COLORADO OIL AND GAS CONSERVATION COMMISSION (COGCC)

2019 ANNUAL REPORT

to the

WATER QUALITY CONTROL COMMISSION (WQCC)
and
WATER QUALITY CONTROL DIVISION (WQCD)
of
THE COLORADO DEPARTMENT OF
PUBLIC HEALTH AND ENVIRONMENT
(CDPHE)

COLORADO

Oil & Gas Conservation Commission

Department of Natural Resources

IN ACCORDANCE
with
THE AUGUST 28, 1990 MEMORANDUM OF AGREEMENT
and
THE IMPLEMENTING PROVISIONS OF SENATE BILL 89-181

December 31, 2019

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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 groundwater protection. This authority was provided by Senate Bill (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 and the Water Quality Control Division (WQCD) 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 28th annual report provides an overview of COGCC functions and a summary of calendar year 2019 activities, with a focus on groundwater protection programs. Major issues concerning the implementation of water quality standards and classifications are also reported.

2.0 WQCC/WQCD AND COGCC COORDINATION AND PUBLIC OUTREACH

2.1 Inter-agency Coordination

In 2019 the COGCC, WQCC, and WQCD coordinated implementing the provisions of SB 89-181 and the MOA. COGCC and the Colorado Department of Public Health and Environment (CDPHE) Office of Emergency Preparedness and Response staff communicated frequently through email and telephone calls regarding spills at or near oil and gas facilities when there was some question as to whether or not a spill was exploration and production (E&P) waste. COGCC took the lead for all E&P waste spills.

Following COGCC's last briefing to the WQCC on the January 14, 2019 Groundwater Summit, COGCC staff met with WQCD staff on April 23 and August 27 to discuss program issues. Agenda items included follow up on various active investigations, enforcement matters, and E&P waste management practices within the oil and gas industry.

2.2 Public Outreach

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

Commission Hearings:
In 2019, the COGCC held two of its regular hearings (out of 10) outside of Denver: one in Rifle, Garfield County (August) and one in Greeley, Weld County (November).

Scheduled Meetings:
COGCC staff participates in regularly scheduled meetings with the regulated community and other interested stakeholders in parts of the state with active oil and gas operations. The Gas and Oil Regulatory Team (GORT), established by COGCC Order, met in Durango two times in 2019 (June 13th and November 15th), focusing on oil and gas operations in the San Juan basin in southwestern Colorado. GORT provides a forum for meaningful dialogue between operators, citizens, county and local governments, the Southern Ute Indian Tribe (SUIT), the Bureau of Land Management (BLM), the U.S. Forest Service (USFS), and the COGCC. The Northwest Colorado Oil and Gas Forum (NWCOGF) usually meets in Rifle or Grand Junction, generally three times yearly, only met once in 2019 (December, 15th), and focuses on the Piceance basin and other operations in the northwestern part of the state. The NWCOGF is co-chaired by Garfield County and the COGCC Director or Deputy Director; other state, federal, and local government agencies, the oil and gas industry, and concerned landowners and citizens regularly participate. COGCC staff attend GORT and NWCOGF meetings and give presentations on emerging issues and hot topics, as well as routine updates on operations statewide and in the respective geographic areas.

Stakeholder Participation:
COGCC continues to solicit participation in the regulation of oil and gas exploration and production. Stakeholders, including the oil and gas industry, local governments, citizens, other regulatory agencies, non-governmental organizations, agriculture interests, and the environmental community provide input into permitting, policy development, rulemaking, and other processes.

Local Government Designee Program:
COGCC created the Local Governmental Designee (LGD) program via rulemaking in 1992 to provide a conduit of information between local governments and the COGCC. COGCC bolstered the LGD program in 2012 with the addition Local Government Liaison (LGL) staff to assist and facilitate participation in the LGD program through training, outreach, and providing information, data, and presentations about specific aspects of oil and gas operations, COGCC rules, use of the COGCC website, and the COGCC's changing regulatory program under SB 19-181. COGCC created the Community Relation Unit in 2018 and which includes LGL staff working under the supervision of the COGCC Communications Director.

As of December 13, 170 local governments, including two combined city-county governments (Denver and Broomfield), 53 other counties, 103 municipalities (besides Denver and Broomfield), and 10 special districts are registered to participate in the LGD program. Through mid-December 2019, LGL staff involvement included the following:

- Facilitated four (4) SB19-181 COGCC Director-LGD meetings
- Provided twelve (12) LGD check-in meetings and listening sessions
- Provided six (6) LGD orientation trainings
- Provided two (2) citizen group trainings
- Initiated two (2) LGD informational surveys
- Coordinated three (3) regional oil and gas public meetings

- Participated in over thirty (30) other events including but not limited to source water protection planning meetings, county oil and gas working groups, city council oil and gas workshops, regional resource manager meetings, public listening sessions, county and municipal oil and gas advisory board meetings, and operator outreach events.

COGCC Website:
The COGCC continues to use its website to make announcements and distribute information and data. COGCC information and data systems are described further in Section 3.3.

3.0 COGCC ORGANIZATION

3.1 COGCC Commissioners

The Colorado Oil and Gas Conservation Act (The Act), as amended by SB 19-181, specifies the composition of the Commission. The Act 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 (DNR) and the CDPHE. 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, one member is to have substantial experience in the oil and gas industry; 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; one member must be actively engaged in agricultural production or be a royalty owner; and one member must have formal training or substantial experience in public health. Excluding the executive directors, no more than four members may be from the same political party.

Biographies of the Commissioners are posted on the COGCC website http://cogcc.state.co.us/about.html#/commissioners.

SB19-181 Changes to the Commission

SB 19-181 signed into law by Governor Polis on April 16, 2019 changes the existing seven voluntary COGCC Commissioners, appointed by the Governor, to a five person professional commission, also to be appointed by the Governor. The new commission will retain both the Executive Director of the DNR and Executive Director of the CDPHE as ex officio non-voting members. This change will take place by July 2020. Until the professional commission is seated, the existing volunteer commission remains in place.

3.2 COGCC Staff

The COGCC has 130 full time employee (FTE) positions located in the Denver office and throughout the state in field offices. The Staff include engineers, environmental protection specialists (EPS), field inspectors, permitting technicians, hearings specialists, and a variety of other professionals. Table 3-1 summarizes each group and their primary functions. New work groups and staff functions related to water resource protection and compliance are described in more detail in the paragraphs that follow. The current organizational chart and a series of maps showing regional areas of responsibility are included as Appendix 1.

Table 3-1. COGCC Groups and Primary Functions

Group	Number of FTE	Primary Functions
Executive	4	Director, Chief of Staff, Deputy Director and Executive Assistant
Environmental	25	Spills, remediation projects, pit closures, complaint response, environmental projects, Oil and Gas Location Assessments & pit permitting, environmental database, special projects
Engineering	18	Permitting downhole wellbore plans, underground injection control (UIC) permitting, oil/gas facility oversight, flowline integrity
Orphaned Well Program	6	Plugging orphan wells, orphan site clean-up, site reclamation
Field Inspection	35	Inspection of oil/gas wells, facilities, and locations; complaint response complaint intake, management and resolution; interim and final reclamation; agency contact for responding to emergency situations and working with emergency response personnel
Community Relations	2	Local government liaison and communications
Permitting & Technical Services	21	Permitting oil and gas wells, bonding, production reporting and levy collection, financial assurance, database management/support, GIS, website and eForm development/support
Hearings	10	Hearings, rulemaking, enforcement
Financial	5	Budget management, procurement, purchasing

Community Relations – In 2018, the COGCC created the Community Relations Unit (CRU) as a new work group that currently includes a Complaint Specialist and a Communications Officer. The Communications Officer was added in 2019 to expand interaction and communication with local, state and federal government agencies, the general public, the oil and gas industry, and various other stakeholders.

Staff functions that directly relate to water resource protection and compliance with groundwater and surface water standards include the following:

Permitting – Applications for Permit to Drill (APD) are reviewed to ensure compliance with all rules related to aquifer protection. Oil and gas wells must be designed and installed to prevent

the migration of fluids or gas between formations or into aquifers. Permit technicians and engineering staff review drilling permit applications for surface casing and cementing requirements, among other requirements designed to protect aquifers. The COGCC issued 2,026 well permits in 2019 through December 6.

Location Assessments - Under the Form 2A process, Operators are required to provide site-specific environmental information about surface locations. Consultation by the CDPHE and Colorado Division of Parks and Wildlife (CPW) with the COGCC, the surface owner, and the operator is required in some circumstances. Oil and Gas Location Assessment (OGLA) specialists in the environmental group 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 water resources; public health, safety and welfare; the environment; or wildlife resources.

On May 16, 2019, COGCC initiated the SB 19-181 required Director Objective Criteria, which consists of 16 criteria that the Form 2A must be reviewed against for approval. Those Form 2A's which meet the Objective Critera review are often approved with site-specific conditions of approval (COA) to minimize or mitigate potential impacts. The COGCC approved 241 Form 2A Oil and Gas Location Assessments in 2019 through December 12

Underground Injection Control (UIC) Permitting – The USEPA delegated authority to COGCC to review, approve, and monitor the injection of E&P waste into Class II UIC wells. COGCC staff works with WQCD and USEPA staff to ensure that operators of Class II injection wells in Colorado comply with UIC rules and regulations to prevent groundwater contamination. COGCC's staff geologic experts review UIC permits for site-specific matters, such as the occurrence of faults and potential for induced seismic activity. UIC permits include restrictions on injection pressures, daily injection rates and volumes, based on staff analysis. Commercial and non-commercial injection operations are actively managed by the COGCC in conjunction with the U.S. Geological Survey Earthquake Notification Service, through the installation and continuous monitoring of several local seismometers to evaluate if injection of produced water has some relationship to local seismicity. COGCC has instituted a "traffic light" monitoring system, which dictates specific mitigation measures, up to requiring injection to be halted if seismic activity reaches specific levels. Through November, COGCC Staff approved 22 Class II UIC well permits in 2019.

Pit Permitting – Operators may construct pits at oil and gas locations for a variety of purposes, most commonly to contain drill cuttings, produced water and flow back, and for the reuse and recycling of produced water. COGCC is responsible for permitting pits (Form 15), inspecting their operation, and overseeing their closure. The OGLA and EPS 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. In 2019, COGCC approved 3 Form 15s. Applications for new pits are down significantly over previous years reflecting both a decrease in new oil and gas activity in areas

that traditionally have used pits for produced water disposal and widespread industry use of "pit-less" drilling and completion activities.

Centralized E&P Waste Management Facility Permitting – COGCC environmental staff permit non-commercial centralized E&P waste management facilities under Rule 908. Generally, these facilities are larger than a typical tank battery or pit that might handle wastes from only one or a few wells. These larger facilities handle wastes from many wells and often from more than one field or lease operated by a single oil and gas operator. These facilities may include lined pits, land treatment facilities, land application areas, 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, environmental impacts, 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 2019, the COGCC permitted 2 new centralized E&P waste management facilities. There are 54 active permitted centralized E&P waste management facilities in the state.

Oversight of Produced Water Disposal – Well over 300 million barrels of water are co-produced with oil and gas production annually. Approximately 70 percent of the produced water is disposed 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 a Colorado Discharge Permit System (CDPS) permit. Disposal facilities may be commercial and subject to oversight by CDPHE or they may be private and subject to oversight by COGCC. To minimize waste and the use of fresh water, many operators are reusing and recycling produced water and other fluids for drilling and well completion activities including hydraulic fracturing (frac) treatment operations. COGCC staff review UIC permits, pit permits, centralized E&P waste management permits, and other proposals, including water reuse and recycling plans, to ensure that produced water is handled appropriately.

Complaint Response – COGCC responds to complaints from all parties. Once received through the online intake process or by phone, the complaint specialist first determines if the complaint falls under the jurisdiction of COGCC regulatory authority. If it's related to another regulatory agency, COGCC will make a formal referral to the appropriate agency on behalf of the complainant. For complaints under COGCC authority, the complaint specialist will determine the appropriate group within COGCC to assign the complaint. For example the Field Inspection Unit (FIU) handles a large percentage of complaints such as odor, noise, dust, trash and storm water issues. As related to protection of groundwater, the Environmental Group responds to complaints alleging impacts to domestic water wells. The Environmental unit also responds to complaints where groundwater or surface water may be threatened by spills/releases or the management of E&P waste.

Complaint investigations generally include a site visit where COGCC staff inspect the location of the complaint. For complaints related to domestic water wells, the environmental unit collects representative groundwater samples and has them analyzed at laboratories to determine if groundwater quality was impacted by oil & gas operations. Regardless the type of complaint,

COGCC staff investigate to determine if there were violations of applicable rules. Where violations are discovered, COGCC issues corrective actions to the operators to mitigate the issue. In cases where complaints result in the discovery of rule violations, enforcement actions are pursued with the operators.

In 2019, COGCC received 483 complaints accounting for a significant staff workload. Of those, 40 were assigned to the environmental unit for investigation of various allegations related to groundwater and surface water contamination, spills/releases and other threats to the environment. Of the 40, a total of 15 complaints were specifically related to concerns about water quality from domestic water wells. Each of the water wells was sampled and a report was provided to the complainant with a detailed discussion of the results. No water wells were found to have been impacted by oil and gas operations in 2019. Results from two water well samples were still pending at the writing of this report.

Spill/Release Response and Remediation Oversight – 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 groundwater, 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. COGCC's oversight of spills, releases, remediation projects, and environmental investigations is discussed in more detail in Section 6 of this report.

Orphaned Well Program – COGCC used appropriated funds and claimed financial assurance to perform plugging and abandonment, remediation, and reclamation work at orphaned oil and gas sites in 19 counties: Adams, Baca, Garfield, Jackson, Jefferson, La Plata, Larimer, Lincoln, Logan, Mesa, Moffat, Montezuma, Montrose, Morgan, Rio Grande, San Miguel, Washington, Weld, and Yuma. COGCC plugged 10 wells and commenced remediation or reclamation at 16 locations during Fiscal Year 2019. Ongoing reclamation maintenance of storm water BMP s, weed control, and maintenance seeding was also performed at other locations that were reclaimed in prior fiscal years. For Fiscal Year 2020 and future fiscal years, the Orphaned Well Program budget is sufficient to plug up to about 35 wells and remediate or reclaim up to about 75 sites each year.

Enforcement – As of December 1, 2019, the Commission has issued 21 enforcement orders, including 18 Administrative Orders by Consent and three Order Finding Violations. These orders resolved 38 Notices of Alleged Violations and imposed $2,841,920 in gross penalties, of which $82,800 was conditionally suspended.

3.3 COGCC Information/Data Systems

Each year COGCC works to improve its data management systems and GIS as time and resources allow. Primary data systems that were improved or developed in 2019 include:

- eForms – additional forms developed and some existing forms revised
- Geographic Information Systems (GIS)

- Environmental Database improvements
- Data Downloads – new data sets made available
- Online Environmental Reports
- Daily Activity Dashboard on website updated

Brief descriptions of the changes for each system are provided in the following sections.

3.3.1 eForms

COGCC uses an electronic form filing system built on a Microsoft Silverlight™ platform called "eForms." The eForm application allows operators to submit applications and notices electronically, and the system also provides for automatic email notices to appropriate parties, including the applicant or operator, COGCC staff, and local governments or other regulatory entities. Because Microsoft will no longer support Silverlight™ past 2020, COGCC has begun the transition to a new electronic form system. This process commenced with the pilot development of the Form 8 – Oil and Gas Conservation Levy and will continue over the next two years. eForms currently in use or pending completion (*****) are:

Form 2 – Application for Permit to Drill
Form 2A – Oil and Gas Location Assessment
Form 4 – Sundry Notice
Form 5 – Drilling Completion Report
Form 5A – Completed Interval Report
Form 6 – Well Abandonment Report
Form 7 – Monthly Operations Report
Form 8 – Oil and Gas Conservation Levy*
Form 10 – Certificate of Clearance/Change of Operator
Form 14 – Monthly Report of Non-Produced Water Injected*****
Form 14A – Authorization of Source of Class II Waste for Disposal*****
Form 15 – Earthen Pit Report/Permit
Form 17 – Bradenhead Test Report
Form 19 – Spill/Release Report
Form 21 – Mechanical Integrity Test (MIT) Report
Form 22 – Accident Report
Form 23 – Well Control Report
Form 26 – Source of Produced Water for Disposal
Form 27 - Site Investigation and Remediation Workplan (release date January 1, 2017)
Form 31 – Underground Injection Formation Permit Application
Form 33 – Injection Well (UIC) Permit Application
Form 41 – Trade Secret Claim of Entitlement
Form 42 – Field Operations Notice
Form 43 – Sample Analytical and Data Form
Form 44 – Flowline Reporting

FIR – Field Inspection Report
FIRR – Field Inspection Report Resolution Form
NOAV – Notice of Alleged Violation
Warning Letter

With eForms, operators are able to submit forms and attachments electronically. COGCC staff review and approve the forms electronically, and data from the forms are uploaded to the MRDB instantaneously upon approval. For forms that require review by multiple staff members (e.g., permitting, engineering, etc.), each staff member involved in the process passes their task within the eForm system.

3.3.2 GIS – Geographic Information Systems

The GIS Online map is an important tool used by staff, industry, and other agencies to submit and process permits, create reports, and view information related to exploration and development. The COGCC interactive map is also a go-to resource for the general public and interested stakeholders regarding environmental concerns and siting issues related to current and planned drilling and production activity.

The GIS Online map contains over 170 spatial datasets including oil and gas well locations, permits, spacing orders, field boundaries, and useful reference information such as cities, rivers, roads, sections, land ownership, etc. Aerial photos, topographic quads, and geologic maps are also included as valuable information resources. The newest version of online mapping system allows users to zoom to a specific street address or parcel for much of Colorado; has improved printing functionality; and includes a live connection to our environmental sampling database. To aid operators and other interested parties with their own GIS work, the COGCC website provides GIS shapefiles for download, including files that have daily updated well information, permit and pending permit data, and wellbore traces for directional and horizontal wells across Colorado. Recently added are downloads of KMZ files for well locations that can be used in Google Earth on smartphones and tablets. The COGCC's online mapping tool is regularly recognized as one of the best state-level oil and gas resources in the nation.

3.3.3 Environmental Database

The Groundwater Protection Council (GWPC) in conjunction with the COGCC has developed a publicly available, searchable database of groundwater, surface water, and soil sample analytical results from throughout the state. Referred to as the COENV database, it has been active since September 2012. The COENV database has sampling data dating back as far as 1941. The environmental database currently contains over 18,280 sample locations and 52,510 individual samples (as of December 11, 2019). In 2019, 4,929 total samples were added to the database. Since the statewide rules for groundwater sampling went into effect on May 1, 2013, COGCC has received a total of 13,281 water samples from 3,205 separate locations from operators in compliance with the rules.

The data can be accessed through the GIS Online map. Sample locations with available water and natural gas data appear as green triangles when the "Sites with Lab Data" layer is turned on. The user can double click on a sample site and gain access to the analytical data for that site.

The COENV database allows for electronic data deliverables to be used for input. New samples from COGCC staff sampling efforts; current COGCC baseline sampling rules 317B, 318A.f, 608, and 609; and older samples from COGCC Orders and the Colorado Oil and Gas Association (COGA) Voluntary Baseline Sampling Program are accessible. In April 2014, the COENV database was made available for download in an Access database format for those who wish to query large datasets.

In October of 2018 The eForm 43 (Analytical Sample Data Submittal Form) was released. The eForm 43 includes a streamlined data upload process with built in data quality checks and a printable document (Form 43) that will serve as a receipt for information submitted to the COGCC.

3.3.4 Data Downloads

Historically, the COGCC has provided production data, spacing order data, and GIS shapefiles for download from the website. GIS data available include well surface locations and directional data (updated daily), pits, oil and gas fields, sensitive wildlife habitat, some 100-year floodplain data and approximate buffers associated with COGCC Rule 317B – Public Water System Protection.

In addition to GIS data listed above, and in an effort to increase transparency, the COGCC aggregates datasets directly from our MRDB and provides them for public use. The MRDB, managed and maintained by COGCC with assistance from the Governor's Office of Information Technology (OIT), is a comprehensive repository of Colorado's oil and gas data. Although all the data is available through interactive search tools on the website, these downloads allow the industry, public, non-governmental organizations, or other interested parties to access large amounts of data in searchable formats so that they may run their own analyses. These datasets are updated periodically.

The data downloads now available are:

Complaints Data
NOAV Data
Flowline Notice to Operators (NTO) Inventory
MIT Data
Spill and Release Data
Analytical Sample Data
Field Inspection Reports
Production Data
Spacing Orders
GIS Shapefiles

The COGCC is developing additional data downloads for future release, including Remediation Projects.

3.3.5 Online Environmental Reports

Written reports for COGCC-managed baseline sampling projects and other special environmental studies, such as status reports for monitoring Project Rulison in Garfield County and the various aquifer characterizations are posted on the website under the "Library" tab where they are primarily organized by basin and available for download as portable document format (PDF) files.

Although not new, the brochure, *How Well Do You Know Your Water Well* continues to be very popular. The brochure was updated and revised in 2011 to include information about mitigating methane in water wells, current contact information for various agencies, and water well maintenance and recordkeeping. COGCC provides this useful brochure to water well owners when water samples are collected from their wells by COGCC, operators, or third party contractors.

3.3.6 Daily Activity Dashboard

In late 2016, the COGCC launched the Daily Activity Dashboard, a web-based tool designed to give local governments, the public, and other stakeholders a more efficient way to access, sort, and display the most commonly used data related to oil and gas operations. The Dashboard is a visual interactive tool that allows a user to generate custom statistical charts, graphs, tables, reports, and simple maps based on data that are updated daily.

The Dashboard does not offer any new types of oil and gas data to the public, or replace existing ways of searching for online oil and gas data in the Colorado Oil and Gas Information System, but instead provides a convenient way to access information on pending permits, well status, production, well inspections, NOAVs, active notifications and spills. This tool can be accessed by clicking "Dashboard" in the main menu of the COGCC homepage and continues to be a popular page on our website.

3.4 COGCC Environmental Program and Project Funding

The General Assembly annually appropriates a line item within COGCC's budget for the environmental staff to respond to, investigate, prevent, monitor, or mitigate conditions that threaten or actually cause adverse impacts to air; water; soil; public health, safety, and welfare; or wildlife resources. This work includes, but is not limited to, the collection of water and soil samples, laboratory analyses of the samples, and review and analysis of laboratory results and other environmental data. In FY 2019-2020, the appropriation for this line item is $312,033.

In addition, the General Assembly annually appropriates a line item to fund special environmental protection and mitigation studies including, but not limited to, gas seepage mitigation studies, outcrop monitoring studies, soil gas surveys in the vicinity of plugged

orphaned wells, and baseline water quality and subsequent follow-up studies. The intent was to provide readily available funds for special projects as the need arises. The COGCC reports all expenditures made from this line item in the previous year to the General Assembly in its annual budget request. The appropriation for this line item in FY 2019-20 is $325,000. The FY 2019-20 special environmental projects are described in Section 8.

In addition to the foregoing, COGCC receives an annual appropriation to respond to emergencies related to oil and gas operations that threaten or cause significant adverse impacts to public health, safety, welfare, or the environment. For FY 2019-20, this appropriation is $750,000. The COGCC also receives an annual appropriation for plugging, abandoning, and reclaiming orphaned wells (PROW). The FY 2019-20 appropriation for the PROW line item is $5,011,000.

4.0 NEW COGCC REGULATIONS AND POLICIES

4.1 Senate Bill 19-181

On April 3, 2019, the Senate passed SB 19-181, which the Governor signed into law on April 16, 2019. This Bill requires several changes to the overall regulatory framework, which are summarized below:

- Local Government Control – it enables local governments to have increased oversight of land use related oil and gas activities in their communities;
- New Commission Makeup and Members – immediately after the Bill was signed, the makeup of the Commission was changed and a new volunteer commission was seated. A professional Commission appointed by the Governor will be seated by July 2020;
- Objective Criteria – until the rulemaking required by the Bill is completed, the Director and staff developed 16 objective criteria to apply during review of an Application for Permit to Drill and an Oil and Gas Location Assessment. This objective criteria is also used when evaluating the following permits: Request to Vent or Flare, Intent to Plug and Centralized E&P Waste Management Facility;
- COGCC Rulemaking – the Bill required new rulemaking as follows: Flowline, Practice and Procedure, Alternative Location Analysis, Cumulative Impacts and Mission Change. The Flowline rulemaking was completed and the final rules adopted on November 21, 2019.
- CDPHE AQCC Rule Making – the Bill tasks the AQCC to adopt additional air quality rules to minimize emissions from oil and gas activities;

The Bill also provided additional resources to COGCC in anticipation of increased workload. This included the addition of two new Deputy Directors and 24 new full time employees.

Detailed information about SB 19-181 can be accessed on the COGCC web-site at: http://cogcc.state.co.us/sb19181.html#/overview.

5.0 OIL AND GAS EXPLORATION AND PRODUCTION ACTIVITY

Data used in the following discussion are current as of December 2019.

One metric used to measure exploration and development activity levels is the number of approved permits. A total of 2,026 permits to drill were issued in 2019, compared to 5,116 in 2018, 3,906 in 2017, and 2,835 in 2016. Most of the permits, approximately 76%, were issued in Weld County (1,543 permits) in the active shale play of the Niobrara and Codell formations

Another metric to gauge activity level is the number of wells drilled; COGCC tracks well starts and, specifically, horizontal well starts. As of December 1, 2019, there were 1,578 well starts statewide, compared to 1,842 well starts in 2018. In 2019, 1,094 wells starts were for horizontal wells, or approximately 69 percent of the total well starts for the state. As in recent years, horizontal drilling associated with the Niobrara and Codell Formations in the Denver-Julesburg (DJ) Basin continues to dominate the drilling activity in the State. In 2019, 984 (90 percent) of the horizontal wells starts for the state were in Weld County targeting the Niobrara and Codell Formations. Over time, wells drilled in Colorado have shifted from a dominance of vertical wells to horizontal wells as shown in Table 5-1 and Figure 5-1, below.

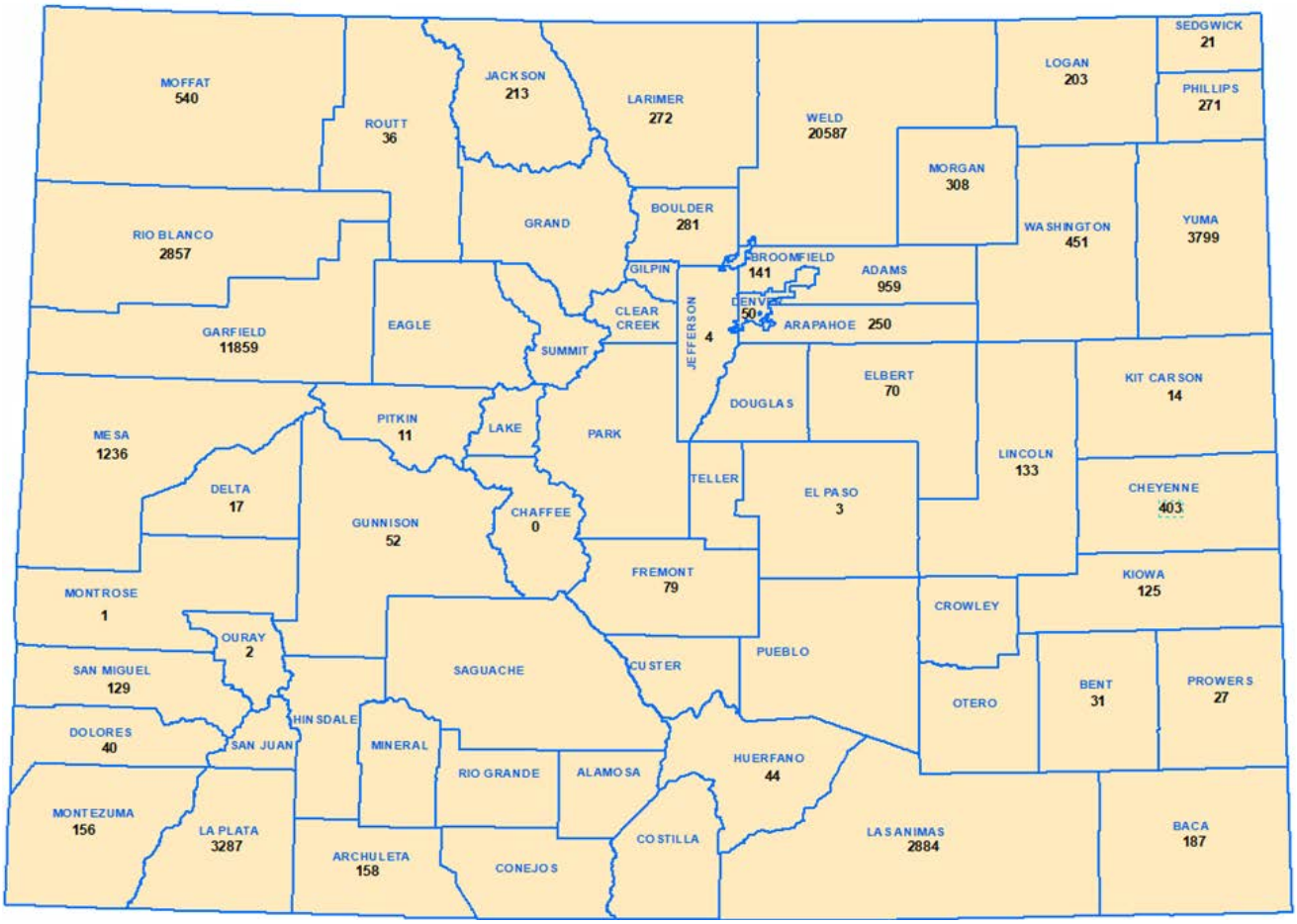
Table 5-1. Annual Permit and Well Start Activity 2009 - 2019

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Permits	5159	5996	4659	3773	4025	4190	2987	2835	3906	5116	2026
Well Starts	2072	2778	3220	2297	1976	2428	1492	1036	1950	1842	1578
HZ Well Starts	31	123	280	641	1160	1484	1096	764	1334	1360	1094
Percent Horizontal	1%	5%	9%	29%	62%	61%	73%	74%	68%	74%	69%

Figure 5-1. Annual Permit and Well Start Activity 2009 – 2019

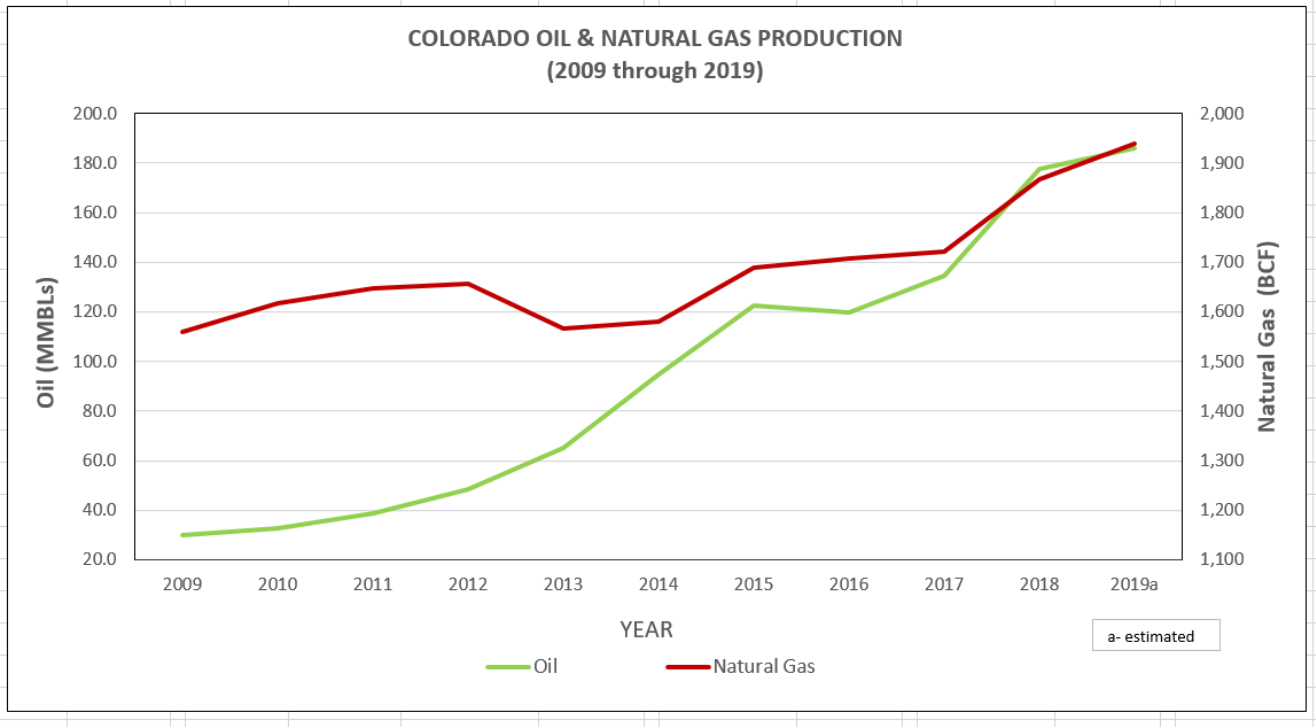
As of November 14, 2019, there were 52,191 active wells in the state. Figure 5-2 shows the number of active wells by County. Weld and Garfield counties have the most active wells, with 20,587 and 11,857 wells, respectively, followed by Yuma County with 3,799 and La Plata County with 3,287 wells.

Figure 5-2. Number of Active Wells by County (2019)



Oil and gas production reports for 2019 are not yet complete and, therefore, final production figures for 2019 are not available. COGCC expects production reporting to be finalized by April 15, 2020. With that caveat, COGCC estimates that statewide oil production for 2019 will be approximately 186 million barrels (Mbbl) of oil produced after final accounting. This is the highest annual oil production on record exceeding the previous highest production record of 177.6 Mbbl in 2018. Further, COGCC estimates that approximately 1.94 trillion cubic feet (tcf) of natural gas will be produced in Colorado during 2019, exceeding the previous highest production record of 1.87 tcf in 2018. Since 2009, Colorado's oil production has dramatically increased from 30.0 million bbl to the current levels, while natural gas production has remained relatively flat (Figure 5-3) although increasing in step with oil production since 2017.

Figure 5-3. Colorado Oil and Gas Production 2009-2019



The COGCC estimates the total dollar value for oil and natural gas produced in Colorado in 2019 to be approximately $14.6 billion. For comparison, the combined value was $15.5 billion in 2018, $11.5 billion in 2017 and $8.7 billion in 2016.

Total State Well Count vs Well Plugging and Abandonment

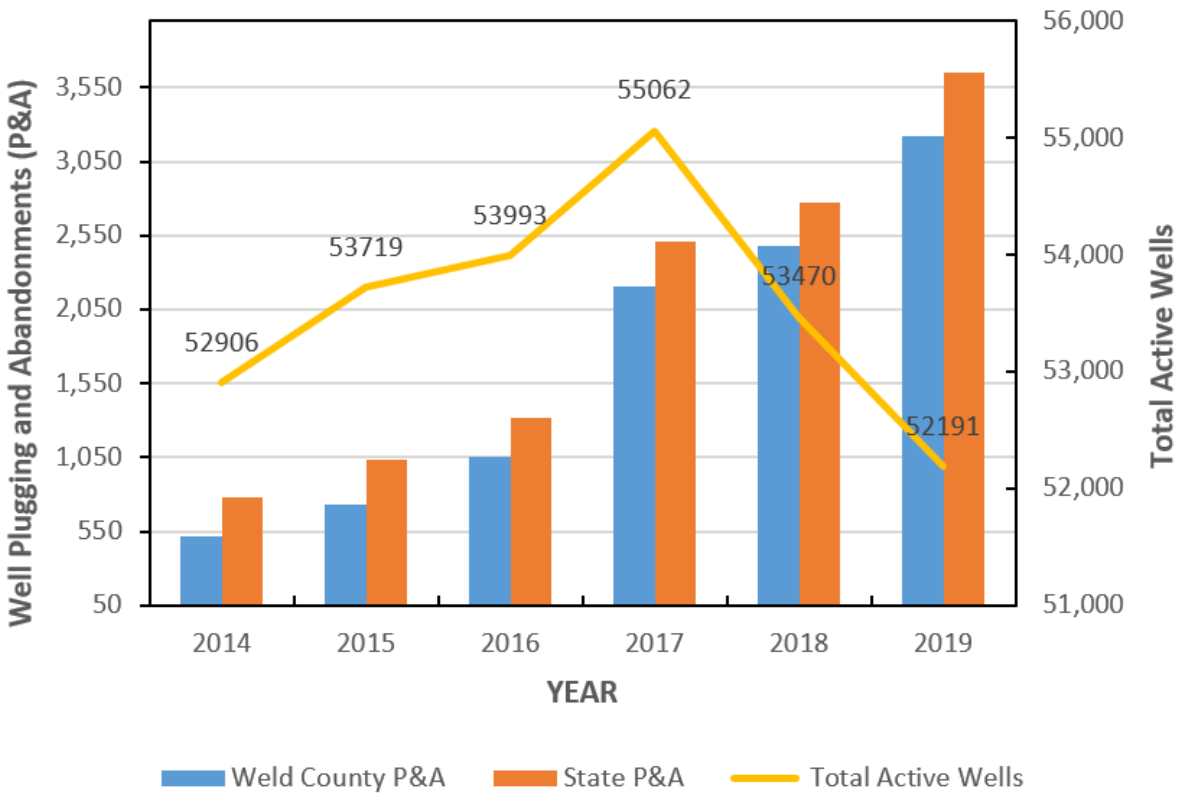
The horizontal development in the Greater Wattenberg Field Area (GWA), centered in Weld County and policies by the COGCC engineering staff (Offset Well Policy) has resulted in a large number of older conventional oil & gas wells being plugged & abandoned (P&A).. This also results in the decommissioning of the production facilities related to those wells. Horizontal wells (up to 3 miles in some cases) are replacing the older vertical wells often eliminating numerous older wells while more efficiently producing the mineral resource. Additionally, the Offset Well Policy requires that existing (mostly older vertical) wells undergo engineering review to eliminate any possible potential for communication between horizontal wells that are being hydraulically stimulated. This requirement (2013) has increased operator P&A activities in the GWA and the removal of the older production facilities.

With the removal of older production facilities, the modern horizontal well production facilities are purpose built to centralize production from numerous horizontal wells, which helps to minimize adverse impacts to air, soil, ground water and surface water resources, while reducing land disruption. The typical new production facility construction is co-located on the well pad minimizing off location flowline runs. The consolidation of the production facilities decreases

potential spill/release locations and, through preventative measures such as production facility liners, also provides improved fluid containment in the result of spills/releases.

This development has resulted in the P&A of approximately 12,000 wells since 2014 with the majority share (85%) in Weld County. At the same time approximately 10,326 new wells have been drilled resulting in a State-wide total well count reduction of approximately 2,900 wells since the high count of 55,062 in 2017. The majority of these new wells (70%) are new horizontal wells in GWA (Figure 5-4).

Figure 5-4. Well Plugging and Abandonment and Total Active Wells 2014 - 2019



6.0 SPILLS/RELEASES, REMEDIATIONS, AND ENVIRONMENTAL INVESTIGATIONS

6.1 Statewide Spills/Releases and Remediation Projects

Operators are required to report spills and releases of E&P waste and produced fluids that occur as a result of oil and gas operations in accordance with COGCC Rule 906, as revised in 2013, using a Form 19 – Spill/Release Report. Oil, condensate, and produced water are the substances most commonly spilled or released. These substances fall under the 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. COGCC defines spills as "any unauthorized sudden discharge of E&P waste to the environment" and releases as "any unauthorized discharge of E&P waste to the environment over time." Through December 7, 2019, 599 spills or releases were discovered and reported to the COGCC in 2019. Of the 599 spills or releases reported, 449 were closed during the reporting period. The remaining unclosed spill generally transition into remediations if the timeframe for spill/release closure exceeds 90 days. A spill is considered closed when the operator has cleaned up the impacted media and provided COGCC with documentation that remaining soil and/or groundwater is in compliance with Table 910-1 contaminant concentration levels. The operator must also demonstrate that E&P waste is properly treated or disposed and that any surface disturbance is restored. Once this documentation is provided, COGCC environmental protection specialists will administratively change the spill to closed status.

Although only spills and releases that meet certain thresholds require reporting, operators are required to remediate environmental impacts associated with any spill or release of E&P waste of any size. The COGCC environmental staff review and approve remediation plans, evaluate analytical data, monitor the progress of the remediation, and ensure cleanup standards and other remediation requirements are met through verification sampling, data review, site inspections, and other measures. If operators find impacts from historical operations during the course of routine operations or facility closure, those impacts are typically reported as releases and the operator proceeds with investigation and cleanup. It is important to note that many times the operator who finds and cleans up the impact is not the operator responsible for the occurrence of those impacts.

Where groundwater 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 groundwater or free hydrocarbon product), remediate, establish points of compliance, and monitor contaminant levels. In accordance with the MOA for Response to Spills/Releases to Surface Water, the COGCC notifies the WQCD of spills or releases impacting surface waters; in 2019, seven spills or releases to surface waters were reported to WQCD staff.

Remediation projects are tracked in the COGCC's database and can be accessed on the COGCC website. Through December 16, 2019, the COGCC received approximately 1,261 new remediation plans, and closed approximately 1,050 remediation projects. It should be noted that not all reported spills and releases are required to be closed under an approved remediation plan, but certain facilities, like production pits and partially buried produced water vessels are required by COGCC rule to be closed in accordance with an approved plan. As discussed in the previous section the P&A of conventional wells and decommissioning of associated production facilities has led to the submittal of a high number of Form 27s to document the removal of buried or partially buried vessels. In many cases, historic releases are discovered during the removal of these vessels or at other locations during the decommissioning of older production facilities. It is

a positive outcome that these impacts are reported and cleaned up during the decommissioning process.

7.0 SPECIAL ENVIRONMENTAL PROJECTS

This section describes projects which were completed or underway during calendar year 2019 for which funding came from the special environmental projects and mitigation studies budget line (the list below includes work completed in FY 2018-19 and ongoing for FY 2019-20):

Naturally Occurring Radioactive Materials (NORM) Produced Water Project (COGCC Special Project 10243) – Beginning in FY 2018, the COGCC Environmental Staff completed sampling of a total of 52 produced water samples and 5 production gas samples from 47 separate well sites statewide for Naturally Occurring Radioactive Materials (NORM) as part of this Special Project. The sampling targeted water production from geologic formations producing oil and gas throughout Colorado, including the Sussex, Codell, Niobrara, Muddy J, Dakota, Mesa Verde (Williams Fork), Mancos, Leadville, J and D Sand, Vermejo/Raton, Fruitland, Osage, Topeka, and Cherokee formations. Source water for hydraulic fracturing fluids along with frac "flowback" fluids were also sampled. Twenty-two oil and gas operators participated.

NORM constituents analyzed include activities of radium isotopes and concentrations of uranium and thorium in addition to general water quality parameters. All water samples were analyzed for the stable isotopes of oxygen and hydrogen (diagnostic of water sources) and a subset of water samples were analyzed for carbon-14 (^{14}C) and tritium (^{3}H) as indicators of age of waters sampled. All samples were also analyzed for a full suite of general chemistry constituents (e.g., anions, cations, metals) and hydrocarbons.

This study is a follow up to "Analysis of Naturally Occurring Radioactive Materials in Drill Cuttings, Greater Wattenberg Field, Weld County" completed in November 2014. It is also responsive to the October 2011 State Review of Oil and Natural Gas Environmental Regulations (STRONGER) review of COGCC regulations.

The data gathered in this study will be used to provide staff, operators, other agencies, and the public with summary and detailed NORM-related analytical data for produced water from across Colorado's oil and gas producing basins. Additionally these data may be useful for oil and gas operators and other regulatory agencies in determining acceptable waste handling methodologies.

The final report was issued on November 4, 2019, and the final report and associated sampling plan are both available in the Technical Reports Library within the miscellaneous grouping on the COGCC webpage.

3M4M Projects, La Plata and Archuleta Counties – Between 2001 and 2010, the COGCC installed 17 monitoring wells at 11 locations along the Fruitland Formation outcrop in La Plata and Archuleta counties to monitor gas pressure changes in the Fruitland Coal. All monitoring wells are equipped with downhole pressure transducers that report data via a satellite telemetry

system to a central data center. In 2008 and 2009, the COGCC and its contractor designed and installed methane seep mitigation systems at two locations in La Plata County. The system at the South Fork Texas Creek (SFTC) site collects methane from a shallow "French drain" type network of piping and converts the methane to electricity.

The COGCC has worked with San Juan Basin operators to continue the monitoring and mitigation system and to provide ongoing operations and maintenance support to ensure the systems stay in working order and continue to relay data as designed. The COGCC and its partners and contractors have conducted the following activities:

- Performed routine operations and maintenance activities of all systems;
- Reviewed gas quality measurements stored in all data loggers;
- Collected weather station data;
- Conducted a system-wide field inspection tour;
- Collected well pressure measurements from a central data center; and
- Analyzed data and prepared the annual report.

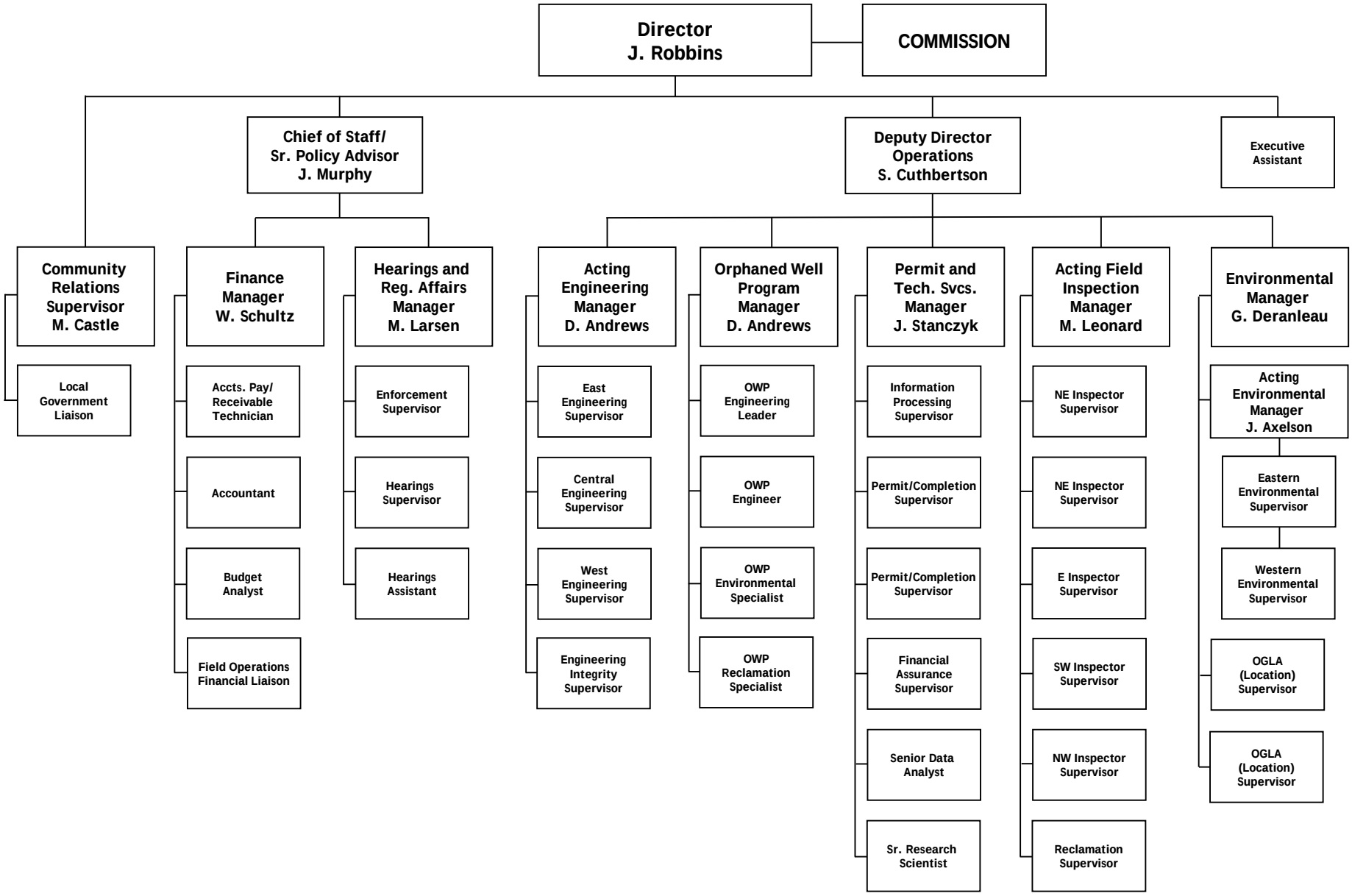
Since May 2009, the SFTC system has collected 28,513 million cubic feet of methane and generated 316,255 kilowatt-hours of surplus electricity, which is transferred to the La Plata County Electric Association grid.

Project Rulison, Garfield County – In early FY 2018, the COGCC and its contractor completed the revision the Rulison Sampling and Analysis Plan (RSAP). In this revision of the RSAP, the Tier I boundary is unchanged. It is set at a 1-mile radius from the Project Rulison device emplacement well R-E. The Tier II boundary is redefined to take advantage of knowledge of the fracture orientation pattern and insights from subsurface modelling (Department of Energy [DOE] 2010) that have developed since the RSAP was initially published. The most significant modification to the plan is a realignment of the Tier II buffer zone from a circle to an ellipse with the major (long) axis aligned with the average hydro-geologic fracture orientation of $N75^0W$. The distance from the origin (emplacement well R-E) to the farthest point on the major axis of the ellipse is 2 miles. The minor (short) axis of the ellipse is perpendicular to the long axis and the distance from the origin to boundary is 1.5 miles. The draft version of this plan was distributed to various stakeholders including the CDPHE, DOE, Garfield County, and various operators for review and comment prior to the final revision. In October 2019, the DOE Legacy Management published their Rulison Monitoring Plan and Path Forward for Gas Drilling near the Rulison, Colorado, Site. These documents can be found on the COGCC website under Library and Project Rulison.

APPENDIX 1

COGCC Organizational Chart

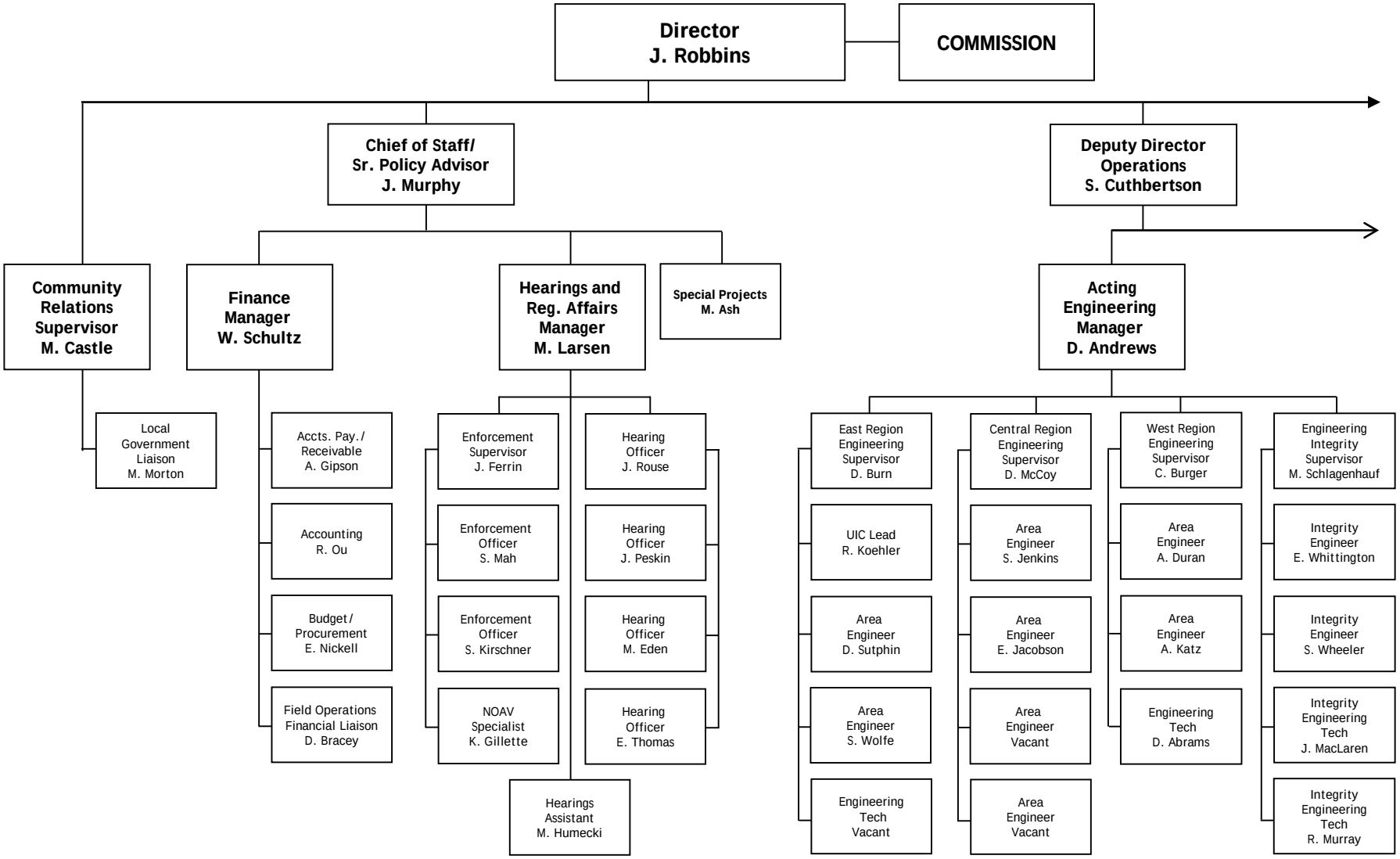
COLORADO OIL & GAS CONSERVATION COMMISSION



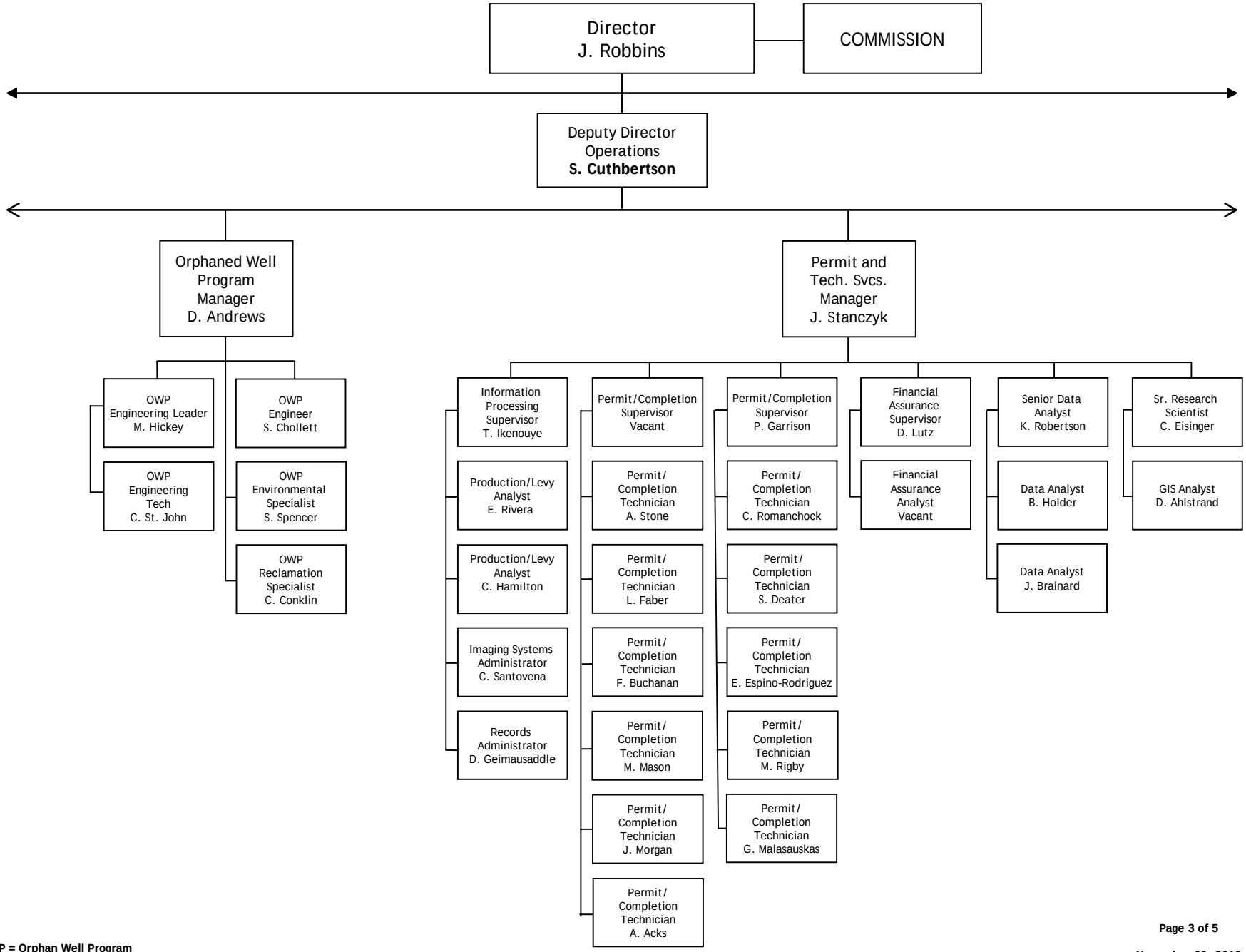
See the next four pages for details

Reg = Regulatory
Tech = Technical
Svcs = Services

November 20, 2019

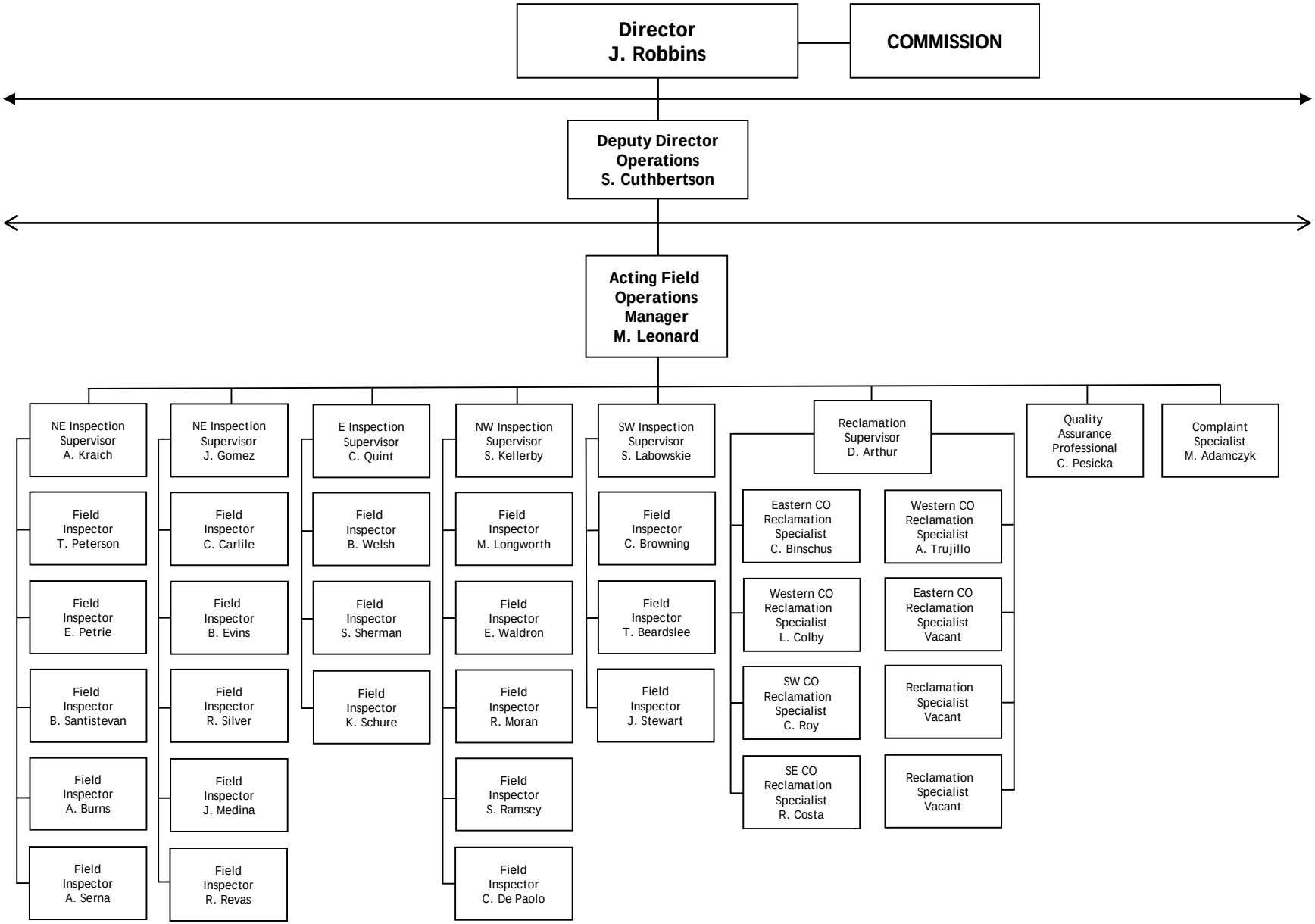


Acct./Pay. = Accounts Payable/ Receivable
NOAV = Notice of Alleged Violation
UIC = Underground Injection Control



OWP = Orphan Well Program
GIS = Geographic Information System

November 20, 2019


Director
J. Robbins
COMMISSION
Deputy Director
Operations
S. Cuthbertson
Acting Field
Operations
Manager
M. Leonard
NE Inspection
Supervisor
A. Kraich
Field
Inspector
T. Peterson
Field
Inspector
E. Petrie
Field
Inspector
B. Santistevan
Field
Inspector
A. Burns
Field
Inspector
A. Serna
NE Inspection
Supervisor
J. Gomez
Field
Inspector
C. Carlile
Field
Inspector
B. Evins
Field
Inspector
R. Silver
Field
Inspector
J. Medina
Field
Inspector
R. Revas
E Inspection
Supervisor
C. Quint
Field
Inspector
B. Welsh
Field
Inspector
S. Sherman
Field
Inspector
K. Schure
NW Inspection
Supervisor
S. Kellerby
Field
Inspector
M. Longworth
Field
Inspector
E. Waldron
Field
Inspector
R. Moran
Field
Inspector
S. Ramsey
Field
Inspector
C. De Paolo
SW Inspection
Supervisor
S. Labowskie
Field
Inspector
C. Browning
Field
Inspector
T. Beardslee
Field
Inspector
J. Stewart
Reclamation
Supervisor
D. Arthur
Eastern CO
Reclamation
Specialist
C. Binschus
Western CO
Reclamation
Specialist
L. Colby
SW CO
Reclamation
Specialist
C. Roy
SE CO
Reclamation
Specialist
R. Costa
Western CO
Reclamation
Specialist
A. Trujillo
Eastern CO
Reclamation
Specialist
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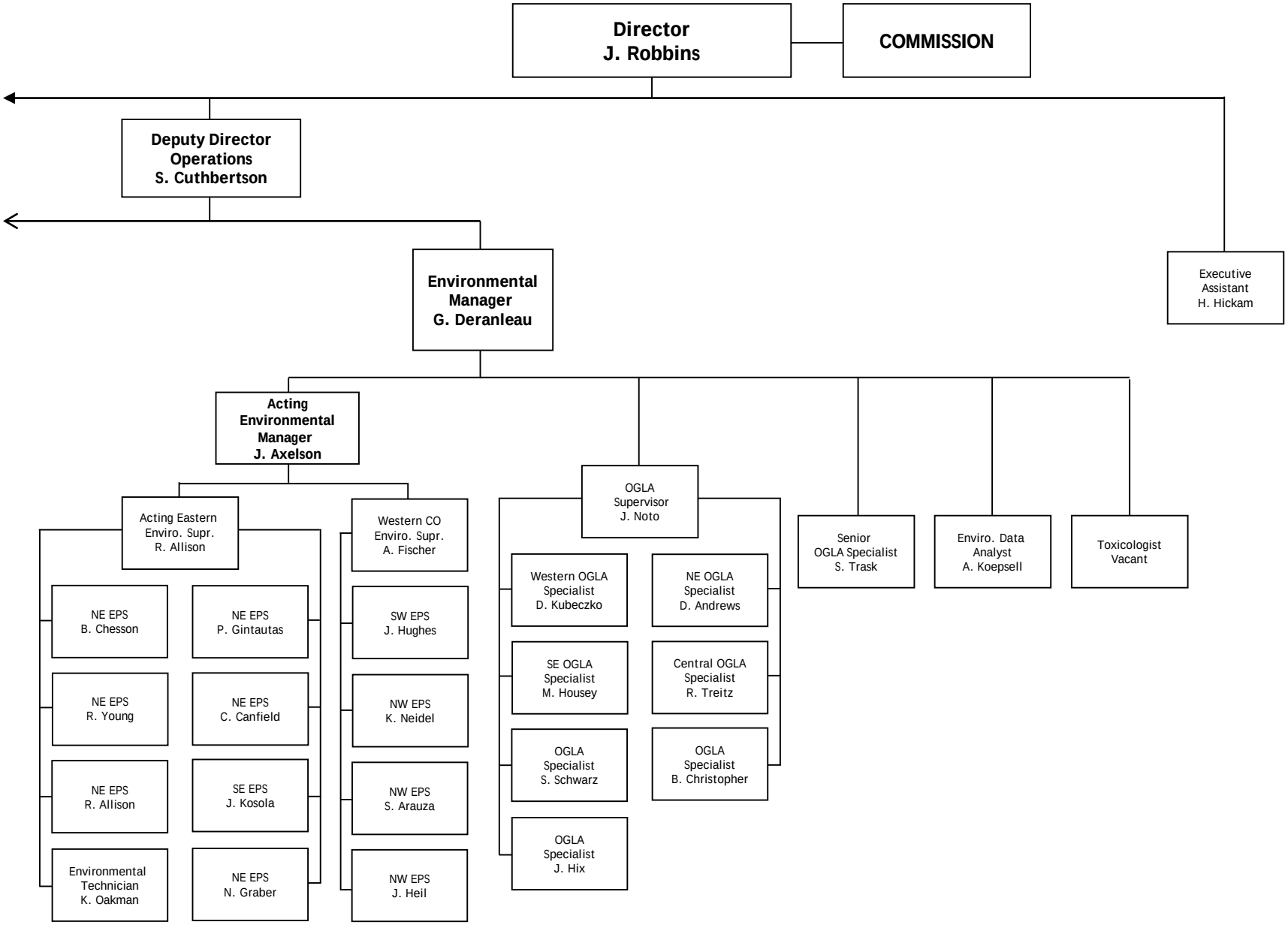
C. Pesicka
Complaint
Specialist
M. Adamczyk



EPS = Environmental Protection Specialist
OGLA = Oil and Gas Location Assessment

November 20, 2019