isotopic characterization. This is in contrast to the relatively common occurrence of biogenic methane in water wells in the Mamm Creek area south of the Colorado River. In addition, an area of higher than expected sodium chloride (NaCl) type water was observed in the western portion of the study area (when compared to the eastern part). This suggests that NaCl type water occurs naturally in the portions of the Wasatch Formation likely as the result of both a longer residence time and travel distance for recharged water in the Wasatch Formation outcrop along the Grand Hogback. The Final Report of the Phase IV Study is available on the COGCC website (www.cogcc.state.co.us, Library, Piceance Basin Studies).

Drilling Near Project Rulison Test Site

In 1969, the Atomic Energy Commission, a predecessor to the U.S. Department of Energy (DOE), conducted several experiments on the use of nuclear devices to enhance natural gas production from wells. The project conducted in Garfield County is known as Project Rulison and the well in which the nuclear device was detonated is located on Battlement Mesa.

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 a number of radionuclides. This monitoring program included background monitoring of non-impacted gas and water from the Williams Fork and overlying formations, of 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 have been submitted to the COGCC. Reports summarizing the results of Gas Well Drilling Monitoring activities have also been submitted by Presco to the COGCC. These reports are available on the COGCC website, www.cogcc.state.co.us Library.

In May 2007, Noble Energy acquired PRESCO's interests in the Battlement Mesa area. Since that time, Noble has been developing a radionuclide monitoring plan that will be applied during drilling and production for wells in the area of the Rulison test. The plan is anticipated to be received in late 2007 and will be reviewed by the COGCC, the Radiation Management Unit of the CDPHE, and the DOE. Recommendations regarding the adequacy of the plan will be provided to the COGCC Commissioners at the December 2007 hearing.

In December, 2006, COGCC staff met with the DOE Legacy Management (DOE-OLM), which assumed oversight of both Project Rulison and Project Rio Blanco sites on October 1, 2006. During the meeting, COGCC staff and DOE-OLM staff and contractors discussed current and anticipated oil and gas drilling activities and potential monitoring that may be required during drilling and production for wells in the vicinity of the two test sites. DOE-OLM staff provided COGCC with an overview and tentative schedule for their natural gas flow and transport modeling effort for Williams Fork Formation in the vicinity of the Project Rulison test site. A draft report was completed in September 2007 and was reviewed by the COGCC, Dr. John McCray of the Colorado School of Mines, and the Radiation Management Unit of the CDPHE.

In October 2007, an informational session was held as part of the regular Commission hearing. During this informational session, presentations were given by COGCC staff, the CDPHE, and the DOE regarding the history of the Rulison test, monitoring efforts, and a recent fate and transport modeling study. In addition, landowners in the area and operators were provided an opportunity to present their concerns and opinions regarding energy development in the area of the Rulison test site.

Stream Depletion Study

In November 2006 the COGCC, in conjunction with the Colorado Geological Survey (CGS) and the State Engineer's Office Division of Water Resources (DWR), evaluated proposals to conduct a stream depletion study in the Piceance Basin. The purpose of this study was to develop a quantitative assessment of the levels of stream depletion or reduction in formation outflows (spring flows or flowing stream systems gaining from contact with formations), if any, that may be occurring as a result of the removal of water by CBM wells, in addition to defining areas where the ground water in the coal seams in the Williams Fork Formation are tributary or non-tributary to the surface water flow system. This study was funded by the CGS and the contract was awarded to S.S. Papadopoulos and Associates of Boulder, Colorado.

Lone Pine Field Surface Water Release - Jackson County

A crude oil release impacting surface water was reported to the COGCC on March 13, 2006 at the Lone Pine Field, Township 9 North, Range 81 West, and Section 28 in Jackson County. Crude oil was released into Hell Creek from a flowline leak, which was located approximately 250 feet southeast of the wellsite where the flowline passes under the creek. The spill was successfully cleaned-up. COGCC took the lead in enforcement on this matter, but

communicated with WQCD staff, in accordance with our MOA regarding response to spills and releases to surface water. Enforcement by the COGCC resulted in an Administrative Order by Consent (AOC) and fine (\$17,000).

West Divide Creek Gas Seep Remediation Update – Garfield County

In accordance with the COGCC requirement for periodic reporting on the ongoing remediation of shallow ground water contamination at the West Divide Creek Seep, EnCana provides quarterly reporting on the status of the seep remediation. The low-flow air sparge system designed to remediate the contamination of shallow ground water by benzene, ethylbenzene, and total xylenes (BEX), continues to decrease concentrations and aerial extent of these compounds in the ground water and seeps in the impacted area. The concentration and aerial extent of thermogenic methane in the ground water and seeps in the impacted area also continues to decrease although at a lower rate than the BEX compounds. There were no detections of BEX compounds in any West Divide Creek surface water sample locations in FY 2006-2007.

Orphaned Wells and Sites

Approximately \$42,000 of Fund 170 money was used to plug and abandon, restore and reclaim orphaned sites in northwestern Colorado. Proper plugging and well abandonment ensures that the shallow fresh water aquifers are protected from fluid migration in the boreholes. Projects included:

Plugging and abandonment of one (1) orphaned well in Moffat County.

Plugging and abandonment of one (1) orphaned well and reclamation of the access road in Garfield County.

NORTHEAST COLORADO

Oil and Gas E&P Activity

Weld County accounted for approximately 24% of the total drilling permits in 2006. Weld County had approximately 14.8% of the 2006 total gas production and 51.8% of the 2006 total oil production in Colorado. Yuma County accounted for approximately 14% of the total drilling permits in 2006 and approximately 3.0% of the 2006 total gas production in Colorado. Smaller oil fields are located in other counties throughout northeast Colorado.

Public Involvement

COGCC staff continues to receive and follow-up on complaints from the Weld County Department of Public Health & Environment, Tri-County Health Department, Larimer County Environmental Advisory Board, Morgan County Office of Emergency Management, Northeast Colorado Health Department, other municipalities, and the public throughout northeastern Colorado.

In an effort to cooperate with other regulatory agencies, COGCC environmental staff and the Weld County Department of Public Health & Environment conducted a joint inspection of several centralized E&P waste management facilities on June 30, 2006. Facilities operated by Kerr McGee Rocky Mountain Corporation, Noble Energy Production Inc. and Petro-Canada Resources (USA) were inspected. Several issues were identified and the operators are taking appropriate action to bring all of the facilities into compliance with COGCC permit conditions.

Environmental Issues

Approximately \$30,222 of Fund 170 money was spent investigating citizen complaints and the findings of COGCC field inspections in northeastern Colorado.

Ground Water

In all cases where ground water was impacted, operators are required to conduct a site investigation 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.

There were seventeen (17) complaints alleging impacts to water wells in the northeastern portion of Colorado. Upon investigation, COGCC staff determined that two (2) of these water wells had been impacted by thermogenic gas. COGCC staff was able to identify the source of the gas in one of the water wells and has enforced upon the responsible operator. The investigation to identify the source of the gas in the other impacted water well continues.

Additionally, as a result of water well sampling requirements in accordance with amended Rule 318A, two (2) water wells were found to have been impacted by thermogenic gas. The source of the gas in these two water wells has not been determined, but continues to be investigated by COGCC staff.

Surface Water

There were six (6) spill/release events in which E&P waste fluids reached surface water. These were reported to the WQCD in accordance with our MOA. In cases where surface water was impacted, the operators responded with appropriate emergency procedures and other corrective measures to comply with COGCC and WQCD requirements.

Arapahoe Aquifer Baseline Water Quality Study – Adams County

COGCC staff contracted with Lepert Associates, Inc., of Golden, Colorado to conduct baseline ground water quality sampling of twenty (20) water wells completed in the Arapahoe Aquifer in Adams County in Townships 1 and 2 South, Ranges 59 through 64 West. Field sampling was completed in late June 2007. Water wells were sampled for general water quality parameters and dissolved methane concentrations. The project cost was \$25,000 with the funding coming from the Special Environmental Protection and Mitigation Studies line item of Fund 170. A copy of the Final report is available on the COGCC website Library.

Greater Wattenberg Area Baseline Study

As part of a FY 2006 budget request, the COGCC received funding to conduct a gas and water quality investigation in the Greater Wattenberg Area (GWA) of the D-J Basin. Seventy-eight (78) gas wells and eleven (11) Laramie/Fox Hills water wells in selected townships within the GWA will be sampled. This project significantly expanded the COGCC database of analytical results from gas and ground water samples. Analytical data are one of the primary tools used by the COGCC staff in responding to landowners who allege impacts to water wells from oil and gas activities in the GWA. These and other available data and will be used by staff to determine whether impacts to ground water resources from oil/gas operations have occurred. A total of approximately \$113,000 of Fund 170 money was spent in FY 2005-2006 and 2006-2007 on this project.

Ogallala Aquifer Baseline Study

During the last several years there has been a significant increase of oil and gas drilling in Washington and Yuma Counties in northeastern Colorado. Oil and gas is produced in this part of the D-J Basin from the Upper Cretaceous Niobrara Formation and the Lower Cretaceous D and J Sandstones. Produced water from these formations generally contains very high concentrations of total dissolved solids (TDS). This area is underlain by the northern portion of the High Plains aquifer. In eastern Colorado the High Plains aquifer is comprised of the Miocene Ogallala Formation as well as Pleistocene unconsolidated alluvial deposits. The Ogallala is the most significant hydro-geologic unit and provides the bulk of the regional ground water resource. The aquifer is typically under unconfined conditions and the primary source of recharge is from infiltration of precipitation. As a result, COGCC performed a baseline study to evaluate current water quality characteristics in the Ogallala Aquifer. URS Corporation was selected to perform the study and sampled a total of 75 existing water wells in Washington and Yuma Counties. Results of the study showed a median TDS concentration of 274 mg/L in the wells sampled and general water quality was very good. Approximately \$91,000 of Fund 170 money was spent on this project. Additional baseline sampling of the Ogallala Aquifer is planned in the future.

Orphaned Wells and Sites

Approximately \$67,515 of Fund 170 money was used to restore and reclaim orphaned sites in northeastern Colorado. Proper plugging and well abandonment ensures that the shallow fresh water aquifers are protected from fluid migration in the boreholes. Projects included:

One (1) site in Boulder County, work included: evaluation of orphaned well for scope of work to P&A.

One (1) site in Jefferson County, work included soil gas survey and water well sampling and re-plugging/abandonment of an orphaned well.

Two (2) sites in Logan County, work included site reclamation of the former Lewis Creek and Little Hoot gas processing facilities.

One (1) site in Weld County, work included installation and sampling of groundwater monitoring wells following remediation of impacted soil/groundwater.

In addition a the limited site investigation and evaluation of nine (9) former earthen pits sites in Logan County that were associated with "O" Sand oil production was conducted. A feasibility study was also conducted to explore various remediation options for the orphaned sites.

SOUTHEAST COLORADO

Oil and Gas E&P Activities

Southeastern Colorado produces conventional gas, CBM gas, and crude oil from several basins, including the Raton, the DJ and the Hugoton Embayment. Approximately 1.05 bcf of gas is produced in this region with 88.5% of the gas produced being produced in Las Animas County. A total of 1,918,208 barrels (bbls) of crude oil were produced in FY 2006-2007 with Cheyenne County accounting for 81% of the production.

There are a approximately 3,370 active wells within the region; 2,548 of the wells (68%), are located in Las Animas County. The most active area continues to be the Raton Basin with

517 applications for permits to drill (APDS) submitted in FY 2006-2007. In the remaining counties a total of 62 APDS were submitted.

Approximately 182,472,261 barrels of produced water were generated in Southeast Colorado during FY 2006-07. Ninety three (93) per cent of the produced water was generated from wells in Las Animas and Huerfano Counties. Produced water is managed by underground injection, surface water discharge and through evaporation/percolation pits. There are eighty five (85) active injection wells in this region; 40 in Cheyenne County, 17 in Las Animas County, 13 in Baca County, nine (9) in Kiowa County, and six (6) additional wells in various counties.

Public Involvement

COGCC staff participated as a stakeholder in the Colorado Water Quality Forum Agricultural Diversion Work Group. The work group consists of representatives from the oil and gas industry, the Colorado Water Quality Control Division (WQCD), irrigators, the agriculture community and wastewater treatment facilities. The group is working on the development of a narrative policy that will assist WQCD permit writers in ensuring that surface water discharge permits are protective of all surface water quality uses including irrigation.

Environmental Issues

Approximately \$31,404.27 of ERF money was spent investigating citizen complaints, and the findings of COGCC field inspections in Southeastern Colorado. The investigations included water well, surface water, spring and soil sampling, conducting a baseline soil gas survey and data analysis by a third party contractor.

Ground Water

Thirteen (13) water wells were sampled during FY 2006-2007. Four water wells were sampled in response to landowner allegations of impacts, seven were sampled to establish baseline conditions and two were sampled as follow-up to previous impacts.

▪ Alleged Impacts

A landowner in Las Animas County alleged that their water well had been impacted by CBM development. However, analytical data indicated that the water was of good quality and there were no indications of impact from CBM development. Testing for iron related (IRB), sulfur reducing (SRB) and slime producing bacteria identified fairly aggressive populations of IRB and SRB bacteria, which could have caused the problems observed by the complainant. The landowner was provided copies of the data and a pamphlet developed by the CDPHE on managing iron and sulfur bacteria in water wells and household distribution systems.

Another landowner in Las Animas County alleged that water from his well was impacted by a drilling operation approximately 2500 feet from his well. According to the landowner the well water became cloudy during the drilling at the CBM well. Samples of the water, the particulates and gas were collected from the water well. The particles were analyzed by several techniques including X-ray diffraction in an effort to characterize them. The particles in the well are predominantly naturally occurring quartz, feldspars and clay minerals. These particles are likely from the formation in which the well is completed breaking off and being carried into the well bore by methane. The isotopic composition of the methane coming from the water well is very different from the isotopic composition of the methane in three nearby producing gas wells, including the well alleged to have been the cause of the impacts to his water well. Many water wells in the Raton Basin are completed in coal bearing units and the well with alleged impacts appears to be one of these. As water is withdrawn from the water well and used by the landowner, the pressure decreases in the aquifer and methane desorbs from the coal seams in

the process used to produce methane in the CBM gas wells. Currently, it does not appear that this well was impacted by oil and gas activities.

Two wells were sampled in south central Huerfano County after a well house explosion in the area. The water well owners were concerned that the apparent accumulation of methane in the water wells was related to CBM production in the area. A gas sample was also collected from a producing gas well in Huerfano County for comparison to methane detected in the shallow water wells. Thermogenic methane that is similar in composition to the gas being produced from the Vermejo Formation in this area was detected in these wells. The water well impacts in Huerfano County are discussed in more detail in a separate section.

- Baseline Sampling

Seven (7) water wells were sampled at the request of landowners to establish baseline conditions prior to drilling. Overall the water quality in the sampled wells is good.

- Huerfano County Methane in Water Wells

Eleven (11) additional water wells were sampled between July and October of 2007 as part of the ongoing investigation of the presence of thermogenic methane in shallow aquifers in Huerfano County. The operator of the gas wells in this area initially voluntarily shut-in the production wells. Subsequently, the COGCC has issued two Cease and Desist Orders that require the wells to remain shut-in until review of the proposed monitoring and mitigation plan is completed and the matter of brining the wells back on production is heard by the COGCC Commission.

- North Fork Ranch Water Well Impacts

COGCC Staff and a gas operator continued to investigate and respond to an upset condition that resulted in impacts to two (2) domestic water wells in the North Fork Ranch (NFR) subdivision in western Las Animas County. The water well impacts were initially investigated on July 20, 2006 and were found to be related to an upset that occurred while drilling the borehole for the surface casing of a CBM well. The CBM well is located 1,300 and 1,500 feet from the domestic water wells. Initial sampling indicated that the water quality had been degraded from baseline water quality and fluoride, manganese, and pH were detected at levels that exceed the ground water standards. The water wells were sampled 26 times during the NOAV response, site investigation and remediation process. The analytical data indicates that water quality has returned to baseline conditions with the exception of manganese which continues to persist at levels above the Regulation 41 Drinking Water Standard of 0.5 mg/l in one of the domestic wells. The gas operator paid for the installation for a water treatment system for this water well owner. COGCC staff is pursuing enforcement on this matter.

- Lincoln County Groundwater Impact

A Notice of Alleged Violation was issued to an operator in Lincoln County for improper management of E&P waste. During a site inspection the COGCC Field Inspector noticed that the production pit liner was in poor condition and observed potential salt impacts to soil and vegetation due to produced water overtopping the pit. The operator submitted a Form 27 Site Investigation Plan and conducted an investigation in response to the NOAV. The investigation included the installation of monitoring wells and ground water and soil sampling. Analytical data indicates that the shallow alluvial aquifer has been impacted by produced water. Benzene, ethyl benzene, toluene, or total xylenes have not been detected, but elevated levels of Total

Dissolved Solids and Chlorides were identified. The extent of the plume has been determined and points of compliance established. No water wells have been impacted. The operator with assistance from an environmental consulting firm is conducting technological feasibility studies to identify most effective remedial process.

- Springs

Produced water being managed in a production pit and water from a nearby spring/seep near Ludlow, Colorado were sampled after a complaint alleging impacts to the groundwater from infiltration of produced water. The water from the seep had twenty times less sodium than the produced water and different overall chemistry. The produced water does not appear to be having an impact on shallow groundwater in the area.

Surface Water

- Stream Depletion Study

In November 2006 the COGCC, in conjunction with the Colorado Geological Survey (CGS) and the State Engineer's Office Division of Water Resources (DWR), evaluated proposals to conduct a stream depletion study in the Raton Basin. The purpose of this study was to develop a quantitative assessment of the levels of stream depletion or reduction in formation outflows (spring flows or flowing stream systems gaining from contact with formations), if any, that may be occurring as a result of the removal of water by CBM wells, in addition to defining areas where the ground water in the coal seams in the Raton and Vermejo Formations are tributary or non-tributary to the surface water flow system. This study was funded by the CGS and the contract was awarded to S.S. Papadopoulos and Associates of Boulder, Colorado.

- Spills of E&P Waste to State Waters

There were eleven (11) spills/release events in which exploration and production waste entered waters of the state. E&P waste included produced water, drilling fluids and drill cuttings. These events occurred within the Raton Basin. Two incidents involved a pit leaking through bedrock fractures. Four incidents involved leaks in lined pits. Two spills were caused by a truck rupturing a pipeline between storage tanks at a disposal well. One spill was caused by a frozen pipeline and subsequent rupture. One spill was caused by a sub-surface water transfer pipeline rupture. Surface water samples were collected and analyzed and no impacts to water quality standards were noted. Another release occurred during the drilling of an CBM well. The drilling pit overflowed and discharged drill cuttings on a creek bed. An NOAV was issued the spill area remediated. An Administrative Order on Consent and a fine were also issued for this incident during the current fiscal year. WQCD staff was notified as required under the MOA between WQCD-COGCC Of the spills/releases of E&P waste to surface water.

- Surface Water Complaints

Two complaints were received alleging that the surface water discharged to the Apishipa River drainage under WQCD CDPS permit have a negative impact on water quality for irrigation purposes. The complaints were specifically related to potential damage to alfalfa crops and soils due to the salinity, sodium, sodium absorption (SAR) and bicarbonate levels of CBM produced water. To respond to the complaints the COGCC collected surface water quality samples on three occasions.

In September 2006 the COGCC collected four samples in the Frio Canyon Spring and Apishipa River near Gulnare, Colorado. The samples were collected at a CPDS Outfall, from a spring (downstream of the outfall) and the two from the Apishipa River. Sodium, bicarbonate, total dissolved solids (TDS), and sodium adsorption ratio (SAR) levels appear to drop past the discharge point when the water from the Frio Canyon Spring enters and mixes with the Apishipa River.

In March 2007 COGCC staff collected five (5) samples near Gulnare, Colorado in the Apishipa River Drainage including from one outfall. Total dissolved solids(TDS) levels in the streams were between 190 and 460mg/l, sodium concentrations in the streams ranged from 12 to 61 mg/l, and the SAR levels in the streams were between 0.6 and 1.4.

In May 2007 COGCC staff collected five (5) samples in the Apishipa River Drainage from the town of Aguilar upstream past the town of Gulnare. TDS in the stream water varied from 120 to 460mg/l on this occasion. The range of sodium in the stream water was from 6 to 60 mg/l on this occasion with SAR between 0.3 and 1.4. These measurements are very similar to early 1980's analyses performed at a gauging station near Aguilar, Colorado. The analytical data does not appear to support the contention that the water is highly saline or sodic-saline and that it would be damaging to crops or soils and it does not support the contention that the character of the water has changed significantly in the last 35 years due to discharge of produced water into or along the Apishipa River Drainage.

The operator has removed the CDPS discharge outfall from the Frio drainage and installed continuous monitoring stations upstream and downstream of one ranch with alleged impacts. The continuous monitoring and continued chemical analyses of the water quality in the Apishipa River drainage system should help aid understanding of potential longer term impacts from discharge of CBM waters.

Stormwater

Three NOAVs were issued to a gas operator related to a complaint about stormwater compliance in North Fork Ranch area of Las Animas County. Site inspections indicated that adequate best management practices had not been incorporated. Because of the nature of the complaint and subsequent findings this issue was also forwarded to the WQCD. A follow-up compliance inspection indicated that the facility was not in compliance with the stormwater permit.

Two complaints were received regarding stormwater and erosion control failures in the Left Hand Fork of Logging Canyon in the North Fork Ranch subdivision in Las Animas County. WQCD staff were also contacted by the landowners and by COGCC staff regarding these issues. Field inspections and investigations were done by COGCC staff and a contractor to the WQCD along the several mile length of road and pipeline construction that is following the subdivision road. Two samples of stream water were collected and analyzed as part of this investigation. The investigation monitoring of the erosion control process in the canyon is on-going. Two NOAV's are expected to be issued as a result of this investigation. This complaint was also forwarded to the WQCD for review. A subsequent inspection indicated that the facility was not in compliance with the WQCD stormwater permit.

Phase II - Methane Seep Mapping and Monitoring Program

The Phase II Methane Seep Mapping and Monitoring program in the Raton Basin began in April 2007 and will be completed by December 31, 2007. The results of the study will be compared to the results from the Phase I Baseline Methane Seep Mapping Program (Phase I Study) conducted in the Raton Basin from 2000-2003. The Phase II study has included mapping gas seeps within Raton Basin, conducting soil gas surveys of the seeps to identify cause and extent of the seep, and collecting gas samples from the seeps and gas and water samples from domestic water wells. The data will be analyzed and evaluated in an attempt to determine if coal bed methane production is causing impacts to public health, safety, welfare, and the environment.

Orphaned Wells and Sites

Approximately \$45,590 was spent on orphaned well sites in Southeast, Colorado in FY 2006-2007. One thousand four hundred sixty two (\$1,462) dollars were spent for a consultant to review well files and travel to the field to locate orphaned plugged and abandoned wells in Fremont County. An additional \$44,488 dollars was spent plugging one well in Kiowa County and one well in Cheyenne County.

APPENDIX 1
COGCC COMMISSIONER BIOGRAPHIES

**BIOGRAPHICAL SKETCHES OF
COLORADO OIL & GAS CONSERVATION COMMISSIONERS
as of 8/8/07**

Richard D. Alward is an ecologist and environmental scientist based out of Grand Junction. He earned his Ph.D. in Ecology from Colorado State University (1999) and both an M.S. (1992) and B.S. (1984) in Biology from the University of Nebraska. Mr. Alward has performed research projects on wildlife habitat management, climate change, grazing, weed control, vegetation monitoring, and native species restoration in Colorado, Utah, Nebraska, South Dakota, Swaziland (while a Peace Corps Volunteer) and Antarctica. He is a member of the Ecological Society of American and the Society for Conservation Biology. His current consulting has him involved in a restoration project with the National Park Service and numerous biological studies that are required as part of the environmental permitting process for development projects, including energy development, throughout western Colorado.

Mark Cutright, P.E. is Operations Manager for Excell Services, Inc. a subsidiary of J-W Operating Co. He earned a B.S. in Petroleum Engineering from the Colorado School of Mines in 1980 and is a Registered Professional Engineer in Oklahoma. During his oilfield career of over 27 years, Mr. Cutright has held various engineering, operations and management positions with EnCana Oil and Gas, Grey Wolf Drilling, Exeter Drilling (an Occidental Petroleum subsidiary) and Brinkerhoff-Signal Drilling. He has extensive experience in the oil industry throughout the Rocky Mountains, California, North-Eastern U.S., Mid-Continent, South-Eastern U.S., South Texas, Ark-La-Tex and South America regions. He has served on numerous boards and committees for Petroleum and Professional Engineering related organizations. He is a member of Society of Petroleum Engineers, International Association of Drilling Contractors, American Association of Drilling Engineers, and International Society of Explosives Engineers. He also serves as a Community Advisor on the Cherry Creek Schools - Long-Range Facility Planning Committee.

Tom Compton and his wife, Penni, own and operate a beef cattle ranch near Hesperus in Southwest Colorado. He holds an M.S. degree in Biology from the University of Alaska and a Ph.D. degree in Zoology from the University of Wyoming. He has taught biology at several colleges including Wheaton College in Illinois, Letourneau University in Texas, Fort Lewis College in Durango and the University of Texas at Tyler. Compton is a past president of the Colorado Cattlemen's Association and served as the original chairman of the board of the Cattlemen's Land Trust. He is the current vice president of the Colorado Rural Electric Association. He also served on Colorado's Roadless Area Task Force.

Michael P. Dowling is a founder and the current chairman of the Colorado Conservation Trust, a former chairman of the Colorado Wildlife Federation, and a former board member of the Colorado Coalition of Land Trusts. He is also a founder and principal of Western Ranchland Investors, a conservation real estate firm that designs and implements limited development solutions for threatened agricultural and natural landscapes. Mr. Dowling has also worked as an energy and environmental consultant, as a management consultant with the international firm of McKinsey & Company, and as an entrepreneur and investment manager in the oil and gas industry. Mr. Dowling has a B.S. in Geology and Geophysics (with honors) from Yale College, a Master of Forest Science degree from the Yale School of Forestry and Environmental Studies, and a Master of Public and Private Management degree from the Yale School of Management. Michael is also an active outdoorsman, a former river guide, and a trustee of the Colorado Symphony Orchestra.

Joshua Epel provides legal counsel to DCP Midstream, LLC. The company is one of the nation's largest natural gas gatherers and processors and operates 52 plants and hundreds of other facilities. Mr. Epel has practiced environmental law for over 25 years, and specializes in air pollution law. His practice has ranged from representing public interest organizations and working for a lead planning agency, to providing legal counsel to the oil and gas, cement, titanium, CFC recycling and other manufacturing industries. Mr. Epel has also authored economic analyses of the cost effectiveness of substituting alternative fuels for conventional motor vehicle fuels for U.S. EPA, NASA and public utilities. In addition to his private sector work, Mr. Epel has served on the Public Advisory Committee of the Grand Canyon Visibility Transport Commission, the Stationary Sources Joint Forum of the Western Regional Air Partnership, and the Denver Metropolitan Regional Air Quality Council, and chaired the Mobile Sources Sub-committee. Most recently, Mr. Epel was a member of the New Mexico Climate Change Advisory Committee.

Kimberlee Miskell Gerhardt is a consulting geologist who has lived in La Plata County for eight years. She earned a B.A. in Geology from Wellesley College (1977), a M.S. in Marine Geology and Geophysics from the University of Miami (1983) and a Ph.D. in Geology from Rice University (1989). Ms. Gerhardt began her professional career as a grade control geologist for Kerr-McGee Corp. in the Church Rock uranium mine near Gallup, N.M. She returned to graduate school and subsequently hired on with Exxon Production Research Company in Houston, Texas. During her ten years with EPR, Ms. Gerhardt worked on reservoir geology projects from Wyoming, Alaska, Texas, the USSR, Australia, Norway, Algeria, China, Angola and Nigeria. She is the past-president of the Four Corners Geological Society, a member of AAPG and has authored and co-authored various professional publications. Ms. Gerhardt is also interested in archeology and is currently pursuing research on lithic toolstone resources in southwestern Colorado.

Trési B. Houpt, a Colorado native, serves as a Garfield County Commissioner. She is a former School Board Member for the Roaring Fork School District, Executive Director of Valley Resource Management and long-time member of the non-profit community. Ms. Houpt is the Chair of the Colorado Counties Inc. (CCI) Natural Resource and Land Use Steering Committee and a member of the National Association of Counties (NACO) Environment, Energy and Land Use Steering Committee. She has worked extensively with Colorado's Congressional Delegation, State Legislators, Local Officials and Industry representatives on creating and proposing laws and regulations that would bring a reasonable balance to energy development in the State of Colorado. Ms. Houpt is currently a member of the Executive Committee and Past-Chair for the I-70 Mountain Corridor Coalition, Past-President for CCI's Western District, current Board Member and Past-Chair for the Rural Resort Region, Board Member for the Rocky Mountain Rail Authority, Advisory Board Member for the Colorado Mountain College Rifle Campus, Advisory Board member for the Ruedi Water and Power Authority, served on the Advisory Board for the State Park System Strategic Planning Process and served on Governor Owens' Blue Ribbon Panel on Housing. Commissioner Houpt has a B.S. in Political Science and Sociology from Lewis and Clark College.

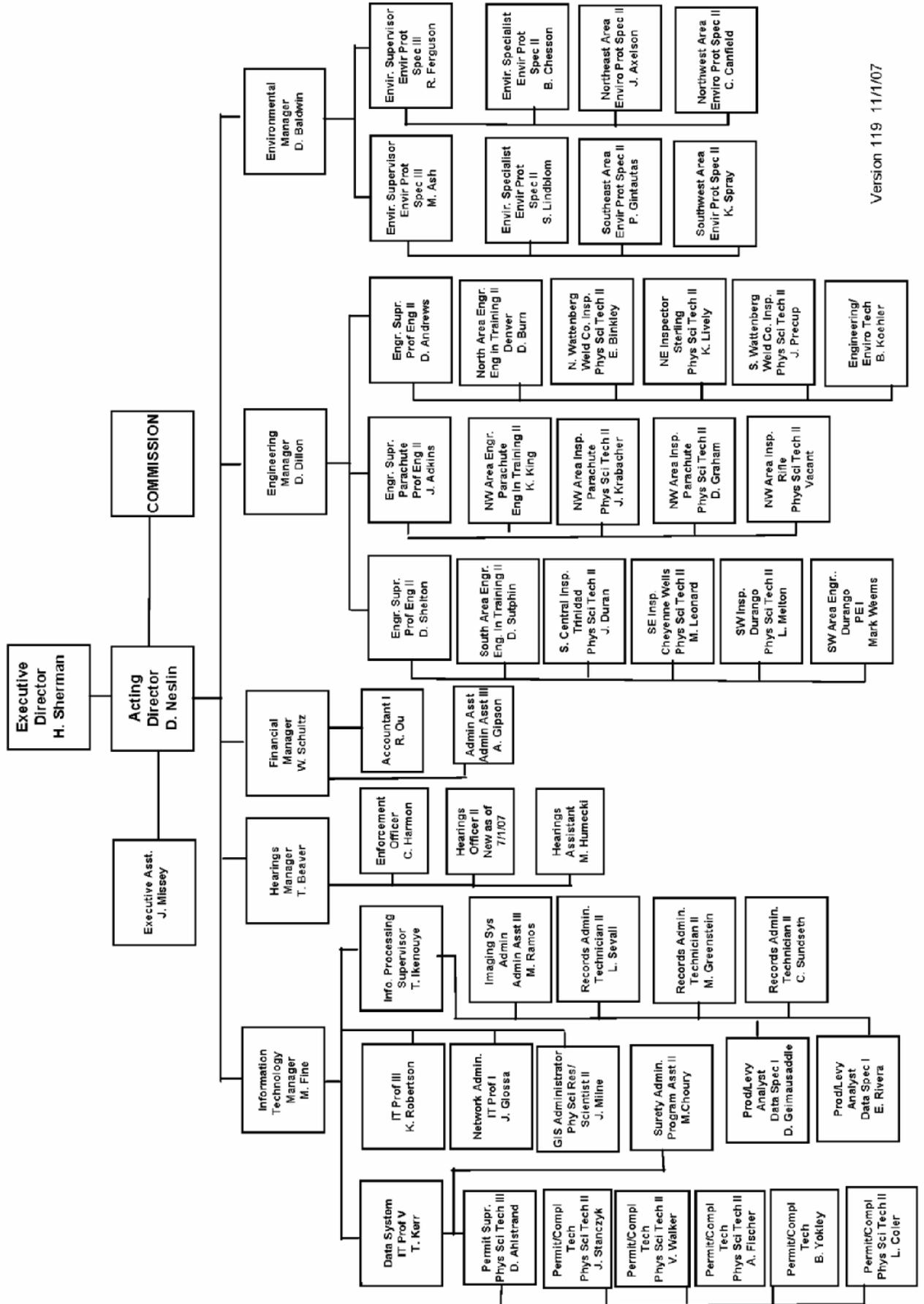
James B. Martin is the Executive Director of the Colorado Department of Public Health and Environment, responsible for broad-based health programs and a full array of environmental activities, including air and water quality protection and improvement; hazardous waste; solid waste management; radiation services; pollution prevention; consumer protection; and environmental leadership. Prior to joining the department, Mr. Martin was the Executive Director of Western Resource Advocates, a Boulder-based environmental law and policy organization. Prior to that, he was Director of the Natural Resources Law Center at the University of Colorado School of Law. He also was Senior Attorney and Director of the energy program for

Environmental Defense, and from 1986 to 1992 he worked for former U.S. Representative and Senator Tim Wirth, including four years as State Director and Counsel. Mr. Martin also served on the Colorado Air Quality Control Commission from February 21, 2003 to January 12, 2007. He earned his undergraduate degree in Biology from Knox College in Illinois and his law degree from Northwestern School of Law, Lewis and Clark College, in Oregon.

Harris Sherman is the Executive Director of the Colorado Department of Natural Resources, overseeing Colorado's energy, water, wildlife, parks, and state lands programs. He is a member of Governor Ritter's Cabinet and also serves as the Director of the Colorado Interbasin Compact Commission. Mr. Sherman received his B.A. degree from Colorado College and his law degree from Columbia University Law School. As Managing and Senior Partner of the Denver office of Arnold & Porter, his law practice focused on natural resources, environmental, water, public land, real estate, and Indian law. He has also served on a wide variety of public and private agencies and organizations including Chairman of the Colorado Water Quality Control Commission; Chair of the Colorado Mined Land Reclamation Board; Chair of the Denver Regional Air Quality Council; Commissioner of Mines; Commissioner of the Denver Water Board; Trustee of the Boettcher Foundation; and Trustee of Colorado College. For several decades, he has been active in land conservation efforts with the Nature Conservancy, Colorado Open Lands, and the Trust for Public Land. As a lifelong Colorado resident, Mr. Sherman is an avid hiker, skier, and cyclist, spending much of his free time at his ranch in Summit County.

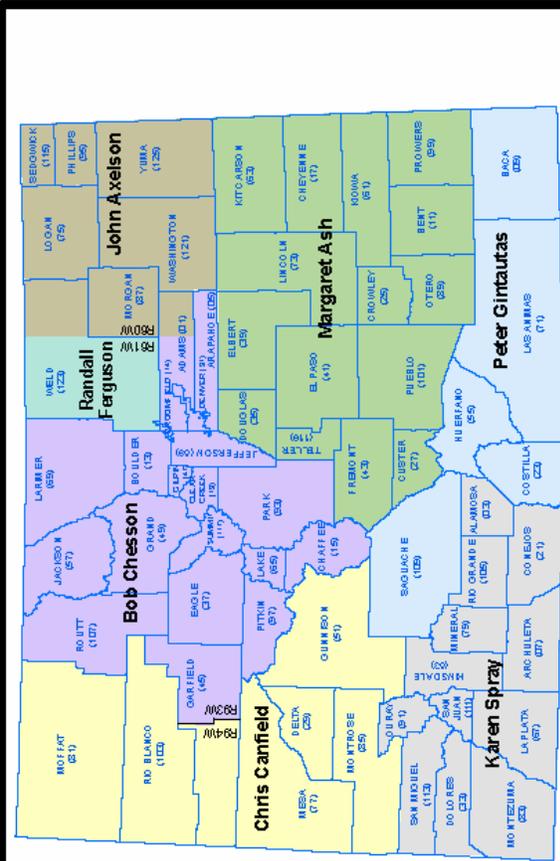
APPENDIX 2
COGCC ORGANIZATION CHART

COLORADO OIL & GAS CONSERVATION COMMISSION ORGANIZATION

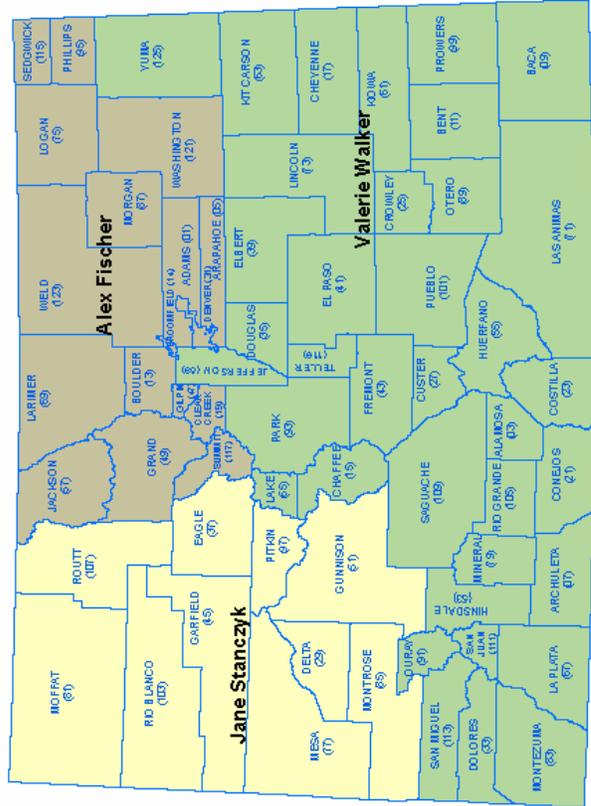


APPENDIX 3

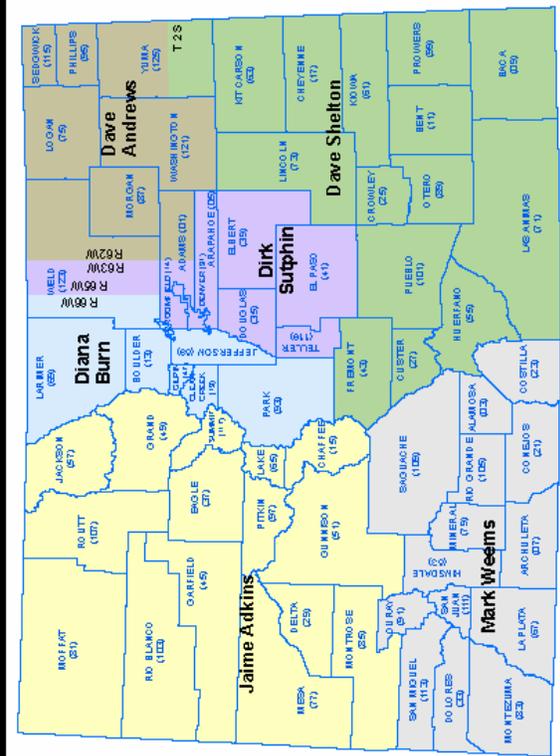
GEOGRAPHIC AREAS OF TECHNICAL RESPONSIBILITIES



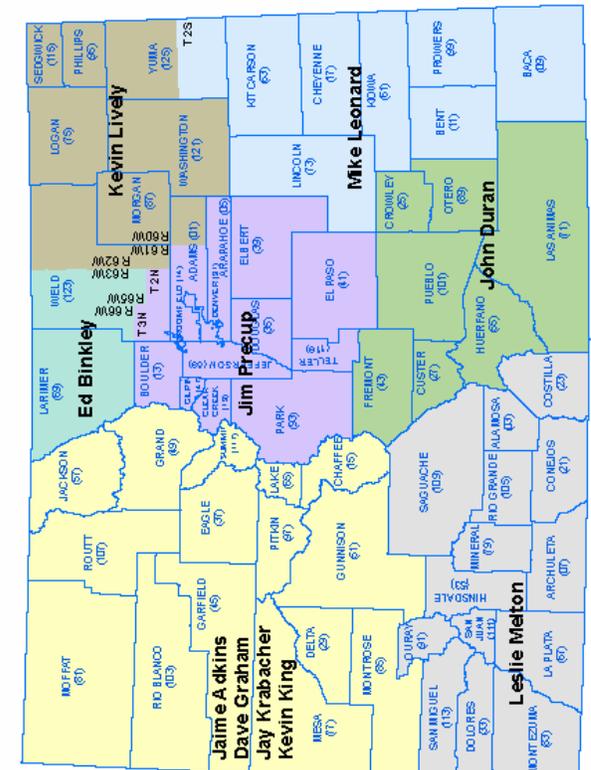
ENVIRONMENTAL



PERMITS (APDs)



ENGINEERING



FIELD OPERATIONS