NEW MEXICO OIL AND GAS ASSOCIATION

Oil Conservation Commission

Case No. 21528

January 4, 2021

Exhibits C through M

JOHN R. SMITHERMAN

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PROFESSIONAL BACKGROUND

NEW MEXICO OIL & GAS ASSOCIATION

Senior Advisor 2020-Present

BESCO OPERATING, L.P., BOPCO/BEPCO, BASS ENTERPRISES PRODUCTION COMPANY FORT WORTH, TX

Vice President	2017-2020
Vice President – Regulatory and Governmental Affairs	2016-2017
Vice President – Operations	2005-2016
Division Production Manager	1994-2005
Division Engineer	1990-1994
Division Drilling and Production Superindendent	1987-1990
Sr. Production Engineer	1986-1987
Production Engineer	1981-1986

CAREER HIGHLIGHTS BY CATEGORY

PRODUCTION OPERATIONS

Managed operations of the largest division of the company (West Texas Division) from 1994 to 2005. Through this time-frame, this division staff (office and field) developed the company's massive acreage position in southeast New Mexico in the lower Delaware formation (Brushy Canyon) focusing on oil production and in the Pennsylvanian formations (Morrow and Atoka) focusing on gas production. Well over 100 vertical wells were drilled and completed along with attendant surface facilities and infrastructure. Hydraulic Fracturing was a key part of this development and our division led the company in propped fracture treatment design and application. During this same time we also redeveloped a significant acreage position within the Slaughter (San Andres) Field (Hockley County, Texas) by drilling slant-laterals to improve waterflood sweep efficiency. In later years, as horizontal drilling became more established, as Vice President - Operations I oversaw the development of infrastructure in New Mexico to support over 10,000 bbl/day of oil production, 120,000 bbl/day of water production and the attendant gas production. This included building our own 58 MW electrical substation and distribution system that allowed the company to be completely free of expensive diesel-fueled electric generators by December of 2013 (well ahead of others in the industry). Further, the produced water gathering and disposal system was built with a capacity of over 180,000 bbls/day and was flexible enough by design to have a station go off-line and redirect water to other stations which would pick up the extra disposal volumes automatically. As Vice President - Operations, I was responsible for opening a new Division office in Denver to oversee our gas well development in the Piceance Basin of northwest Colorado. Besides drilling difficult gas wells, this included the creation of a gas gathering system, a gas processing plant and a produced water gathering and disposal system in a challenging environmental and regulatory environment.

ENGINEERING

Created a novel reservoir management process in the Keystone (Ellenburger) Field (Winkler County, Texas) that resulted in the incremental recovery of over 100 BCF and over 1 MMBO from a reservoir where all other WI owners had concluded that there was nothing more to be done other than gas cap blow-down. Process involved producing water at a high enough rate to outrun the aquifer and "drain" the reservoir. As difficult as this was from an engineering and operational perspective, the real challenge was to create a way for the entire field to be managed this way without a field-wide unit. This was done through several highly technical and highly contentious Texas Railroad Commission hearings where we created a set of field rules which incentivized all parties to participate voluntarily while protecting individual operator's rights.

BEFORE THE OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Exhibit No. C
Submitted by: New Mexico Oil & Gas Association
Hearing Date: January 4, 2021
Case No. 21528

INDUSTRIAL AND POLITICAL RELATIONS

Selected as a **Distinguished Lecturer by the Society of Petroleum Engineers** for the 2020-2021 season. Through that role, I presented a lecture on an engineer's role in creating a safe work environment based on facts our company discovered during an investigation of an accident that occurred at a wellsite during a foam-air well intervention.

Led or had significant roles in these major programs:

1) Organized and led an industry workgroup which led to the creation of the **Candidate Conservation Agreement** to protect the Dunes Sagebrush Lizard (DSL) and the Lesser Prairie Chicken (LPC) in New Mexico and Texas under the aucpices of the U.S. Fish and Wildlife Service as governed by the federal Endangered Species Act. These programs protected these candidate species while preserving the ability to develop oil and gas resources for all participants in the program even if either or both species were listed by the US Fish and Wildlife Department as Threatened or Endangered. So far, this program has supported conservation of these species, prevented the listing of the DSL, and is responsible for the Federal Court to overturn an earlier listing of the LPC as Threatened, all at a modest cost to industry.

2) Led the creation of the current federal rules as to how oil and gas would be developed within the U.S. Secretary of the Interior's Potash Area of southeast New Mexico. I was selected as co-chair representing the oil and gas industry interests in an oil and gas/potash joint industry committee. The committee created a joint recommendation to the **U.S. Secretary of the Interior which resulted in the 2012 Secretarial Order** establishing overarching principles to be used to govern co-development of oil and gas and potash resources in the roughly 500,000 acre **Secretarial Order Potash Area**. The new Order opened significantly more drilling for oil and gas while protecting the resources of the potash mining industry.

LITIGATION

Testified in and/or managed many hearings. These included matters in Federal District court in Albuquerque, New Mexico, State District courts in Texas and Louisiana, the Texas Railroad Commission, and an Arbitration hearing in Texas. In each such proceeding I was qualified and accepted as an Expert in Petroleum Engineering and Oil and Gas Operations.

EDUCATION

B.S. Petroleum Engineering degree with Honors, University of Texas - 1980.
Engineer in Training certification 1981
Industry schools:
Rike - Workovers and Completions
Van Poolen - Advanced Log Analysis
Managing People for Success
Introduction to Reservoir Simulation
Hydrogen Sulfide Certification

Oil and Gas Education

Oil and Gas Well Information

- How are wells drilled?
- What is hydraulic fracturing?
  - Is hydraulic fracturing safe?
  - How is hydraulic fracturing regulated?
  - How much water does hydraulic fracturing use?
- How are wells plugged and abandoned?
- How do I find information on wells in the area?
- Public Land Survey System (PLSS).

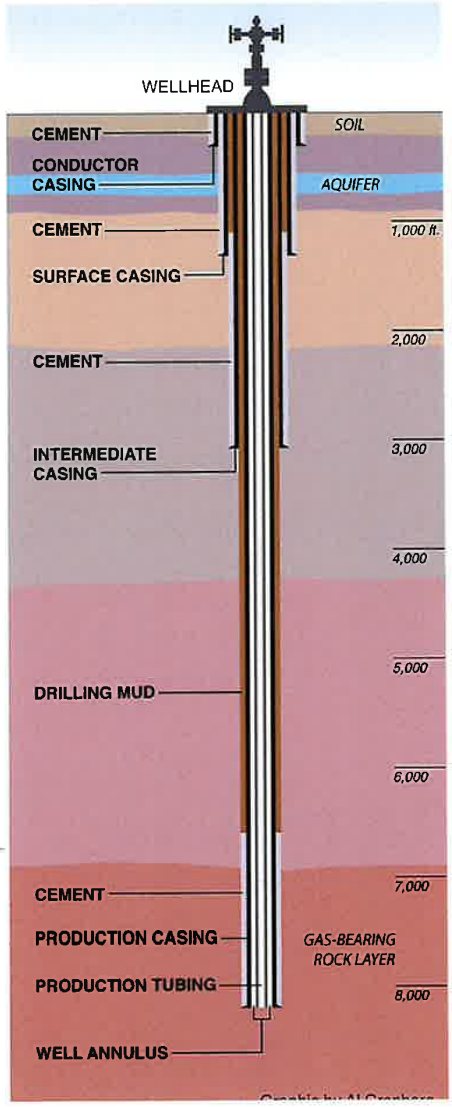
New Mexico Oil and Gas Production and Regulation

- How much oil and natural gas is produced in New Mexico?
- Where are oil and gas produced in New Mexico?
- How does the state benefit from oil and gas production?
- What does the Oil Conservation Division (OCD) do?
- What is OCD's process for permitting a well?
- What are the limits on OCD's jurisdiction?

Water and Oil and Gas Development

- How is groundwater protected when a well is being drilled?
- How much water does the oil and gas industry use?
- Is it possible for oil and gas operators to use recycled water?

Useful Links



Oil and Gas Well Information

How are wells drilled?

Drilling rigs create a hole called a wellbore that targets a geological formation where oil and/or gas may be present. Vertical wells that are straight up and down were typical in the past, but increasingly the industry is moving toward horizontal or directional wells, where the well curves and exposes the wellbore to more of the target formation. In New Mexico, typical oil and gas wells range from 3,000 to 15,000 feet in depth. The horizontal part of the well can extend for up to two miles.

through the "annulus") back to the surface. When the cement hardens, it forms a bond between the walls of the wellbore and the outside of the casing, thus sealing that space off from the flow of fluids (water, oil, or gases). The casing and cementing is then tested to ensure its integrity. This bond protects groundwater and oil and gas reservoirs from contamination. Typically, there are three separate layers of both casing and cement placed between drinking water aquifers and the actual pipe containing crude oil and/or natural gas. To produce oil and gas, holes are made in the casing in the reservoir interval, allowing hydrocarbons to flow into the well and up to the surface where they are processed and transported to market. Once a well is drilled, cased, and cemented, many also undergo stimulation processes, such as hydraulic fracturing, to boost production and minimize the amount of residual oil remaining in the formation.

What is hydraulic fracturing?

Hydraulic fracturing (also known as "fracking" or "hydro fracking") has been used in the oil and natural gas industry since the 1940s. Recent advances in fracking coupled with horizontal drilling have opened up vast oil and gas resources in the United States that were previously considered uneconomic to produce.

Fracking is not a drilling process, but occurs after the wellbore has been drilled, cased, and cemented. During fracking, mostly water and sand (~99.5% of the total volume injected) along with small amounts of chemical additives (<0.5% of the total) are pumped at high pressures into a well. The resulting fractures in target rocks allow oil and gas to be produced from formations with low porosity and permeability, such as tight shale. The sand in fracking fluids props the fractures open so the oil and gas can flow freely into the production casing. The chemical additives are used for a variety of purposes, including to keep the sand temporarily suspended in the water, reduce friction losses, eliminate bacteria, and prevent rust. Nationwide, 90% of wells currently are fracked, and in New Mexico hydraulic fracturing takes place in both the San Juan and Permian Basins.

Is hydraulic fracturing safe?

There have been many claims about fracking contaminating groundwater aquifers across the United States. Despite these claims and the wide press they receive, there have been no proven cases of groundwater contamination from hydraulic fracturing anywhere in the United States. In New Mexico, both horizontal and vertical wells are typically drilled and completed in oil and gas zones that are separated by many thousands of feet of impervious rock layers beneath fresh water aquifer zones. In the Western United States, research shows that the tops of fractures are far beneath fresh water aquifer zones. During the fracking process, all fluids are kept isolated from fresh water through the multiple layers of metal casing and cement placed in the well. Fluids that return to the surface are safely disposed of via state regulated processes.

How is hydraulic fracturing regulated?

Oil and gas production is regulated at state and federal levels so that groundwater contamination or other environmental damage does not occur. The New Mexico Oil Conservation Division (OCD) oversees oil and gas production in New Mexico. The OCD gathers oil and gas well production data, permits new wells, enforces New Mexico's oil and gas laws and rules, and ensures the lands of New Mexico are protected and responsibly restored. OCD also protects the fresh waters of New Mexico from harm resulting from oil and gas production, including fracking activities.

OCD has rules in place to ensure proper well construction, fluid storage, fluid handling, and disposal. In addition, in 2012 the OCD created a hydraulic fracturing fluid disclosure rule (19.15.16.19 NMAC) that requires oil and gas operators to disclose the contents of their frack fluids to the state.

How much water does hydraulic fracturing use?

Across the U.S., the amount of water needed to frack a well can range from 300,000 to over 8,000,000 gallons. Horizontal wells typically use more water than vertical wells, but also produce more oil and gas and reduce overall surface disturbance.

Each formation and well is unique: a hydraulic fracturing job in a formation in southeast New Mexico uses different volumes and concentrations of additives than a well drilled in northwestern New Mexico. In 2013, the average fracking fluid volume for a well in Eddy County was 1.1 million gallons per well and in San Juan County it was 316,000 gallons per well. In total, hydraulic fracturing fluid volumes in 2013 were 1.7 billion gallons. In New Mexico, the Office of the State Engineer reports that oil and gas production accounts for less than 1% of fresh water use (2010 data).

How are wells plugged and abandoned?

When a well has reached the end of its useful life and has become depleted, or if no oil or gas is found in a well (a "dry hole" is drilled), the well is plugged and abandoned. New Mexico has a rule (19.15.25 NMAC) that guides how to properly plug and abandon a well. Wells can be temporarily or permanently abandoned. Operators must submit, and OCD must pre-approve a Form C-103 before plugging a well, which provides details about proposed procedures for plugging the well. To plug and abandon a well, cement, drilling mud, and plugs are placed in the wellbore to prevent fluid from migrating among the underground rock layers. This is done to permanently confine oil, gas, and water into the strata in which they were originally found. Integrity testing is performed before approval for abandonment is granted.

How do I find information on wells in the area?

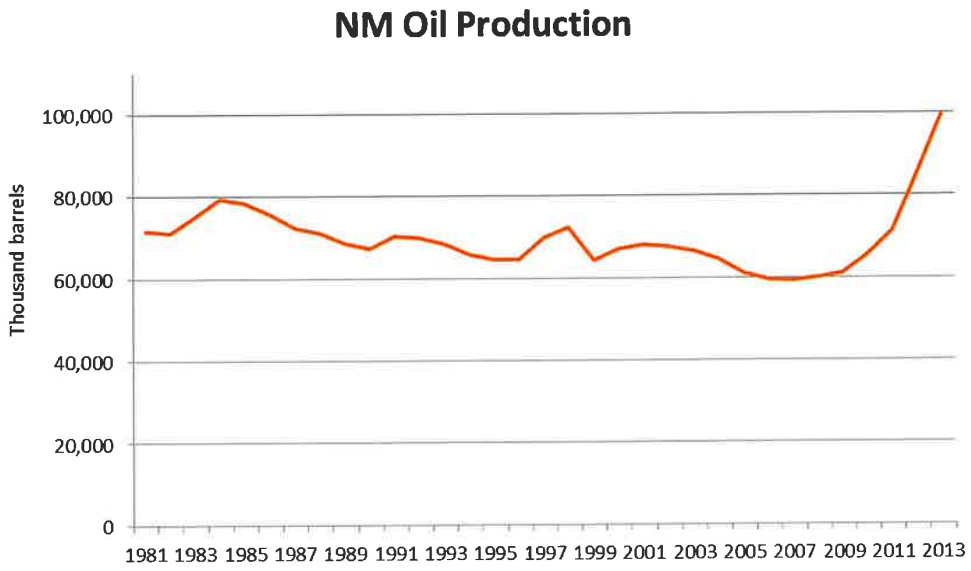
The OCD Well Search application allows you to look up a well using a variety of search parameters, including the well's operator or the location of the well. Once you've found the well you're looking for, you can access information on when it was drilled ("spudded"), its depth, its history of production, and well completion details such as casing and cementing programs, among other information.

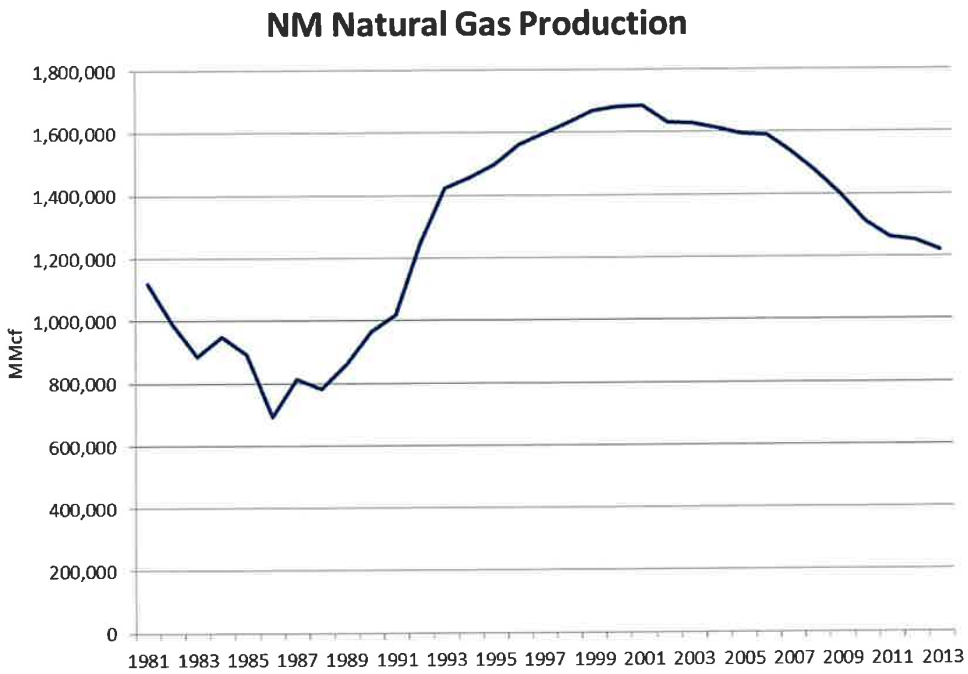
New Mexico Oil and Gas Production and Regulation

How much oil and natural gas is produced in New Mexico?

natural gas production declined 14%, largely due to low prices that did not spur development. A full history of production data can be accessed here.

Production data is gathered through C-115 forms, on which operators provide OCD with monthly reports of the amount of oil and natural gas produced, the quantity of water produced from wells, and how much fluid was injected into disposal wells and tertiary oil recovery efforts.

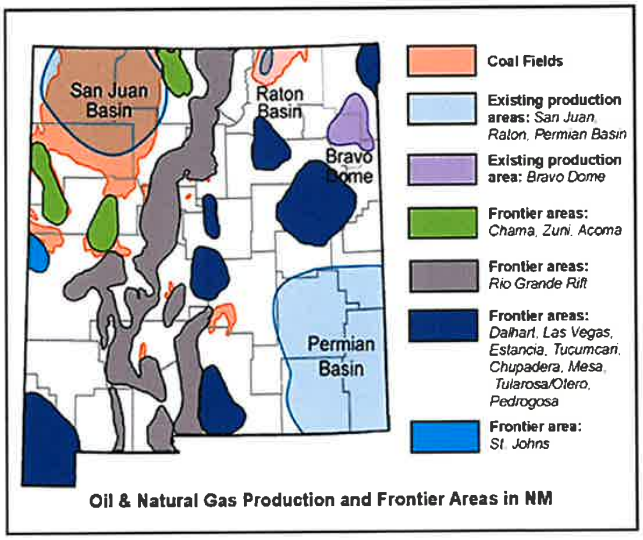




Where are oil and gas produced in New Mexico?

There are two major oil and gas producing regions in the state: one in southeast New Mexico (the Permian Basin) and one in northwest New Mexico (the San Juan Basin). Oil and gas are produced on private, state, federal, and tribal lands in New Mexico. The Permian Basin in southeastern New Mexico and West Texas is the major oil producing region in the state. It covers all or parts of Lea, Eddy, Chaves, and Roosevelt Counties. Since 1920, 20 major oil plays have been exploited in the basin, which contains 3 of the largest 100 oil fields in the United States. The continued advancements in horizontal drilling technology and horizontal completion techniques have expanded the development of numerous plays within the New Mexico portion of the Permian Basin. These plays include producing zones within

Sandoval, and McKinley Counties and a small part of Cibola County. The San Juan Basin houses one of the largest fields of proved natural gas reserves in the United States. Oil and gas companies are also exploring the Mancos shale and Gallup sand in the San Juan Basin for oil development.



Oil & Natural Gas Production and Frontier Areas in NM

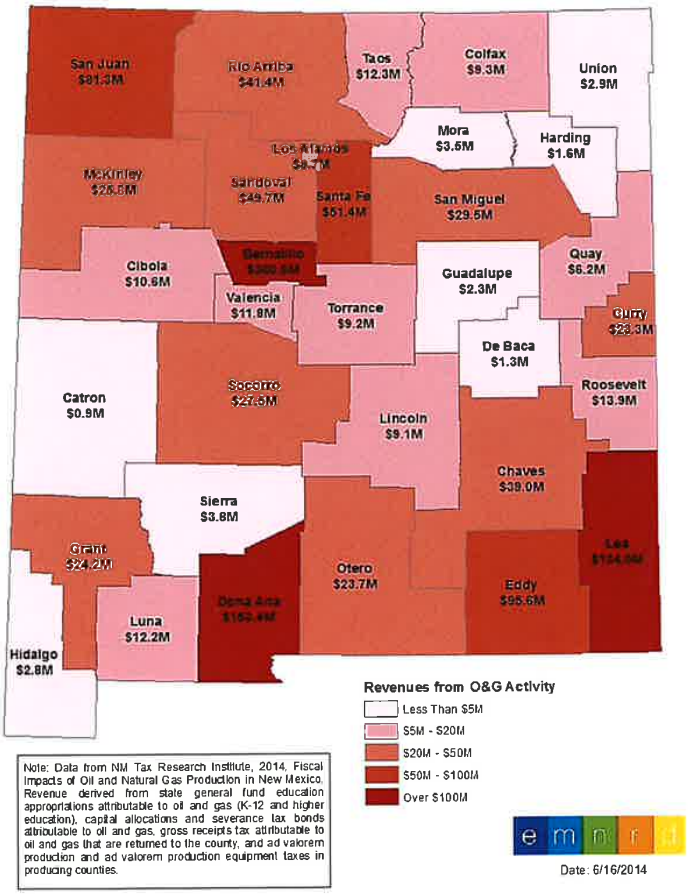
How does the state benefit from oil and gas production?

Oil and gas development is a key part of New Mexico's economy. In fiscal year (FY) 2013, the oil and gas industry provided 31.5% of New Mexico's General Fund, which in turn funds schools, hospitals, and other government services. This is a conservative estimate, as it doesn't include induced or secondary revenue generation. Early data suggests oil and gas's contribution to the General Fund in FY 2014 may be as high as 38%. Oil and gas is directly responsible for 86% of the Severance Tax Permanent Fund and 96.6% of the Land Grant Permanent Fund. In FY 2014 the New Mexico State Land Office reported a record $726 million in revenue from oil and gas royalties alone for the state's public schools, universities, and hospitals.

In addition, the oil and gas industry is an important employer in New Mexico. It is estimated that in 2012 9% of all employment in New Mexico, or 68,800 jobs, were directly or indirectly related to the oil and gas industry. In oil-producing counties such as Eddy County, the July 2014 unemployment rate was 4.0%, compared to the state average of 6.9%. Lea and Eddy Counties also had the second and third highest wages by county in 2013, with an average annual salary of $50,200, compared to the state average of $40,600.

While oil and gas production revenue is primarily generated in the southeastern and northwestern regions of the state, the revenue from oil and gas production benefits all reaches of New Mexico through General Fund disbursements, capital funding projects, gross receipts taxes, and ad valorem taxes that go to counties.

County Revenues from Oil & Gas Activity (Fiscal Year 2013)



Note: Data from NM Tax Research Institute, 2014, Fiscal Impacts of Oil and Natural Gas Production in New Mexico. Revenue derived from state general fund education appropriations attributable to oil and gas (K-12 and higher education), capital allocations and severance tax bonds attributable to oil and gas, gross receipts tax attributable to oil and gas that are returned to the county, and ad valorem production and ad valorem production equipment taxes in producing counties.

What does OCD do?

The New Mexico Oil Conservation Division (OCD) is the primary regulator of oil and gas development and production in New Mexico. The OCD gathers oil and gas well production data, permits new wells, enforces New Mexico's oil and gas laws (70-2-1–38; 71-5-1–23; and 74-6-1–16 NMSA 1978) and rules, and ensures oil and gas development is conducted in a way that protects human health and the environment and the lands of New Mexico are protected and responsibly restored. OCD also administers oil and gas–related aspects of the Water Quality Act and regulates development and production of geothermal resources under the Geothermal Resources Conservation Act.

OCD has five bureaus, which include the:

- **Administrative Bureau**, which ensures smooth operation of the division, coordinates the hearing and bonding processes, maintains records, and does budgeting and procurement;
- **Engineering and Geological Services Bureau**, which processes administrative applications and exceptions to OCD rules and whose staff serve as Hearing Examiners for Division hearings;
- **Environmental Bureau**, which develops and enforces environmental rules and regulations that prevent water contamination and govern waste disposal;
- **Legal Bureau**, a subset of EMNRD's General Counsel staff, which provides legal advice and support, works with well operators to develop Agreed

What is OCD's process for permitting a well?

A party seeking to drill a natural gas or oil well in New Mexico must submit a Form C-101, Application for Permit to Drill (APD). The APD identifies the well location and provides information on target formations and spacing, along with drilling plans and procedures including the casing, cementing, and blowout prevention plans. The C-101 also includes information on depth to groundwater at the drilling location, distance from the nearest fresh water well, and distance to nearest surface water location. This information is reviewed by OCD personnel and additional conditions are imposed where necessary to protect public health and the environment. After approval is received and a well has been drilled, the operator submits a C-105, Well Completion or Recompletion Report and Log, no later than 20 days after completion. The C-105 includes information of exact well depth and depths and characteristics of casing and cementing.

What are the limits on OCD's jurisdiction?

The federal government through the Bureau of Land Management (BLM) oversees aspects of drilling on federal public lands. This includes offering leases sales and a separate process for APDs and plugging and abandonment/reclamation. The New Mexico Oil and Gas Act and OCD Rules also apply to federal public lands.

On non-federal lands, there are a few additional areas related to the oil and gas industry over which OCD does not have jurisdiction:

Roads and Traffic: OCD does not have jurisdiction over, and exercises no regulatory authority with respect to, private or public roads or road use. The New Mexico Department of Transportation oversees state highways and trucking, while local governments maintain local highways.

Noise: OCD has no statutory authority over noise or nuisance related issues. Noise and nuisance related issues are governed by local ordinances.

Odors and Air Contaminants: OCD does not have regulatory authority over odors or air contaminants other than the disposal of certain gas by-products. However, for a well within city limits, a city may enact ordinances regarding odors or other nuisances. In addition, the New Mexico Environment Department Air Quality Bureau has jurisdiction over odor and air contaminants through the Air Quality Control Act.

Pipelines: Oil and gas pipelines are under the jurisdiction of the NM Public Regulation Commission and U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration. The OCD does, however, have oversight over spills that may take place from gathering lines or pipelines related to oil and gas production activities.

Water and Oil and Gas Development

How is groundwater protected when a well is being drilled?

To protect the wellbore and drinking water formations, metal pipe called "casing" is placed in the wellbore and cement is pumped down the casing. The cement pushes out the bottom of the casing and flows up the space between the wellbore and casing (or through the "annulus") back to the surface. When the cement hardens, it forms a bond between the walls of the wellbore and the outside of the casing, thus sealing that space off from the flow of fluids (water, oil, or gases). The casing and cementing is then tested to ensure its integrity. This bond protects groundwater from contamination. Typically, there are three separate layers of both casing and cement placed between drinking water aquifers and the actual pipe containing crude oil and/or natural gas. New Mexico requirements for cementing, casing, and testing their integrity are outlined in 19.15.16 NMAC.

How much water does the oil and gas industry use?

The New Mexico Office of the State Engineer collects and reports fresh water withdrawals (use) every five years. The last report has 2010 data and shows that the amount of water withdrawn for oil and gas operations was reported to be 731 million gallons. This represents well less than 1% of all water used in New Mexico.

Hydraulic fracturing disclosure forms provide additional insight into water use in the oil and gas industry in New Mexico, as hydraulic fracturing is a large source of water consumption in the industry. Hydraulic fracturing fluid disclosure forms from 2013 shows that 1.7 billion gallons of fluid, mostly water, was used for fracturing in New Mexico. Some of this water is reused and most is currently disposed of in injection wells.

Is it possible for oil and gas operators to use recycled water?

Although the total amount of water the oil and gas industry uses represents a small fraction of overall water use in New Mexico, there can be localized impacts to already-stressed water supplies. The oil and gas industry is making moves to reduce its fresh water needs through recycling and reusing flowback fluids (which exit the well after hydraulic fracturing) and produced water (which exits the well during production). In addition, a number of companies are developing technologies that reduce how much water is needed per hydraulic fracture job as well as ways to fracture wells without water.

The OCD encourages the recycling and reuse of water and is working with industry to ensure efficient, effective, and safe water reuse. OCD issued a notice in 2013 to clarify that no permit or authorization is required for produced water reuse as a drilling or completion fluid. In 2014, further modifications to rules have been proposed to encourage reuse and recycling of produced water.

Useful Links

- GO-TECH Website
- New Mexico State Land Office Oil and Gas Information:
- New Mexico Oil and Gas Statistics
- New Mexico Water Rights Lookup

- Interstate Oil & Gas Compact Commission
- Groundwater Protection Council
- Intermountain Oil & Gas BMP Project
- American Petroleum Institute Hydraulic Fracturing Video
- Environmentally Friendly Drilling
- USGS Groundwater Information

EMNRD Home
505-476-3200
EMNRD News
Public Information Office
New Mexico.gov

State Parks
1-888-667-2757
Find a State Park
Reserve a Campground
Boating Information

State Forestry
505-476-3325
Forest and Watershed Health
Fire Forms
New Mexico Forest Re-Leaf

Mining & Minerals
505-476-3400
Programs
Mining Applications and Forms
RFPs and ITBs

Energy Conservation
505-476-3315
Tax Incentives
Forms
RFPs

Oil & Gas
505-476-3441
About OCD
OCD Online
Hearings

Comparison of Terms – Vent / Venting

Colorado

"Venting" *means allowing natural gas to escape into the atmosphere, but does not include:*

A. The emission of gas from devices, such as pneumatic devices and pneumatic pumps, that are designed to emit as part of normal operations if such emissions are not prohibited by AQDD Regulation No 7, as incorporated by reference in Rule 901.b;

B. Unintentional leaks that are not the result of inadequate equipment design; and

C. Natural gas escaping from, or downstream of, a Tank unless: 1) there is no separation occurring at equipment upstream of the Tank; 2) the separation equipment is not sufficiently sized to capture the entrained gas; or 3) the natural gas is sent to the Tank during circumstances when the gas cannot be sent to the gathering line or the combustion equipment used to Flare the gas is not operating.

Source: Colorado Oil and Gas Commission – 100 Series (Definitions)

NMOGA

"Vent" or "Venting" *means the release of uncombusted natural gas to the atmosphere, but does not include:*

(1) the emission of gas from devices or equipment, such as pneumatic devices and pneumatic pumps, that are designed to emit as part of normal operations if such emissions are not prohibited by New Mexico Environment Department, Environmental Protection Agency or tribal authority;

(2) unintentional leaks that are not the result of inadequate equipment design; and

(3) natural gas released from, or downstream of, a tank unless there is no separation occurring at equipment upstream of the tank; the separation equipment is not sufficiently sized to capture the entrained gas; or the natural gas is sent to the tank during circumstances when the gas cannot be sent to the gathering line or the combustion equipment used to Flare the gas is not operating.

Source: 19.15.27.7.S & 19.15.28.7.N

Ref: 19.15.27.7.D

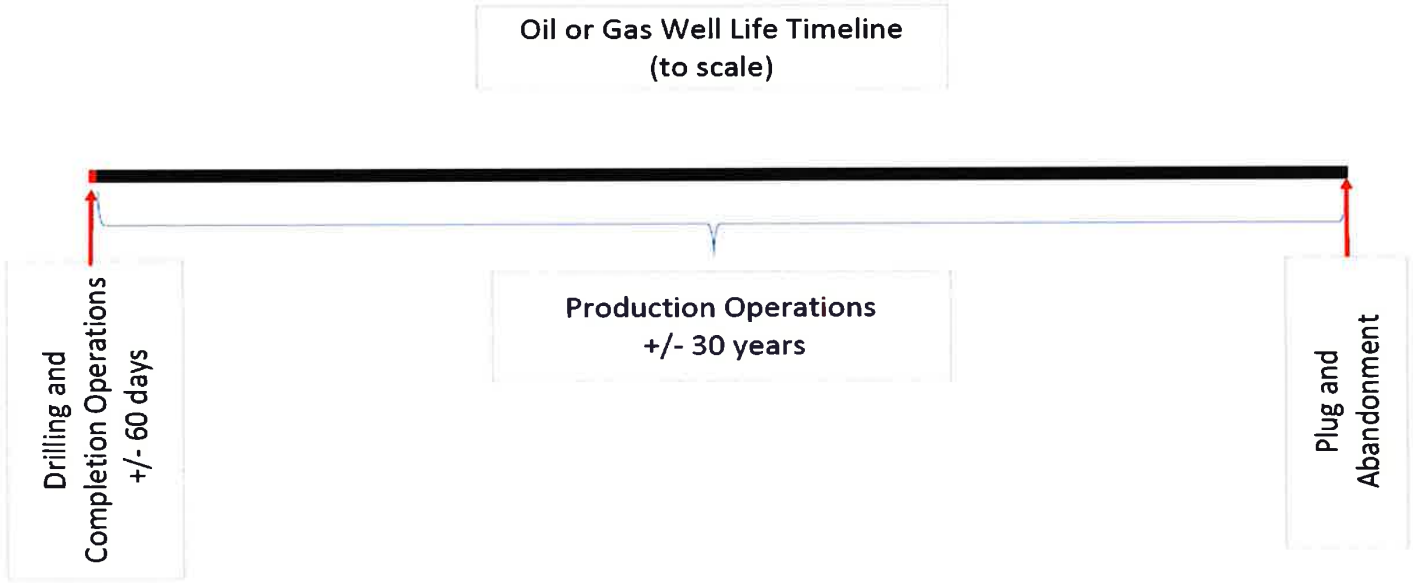
Well Life Timelines

(Drilling – Completing – Operating)

Ref: 19.15.27.7 and various points in the rule

NMOGA

Oil or Gas Well Life Timeline (to scale)



Comparison of Terms – Completion Operations

Division	EPA OOOO/OOOOa	NMOGA
• ***"Completion operations"*** *means the period that begins with the initial perforation of the well in the completed interval and concludes on the earlier of 30 days after commencement of initial flowback or when permanent production equipment is first placed into service.*	• *Not defined except by reference to flowback phases and Startup of Production.*	• ***"Completion operations"*** *means the period that begins with the initial perforation of the well in the completed interval and concludes upon startup of production.*

Ref: 19.15.27.7.D

NMOGA

Comparison of Terms – Initial Flowback

Division	EPA OOOO/OOOOa	NMOGA
• ***"Initial flowback"*** means the period during completion operations that begins with the onset of flowback and concludes when it is technically feasible for a separator to function.	• ***"Initial flowback"*** means the period during a well completion operation which begins at the onset of flowback and ends at the separation flowback stage.	• ***"Initial flowback"*** means the period during a well completion operation which begins at the onset of flowback and ends at the separation flowback stage.

Ref: 19.15.27.7.K

NMOGA

Comparison of Terms – Separation Flowback

Division	EPA OOOO/OOOOa	NMOGA
• ***"Separation flowback"*** means the period during completion operations that begins when it is technically feasible for a separator to function and concludes on the earlier of 30 days after the commencement of initial flowback or when permanent production equipment is placed into service.	• ***"Separation flowback"*** means the period during a well completion operation when it is technically feasible for a separator to function. The separation flowback stage ends either at the startup of production, or when the well is shut in and permanently disconnected from the flowback equipment.	• ***"Separation flowback"*** means the period during a well completion operation when it is technically feasible for a separator to function. The separation flowback stage ends either at the startup of production, or when the well is shut in and permanently disconnected from the flowback equipment.

Ref: Division: 19.15.27.7.Q NMOGA: 19.15.27.7.R

NMOGA

Comparison of Terms – Startup of Production

Division	EPA OOOO/OOOOa	NMOGA
• *Not defined.*	***"Startup of production"*** *means the beginning of initial flow following the end of flowback when there is continuous recovery of salable quality gas and separation and recovery of any crude oil, condensate, or produced water, except as otherwise provided in this definition.*	***"Startup of production"*** *means the beginning of initial flow following the end of flowback when there is continuous recovery of salable quality gas and separation and recovery of any crude oil, condensate or produced water.*

Division: none NMOGA: 19.15.27.7.Q

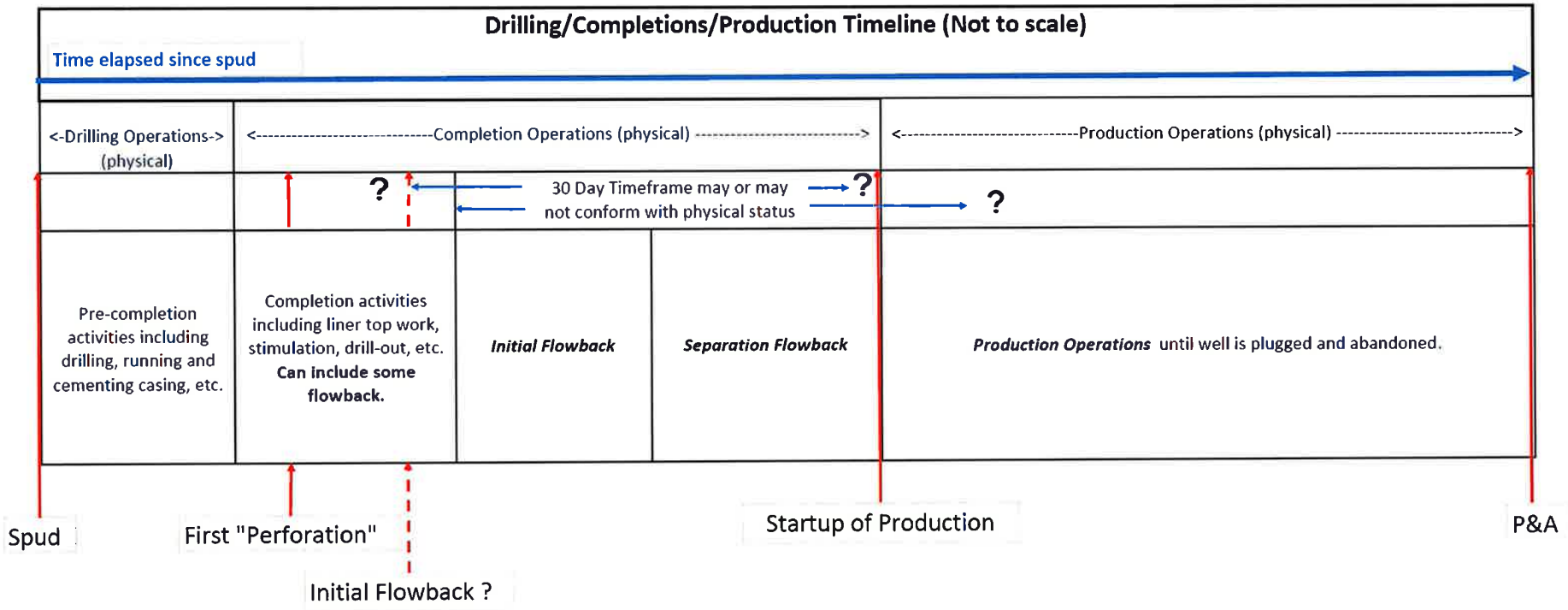
NMOGA

Comparison of Terms – Production Operations

Division	EPA OOOO/OOOOa	NMOGA
• ***"Production operations"*** *means the period that begins on the earlier of 31 days following the commencement of initial flowback or when permanent production equipment is placed into service and concludes when the well is plugged and abandoned."*	• *Not defined except as referenced in the definition of Startup of Production.*	***"Startup of production"*** *means the beginning of initial flow following the end of flowback when there is continuous recovery of salable quality gas and separation and recovery of any crude oil, condensate or produced water.*

Ref: 19.15.27.7.O and various points in the rule

NMOGA



Ref: 19.15.27.7 and various points in the rule

Oxygen Introduction During Certain Activities

Examples of a sources of Oxygen that are not related to poor maintenance:

- Commissioning of equipment (both new and returned to service)
- Nitrogen Lift (temporary gas lift to establish production)
- Foam-air well interventions

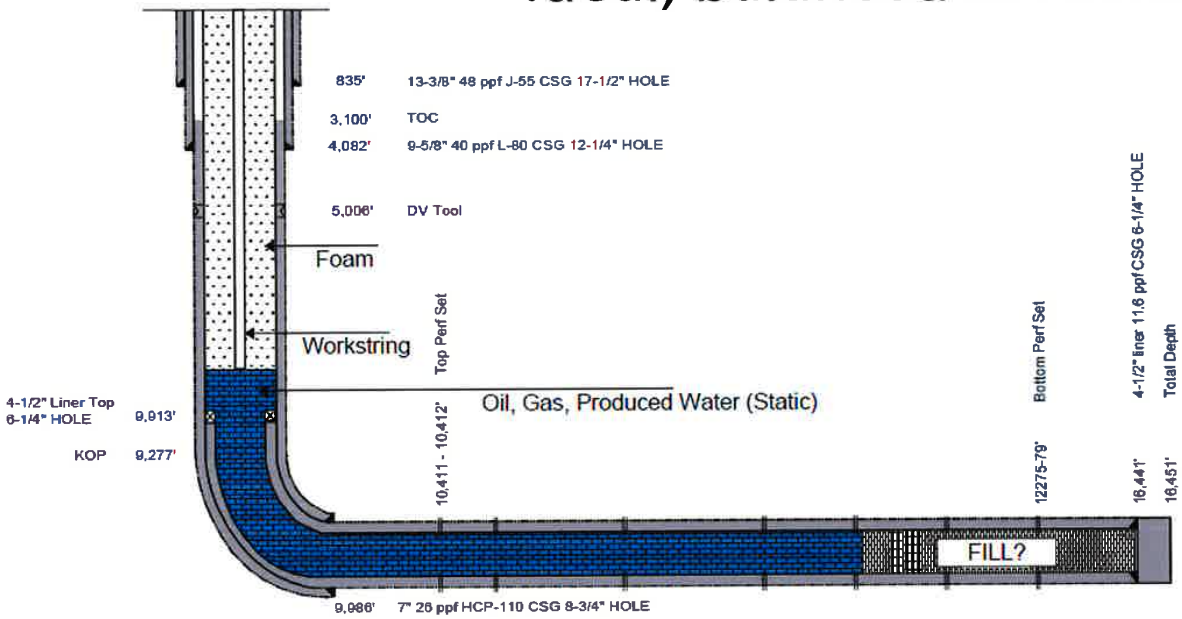
Division: 19.15.27.8.D.(5)(i) NMOGA: 19.15.27.8.D.(5)(m)

NMOGA

Wellbore Diagram

Circulate Foam at KOP
(Planned)

Ideal, balanced condition.

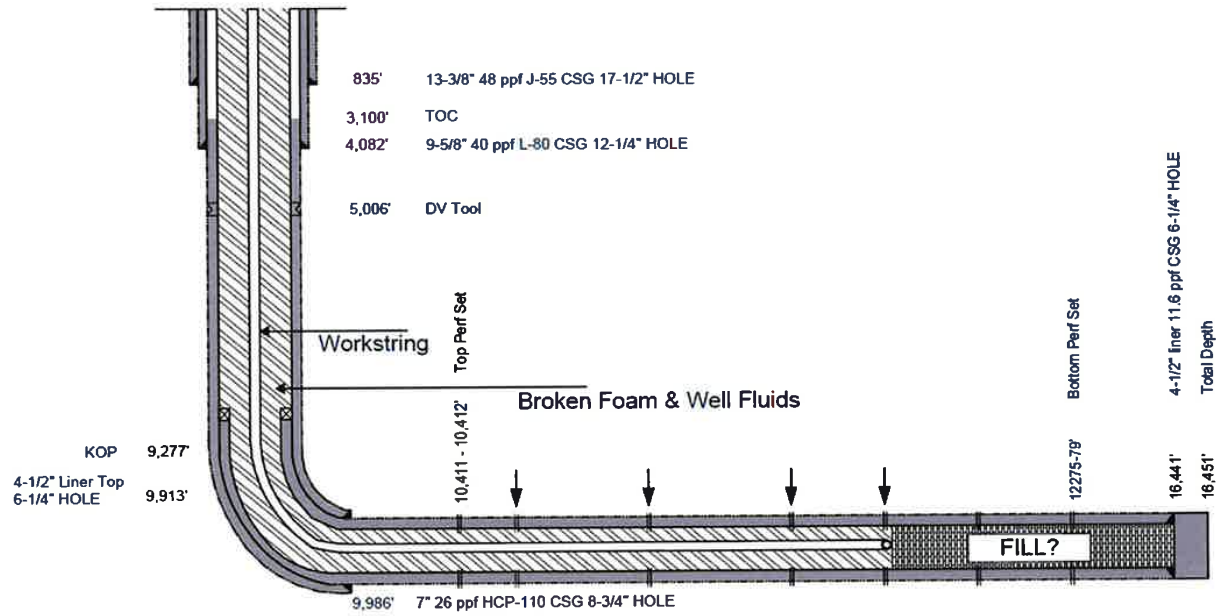


Division: 19.15.27.8.D.(5)(i) NMOGA: 19.15.27.8.D.(5)(m)

NMOGA

Wellbore Diagram

Underbalanced

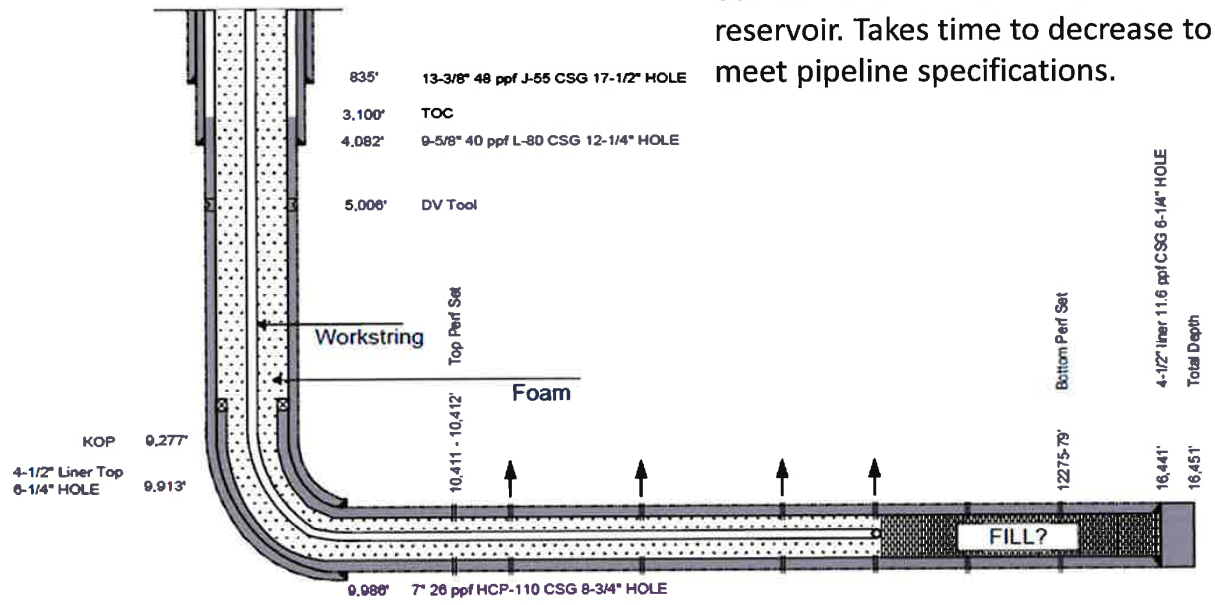


Division: 19.15.27.8.D.(5)(i) NMOGA: 19.15.27.8.D.(5)(m)

NMOGA

Wellbore Diagram

Overbalanced



Even using a Nitrogen generator, sufficient Oxygen remains in clean-out foam and will enter the reservoir. Takes time to decrease to meet pipeline specifications.

Division: 19.15.27.8.D.(5)(i) NMOGA: 19.15.27.8.D.(5)(m)

NMOGA

Gas Management Plan

Understanding of when operators are in compliance with Gas Capture Requirements and thus can avail themselves of more streamlined regulations offered by the Division.

19.15.27.9.D.(2) & 19.15.27.9.D.(6)(b)

NMOGA

This is an attempt to understand how the Division views when an operator is or is not in compliance with gas capture requirements and is allowed to file a more streamlined gas management plan (or any such relief).			
Example of Gas Capture compliance assuming a **theoritical baseline capture of 78%**.			
If baseline is capture rate is 78% (therefore baseline loss rate is 100% - 78% = 22%, then by formula, gas capture should be increased by 4 percentage points per year until 98% is reached. (22% - 2% = 20%) / 5 = 4%/year			
Year in which APD is filed	Compliance Target by end of year	Compliance minimum during the year based on actual cumulative gas capture performance	Remarks
2021	None	None	2021 will be the year when actual company performance will be used to establish our baseline. Company cannot be out of compliance during 2021 since there is no established capture criteria.
2022	82%	78%	If a company falls below 78%, cumulatively, during 2022 the company is considered out of compliance and must report that fact and must obey those provisions targeting companies in that status (file more detailed GMP, for example). In actuality, the baseline and the 2022 capture target are not set until 2021 data is filed by Feb 28, 2022. Same comment for each year based on the value in column D.
2023	86%	82%	If a company falls below 82%, cumulatively, during 2023 the company is considered out of compliance and must report that fact and must obey those provisions targeting companies in that status (file more detailed GMP, for example). Same comment for each year based on the value in column D.
2024	90%	86%	Company cannot fall below 86%
2025	94%	90%	Company cannot fall below 90%
2026	98%	94%	Company cannot fall below 94%
Beyond	98%	98%	Company cannot fall below 98%

PAUL C. THOMPSON
5423 Foothills Drive
Farmington, New Mexico 87402
(505) 327-4892

SUMMARY

Over forty years' experience in the oil and gas industry; the last thirty eight covering all aspects of drilling and production in the San Juan Basin.

PROFESSIONAL EXPERIENCE

WALSH ENGINEERING AND PRODUCTION CORP. (March 1992-Present)
EPIC ENERGY, LLC

President - Perform petroleum engineering and consulting services, which include reservoir studies, property evaluations, and wellsite supervision of drilling, completion, and workover activities. Firm also provides contract pumping services, gas marketing, and tax and royalty administration.

- Participated in the drilling of several hundred Fruitland Coal, Mesa Verde, Pictured Cliffs, and Dakota-Morrison wells in the San Juan Basin.

- Designed and supervised the completion of over one hundred Fruitland Coal wells, as well as numerous conventional wells.

- Provide engineering support and field supervision for over a 1,000 oil and gas wells in the San Juan Basin. Epic Energy, LLC owns and operates over 400 oil and gas wells in the San Juan Basin.

- Evaluated, using decline curve and cash flow analysis, numerous different companies or properties for possible sale, acquisition, or bank valuation.

- Filed permits to drill wells and install gathering facilities with the BLM, New Mexico Oil Conservation Commission, Colorado Oil Conservation Commission, La Plata County Planning Department, and the Jicarilla, Navajo and Southern Ute Indian Tribes. Filed Environmental Assessments with the BLM and Navajo Tribe and permits for water injection with the EPA.

- Designed and supervised the installation and operation of production separators, compressors, pump jacks, pistons, tanks, and water and gas gathering lines.

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• Testified before the New Mexico Oil and Gas Conservation Commission as an expert witness.

WILLIAMS PRODUCTION COMPANY (1979 - 1992)
(Formerly Northwest Pipeline Corporation)

Manager of Production and Drilling (1984 - 1992)
Farmington, N. M.
Directed staff of sixteen people responsible for all drilling and production activities on WPC's leasehold acreage. WPC operated 300 wells and had an interest in 1900 non-operated wells with total reserves of over 800 Bcf.

Senior Engineer - Farmington, New Mexico (1982 - 1984)
Directed activities of a Drilling Engineer and Drilling Foreman during all drilling, completion, and workover operations.

Drilling Engineer - Farmington, New Mexico (1979 - 1982)
Prepared cost estimates, drilling and completion prognosis, obtained permits, and supervised field activities on 93 San Juan Basin wells.

PHILLIPS PETROLEUM COMPANY (1977 - 1979)

Pilot Plant Research and Refinery Economics - Bartlesville, Oklahoma

Completed the start up of a used motor oil re-refining demonstration plant. Developed production process for tertiary oil recovery chemicals.

EDUCATION

B.S. Chemical Engineering, New Mexico State University
Las Cruces, New Mexico 1976

PROFESSIONAL REGISTRATION

Registered Professional Engineer in New Mexico
Certificate No. 8748

PROFESSIONAL ASSOCIATIONS

American Petroleum Institute - Chapter President 1982
Society of Petroleum Engineers - Member
Independent Petroleum Association of New Mexico - President 2005

Specific Tasks Associated with AVO Inspections

Scheduling (Production Analyst)

- Monitor production from the previous month to determine which wells need an AVO inspection documented.
- Sort the wells by Foreman and Lease Operator.
- Notify the Lease Operator of the wells needing a documented AVO inspection and a due date.

Documentation (Lease Operator)

- Document via a checklist or other written record that they have inspected all of the equipment on location by listening, looking, and smelling for any signs of leaking hydrocarbons. Take the appropriate action to repair or stop any leaks.
- Transmit the inspection back to the office.

Tracking (Production Analyst)

- Track all of the AVO inspection documents to confirm that every well that needed a documented AVO inspection was actually inspected.
- Review all of the inspection documents to be sure that there are no outstanding issues and that all of the areas of the inspection are complete.
- Store AVO inspection documents for 5 years in a manner which will make them readily accessible if requested by the NMOCD.

NMOGA

Time and Costs Associated with Documenting AVO Inspections

Non-Stripper Wells - 34 Wells
NMOCD Proposed Frequency

Function	Performed By	Hours	Frequency /year	Total Hours
Scheduling	Production Analyst	2	52	104
Documenting	Lease Operator (34 wells)	8.5	52	442
Tracking	Production Analyst	8	52	416
Sub Total Non-Stripper Wells				**962**

Stripper Wells - 404 Wells
NMOCD Proposed Frequency

Function	Performed By	Hours	Frequency /year	Total Hours
Scheduling	Production Analyst	8	12	96
Documenting	Lease Operator (406 wells)	101.5	12	1218
Tracking	Production Analyst	40	12	480
Sub Total Stripper Wells				**1794**

Total Annual Hours Required to Document AVO tests for Epic Energy **2756**

Full Time Equivalent Jobs **1.33**

NMOGA

Time and Costs Associated with Documenting AVO Inspections

Non-Stripper Wells - 34 Wells
NMOGA Proposed Frequency

Function	Performed By	Hours	Frequency /year	Total Hours
Scheduling	Production Analyst	2	12	24
Documenting	Lease Operator (34 wells)	8.5	12	102
Tracking	Production Analyst	8	12	96
Sub Total Non-Stripper Wells				**222**

Stripper Wells - 404 Wells
NMOGA Proposed Frequency

Function	Performed By	Hours	Frequency /year	Total Hours
Scheduling	Production Analyst	8	4	32
Documenting	Lease Operator (406 wells)	101.5	4	406
Tracking	Production Analyst	40	4	160
Sub Total Stripper Wells				**598**

Total Annual Hours Required to Document AVO tests for Epic Energy **820**

Full Time Equivalent Jobs **0.39**

NMOGA

NMOCD and NMOGA Proposed AVO Inspections

Well Category	NMOCD Proposed Frequency	NMOGA Proposed Frequency
Active Non-Stripper Wells	1,220,440 (weekly)	281,640 (monthly)
Active Stripper Wells	375,432 (monthly)	125,144 (quarterly)
Inactive Wells	119,860 (weekly)	2,305 (annual)

NMOGA

Temporarily Abandoned Wells

19.15.25.12 APPROVED TEMPORARY ABANDONMENT: The division may place a well in approved temporary abandonment for a period of up to five years. Prior to the expiration of an approved temporary abandonment the operator shall return the well to beneficial use under a plan the division approves, permanently plug and abandon the well and restore and remediate the location or apply for a new approval to temporarily abandon the well. An operator is limited to placing the following numbers of wells in approved temporary abandonment:

A. one well, if the operator operates between one and five wells; or

B. one-third of all wells (rounded to the nearest whole number), if the operator operates more than five wells.

19.15.25.13 REQUEST FOR APPROVAL AND PERMIT FOR APPROVED TEMPORARY ABANDONMENT:

A. An operator seeking approval for approved temporary abandonment shall submit on form C-103 a notice of intent to seek approved temporary abandonment for the well describing the proposed temporary abandonment procedure the operator will use. The operator shall not commence work until the division has approved the request. The operator shall give 24 hours' notice to the appropriate division district office before beginning work.

B. The division shall not approve a permit for approved temporary abandonment until the operator furnishes evidence demonstrating that the well's casing and cementing are mechanically and physically sound and in such condition as to prevent:

(1) damage to the producing zone;

(2) migration of hydrocarbons or water;

(3) the contamination of fresh water or other natural resources; and

(4) the leakage of a substance at the surface.

C. The operator shall demonstrate both internal and external mechanical integrity pursuant to Subsection A of 19.15.25.14 NMAC.

D. Upon successful completion of the work on the temporarily abandoned well, the operator shall submit a request for approved temporary abandonment to the appropriate division district office on form C-103 together with other information Subsection E of 19.15.7.14 NMAC requires.

E. The division shall not approve a permit for approved temporary abandonment until the operator provides financial assurance for the well that complies with Subsection D of 19.15.8.9 NMAC.

F. The division shall specify the permit's expiration date, which shall be not more than five years from the date of approval.

Temporarily Abandoned Wells

19.15.25.14 DEMONSTRATING MECHANICAL INTEGRITY:

A. An operator may use the following methods of demonstrating internal casing integrity for wells to be placed in approved temporary abandonment:

(1) the operator may set a cast iron bridge plug within 100 feet of uppermost perforations or production casing shoe, load the casing with inert fluid and pressure test to 500 psi surface pressure with a pressure drop of not more than 10 percent over a 30 minute period;

(2) the operator may run a retrievable bridge plug or packer to within 100 feet of uppermost perforations or production casing shoe, and test the well to 500 psi surface pressure for 30 minutes with a pressure drop of not greater than 10 percent over a 30 minute period; or

(3) the operator may demonstrate that the well has been completed for less than five years and has not been connected to a pipeline.

B. During the testing described in Paragraphs (1) and (2) of Subsection A of 19.15.25.14 NMAC the operator shall:

(1) open all casing valves during the internal pressure tests and report a flow or pressure change occurring immediately before, during or immediately after the 30 minute pressure test;

(2) top off the casing with inert fluid prior to leaving the location;

(3) report flow during the test in Paragraph (2) of Subsection A of 19.15.25.14 NMAC to the appropriate division district office prior to completion of the temporary abandonment operations; the division may require remediation of the flow prior to approving the well's temporary abandonment.

C. An operator may use any method approved by the EPA in 40 C.F.R. section 146.8(c) to demonstrate external casing and cement integrity for wells to be placed in approved temporary abandonment.

D. The division shall not accept mechanical integrity tests or logs conducted more than 12 months prior to submittal.

E. The operator shall record mechanical integrity tests on a chart recorder with a maximum two hour clock and maximum 1000 pound spring, which has been calibrated within the six months prior to conducting the test. Witnesses to the test shall sign the chart. The operator shall submit the chart with form C-103 requesting approved temporary abandonment.

F. The division may approve other testing methods the operator proposes if the operator demonstrates that the test satisfies the requirements of Subsection B of 19.15.25.13 NMAC.

Morgan Iannuzzi

WORK EXPERIENCE

Air Specialist / Air Team Lead – Chevron MidContinent Business Unit Midland, TX
- Leading a team of 7 Air Specialists June 2018 – Present
- Managing air permitting program for Texas, New Mexico, Colorado and Oklahoma, including Title V permits
- Collaborating with Operations, Engineering and Maintenance personnel to minimize flaring
- Led team to recruit summer interns and new college hires

Health, Environment & Safety (HES) Communications Specialist – Chevron San Ramon, CA
- Wrote Board of Directors Briefs August 2016 – June 2018
- Developed PowerPoint slide decks on HES topics for executive audiences
- Organized semi-annual townhalls for Vice-President of HES

Field HES Specialist – Chevron San Joaquin Valley Lost Hills, CA
- Provided day-to-day safety support including crew engagements June 2015 – August 2016
- Managed environmental issues including waste manifests, Air Pollution Control District inspections, and regulations
- Supported full field shut down to ensure compliance with asbestos and lead regulations

Occupational Hygiene Specialist – Chevron San Joaquin Valley Bakersfield, CA
- Implemented a new hydrogen sulfide standard June 2013 – June 2015
- Oversaw budget to improve Occupational Hygiene Process
- Managed compliance with Globally Harmonized System of Hazard Communication

Environmental Engineer – Chevron Energy Technology Company San Ramon, CA
- Led effort to support EPA Greenhouse Gas Reporting Rule compliance June 2011 – June 2013

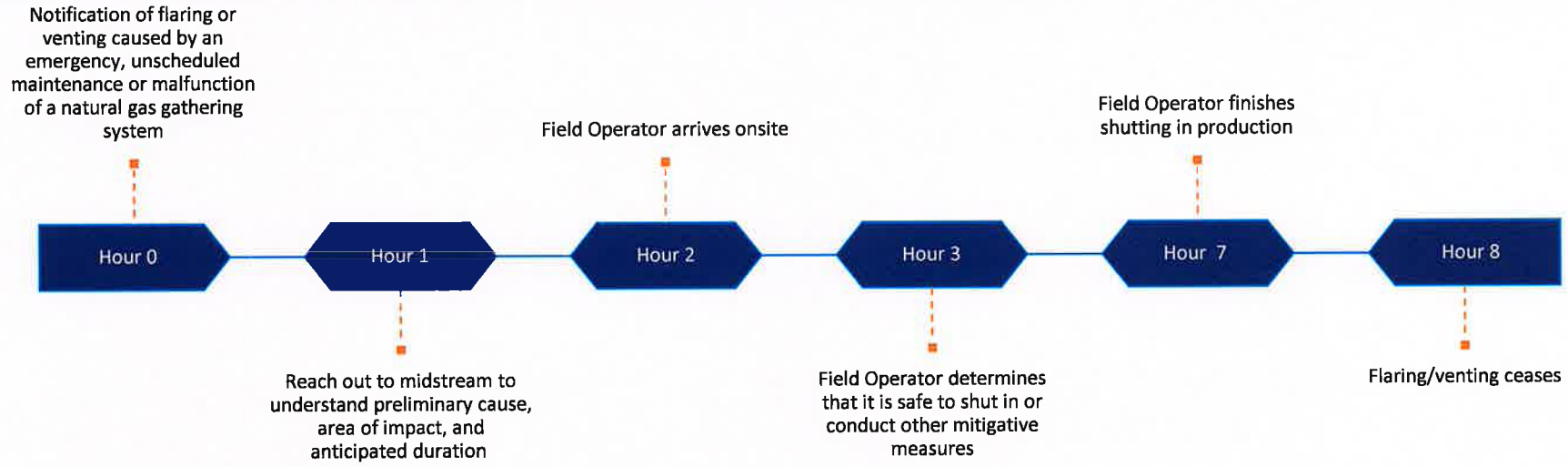
EDUCATION

University of Maryland Online
Master's of Science: Environmental Management Anticipated Dec. 2022
Relevant courses: Principles of Air Quality Management Cumulative GPA: 4.0/4.0

Pennsylvania State University, University Park, PA
Bachelor of Science: Environmental Systems Engineering May 2011
Schreyer Honors College Cumulative GPA: 3.96/4.00
Minors: Geographic Information Science & Watersheds and Water Resources
Senior Thesis: Nieto, A.; Iannuzzi, M; "Supply-and-demand geoeconomic analysis of mineral resources of rare earth elements in the United States."Mining Engineering, 2012, Vol. 64, No.4
Published: Iannuzzi, M.A; Reber, R.; Lentz, D.M. and Hedden, R.C., "USANS Study of Porosity and Water Content in Sponge-Like Hydrogels." *Polymer*. April 2010.

BEFORE THE OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Exhibit No. E
Submitted by: New Mexico Oil & Gas Association
Hearing Date: January 4, 2021
Case No. 21528

19.15.27.7.G.(4) - Hypothetical upstream operator response timeline



Factors potentially impacting timing

- Inclement weather
- Road conditions
- Operating conditions
- Time of day
- Distance to site
- Status of utilities and communication
- Alternate means of gas takeaway

NMOGA

19.15.27.8.B.(2) - Enclosed Flares & Siting

Limitations of Enclosed Flares

- Capacity constraints
- Ensuring adequate air flow
- Does not reduce the volume flared (i.e., no additional surface waste or emission reduction benefit)

Siting Requirements

- Radiation calculations
- Dispersion analysis
- Terrain evaluation

Image from TCEQ: Flare Operation Discussion (texas.gov)

NMOGA

19.15.27.8.E.(3) – Flare Efficiency

- Destruction efficiency is an air emissions matter, not prevention of waste
- Destruction efficiency indicates flare effectiveness
  - $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$
  - EPA defines destruction efficiency as *"destruction efficiency is the percentage of a specific pollutant in the flare vent gas that is converted to a different compound (such as carbon dioxide [CO2], carbon monoxide, or another hydrocarbon intermediate)"*
- Efficiency depends on multiple variables:
  - Gas flowrate
  - Gas composition (e.g., heating value)
  - Air/Fuel ratio
  - Type of flare (e.g., assist gas)
  - Ambient conditions (e.g., wind, rain)
- EPA Control Technique Guidelines
  - States that combustion devices *"may not continuously meet this efficiency [98%] in practice, due to factors such as variability of field conditions"*

NMOGA

19.15.27.8.E.(3)(b) – Ignition Systems

Three Separate technologies

- Auto ignitor (e.g., stove)
- Continuous pilot (e.g., water heater)
- Other monitoring technology (e.g., thermocouple, infrared camera, acoustic monitoring)
  - Alerts indicate a possibility of a malfunction, not certainty

Retrofitting Requires Time

- Manufacturers to produce ignition systems
- Operators to:
  - Allocate capital resources
  - Engineer systems
  - Install technologies
  - Train employees on proper use

NMOGA

PAUL S. REINERMANN

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Goliad, Texas 77963
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PROFESSIONAL EXPERIENCE

Enterprise Products Partners **May 2012 to Present**
Victoria, Texas

Field Environmental Manager – September 2017 to present
Field Environmental Supervisor – April 2015 to Sept 2017
Senior Field Environmental Engineer – May 2012 to April 2015

- As Field Environmental Manager, manages 6 environmental professionals that oversee permit and regulatory compliance for natural gas pipelines, compressor stations, natural gas process plants, fractionation plants, condensate processing plants, and storage facilities in Texas and New Mexico. Reviews records and reports prior to submittal to ensure that their truth and accuracy. Performs review of environmental expenditures and identifies opportunities to reduce costs. Participates in statewide environmental associations.

- As Field Environmental Supervisor, supervised 4 environmental professionals in Texas. Similar duties cited as Field Environmental Manager.

- As Senior Field Environmental Engineer, coordinated environmental requirements for air, water, and waste with Operations, Maintenance, Capital Projects, Pipeline Integrity, and Engineering groups. Ensure that sites and projects are properly permitted and adhere to the required monitoring, testing, record keeping and reporting requirements. Responded to Agency requests for information related to releases and onsite inspections. Prepared reports for releases and routine compliance reports required by permits, New Source Performance Standards (NSPS) and Maximum Achievable Control Technology (MACT) standards.

INVISTA, S.á r.l. **June 2007 to May 2012**
Victoria, Texas

Senior Environmental Engineer – Program Leader

- As the Regulatory and Reporting Leader for Air Emission Inventory, Greenhouse Gas (GHG), Tier 2 and Toxic Release Inventory (TRI) Programs developed written procedures to ensure the sustainability of the programs. Procedures identify all regulatory requirements, site specific compliance aspects, data sources, key personnel, and timing. Coordinates the annual reporting events following the procedures for accurate and timely submissions.

- As the Federal Air Compliance and Reporting Leader provides technical and regulatory expertise regarding interpretation and application of NSPS, NESHAPS, and MACT standards. Wrote and implemented written procedures to ensure the accurate and timely creation of all records and submittal of all reports required by the applicable NSPS, NESHAPS, and MACT standards. Recommended and created procedure to incorporate the Management of Change Process and the Emerging Issues Review

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Santa Fe, New Mexico
Exhibit No. F
Submitted by: New Mexico Oil & Gas Association
Hearing Date: January 4, 2021
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Process to assist with the early detection of the regulatory impact of existing and planned site equipment and operations.

- As the Air Emissions Testing and Compliance Monitoring Systems Advisor, gains and maintains expertise with emissions testing and compliance monitoring systems including parameter, emissions and opacity monitoring systems. Coordinates non-routine compliance test programs required by permits or regulations with Operations and, as required, TCEQ and EPA.

- As the Environmental Release Reporting Specialist, developed written procedures to ensure that release reporting is properly coordinated from the time of initial observation through final reporting for releases to air, water and ground. Maintains and adjusts procedures based upon new requirements and lessons learned. Responsible for coordinating all final written reports to EPA, TCEQ, and Local agencies related to air releases. Participate in incident investigations and implement corrective actions.

- Coordinates projects to implement and maintain various environmental performance management systems for release reporting, Title V Compliance, Air Emissions Inventory, and Continuous Emissions Monitoring Systems.

- Prepares and presents briefings related to regulatory and permit obligations for operators, maintenance personnel, site and corporate engineers, site management, the legal team, and environmental agencies related to air permit requirements, state and federal air pollution regulations, air pollution testing, monitoring, performance management, record keeping and reporting.

- With regard to air permitting, provides technical information, reviews proposed requirements, and recommend revisions to Management, Operations, TCEQ and EPA. Identifies needs for air permitting of various unpermitted operating scenarios.

Pavilion Technologies, Inc. **October 1994 to June 2007**
Austin, Texas

Director, Environmental and Regulatory Affairs

- Provided technical and regulatory expertise regarding interpretation and application of NSPS, NESHAPS, MACT, Acid Rain, Title V Operating Permits, PSD Permits, and State specific regulations including 30 TAC 101-117 in support of air pollution testing, monitoring, performance management, advanced process control, record keeping and reporting projects.

- Reviewed and commented on regulations and permits to EPA, State, and Local agencies to ensure that realistic operating scenarios are reflected and that operational flexibility is allowed.

- Ensured that environmental performance management systems accurately reflect requirements and reduce non-compliance risks Albemarle, Chevron Phillips, Dow, EQUATE, Equistar, NOVA Chemicals, TOTAL and other companies.

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- Convinced International, EPA, State and Local agencies to accept alternative monitoring systems for 3M, Albemarle, BP, Chevron Phillips, Dow, Equistar, ExxonMobil, Georgia Gulf, Merck, Texas Petrochemicals and other companies.

- Prepared and communicated commonsense language of regulations and permits for understanding by operators, engineers and managers.

- Prepared and presented regulatory and technical information to companies and environmental agencies world-wide related to air pollution testing, monitoring, performance management, advanced process control, record keeping and reporting.

US Generating Company **August 1993 to October 1994**
Bethesda, Maryland

Environmental Specialist

- Oversaw and coordinated activities with plant personnel, corporate officials and regulatory agencies to ensure and maintain compliance with air, water, and waste permits and regulations during the startup and initial operation of two new facilities.

- Negotiated and obtained permits, permit variances and alternative regulatory requirements. Identify and pursue cost effective permit and regulatory options and monitoring strategies.

- Acted as the air compliance expert for 12 facilities assisting with the interpretation of regulations and permits related to air testing, monitoring, record keeping and reporting.

US EPA Headquarters **August 1990-August 1993**
Office of Air Quality Planning and Standards
Stationary Source Compliance Division
Washington DC

Chief, Compliance Analysis Section

- Supervised staff of 4 to 10 with primary responsibilities to develop and oversee EPA air compliance and enforcement information systems and strategies.

- Coordinated air compliance and enforcement information with Office of Enforcement EPA Regional Offices and State agencies.

- Oversaw development of the Compliance Assurance Monitoring rule (40 CFR Part 64).

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- Participated in long range planning, rule effectiveness, rate of progress and operating permits program advisory work groups and meetings.

US EPA Region 4 **July 1986-August 1990**
Air, Pesticides and Toxics Management Division
Atlanta, Georgia

Regional Source Sampling and Monitoring Expert

- Reviewed requests and prepared comments on new and revised state and federal air and hazardous waste regulations.
- Reviewed and prepared comments on new and revised inspection procedures, test methods and monitoring requirements.
- Received EPA Individual Bronze Award for development and implementation of the Region 4 CEM Enforcement Plan.
- Observed and coordinated air pollution compliance tests and CEM performance specification tests to ensure that state and federal requirements are fulfilled. Performed inspections of stationary sources.

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PEDCO Environmental Inc. (Currently Shaw Group) **August 1982 – July 1986**
Cincinnati, Ohio

Project Manager

- Planned and managed source air pollution projects.
- Prepared reports, reviewed analytical results and reduced test data for over 100 source air pollution projects.
- Developed expertise in the field app1ication of EPA test methods, CEMS, metals testing, organic compound testing and other test procedures.
- Performed inspections of asbestos demolition and renovation sites to determine compliance with environmental and safety regulations.

EDUCATION

University of Cincinnati, Cincinnati, Ohio; B.S. Chemical Engineering, June 1982

19.15.28.7

19.15.28.7 DEFINITIONS: Terms shall have the meaning specified in 19.15.2 NMAC except as specified below.

...

D. "Emergency" means a temporary, infrequent, and unavoidable event in which the loss of natural gas is uncontrollable or necessary to avoid a risk of an immediate and ~~substantial~~ adverse impact on safety, public health or the environment, but does not include an event arising from or related to:

(1) the operator's failure to install appropriate equipment of sufficient capacity to accommodate the anticipated or actual rate and pressure of the natural gas gathering system;

(2) the operator's failure to limit the gathering of natural gas when the volume of natural gas exceeds the capacity of the natural gas gathering system;

(3) scheduled maintenance;

(4) unscheduled maintenance or a malfunction that results in venting or flaring of natural gas by an upstream operator;

(5) the operator's negligence, ~~including a recurring equipment failure; or~~

(6) three or more emergencies at one site for similar causes experienced by the operator within the preceding 60 days, unless ~~the division determines the operator could not have reasonably anticipated the current event and~~ it was beyond the operator's control.

19.15.28.7.D(5)

- Recurring equipment failure is not necessarily due to an operator's negligence but rather to due unforeseen wear and tear on mechanical and electronic systems. The term "recurring" could be viewed as only more than one time and it is not clear if the equipment failure is limited to a single site and a specific piece of equipment or to all sites of an operator's natural gas gathering system and common pieces of equipment.

- The goal of all companies is to keep equipment running efficiently and effectively in order to operate safely and reliably. Companies adhere to site specific preventative maintenance measures in an effort to prevent equipment failure.

- When a failure occurs (with or without emissions), operators evaluate the potential cause(s) and address the cause(s) prior to placing the equipment back into service. However, diagnosis can be difficult in determining why equipment suddenly shutdowns or fails so several shutdowns/failures could occur within a few hours or a few weeks.

19.15.28.7.D(5)

- Example 1: An engine driving a compressor could have a safety alarm that is triggered and shuts down the engine causing the compressor and associated piping to vent. The safety alarm can be specific in nature or general in nature.
    - For specific alarms, a correction can be made that should prevent reoccurrence but the correction may not be prove to be the fix and a few hours or a few days later the same specific alarm occurs and a different correction is applied.
    - For general alarms, the engine is evaluated for most likely causes. In some cases the engine is restarted and watched closely in case a shutdown occurs again. In other cases, a scenario similar to the specific alarm can take place.
- Example 2: A Process Safety Valve (PSV) fails open prematurely, below the set-point so the line is shutdown to reduce the pressure, closing the valve. The qualified PSV technician examines the PSV and clears the valve sensing line then tests the valve three times at rated pressure with nitrogen. The PSV is put back into service and less than 1 hour later the PSV again fails open. The qualified PSV technician removes, disassembles, cleans, and reassembles the PSV. The PSV is tested and passes. The PSV does not have a recurring failure, this should be considered a single incident.

19.15.28.7.D(6)

- 19.15.28.7.D.(6): The third or more "emergency" ventings for an entire natural gas gathering system in a 60-day period could not be considered an emergency unless the OCD determines that the event could not have been reasonably anticipated. Weather events, such as lightning strikes and hard freezes, can cause equipment to vent at multiple sites on the same day, of which only two are automatically considered to be an emergency. The remaining ventings would have to wait for OCD approval.

- Recommend striking "unless the division determines the operator could not have reasonably anticipated the current event and"

- The final OCD rule should state that the emergency must occur at the same site and for similar causes. This is necessary since emergency events occurring across multiple sites due to weather related events, third party power outages, or other situations are beyond the control of operators.

NMOGA

19.15.28.7.D(6)

- Finalizing the OCD rule to allow for "three or more emergencies at one site for similar causes" would allow for emergency ventings due to causes approved by OCD to be deducted from the calculation of gas loss:
  - Lightning Strikes
    - Effect individual sites in a Natural Gas Gathering System
  - Weather – High Wind, Ice Storms, etc.
    - Effect Wide Areas, Multiple Sites in a Natural Gas Gathering System
  - Third party Electricity Outages
    - Effect Wide Areas, Multiple Sites in a Natural Gas Gathering System

- Fire Eyes and Gas Detection Instruments – Safety Devices to detect the presence of fire or a gas release.
  - If fire seen or gas detected, then automatically shut down and vent equipment at the site
    - For a compressor station, all compressors and the station blown down.
    - Unclear under proposed rule if three or more compressors at a site, is this a single emergency venting or multiple.
    - This could cause upstream sites to vent if pressure builds in line

19.15.28.8 Venting and Flaring of Natural Gas

B. The operator shall not flare or vent natural gas except:

(3) during the following activities unless prohibited by applicable state and federal law, rule, or regulation for the emission of hydrocarbons and volatile organic compounds:

- **(a)** ~~scheduled~~ repair and maintenance, including blowing down and depressurizing equipment to perform repair or maintenance;
- **(b)** normal operation of a gas-activated pneumatic controller or pump;
- **(c)** normal operation of a dehydration unit and amine treaters;
- **(d)** normal operation of a compressor or compressor engine and turbines;
- **(e)** normal operation of a storage tank or other low-pressure production vessel, but not including venting from a thief hatch that is not properly ~~fully and timely~~ closed and maintained ~~or from a seal that is not maintained on an established schedule~~ on a tank routed to a flare or control device;
- **(f)** gauging or sampling a storage tank or other low-pressure vessel;
- **(g)** loading out liquids from a storage tank or other low-pressure vessel to a transport vehicle;
- (h) fugitive emissions components, such as valves, flanges, connectors
- (i~~h~~) blowdown to repair a gathering pipeline;
- (j~~i~~) pigging a gathering pipeline; ~~or~~
- (k**j**) purging a gathering pipeline~~.~~; or
- (l) Commissioning of pipelines, equipment, or facilities.

19.15.28.8 Venting and Flaring of Natural Gas

- 19.15.28.8.B.(3)(a): Proposed OCD rules do not allow the venting or flaring of equipment due to "unscheduled maintenance" but only from "scheduled maintenance". Scheduled maintenance is planned maintenance based upon anticipated site operations, recommendations of equipment providers, and experience. Unscheduled maintenance occurs when there is the potential for equipment failure. Maintenance, whether scheduled or unscheduled has the identical procedure and generally the first step is to isolate the equipment and then vent the equipment to ensure the safety of the workers.

- The final OCD rule should be written to encourage unscheduled maintenance be performed as quickly as practicable so as to prevent equipment failure by allowing the venting during unscheduled maintenance.

- Example: In observing engine or pump operations, operational data is noted, generally on a daily basis. If the operational data indicates a slightly abnormal operating condition such as higher than normal cylinder temperatures, maintenance may be scheduled to address the situation. Sometimes this maintenance may be scheduled for the next day or sooner. The proposed OCD rules would call this "unscheduled maintenance" as it is scheduled less than 14 days in advance. Operations will notify producers electronically as to the shutdown if they believe that it could affect their operations.

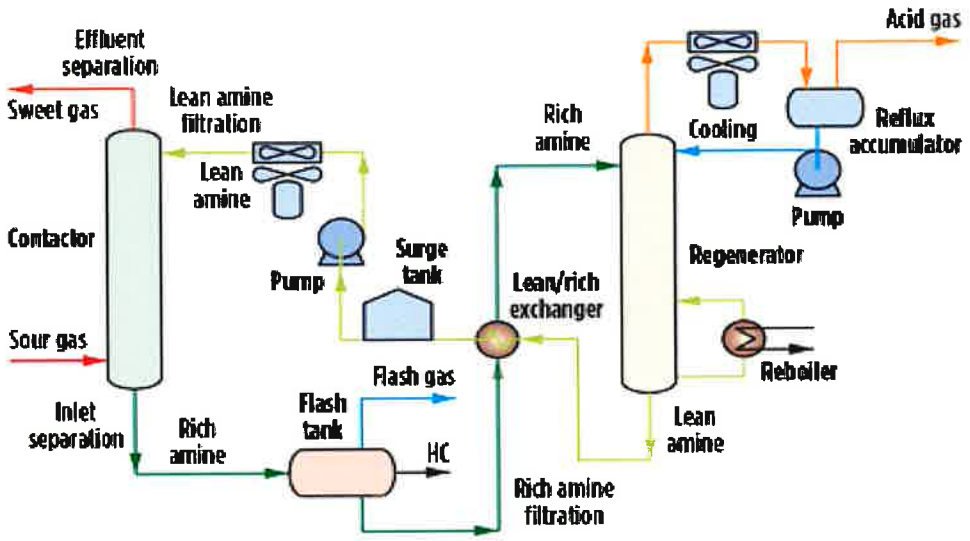
19.15.28.8 Venting and Flaring of Natural Gas

19.15.28.8.B(3)(b)-(h):

- The final OCD rule should allow the venting and flaring of all equipment and fugitive components that vent as part of normal operation.
- The venting of natural gas from the normal operation of the sources listed in 28.8.B(3) are not fully permitted or regulated so 28.8.B(1) would not apply to most listed sources in 28.8.B(3). NMED regulates the VOC portion of the natural gas being vented not the methane, ethane and carbon dioxide.
- The final OCD rule should add the following source types and the exclusion for thief hatches be limited.

19.15.28.8 Venting and Flaring of Natural Gas

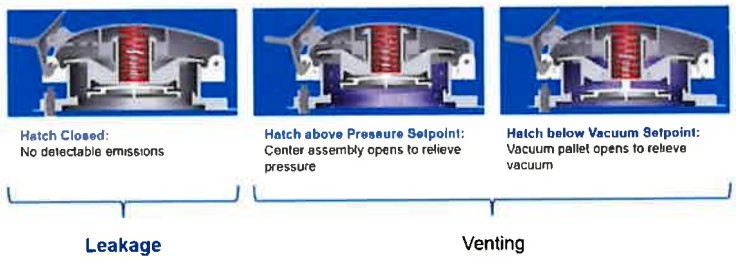
- Example 1: Amine Treater – the recycling of the amine returning from the gas contactor will first vent at a flash tank and next vent from the amine still. Amine flash tank emissions can either be routed to process, routed to the pipeline or to a control device or a combination. Amine still emissions can be vented to atmosphere or to a flare.



19.15.28.8 Venting and Flaring of Natural Gas

- Example 2: Turbines – Turbines can also be used to drive compressors. Since compressor engines are listed then turbines should also be listed. In addition, during normal startup activities, some turbines will use natural gas as a starting gas to turn the turbine just prior to firing the turbine.

- Example 3: A thief hatch is designed to allow a tank to breath to prevent tank overpressure events which could result in structural failure. The final OCD rule should allow release of pressure from properly operated thief hatches.



- Example 4: Fugitive emissions components: Fugitive emissions components emit gas to the atmosphere under normal operation and are authorized by NMED.

19.15.28.8 Venting and Flaring of Natural Gas

- Examples NMED Allowable Emissions for a Compressor Station

Table 11: Sum of Total Annual Emissions (TPY) at the Facility [Condition IV Line 22]
Fill in the Sum of TPY emissions from each of the above tables and calculate Facility totals. See Condition III.

Sum From Table #	Equipment Type	NOx	CO	PM10	SO2	H2S	Total HAPs	VOC
1	Engines and Turbines	59.1	84.0	2.2	2.3	<0.01	5.8	43.0
3	Glycol Dehydrators	N/A	N/A	N/A	N/A	<0.01	4.5	7.6
4	Amine Units	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	Flares	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Thermal Oxidizers	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	Other Combustion Units	0.43	0.36	0.03	0.05	<0.01	0.01	0.02
8	Condensers	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	Storage Tanks	N/A	N/A	N/A	N/A	N/A	<0.01	3.7
10	Truck Loading Operations	N/A	N/A	N/A	N/A	N/A	<0.01	1.4
	Fugitive Emissions	N/A	N/A	N/A	N/A	0.01	0.16	3.6
	SSM/M Emissions	10.0	10.0	N/A	N/A	N/A	1.0	10.0
	Total:	69.5	94.3	2.2	2.4	0.01	11.5	69.3

19.15.28.8 Venting and Flaring of Natural Gas

- Below: 1,2, and 5 are turbines,3a and 3b are Dehy Flash and Still, T's are tanks, F-001 are fugitive components; LOAD are loading emissions and Flare is for process control and Startup, Shutdown and Maintenance.

Table 106.A: Allowable Emissions

Unit No.	NO_x (pph)	[1]NO_x (tpy)	CO (pph)	CO (tpy)	VOC (pph)	VOC (tpy)	SO_2 (pph)	SO_2 (tpy)	PM_{10} (pph)	PM_{10} (tpy)	$PM_{2.5}$ (pph)	$PM_{2.5}$ (tpy)	H_2S (pph)	H_2S (tpy)
1	27.0	90.8	7.4	11.3	<	3.4	<	2.2	<	2.8	<	2.8	<	<
2	27.0	90.8	7.4	11.3	<	3.4	<	2.2	<	2.8	<	2.8	<	<
5	4.4	19.4	5.9	25.8	1.4	6.2	<	2.1	<	1.2	<	1.2	<	<
3a	-	-	-	-	0	0	-	-	-	-	-	-	0	0
3b	<	<	<	<	<	3.80	<	<	<	<	<	<	<	<
T-008	-	-	-	-			-	-	-	-	-	-	-	-
T-009	-	-	-	-			-	-	-	-	-	-	-	-
T-011	-	-	-	-	*	18.9	-	-	-	-	-	-	-	-
T-012	-	-	-	-			-	-	-	-	-	-	-	-
F-001	-	-	-	-	*	35.9	-	-	-	-	-	-	-	-
LOAD	-	-	-	-	*	9.8	-	-	-	-	-	-	-	-
Flare (Process)	7.8	2.8	62.8	22.7	61.9	22.3	0.1	0.5	-	-	-	-	0.06	0.02

1 Nitrogen dioxide emissions include all oxides of nitrogen expressed as NO_2

NMOGA

19.15.28.8 Venting and Flaring of Natural Gas

19.15.28.8.B(3)(l):

- It is necessary to flare or vent during commissioning activities to ensure safe operation and safety of personnel, so this venting must be allowed by the final OCD rule.

- The proposed OCD rule would have this necessary venting count towards loss for a natural gas system as it is not expressly recognized.
- Examples:
  - Lines and equipment are cleared for the following reasons:
    - Avoid explosive mixtures – to atmosphere
    - Get oxygen out of system– to atmosphere
    - Move inert gases out of the system – to flare

19.15.28.8 Venting and Flaring of Natural Gas

C. **Performance standards.**

(1) The operator shall monitor annual gas capture percentage in accordance with 19.15.28.10 NMAC and if not ~~meeting the prescribed rate as described by~~ in compliance with 19.15.28.10(A) ~~take all reasonable actions to prevent and minimize leaks and releases of natural gas from a natural gas gathering system and~~ shall implement an operations plan to address mitigative actions taken to improve gas capture percentage. Plans submitted to the division shall be treated as confidential business information ("CBI"). ~~minimize the waste of natural gas for each non-contiguous natural gas gathering system. The plan should include procedures to reduce leaks and releases, such as a routine maintenance program, cathodic protection, corrosion control, liquids management and integrity management. The operator shall file its operations plan with the division:~~

(a) An operator whose gas capture percentage is not in compliance with 19.15.28.10(A) shall establish and submit to the Division a mitigative action plan within 90 days of the reporting in 19.15.28.10(B).

(b) For operators under a mitigative action plan, any changes to the plan or proof of gas capture percentage in compliance with 19.15.28.10(A) and subsequent termination of the mitigative action plan shall be submitted to the Division no later than March 31 of the following year.

19.15.28.8 Venting and Flaring of Natural Gas

19.15.28.8.C(1), (1)(a) and (1)(b):

- Operators that do not meet the capture efficiency should have the flexibility to craft a "mitigation plan" specific to the issues preventing the achievement of the required natural gas capture efficiency.

- Companies that operate pipelines, compressor stations and other equipment in natural gas service have programs for routine inspection and maintenance, cathodic protection, corrosion control, liquids management and integrity management to ensure the safe and reliable operation of their natural gas gathering system. A routine maintenance plan can cover electronic transmitters, pilot flame indicators, flow meters, compressors, pumps, effectively all equipment at a site and is generally captured in an electronic work order system provided by third party vendors such as Oracle or SAP.

19.15.28.8 Venting and Flaring of Natural Gas

C. Performance standards.

(42) The operator shall conduct a ~~weekly~~ monthly AVO inspection of the compressors, dehydrators and treatment facilities associated with a natural gas gathering system to confirm those components are operating properly and there are no leaks or releases except as allowed in Subsection B of 19.15.28.8 NMAC. This section does not apply to sites required to perform a monthly AVO inspection as required by the New Mexico Environment Department, Environmental Protection Agency, or a tribal authority.

19.15.28.8 Venting and Flaring of Natural Gas

19.15.28.8.C(4):

- AVO inspections are intended to address air emissions, not surface waste
- Compressor stations permitted by NMED in sour gas service are required to perform monthly AVO inspections
- Compressor stations subject to 40 CFR Part 60, Subpart OOOOa are subject to quarterly leak detection monitoring.
- EPA's "Control Techniques Guidelines for the Oil and Natural Gas Industry" (EPA-453/B-16-001, October 2016, Page 9-40) recommends that state agencies specify quarterly leak detection monitoring for existing compressor stations.

19.15.28.8 Venting and Flaring of Natural Gas

C. Performance standards

(~~5~~3) The operator shall perform an annual ~~instrument~~ monitoring of the entire length of a gathering pipeline using an AVO technique, ALARM technology, aerial visual inspections, or other valid method to detect leaks and releases. The operator shall record and upon the division's request, report ~~to the division~~ the date and time of the monitoring, and the method and technology used. Records of monitoring shall be retained by the operator for at least five years. Personnel conducting inspections shall be knowledgeable on the methods and technology being used. ~~and the name of the employee(s) who conducted the monitoring~~. ~~If the operator uses ALARM technology to detect and isolate a leak or release within 48 hours of discovery and repair the leak or release within 15 days of discovery, the operator may obtain a credit against its reported volume of lost natural gas pursuant to Paragraph (4) of Subsection B of 19.15.28.10 NMAC.~~

19.15.28.8 Venting and Flaring of Natural Gas

19.15.28.8.C(5):

- Instrument monitoring is not the only means to detect leaks from a gathering pipeline, visual inspections are commonplace, effective, and should be specifically allowed. Also, audio, visual and olfactory (AVO) can be used.
- Naming the employee on a form should not be a requirement, rather, the requirement should be that the person performing the monitoring is knowledgeable on the methods and/or technology used.
- Aerial patrols are common to detect leaks from gathering lines utilizing visual observations. Ground patrols (UTVs or trucks) travel the pipelines as well utilizing AVO methods for detecting leaks.

19.15.28.9 Location Requirements

A. The operator shall file with the division a GIS digitally formatted as-built map:

(1) for a new gathering pipeline or natural gas gathering system, no later than 90 days after placing the gathering pipeline or system into service;

(2) for an existing gathering pipeline or natural gas gathering system, no later than May 31, 2021; and

(3) for an addition to an existing gathering pipeline or natural gas gathering system, no later than 90 days after placing the addition into service.

B. To ensure proper field identification of a gathering pipeline in an emergency, the as-built map shall include a layer which identifies the pipeline size and construction material type.

~~**C.** No later than May 31 of each year, the operator shall file with the division an updated GIS digitally formatted as-built map of its gathering pipeline or natural gas gathering system, which shall include a GIS layer that identifies the date, location and volume of vented or flared natural gas of each emergency, malfunction and release reported to the division since 19.15.28 NMAC became applicable to the pipeline or system.~~

19.15.28.9 Location Requirements

19.15.28.9.C

- OCD has two online mapping systems that could plot the natural gas gathering system information provided in proposed 19.15.28.9.A(1).
- Through the C-129 form, OCD will be provided the information to add to their mapping the GPS location, date, and volume of gas released that could be plotted by the OCD.
- In addition, OCD plotting of the information would be more real-time and more relevant for the public compared to the proposed requirement for operators to provide an annual updated GIS some 5 months after the end of the calendar year.
- The EMNRD OCD Methane Tracker Dashboard could be populated with the C-129 information.

JOE LEONARD, P.E.

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AREAS OF EFFECTIVENESS:

- Design and execution of onshore production facilities and pipeline projects
- Air quality compliance

PROFESSIONAL EXPERIENCE:

Devon Energy, 2011 – Present

2019 - Present **Facilities Engineer – "Design Engineer" – Oklahoma City, OK**

- Design/Specify Equipment/Instrumentation/Pipe/Valves/Fittings used in standardized production facilities
- Responsible for design documentation (e.g. BOM's, P&ID's, C&E's, Plot Plans, 3D Models, etc.)
- Participate in Process Hazard Analyses
- Troubleshoot operational issues
- Advise on corporate, state and federal regulatory initiatives

2017 - 2018 **Facilities Engineer – "Asset/Area Engineer" – Oklahoma City, OK**

- Executed new and existing production facility and pipeline projects to satisfy scope, schedule and budget
- Worked as a member of a multidisciplinary asset team within Devon
- Worked with external third parties regarding successful oil, gas and water takeaway
- Responsible for troubleshooting asset operational issues

2015 - 2016 **Facilities Engineer – "Corporate Engineer" – Oklahoma City, OK**

- Responsible for facility engineering expertise on an EPA Section 114 Information Request
- Developed corporate guidance for mechanical design and integrity initiatives
- Developed gas lift surface equipment designs for remote locations
- Participated in Process Hazard Analyses

2014 **Facilities Engineer – "Field Engineer" – Victoria, TX**

- Executed a field-wide due diligence facility retrofit project for a newly acquired asset (GeoSouthern Energy)
- Aided in the design of standardized production facilities
- Responsible for troubleshooting asset operational issues

2011 - 2013 **EHS Engineer – "Air Quality SME" – Oklahoma City, OK**

- Technical member of multiple industry groups (TXOGA, CAIG, NMOGA, etc.)
- Responsible for emissions inventory of corporate assets
- Advised on corporate, state and federal regulatory initiatives

TECHNICAL SKILLS:

Proficient in Microsoft Office Applications, Process Modeling Software (i.e. BR&E's ProMax) and AutoCAD

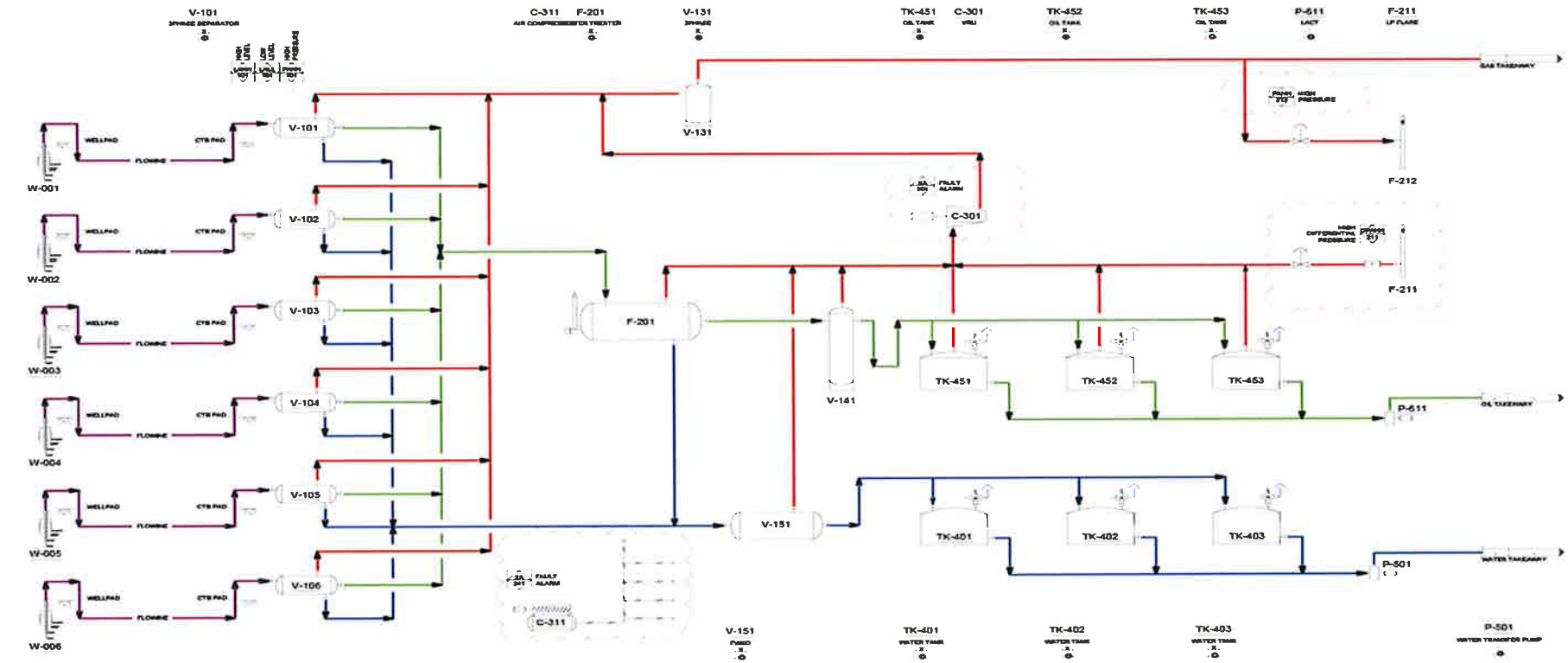
KNOWLEDGE SKILLS:

- API SPEC 12F - Specification for Shop-welded Tanks for Storage of Production Liquids
- API SPEC 12J - Specification for Oil and Gas Separators
- API RP 14C - Recommended Practice for Analysis, Design, Installation, and Testing of Basic Surface Safety Systems for Offshore Production Platforms
- API RP 500 - Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2
- API RP 520 - Recommended Practice for Sizing, Selection and Installation of Pressure-relieving Devices in Refineries, Part I-Sizing and Selection
- API STD 521 - Standard for Guide for Pressure-relieving and Depressuring Systems Petroleum and natural gas industries-Pressure-relieving and depressuring systems
- API STD 2000 - Standard for Venting Atmospheric and Low-pressure Storage Tanks: Nonrefrigerated and Refrigerated
- ASME B31.3 – Process Piping
- ASME B31.8 – Gas Transmission and Distribution Piping Systems
- ASME SECTION VIII – Boiler and Pressure Vessel Code Division 1
- John M. Campbell - Separation Equipment - Selection & Sizing - PF-42
- John M. Campbell - Instrumentation, Controls and Electrical Systems for Facilities Engineers - ICE-21

CREDENTIALS:

- Bachelor of Science in Chemical Engineering from Oklahoma State University in December 2011 (GPA: 3.3/4.0)
- Professional Engineering License since June 2017

BEFORE THE OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Exhibit No. G
Submitted by: **New Mexico Oil & Gas Association**
Hearing Date: January 4, 2021
Case No. 21528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C-311
F-201
V-131
TK-451
C-301
TK-452
TK-453
P-511
F-211
W-001
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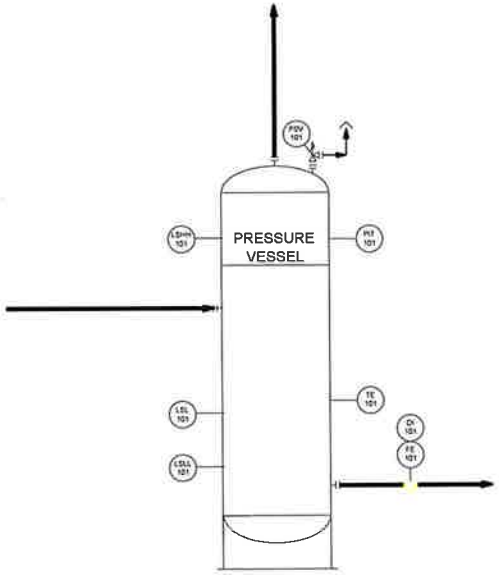
W-003
W-004
W-005
W-006
V-102
V-103
V-104
V-105
V-106
F-212
V-141
TK-401
TK-402
TK-403
P-501
NOTES:
SCENARIO 1: SALES LINE - HIGH HIGH PRESSURE (PAHH-212)
VRU - FAULT ALARM (XA-301)
ARRESTOR - HIGH DIFFERENTIAL PRESSURE (DPAHH-211)
SCENARIO 2: SITE 1 - AIR COMPRESSOR FAULT (XA-311)
SITE 2 - AIR COMPRESSOR FAULT (XA-311)
SITE 3 - AIR COMPRESSOR FAULT (XA-311)
SCENARIO 3: INLET SEPARATOR - HIGH HIGH LEVEL (LAHH-101)
INLET SEPARATOR - LOW LOW LEVEL (LALL-101)
INLET SEPARATOR - PRESSURE ALARM HIGH HIGH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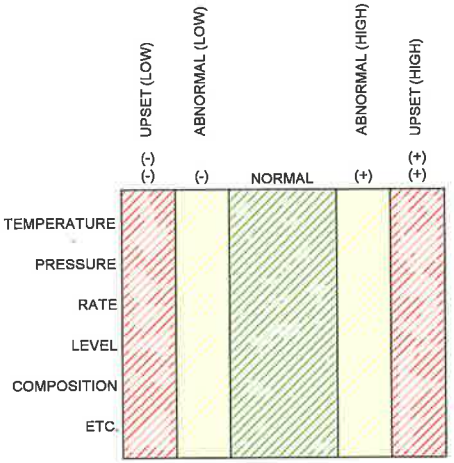
VESSEL


UPSET (LOW)
(-)
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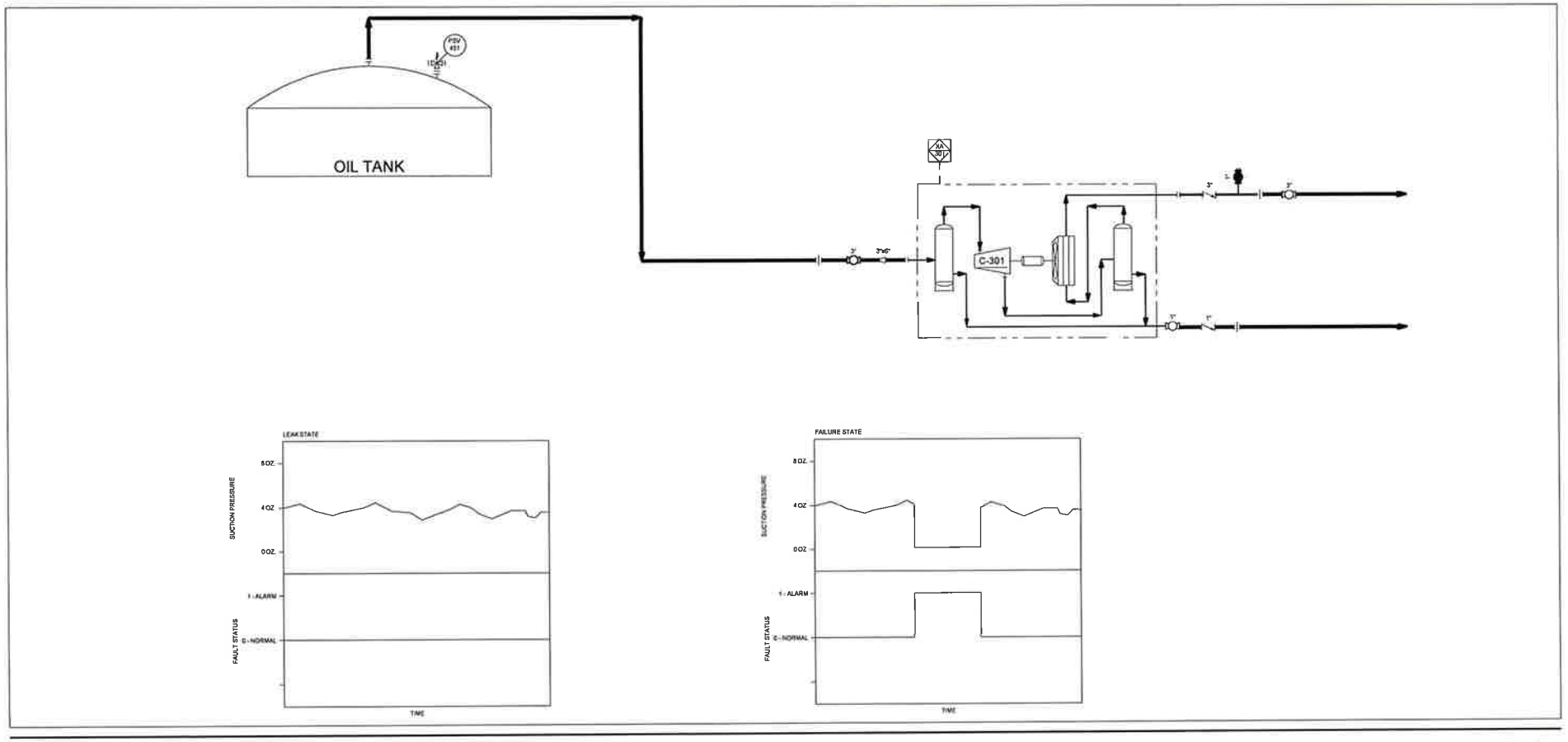
ETC.


OIL TANK
C-301
LEAK STATE
SUCTION PRESSURE
8 OZ.
4 OZ.
0 OZ.
1 - ALARM
0 - NORMAL
FAULT STATUS
TIME
FAILURE STATE
SUCTION PRESSURE
8 OZ.
4 OZ.
0 OZ.
1 - ALARM
0 - NORMAL
FAULT STATUS
TIME

Pneumatic Controller Examples

"Switch" Style

"Displacer" Style

"Pilot" Style

Images: www.kimray.com

Jeffrey "Ryan" Davis

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Farmington, NM 87401

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Experience

Drilling, Completion and Production Operations Management: January 2013 – Present

Operations Manager, Merrion Oil & Gas Corporation

- Economic forecasting, decline curve analysis and budget preparation
- Contract Negotiation (Gas gathering, crude oil sales, service agreements)
- Safety and Insurance Compliance (Safety program development and implementation for field employees and contractors, Insurance limits for field activities)
- Personnel Management (Scheduling and resource management)
- Project Management (Coordinate regulatory and engineering tasks to ensure success of project)

Production and Field Operations Optimization: July 2008 – December 2012

Production Engineer, Merrion Oil & Gas Corporation

- Well optimization- Artificial Lift Selection, Lease operating expense optimization, Well workover analysis and supervised field work
- Regulatory Compliance- Coordinate and ensure state and federal regulatory compliance with field operations (Production reporting, activity permitting and notification, air quality permitting)

Education

New Mexico Institute of Mining and Technology – Socorro, NM – Bachelor of Science in Mechanical Engineering

May 2008

- 2005-2008: Worked at the National Radio Astronomy Observatory (NRAO) as a student engineer (3D Modeling, prototype development and final design implementation)
- 2007-2008: Participated in the Society of Automotive Engineers (SAE) Mini-Baja for two years as junior and senior design project.

Communication

2019 Desk and Derrick Industry Appreciation Dinner Keynote Speaker
2018 Provided Direct Testimony on 2016 BLM Venting and Flaring Rule to United States Office of Management and Budget

Leadership

- 2021 Independent Petroleum Association of New Mexico (IPANM) President
- Class of 2016 Leadership San Juan Graduate
- NMT Team captain for the 2008 Baja SAE® Illinois. Placed 17th overall out

of 115 schools.

Skills & Abilities Mechanical background, Production Engineering (Production optimization, decline curve analysis, artificial lift application), Management (Budgeting, project management, gas scheduling and marketing)

H2

Liquids Unloading

TITLE 19	NATURAL RESOURCES AND WILDLIFE
CHAPTER 15	OIL AN GAS
PART 27	VENTING AND FLARING OF NATURAL GAS

19.15.27.8.D(3)(b) - Manual Liquids Unloading

NMOGA

Liquids Loading

Liquid accumulation in wellbore

- Gas flow rate declines over time
- Gas velocity below critical velocity
  - Critical velocity: Gas velocity required to suspend droplet in flow

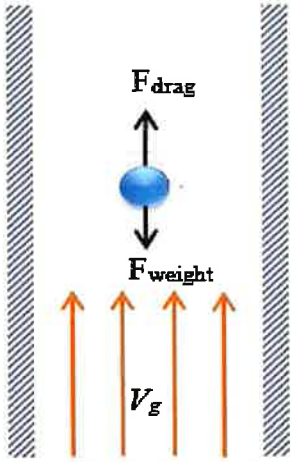


Figure 1: Critical Gas Velocity

Impacts of Liquids Loading

Increased backpressure on the reservoir

- Reduced production performance
- Unstable flow

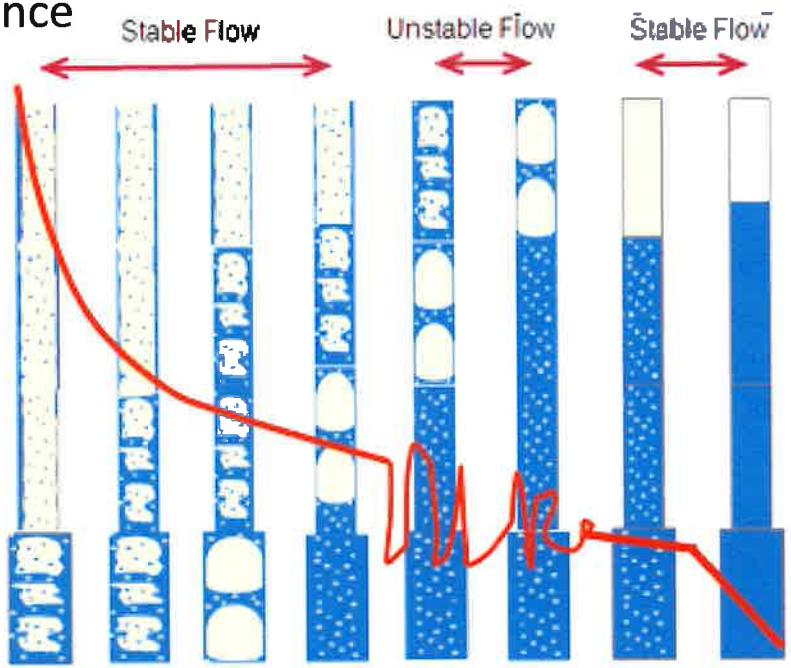


Figure 2: Gas Well Flow Regimes[1]

NMOGA

Plunger Lift

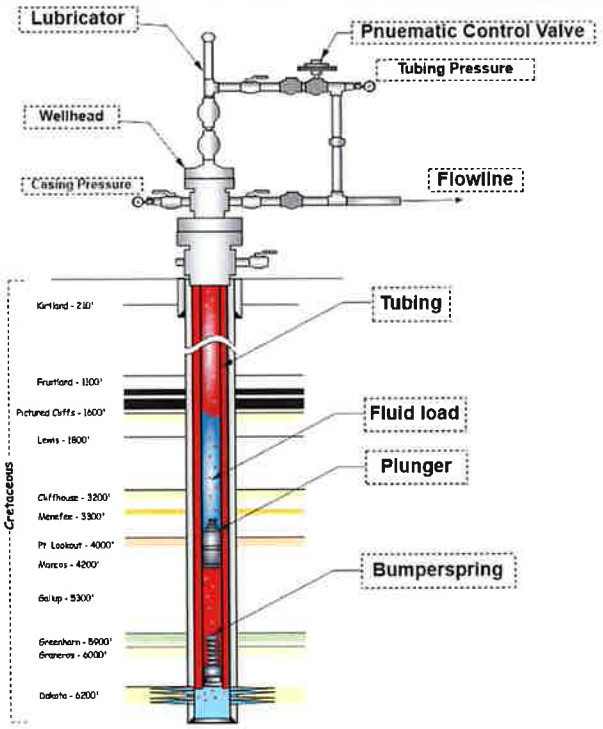


Figure 3: Plunger Lift Configuration

- Artificial lift system
- Utilizes differential pressure to cycle
- Can require manual liquids unloading

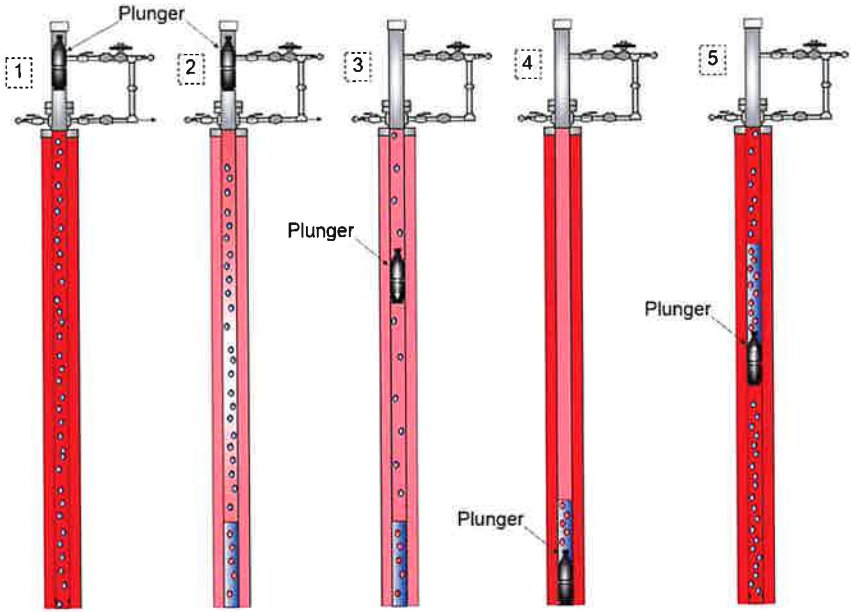


Figure 4: Plunger Cycles

NMOGA

Manual Liquids Unloading

Normal Operation prior to manual liquids unloading (Gas Flowing to Sales)

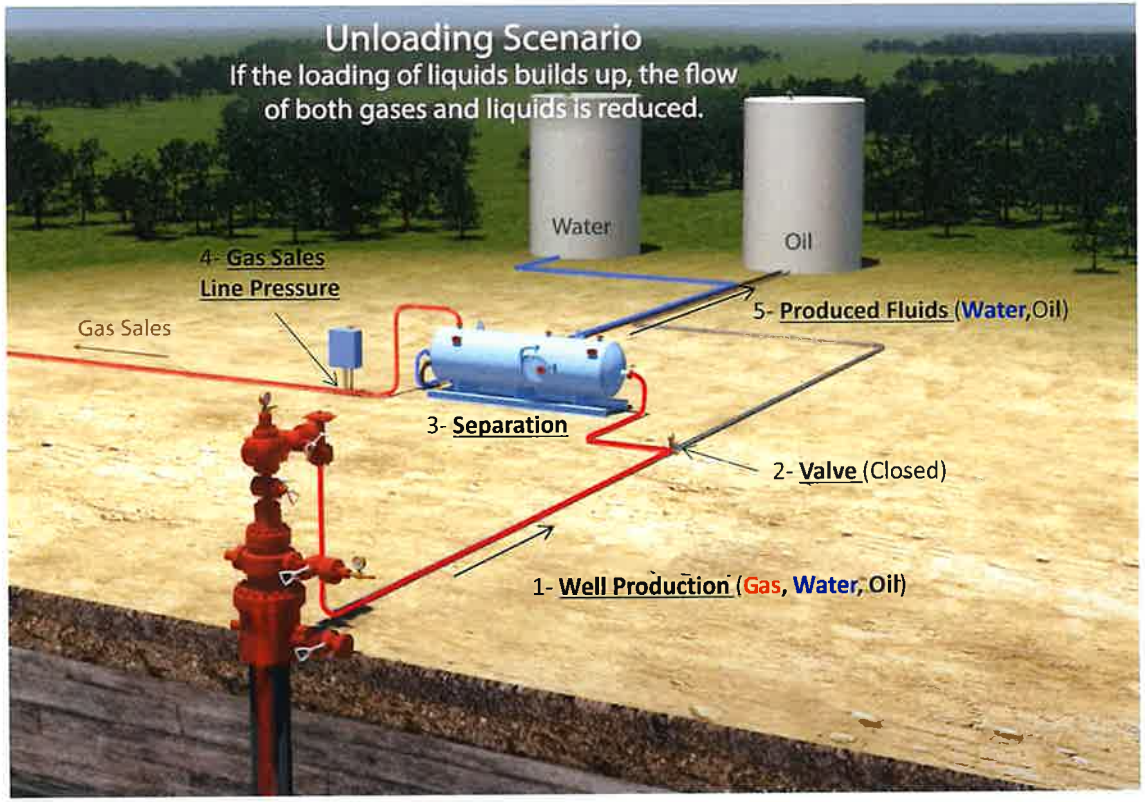


Figure 5: Production Scenario with liquids loading[2]

Manual Liquids Unloading

Remove liquids by maximizing the differential pressure (vent to tank)

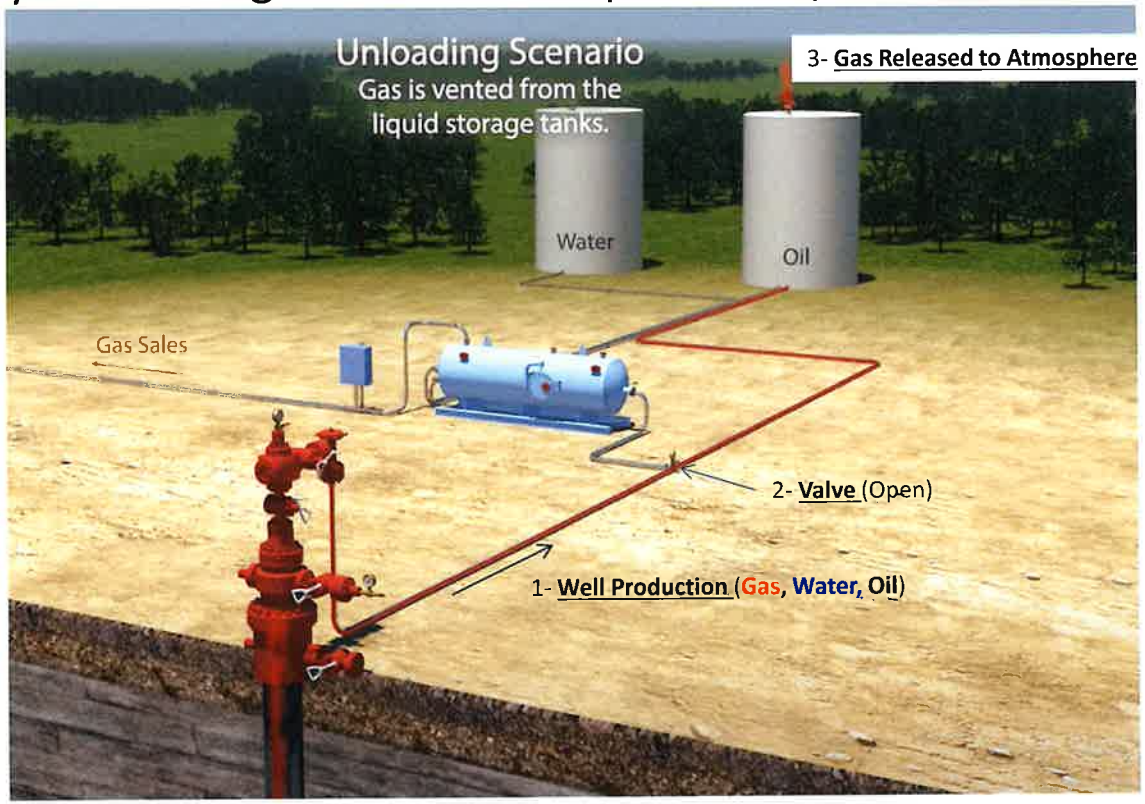
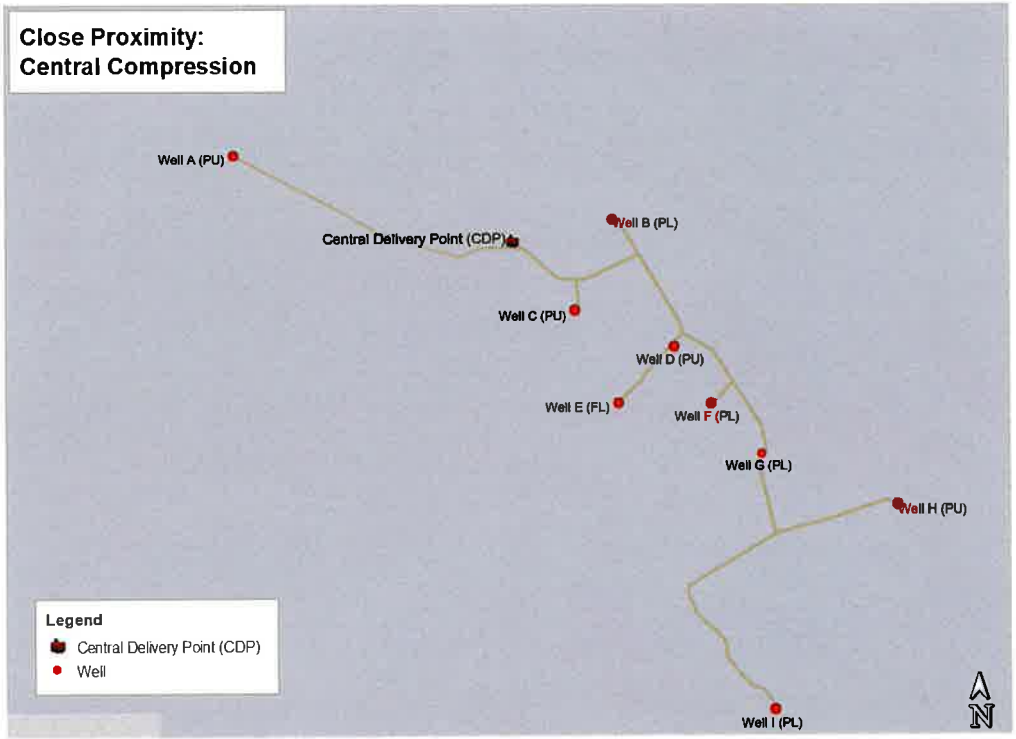


Figure 6: Unloading Scenario[3]

19.15.27.8.D(3)(b) - Proposed Modification

- Allows operator to stay in close proximity to:
  - Unload multiple wells
  - Maintain flow to central compressor
  - Bring entire field back online in a timely fashion



References

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2. Figure 5: Production Scenario with liquids loading. From *Methane Emissions from Process Equipment at Natural Gas Production Sites in the United States: Liquids Unloadings,* by David Allen, 2013. Retrieved from http://dept.ceer.utexas.edu/methane2/study/ https://www.youtube.com/watch?v=tup1SICEXGY&feature=youtu.be

3. Figure 6: Unloading Scenario. From *Methane Emissions from Process Equipment at Natural Gas Production Sites in the United States: Liquids Unloadings,* by David Allen, 2013. Retrieved from http://dept.ceer.utexas.edu/methane2/study/ https://www.youtube.com/watch?v=tup1SICEXGY&feature=youtu.be

David Greaves david_greaves@xtoenergy.com

Employment – ExxonMobil and Affiliates (2008-Present)

Facilities Engineering Manager (Delaware Basin) – XTO Energy – August '18 to Present (Midland, TX)

- Manage 3 teams of 20+ engineers responsible for surveillance and project work on Delaware tank batteries, gas and oil pipelines, electrical infrastructure, compressor stations, gas lift facilities, and gas plant.
- Led team of 7 production accountants for 8 months; transitioned team to upgraded software platform; developed solutions for complex flowback scenarios, gas lift, facility measurement points, satellites, etc.

Senior Facilities Engineer (Delaware Basin) – XTO Energy – June '17 to July '18 (Midland, TX)

- Team lead for 5 engineers and technicians, responsible for managing workload and engineering signoff. Scope included design and construction of massive capital project to develop 100+ sq. mile acreage position.

Facilities Engineer (Williston Basin) – XTO Energy – May '14 to June '17 (Denver, CO)

- Responsible for design (10+ new builds) and surveillance of existing facilities for 200+ wells in ND:
- Engineering interface for multiple midstream-producer oil, gas, and water gathering contracts.
- Investigated gas capture technologies and implemented selected technology onsite to reduce flaring; responsible for deployment of first onsite mobile LNG production skid in ND as means to capture stranded gas for use on XTO drilling and completion sites.
- Technical Co-Chair of North Dakota Petroleum Council Flaring Committee.

Flow Assurance Supervisor – ExxonMobil Development Company – Feb '13 to May '14 (Houston, TX)

- Managed project workload for 15 Flow Assurance engineers.

Planning Engineer – Esso Australia Pty Ltd – Jul '10 to Feb '13 (Brisbane, Australia)

- Relocated to Brisbane to support the Papua New Guinea Liquefied Natural Gas (PNG LNG) Project, a complex LNG Project including remote upstream facilities, 700 km of pipelines, and a 6.9 MTA LNG plant.
- Created Economics Model for Co-Ventures and provided application training to key parties.

Flow Assurance Engineer – ExxonMobil Development Company – Jan '08 to Jul '10 (Houston, TX)

- Performed flow assurance studies for new and existing oil and gas developments in Angola, Australia, Canada, Kazakhstan, Nigeria, and Russia.
  - Performed fluid characterization and pipeline multiphase, thermal-hydraulic transient flow analysis.
  - Evaluated potential solids formation (e.g. hydrates, wax) and developed mitigating strategies.
- Managed contractor development of pipeline management system software.

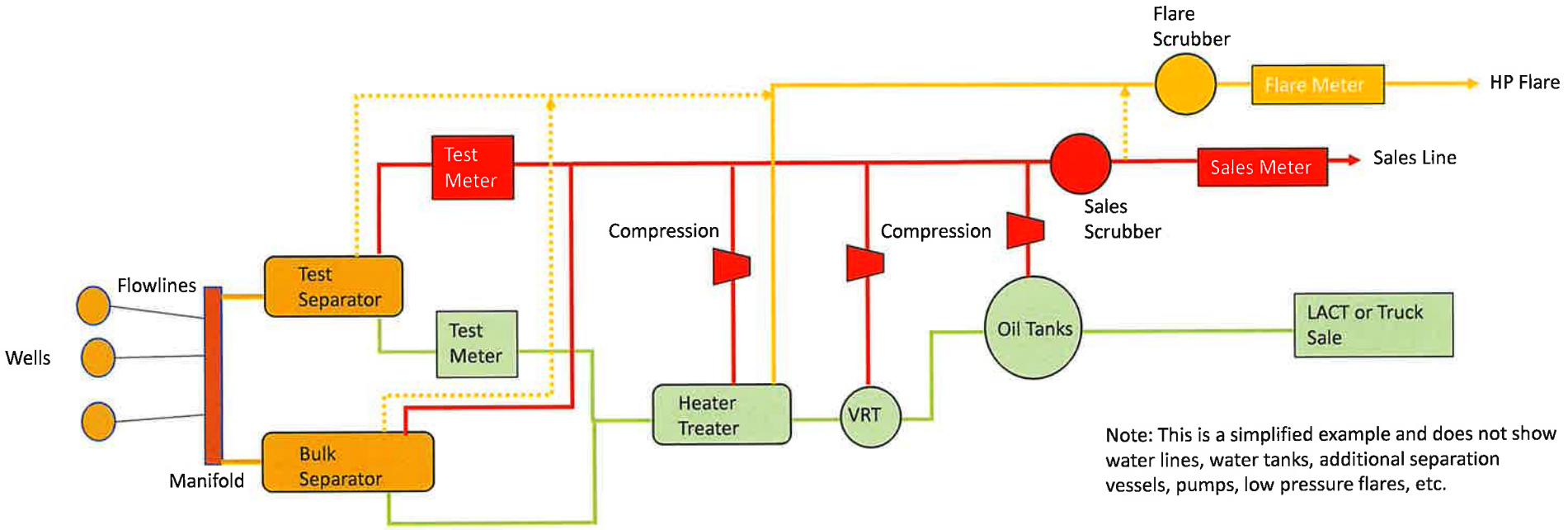
Training and Education

ExxonMobil and 3rd party technical training – 2008 – Present
Reservoir Eng., Cost Estimating, Drilling and Completions, Production Eng., Project Management, Profitability Analysis, Flow Assurance, Risk Assessment, Corrosion, Two Phase Flow in Pipes (Tulsa University), Fluid Properties Prediction, Facilities Eng. Curriculum, Piping Systems, OLGA, IPM, Electrical Eng. Fundamentals, Rotating Equipment, Ariel Compression School, Automation and Measurement.

Education – Colorado School of Mines

- Master of Science (with thesis) - Chemical Engineering (Graduated in December 2007 with 4.0 GPA)
- Bachelor of Science - Chemical Engineering (Graduated in May 2006 with 4.0 GPA)

BEFORE THE OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Exhibit No. I
Submitted by: **New Mexico Oil & Gas Association**
Hearing Date: January 4, 2021
Case No. 21528



Most convenient flare meter location is on aggregated flare line, after any potential liquid removal

- Facilities were designed based on existing regulation at the time of construction
- Retrofitting a site with a flare meter may require significant changes; API MPMS 14.10 Considerations for retrofit include:
  - Safety: "The flow meter and associated instrumentation must be accessible for verification, repair, or calibration." – maintain distance from radiation
  - Liquid: "The potential for two-phase or liquid flow through the meter should be avoided if at all possible by locating the meter downstream of knock-out drums. The ideal flare meter arrangement consists of a single flare meter, located downstream of the final vent system liquid removal equipment, and in horizontal piping before the entry point into the vertical flare header."
  - Straight-Run: "A generally accepted minimum number of header diameters are 20 pipe diameters upstream, and 10 diameters downstream."

- BLM Rule 43 CFR 3175 is for custody transfer, not flare measurement
  - 2020 BLM draft updates state, "Measurement points for flared volumes are not FMPs (Facility Measurement Points)." [and thus do not fall under 3175, which is for FMPs]

- API Manual of Petroleum Measurement Standards (MPMS) 14.10 "Measurement of Flow to Flares" is the most common best reference for flare meters

1.2 BACKGROUND

Measurement of flow to flares is important from accounting, mass balance, energy conservation, emissions reduction, and regulatory perspectives. However, measurement of flow to flares remains distinctly different from traditional flow measurement for accounting or custody transfer. Flares are safety relief systems which typically receive highly unpredictable rates of flow and varying compositions, and for safety reasons do not often lend themselves to being taken out of service to accommodate measurement concerns, even for short periods. Therefore, some of the traditional paradigms applicable to custody transfer measurement systems (reasonably predictable flow rates and composition, the use of in-line proving, capability to readily remove meters from the piping system, the use of by-pass connections, the use of master meters, etc.) must be abandoned altogether or highly modified in flare measurement applications.

- Flare measurement selection should not be restricted to a specific technology
- Per API MPMS 14.10:
  - "It is the intent of this Standard that no flare measurement technology be excluded."
  - "No single type or design of flow meter is suitable in all flare gas measurement applications."
  - "All gas flow meters have a finite range of use."

Primary flare meter challenges* include:

- Low pressure
- Low flow rate (low velocity)
- Safety considerations
- Wide range of turndown (max to min flow rate)
- Liquids accumulation
- Variable gas composition

*When challenges preclude accurate measurement, use estimation methodologies based on engineering principles e.g. pipeline depressurization based on pipe diameter, pressure, and temperature

Technology	Sensitivity to Entrained Mist or Liquid	Sensitivity to Fouling	Ability to Detect Fouling
Differential Pressure	Low to Moderate (varies with liquid load)	Moderate	Physical Inspection
Thermal Flow	High	High	Physical Inspection
Optical	Moderate	High	Meter Diagnostics
Ultrasonic	Low (unless sensor is immersed in liquid, then very high)	High	Meter Diagnostics
Vortex	Low (if meter is installed in horizontal line and bluff body is horizontal)	Low to High (varies with meter design)	Physical Inspection

"Flare flow measurement by its nature provides unique challenges in terms of extreme turndown, large pipe sizes/limited straight lengths, and variations in process pressure, temperature, and fluid composition."

"Flare meters are expected to operate over a wide range of velocities. Meters operating at close to atmospheric pressure and velocities <0.3 m/s – 0.6 m/s (1 ft/s – 2 ft/s) can be operating in transition from turbulent to laminar flow or laminar flow. The meter manufacturer should be consulted on how the meter handles flow in this difficult area and the effect on metering accuracy. The user is also cautioned that operation at these low velocities may also subject the meter to flow instabilities caused by ambient operating conditions such as wind blowing across the flare outlet, dissimilar thermal heating of the flare piping, etc."

"For measurement at low Reynolds number (low velocities), this error can become significant. Many meters experience a significant change in meter factor as the flow transitions from turbulent to laminar flow."

"Orifice meters, which produce significant permanent pressure loss, are typically not suitable as flare meters, with the exception of measuring the addition to the flare system of such streams such as nitrogen sweep gas or fuel gas."

"Thermal flow meters have significant sensitivity to variations in gas composition (see 10.4.3). Thermal flow meters are not recommended for applications where liquid droplets or liquid mist are normally present due to their extreme sensitivity to these substances."

NMOGA

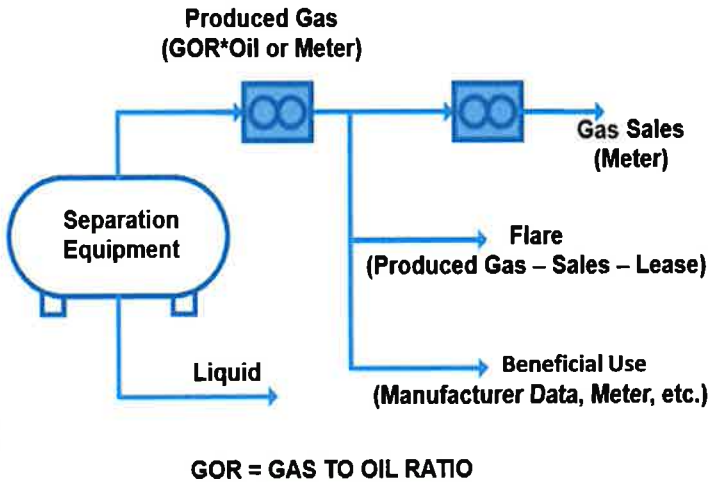
Common practice to estimate beneficial lease use; BLM 43 CFR 3178:

- "The operator must measure or estimate [these] volumes…"
- "When estimating [lease-use] gas volumes, the operator must use the best available information to make a reasonable estimate."

NMOGA

- GOR (gas-oil-ratio) = [Gas Prod./Oil Prod.]
  - The GOR is determined during regular well tests (frequency set by NMOCD)

- Flare = GOR*Oil – Sales – Beneficial Use
  - High pressure produced gas has 3 types of outlets: sales, beneficial lease use, and flare
  - Gas balance used to solve for flare



GOR = GAS TO OIL RATIO

Division recommended categories that NMOGA proposes to be excluded:

- Downhole operations*
- Liquid unloading*
- Uncontrolled storage tanks
- Pneumatic controllers and pumps
- Improperly closed thief hatches

Reasons for removing:

- These volumes are infeasible for aggregation within a meter path
- These volumes cannot be accurately or practically measured or estimated with reasonable consistency for the purposes of production accounting
  - Typically these volumes are low flow, low pressure, and inconsistent
  - Tank vapors have combined effects of working/breathing losses and flash gas liberation as well as impact of any gas blankets

* Part 27 only

NMOGA

- NMOGA's proposed changes to definitions of "flare or flaring" and "vent or venting" would exclude uncontrolled storage tanks, pneumatic controllers and pumps, and improperly closed thief hatches

NMOGA

ZACHARY CRAFT

Enterprise Products
1100 Louisiana
Suite 1000
Houston, TX 77002
713.381.6500

WORK EXPERIENCE

Enterprise Products 2017 – present
Houston, TX

- In-house legal counsel to Enterprise Products[1] and its various subsidiaries and affiliates, including Enterprise Field Services, LLC
- Provide legal services relating to environmental, health, safety and other matters, including but not limited to commercial transactions, structure and governance matters, permitting, compliance, regulatory changes, and enforcement

Baker Botts LLP 2009 – 2017
Houston, TX

- Associate, 2009-2014; Senior Associate, 2015-2017
- Represented a variety of clients in the energy industry, including upstream producers, midstream companies, refiners, chemical manufacturers, and electric utilities
- Served clients on environmental matters relating to permitting, compliance counseling, enforcement defense, advocacy in state and federal regulatory matters, and corporate transactions

EDUCATION

Columbia Law School
New York, NY — Juris Doctor, 2009

Emory University
Atlanta, GA — Bachelor of Arts, Economics, 2006

With highest honors

TEXAS BAR ASSOCIATION, LICENSED 2009

[1] Enterprise Products Partners L.P. is one of the largest publicly traded partnerships and a leading North American provider of midstream energy services to producers and consumers of natural gas, natural gas liquids (NGLs), crude oil, refined products and petrochemicals. Our services include: natural gas gathering, treating, processing, transportation and storage; NGL transportation, fractionation, storage and export and import terminals; crude oil gathering, transportation, storage and export and import terminals; petrochemical and refined products transportation, storage, export and import terminals and related services; and a marine transportation business that operates primarily on the United States inland and Intracoastal Waterway systems. The partnership's assets include approximately 50,000 miles of pipelines; 260 million barrels of storage capacity for NGLs, crude oil, refined products and petrochemicals, and 14 billion cubic feet of natural gas storage capacity. Please visit www.enterpriseproducts.com for more information.

BEFORE THE OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Exhibit No. J
Submitted by: **New Mexico Oil & Gas Association**
Hearing Date: January 4, 2021
Case No. 21528

EX-21.1 3 exhibit21_1.htm EXHIBIT 21.1

Exhibit 21.1

LIST OF SUBSIDIARIES
Enterprise Products Partners L.P.
as of February 1, 2020

Name of Subsidiary	Jurisdiction of Formation	Effective Ownership
Acadian Gas Pipeline System	Delaware	TXO-Acadian Gas Pipeline, LLC – 50% MCN Acadian Gas Pipeline, LLC – 50%
Acadian Gas, LLC	Delaware	Duncan Energy Partners L.P. – 100%
Adamana Land Company, LLC	Delaware	Enterprise Products Operating LLC – 100%
Arizona Gas Storage, L.L.C.	Delaware	Enterprise Arizona Gas, L.L.C. – 60% Third Party – 40%
Baton Rouge Fractionators LLC	Delaware	Enterprise Products Operating LLC – 32.25% Third Parties – 67.75%
Baton Rouge Pipeline LLC	Delaware	Baton Rouge Fractionators LLC – 100%
Baton Rouge Propylene Concentrator LLC	Delaware	Enterprise Products Operating LLC – 30% Third Parties – 70%
Baymark Pipeline LLC	Texas	Enterprise Products Operating LLC – 70% Third Party - 30%
Belle Rose NGL Pipeline, L.L.C.	Delaware	Enterprise NGL Pipelines, LLC –41.67% Enterprise Products Operating LLC – 58.33%
Belvieu Environmental Fuels GP, LLC	Texas	Enterprise Products Operating LLC – 100%
Belvieu Environmental Fuels LLC	Texas	Enterprise Products Operating LLC – 99% Belvieu Environmental Fuels GP, LLC – 1%
Breviloba, LLC	Texas	Enterprise Products Operating LLC – 67% Third Party – 33%
BTA ETG Gathering LLC	Texas	Enterprise Products Operating LLC – 100%
BTA Gas Processing LLC	Texas	Enterprise Products Operating LLC – 100%
Cajun Pipeline Company, LLC	Texas	Enterprise Products Operating LLC – 100%
Calcasieu Gas Gathering System	Texas	TXO-Acadian Gas Pipeline, LLC – 50% MCN Acadian Gas Pipeline, LLC – 50%
Canadian Enterprise Gas Products, Ltd.	Alberta, Canada	Enterprise Products Operating LLC – 100%
Centennial Pipeline LLC	Delaware	Enterprise TE Products Pipeline Company, LLC – 50% Third Party – 50%
Chama Gas Services, LLC	Delaware	Enterprise New Mexico Ventures, LLC – 75% Third Party – 25%
Channelview Fleeting Services, L.L.C.	Texas	Enterprise Marine Services LLC – 100%
Chaparral Pipeline Company, LLC	Texas	Enterprise Midstream Companies LLC – 99.999% Enterprise NGL Pipelines II LLC – 0.001%
Chunchula Pipeline Company, LLC	Texas	Enterprise Products Operating LLC – 100%
CTCO of Texas, LLC	Texas	Enterprise Marine Services LLC – 100%
Cypress Gas Marketing, LLC	Delaware	Acadian Gas, LLC – 100%
Dean Pipeline Company, LLC	Texas	Enterprise Midstream Companies LLC – 99.999% Enterprise NGL Pipelines II LLC – 0.001%
Delaware Basin Gas Processing LLC	Delaware	Enterprise GC LLC – 100%
DEP Holdings, LLC	Delaware	Enterprise GTM Holdings L.P. – 100%
DEP Offshore Port System, LLC	Texas	Duncan Energy Partners L.P. – 100%
Dixie Pipeline Company LLC	Delaware	Enterprise Products Operating LLC – 100%

Name of Subsidiary	Jurisdiction of Formation	Effective Ownership
Duncan Energy Partners L.P.	Delaware	Enterprise GTM Holdings L.P. – 99.3% DEP Holdings, LLC – 0.700%
Eagle Ford Pipeline LLC	Delaware	Enterprise Products Operating LLC – 50% Third Party – 50%
Eagle Ford Terminals Corpus Christi LLC	Delaware	Enterprise Products Operating LLC – 50% Third Party – 50%
EFS Midstream LLC	Delaware	Enterprise Acquisition Holdings LLC – 100%
EF Terminals Corpus Christi LLC	Delaware	Eagle Ford Terminals Corpus Christi LLC – 100%
Electra Shipyard Services LLC	Texas	Enterprise Marine Services LLC – 100%
Energy Ventures, LLC	Colorado	Enterprise Crude Oil LLC – 100%
Enterprise Acquisition Holdings LLC	Delaware	Enterprise Products Operating LLC – 100%
Enterprise Appelt, LLC	Texas	Enterprise Houston Ship Channel, L.P. – 100%
Enterprise Arizona Gas, LLC	Delaware	Enterprise Field Services, LLC – 100%
Enterprise Crude GP LLC	Delaware	TCTM, L.P. – 100%
Enterprise Crude Oil LLC	Texas	TCTM, L.P. – 99.99% Enterprise Crude GP LLC – 0.01%
Enterprise Crude Pipeline LLC	Texas	TCTM, L.P. – 99.99% Enterprise Crude GP LLC – 0.01%
Enterprise Crude Terminals and Storage LLC	Texas	Enterprise Crude GP LLC – 100%
Enterprise Custom Marketing LLC	Delaware	Enterprise Crude Oil LLC – 100%
Enterprise EF78 LLC	Delaware	Enterprise Products Texas Operating LLC – 75% Third Party – 25%
Enterprise Field Services, LLC	Texas	Enterprise GTM Holdings L.P. – 100%
Enterprise Field Services (Offshore) LLC	Texas	Enterprise GTM Holdings L.P. – 100%
Enterprise Fractionation, LLC	Delaware	Enterprise Products Operating LLC – 100%
Enterprise Gas Liquids LLC	Texas	Enterprise Products Operating LLC – 100%
Enterprise Gas Processing, LLC	Delaware	Enterprise Products Operating LLC – 100%
Enterprise Gathering II LLC	Delaware	Enterprise Products Operating LLC – 100%
Enterprise Gathering LLC	Delaware	Enterprise Products Operating LLC – 100%
Enterprise GC LLC	Texas	Duncan Energy Partners L.P. – 100%
Enterprise GP LLC	Delaware	Enterprise TE Partners L.P. – 100%
Enterprise GTM Hattiesburg Storage, LLC	Delaware	Enterprise GTM Holdings L.P. – 100%
Enterprise GTM Holdings L.P.	Delaware	Enterprise Products Operating LLC – 99% Enterprise GTMGP, LLC – 1%
Enterprise GTMGP, LLC	Delaware	Enterprise Products Operating LLC – 100%
Enterprise Houston Ship Channel GP, LLC	Texas	Enterprise Terminaling Services, L.P. – 100%
Enterprise Houston Ship Channel, L.P.	Texas	Enterprise Terminaling Services, L.P. – 99% Enterprise Houston Ship Channel GP, LLC – 1%
Enterprise Hydrocarbons L.P.	Delaware	Enterprise Products Texas Operating LLC – 99% Enterprise Products Operating LLC – 1%
Enterprise Interstate Crude LLC	Texas	Enterprise Crude GP LLC – 100%
Enterprise Intrastate LLC	Delaware	Duncan Energy Partners L.P. – 100%
Enterprise Jonah Gas Gathering Company LLC	Delaware	Enterprise Products Operating LLC – 100%

Name of Subsidiary	Jurisdiction of Formation	Effective Ownership
Enterprise Logistic Services LLC (DBA Enterprise Transportation Company)	Texas	Enterprise Products Operating LLC – 100%
Enterprise Lou-Tex NGL Pipeline L.P.	Texas	Enterprise Products Operating LLC – 99% HSC Pipeline Partnership, LLC – 1%
Enterprise Lou-Tex Propylene Pipeline LLC	Texas	Duncan Energy Partners L.P. – 100%
Enterprise Louisiana Pipeline LLC	Texas	Enterprise Products Operating LLC – 100%
Enterprise Marine Services LLC	Delaware	Enterprise TE Partners L.P. – 100%
Enterprise Midstream Companies LLC	Texas	Enterprise TE Partners L.P. – 99.999% Enterprise GP LLC – 0.001%
Enterprise Mont Belvieu Program Company	Texas	Enterprise Products Operating LLC – 100%
Enterprise Natural Gas Pipeline LLC	Delaware	Enterprise GTM Holdings L.P. – 100%
Enterprise Navigator Ethylene Terminal LLC	Texas	Enterprise Products Operating LLC – 50% Third Party – 50%
Enterprise New Mexico Ventures, LLC	Delaware	Enterprise Field Services, LLC – 100%
Enterprise NGL Pipelines II LLC	Delaware	Enterprise Midstream Companies LLC – 100%
Enterprise NGL Pipelines, LLC	Delaware	Enterprise Products Operating LLC – 100%
Enterprise NGL Private Lines & Storage, LLC	Delaware	Enterprise Products Operating LLC – 100%
Enterprise Offshore Port System, LLC	Texas	Enterprise Products Operating LLC – 100%
Enterprise Pathfinder, LLC	Delaware	Enterprise GTM Holdings L.P. – 100%
Enterprise Pelican Pipeline L.P.	Texas	Evangeline Gulf Coast Gas, LLC – 90% Evangeline Gas Corp. – 10%
Enterprise Plevna Marketing LLC	Delaware	Enterprise Crude Oil LLC – 100%
Enterprise Products BBCT LLC	Texas	Enterprise Crude Oil LLC – 99.99% Enterprise Crude GP LLC – 0.01%
Enterprise Products Marketing Company LLC	Texas	Enterprise Products Operating LLC – 100%
Enterprise Products OLPGP, Inc.	Delaware	Enterprise Products Partners L.P. – 100%
Enterprise Products Operating LLC	Texas	Enterprise Products Partners L.P. – 99.999% Enterprise Products OLPGP, Inc. – 0.001%
Enterprise Products Pipeline Company LLC	Delaware	Enterprise Products Operating LLC – 100%
Enterprise Products Texas Operating LLC	Texas	Enterprise Products Operating LLC – 99% Enterprise Products OLPGP, Inc. – 1%
Enterprise Propane Terminals and Storage, LLC	Delaware	Enterprise Terminals & Storage, LLC – 100%
Enterprise Refined Products Company LLC	Delaware	Enterprise Products Operating LLC –100%
Enterprise Refined Products Marketing Company LLC	Delaware	Enterprise Refined Products Company LLC – 100%
Enterprise Sage Marketing LLC	Delaware	Enterprise Crude Oil LLC – 100%
Enterprise Seaway L.P.	Delaware	Enterprise Products Operating LLC – 99.99% Enterprise Crude GP LLC – 0.01%
Enterprise TE Investments LLC	Delaware	Enterprise Products Pipeline Company LLC – 100%
Enterprise TE Partners L.P.	Delaware	Enterprise Products Pipeline Company LLC – 2% Enterprise Products Operating LLC – 98%
Enterprise TE Products Pipeline Company LLC	Texas	Enterprise TE Partners L.P. – 99.999% Enterprise GP LLC – 0.001%
Enterprise Terminaling Services GP, LLC	Delaware	Enterprise Products Operating LLC – 100%
Enterprise Terminaling Services, L.P.	Delaware	Enterprise Products Operating LLC – 98% Enterprise Terminaling Services GP, LLC – 2%
Enterprise Terminalling LLC	Texas	Enterprise Products Operating LLC – 99% Enterprise Gas Liquids LLC – 1%
Enterprise Terminals & Storage, LLC	Delaware	Mapletree, LLC – 100%
Enterprise Texas Pipeline LLC	Texas	Duncan Energy Partners L.P. – 100%

Name of Subsidiary	Jurisdiction of Formation	Effective Ownership
Enterprise White River Hub, LLC	Delaware	Enterprise Products Operating LLC – 100%
Evangeline Gas Corp.	Delaware	Evangeline Gulf Coast Gas, LLC – 100%
Evangeline Gulf Coast Gas, LLC	Delaware	Acadian Gas, LLC – 100%
Front Range Pipeline LLC	Delaware	Enterprise Products Operating LLC – 33.33% Third Parties – 66.67%
Groves RGP Pipeline LLC	Texas	Enterprise Products Operating LLC – 99% Enterprise Products Texas Operating LLC – 1%
HSC Pipeline Partnership, LLC	Texas	Enterprise Products Operating LLC – 99% Enterprise Products OLPGP, Inc. – 1%
JMRS Transport Services, Inc.	Delaware	Enterprise Logistic Services LLC – 100%
K/D/S Promix, L.L.C.	Delaware	Enterprise Fractionation, LLC – 50% Third Parties – 50%
La Porte Pipeline Company, L.P.	Texas	Enterprise Products Operating LLC – 79.24% La Porte Pipeline GP, LLC – 1.0% Third Party – 19.76%
La Porte Pipeline GP, L.L.C.	Delaware	Enterprise Products Operating LLC – 80.04% Third Party – 19.96%
Leveret Pipeline Company LLC	Texas	Enterprise Field Services, LLC – 100%
M2E3 LLC	Texas	Enterprise Products Operating LLC – 100%
M2E4 LLC	Texas	Enterprise Products Operating LLC – 100%
Mapletree, LLC	Delaware	Enterprise Products Operating LLC – 100%
MCN Acadian Gas Pipeline, LLC	Delaware	Acadian Gas, LLC – 100%
MCN Pelican Interstate Gas, LLC	Delaware	Acadian Gas, LLC – 100%
Mid-America Pipeline Company, LLC	Texas	Mapletree, LLC – 100%
Mont Belvieu Caverns, LLC	Delaware	Duncan Energy Partners L.P. – 100%
Neches Pipeline System	Delaware	TXO-Acadian Gas Pipeline, LLC – 50% MCN Acadian Gas Pipeline, LLC – 50%
Norco-Taft Pipeline, LLC	Delaware	Enterprise NGL Private Lines & Storage, LLC – 100%
Old Ocean Pipeline, LLC	Texas	Enterprise Products Operating – 50% Third Party – 50%
Olefins Terminal LLC	Delaware	Enterprise Products Operating LLC – 100%
Panola Pipeline Company, LLC	Texas	Enterprise Midstream Companies LLC – 55% Third Parties – 45%
Pascagoula Gas Processing LLC	Texas	Enterprise Gas Processing, LLC – 75% Third Party – 25%
Pontchartrain Natural Gas System	Texas	TXO-Acadian Gas Pipeline, LLC – 50% MCN Acadian Gas Pipeline, LLC – 50%
Port Neches GP LLC	Texas	Enterprise Products Operating LLC – 100%
Port Neches Pipeline LLC	Texas	Enterprise Products Operating LLC – 99% Port Neches GP LLC – 1%
QP-LS, LLC	Wyoming	Enterprise Products BBCT LLC – 100%
Quanah Pipeline Company, LLC	Texas	Enterprise Midstream Companies LLC – 99.999% Enterprise NGL Pipelines II LLC – 0.001%
Rio Grande Pipeline Company LLC	Texas	Enterprise Products Operating LLC – 100%
Sabine Propylene Pipeline LLC	Texas	Duncan Energy Partners L.P. – 100%
Seaway Crude Holdings LLC	Delaware	Enterprise Seaway L.P. – 50% Third Party – 50%
Seaway Crude Pipeline Company LLC	Delaware	Seaway Crude Holdings LLC – 100%
Seaway Intrastate LLC	Delaware	Seaway Crude Holdings LLC – 100%
Seaway Marine LLC	Delaware	Seaway Intrastate LLC – 100%

Name of Subsidiary	Jurisdiction of Formation	Effective Ownership
Seminole Pipeline Company LLC	Delaware	Enterprise Products Operating LLC – 100%
Skelly-Belvieu Pipeline Company, L.L.C.	Delaware	Enterprise Products Operating LLC – 50% Third Party – 50%
Sorrento Pipeline Company, LLC	Texas	Enterprise Products Operating LLC – 100%
South Texas NGL Pipelines, LLC	Delaware	Duncan Energy Partners L.P. – 100%
SPOT Terminal Operating LLC	Texas	Enterprise Products Operating LLC – 100%
SPOT Terminal Services LLC	Texas	Enterprise Products Operating LLC – 100%
Tarpon Land Holdings LLC	Texas	Enterprise Products Operating LLC – 100%
TCTM, L.P.	Delaware	Enterprise TE Partners L.P. – 99.999% Enterprise GP LLC – 0.001%
TECO Gas Gathering LLC	Delaware	Enterprise Products Operating LLC – 100%
TECO Gas Processing LLC	Delaware	Enterprise Products Operating LLC – 100%
Tejas-Magnolia Energy, LLC	Delaware	Pontchartrain Natural Gas System – 96.6% MCN Pelican Interstate Gas, LLC – 3.4%
TEPPCO O/S Port System, LLC	Texas	Enterprise Crude GP LLC – 100%
Texas Express Gathering LLC	Delaware	Enterprise Products Operating LLC – 45% Third Parties – 55%
Texas Express Pipeline LLC	Delaware	Enterprise Products Operating LLC – 35% Third Parties – 65%
Transport 4, L.L.C.	Delaware	Enterprise TE Products Pipeline Company LLC – 25% Third Parties – 75%
Tri-States NGL Pipeline, L.L.C.	Delaware	Enterprise Products Operating LLC – 50% Enterprise NGL Pipelines, LLC – 33.3% Third Party – 16.67%
TXO-Acadian Gas Pipeline, LLC	Delaware	Acadian Gas, LLC – 100%
Venice Energy Services Company, L.L.C.	Delaware	Enterprise Gas Processing LLC – 13.1% Third Parties – 86.9%
White River Hub, LLC	Delaware	Enterprise White River Hub, LLC – 50% Third Party – 50%
Whitethorn Pipeline Company LLC	Texas	Enterprise Products Operating LLC – 80% Third Party – 20%
Wilcox Pipeline Company, LLC	Texas	Enterprise Midstream Companies LLC – 99.999% Enterprise NGL Pipelines II LLC – 0.001%
Wilprise Pipeline Company, L.L.C.	Delaware	Enterprise Products Operating LLC – 74.7% Third Party – 25.3%

EX-21.1 3 ngls-ex211_193.htm EX-21.1

Exhibit 21.1

Targa Resources Partners LP Subsidiary List

Entity Name	Jurisdiction of Formation
Allied CNG Ventures LLC	Delaware
Carnero G&P LLC	Delaware
Cayenne Pipeline, LLC	Delaware
Cedar Bayou Fractionators, L.P.	Delaware
Centrahoma Processing LLC	Delaware
DEVCO Holdings LLC	Delaware
Downstream Energy Ventures Co., L.L.C.	Delaware
FCPP Pipeline, LLC	Delaware
Flag City Processing Partners, LLC	Delaware
Floridian Natural Gas Storage Company, LLC	Delaware
Grand Prix Development LLC	Delaware
Grand Prix Pipeline LLC	Delaware
Gulf Coast Express Pipeline LLC	Delaware
Gulf Coast Fractionators	Texas
Little Missouri 4 LLC	Delaware
Pecos Pipeline LLC	Delaware
Sajet Development LLC	Delaware
Sajet Properties LLC	Delaware
Sajet Resources LLC	Delaware
Salta Properties LLC	Delaware
Setting Sun Pipeline Corporation	Delaware
Slider WestOk Gathering, LLC	Delaware
T2 Eagle Ford Gathering Company LLC	Delaware
T2 Gas Utility LLC	Texas
T2 LaSalle Gas Utility LLC	Texas
T2 LaSalle Gathering Company LLC	Delaware
Targa Acquisition LLC	Delaware
Targa Badlands Holdings LLC	Delaware
Targa Badlands LLC	Delaware
Targa Canada Liquids Inc.	British Columbia
Targa Capital LLC	Delaware
Targa Chaney Dell LLC	Delaware
Targa Channelview LLC	Delaware
Targa Cogen LLC	Delaware
Targa Delaware LLC	Delaware
Targa Downstream LLC	Delaware
Targa Gas Marketing LLC	Delaware
Targa Gas Pipeline LLC	Delaware
Targa Gas Processing LLC	Delaware
Targa GCX Pipeline LLC	Delaware
Targa Holding LLC	Delaware
Targa Intrastate Pipeline LLC	Delaware
Targa Liquids Marketing and Trade LLC	Delaware
Targa Louisiana Intrastate LLC	Delaware
Targa Midkiff LLC	Delaware
Targa Midland Gas Pipeline LLC	Delaware
Targa Midland LLC	Delaware
Targa Midstream Services LLC	Delaware
Targa MLP Capital LLC	Delaware
Targa NGL Pipeline Company LLC	Delaware
Targa Pipeline Escrow LLC	Delaware

Targa Pipeline Finance Corporation	Delaware
Targa Pipeline Mid-Continent Holdings LLC	Delaware
Targa Pipeline Mid-Continent LLC	Delaware
Targa Pipeline Mid-Continent WestOk LLC	Delaware
Targa Pipeline Mid-Continent WestTex LLC	Delaware
Targa Pipeline Operating Partnership LP	Delaware
Targa Pipeline Partners GP LLC	Delaware
Targa Pipeline Partners LP	Delaware
Targa Receivables LLC	Delaware
Targa Resources Operating GP LLC	Delaware
Targa Resources Operating LLC	Delaware
Targa Resources Partners Finance Corporation	Delaware
Targa Resources Partners LP	Delaware
Targa Southern Delaware LLC	Delaware
Targa SouthOk NGL Pipeline LLC	Oklahoma
Targa SouthTex Midstream Company LP	Texas
Targa Train 6 LLC	Delaware
Targa Train 7 LLC	Delaware
Targa Train 8 LLC	Delaware
Targa Transport LLC	Delaware
Terracotta Ventures LLC	Delaware
Tesla Resources LLC	Delaware
Tesuque Pipeline, LLC	Delaware
TPL Arkoma Holdings LLC	Delaware
TPL Arkoma Inc.	Delaware
TPL Arkoma Midstream LLC	Delaware
TPL Barnett LLC	Delaware
TPL Gas Treating LLC	Delaware
TPL SouthTex Gas Utility Company LP	Texas
TPL SouthTex Midstream Holding Company LP	Texas
TPL SouthTex Midstream LLC	Delaware
TPL SouthTex Pipeline Company LLC	Texas
TPL SouthTex Processing Company LP	Texas
TPL SouthTex Transmission Company LP	Texas
Velma Gas Processing Company, LLC	Delaware
Velma Intrastate Gas Transmission Company, LLC	Delaware
Venice Energy Services Company, L.L.C.	Delaware
Versado Gas Processors, L.L.C.	Delaware

EX-21.1 5 kmi-2019x10kxexh211.htm EXHIBIT 21.1

Exhibit 21.1

Kinder Morgan, Inc.

Subsidiaries of the Registrant as of December 31, 2019

Entity Name	Place of Incorporation
Agnes B Crane, LLC	Louisiana
American Petroleum Tankers II LLC	Delaware
American Petroleum Tankers III LLC	Delaware
American Petroleum Tankers IV LLC	Delaware
American Petroleum Tankers IX LLC	Delaware
American Petroleum Tankers LLC	Delaware
American Petroleum Tankers Parent LLC	Delaware
American Petroleum Tankers V LLC	Delaware
American Petroleum Tankers VI LLC	Delaware
American Petroleum Tankers VII LLC	Delaware
American Petroleum Tankers VIII LLC	Delaware
American Petroleum Tankers X LLC	Delaware
American Petroleum Tankers XI LLC	Delaware
ANR Advance Holdings, Inc.	Delaware
ANR Real Estate Corporation	Delaware
APT Florida LLC	Delaware
APT Intermediate Holdco LLC	Delaware
APT New Intermediate Holdco LLC	Delaware
APT Pennsylvania LLC	Delaware
APT Sunshine State LLC	Delaware
Ascension Holding Company, L.L.C.	Delaware
Banquete Hub LLC	Delaware
Battleground Oil Specialty Terminal Company LLC	Delaware
Bear Creek Storage Company, L.L.C.	Louisiana
Berkshire Feedline Acquisition Limited Partnership	Massachusetts
Betty Lou LLC	Delaware
BHP Billiton Petroleum (Eagle Ford Gathering) LLC	Delaware
Bighorn Gas Gathering, L.L.C.	Delaware
Calnev Pipe Line LLC	Delaware
Camino Real Gas Gathering Company LLC	Delaware
Camino Real Gathering Company, L.L.C.	Delaware
Cantera Gas Company LLC	Delaware
CDE Pipeline LLC	Delaware
Cedar Cove Midstream LLC	Delaware
Central Florida Pipeline LLC	Delaware
Cheyenne Plains Gas Pipeline Company, L.L.C.	Delaware
CIG Gas Storage Company LLC	Delaware
CIG Pipeline Services Company, L.L.C.	Delaware
Citrus Energy Services, Inc.	Delaware
Citrus LLC	Delaware

Exhibit 21.1

Kinder Morgan, Inc.

Subsidiaries of the Registrant as of December 31, 2019

Entity Name	Place of Incorporation
Cliffside Helium, LLC	Delaware
Cliffside Refiners, L.P.	Delaware
Coastal Eagle Point Oil Company	Delaware
Coastal Oil New England, Inc.	Massachusetts
Coastal Wartsila Petroleum Private Limited	India
Colorado Interstate Gas Company, L.L.C.	Delaware
Colorado Interstate Issuing Corporation	Delaware
Colton Processing Facility	[California]
Copano Double Eagle LLC	Delaware
Copano Energy Finance Corporation	Delaware
Copano Energy L.L.C.	Delaware
Copano Energy Services/Upper Gulf Coast LLC	Texas
Copano Field Services GP, L.L.C.	Delaware
Copano Field Services/North Texas, L.L.C.	Delaware
Copano Field Services/South Texas LLC	Texas
Copano Field Services/Upper Gulf Coast LLC	Texas
Copano Liberty, LLC	Delaware
Copano Liquids Marketing LLC	Delaware
Copano NGL Services (Markham), L.L.C.	Delaware
Copano NGL Services LLC	Texas
Copano Pipelines Group, L.L.C.	Delaware
Copano Pipelines/North Texas, L.L.C.	Delaware
Copano Pipelines/Rocky Mountains, LLC	Delaware
Copano Pipelines/South Texas LLC	Texas
Copano Pipelines/Upper Gulf Coast LLC	Texas
Copano Processing LLC	Texas
Copano Risk Management LLC	Texas
Copano Terminals LLC	Delaware
Copano/Webb-Duval Pipeline LLC	Delaware
Cortez Capital Corporation	Delaware
Cortez Expansion Capital Corporation	Delaware
Cortez Pipeline Company	Texas
Coscol Petroleum Corporation	Delaware
Coyote Gas Treating Limited Liability Company	Colorado
CPNO Services LLC	Texas
Cross Country Development L.L.C.	Delaware
Cypress Interstate Pipeline LLC	Delaware
Dakota Bulk Terminal LLC	Delaware
Deeprock Development, LLC	Delaware
Delta Terminal Services LLC	Delaware

Exhibit 21.1

Kinder Morgan, Inc.

Subsidiaries of the Registrant as of December 31, 2019

Entity Name	Place of Incorporation
Double Eagle Pipeline LLC	Delaware
Eagle Ford Gathering LLC	Delaware
El Paso Amazonas Energia Ltda.	Brazil
El Paso CGP Company, L.L.C.	Delaware
El Paso Cheyenne Holdings, L.L.C.	Delaware
El Paso Citrus Holdings, Inc.	Delaware
El Paso CNG Company, L.L.C.	Delaware
El Paso Energia do Brasil Ltda.	Brazil
El Paso Energy Argentina Service Company	Delaware
El Paso Energy Capital Trust I	Delaware
El Paso Energy E.S.T. Company	Delaware
El Paso Energy International Company	Delaware
El Paso Energy Marketing de Mexico, S. de R.L. de C.V.	Mexico
El Paso Energy Service Company, L.L.C.	Delaware
El Paso LLC	Delaware
El Paso Marketing Company, L.L.C.	Delaware
El Paso Merchant Energy North America Company, L.L.C.	Delaware
El Paso Merchant Energy-Petroleum Company	Delaware
El Paso Mexico Holding B.V.	Netherlands
El Paso Midstream Group LLC	Delaware
El Paso Natural Gas Company, L.L.C.	Delaware
El Paso Noric Investments III, L.L.C.	Delaware
El Paso Reata Energy Company, L.L.C.	Delaware
El Paso Remediation Company	Delaware
El Paso Rio Negro Energia Ltda.	Brazil
El Paso Ruby Holding Company, L.L.C.	Delaware
El Paso Services Holding Company	Delaware
El Paso Tennessee Pipeline Co., L.L.C.	Delaware
Elba Express Company, L.L.C.	Delaware
Elba Liquefaction Company, L.L.C.	Delaware
Elizabeth River Terminals LLC	Delaware
Emory B Crane, LLC	Louisiana
EP Ruby LLC	Delaware
EPBGP Contracting Services LLC	Delaware
EPC Building LLC	Delaware
EPC Property Holdings, Inc.	Delaware
EPEC Corporation	Delaware
EPEC Oil Company Liquidating Trust	Delaware Law
EPEC Polymers, Inc.	Delaware
EPEC Realty, Inc.	Delaware

Exhibit 21.1

Kinder Morgan, Inc.

Subsidiaries of the Registrant as of December 31, 2019

Entity Name	Place of Incorporation
EPED B Company	Cayman Islands
EPED Holding Company	Delaware
EPTP Issuing Corporation	Delaware
Fayetteville Express Pipeline LLC	Delaware
Fife Power	Scotland
Florida Gas Transmission Company, LLC	Delaware
Fort Union Gas Gathering, L.L.C.	Delaware
Frank L Crane, LLC	Louisiana
GEBF, L.L.C.	Louisiana
General Stevedores GP, LLC	Texas
General Stevedores Holdings LLC	Delaware
Greens Port CBR, LLC	Delaware
Guilford County Terminal Company, LLC	North Carolina
Gulf Coast Express Pipeline LLC	Delaware
Gulf LNG Energy (Port), LLC	Delaware
Gulf LNG Energy, LLC	Delaware
Gulf LNG Holdings Group, LLC	Delaware
Gulf LNG Liquefaction Company, LLC	Delaware
Gulf LNG Pipeline, LLC	Delaware
Harrah Midstream LLC	Delaware
HBM Environmental LLC	Delaware
Hiland Crude, LLC	Oklahoma
Hiland Partners Finance Corp.	Delaware
Hiland Partners Holdings LLC	Delaware
Horizon Pipeline Company, L.L.C.	Delaware
HPH Oklahoma Gathering LLC	Delaware
I.M.T. Land Corp.	Louisiana
ICPT, L.L.C.	Louisiana
Independent Trading & Transportation Company I, L.L.C.	Oklahoma
International Marine Terminals Partnership	Louisiana
JV Tanker Charterer LLC	Delaware
Kellogg Terminal, LLC	Delaware
Kinder Morgan 2-Mile LLC	Delaware
Kinder Morgan Administrative Services Tampa LLC	Delaware
Kinder Morgan Altamont LLC	Delaware
Kinder Morgan Baltimore Transload Terminal LLC	Delaware
Kinder Morgan Battleground Oil LLC	Delaware
Kinder Morgan Border Pipeline LLC	Delaware
Kinder Morgan Bulk Terminals LLC	Louisiana
Kinder Morgan Canada Company ULC	British Columbia (Canada)

Exhibit 21.1

Kinder Morgan, Inc.

Subsidiaries of the Registrant as of December 31, 2019

Entity Name	Place of Incorporation
Kinder Morgan Carbon Dioxide Transportation Company	Delaware
Kinder Morgan CO2 Company, L.P.	Texas
Kinder Morgan Commercial Services LLC	Delaware
Kinder Morgan Contracting Services LLC	Delaware
Kinder Morgan Crude & Condensate LLC	Delaware
Kinder Morgan Crude Marketing LLC	Delaware
Kinder Morgan Crude Oil Pipelines LLC	Delaware
Kinder Morgan Crude to Rail LLC	Delaware
Kinder Morgan Cushing LLC	Delaware
Kinder Morgan Dallas Fort Worth Rail Terminal LLC	Delaware
Kinder Morgan Deeprock North Holdco LLC	Delaware
Kinder Morgan Endeavor LLC	Delaware
Kinder Morgan Energy Partners, L.P.	Delaware
Kinder Morgan EP Midstream LLC	Delaware
Kinder Morgan Finance Company LLC	Delaware
Kinder Morgan Foundation	Colorado
Kinder Morgan Freedom Pipeline LLC	Delaware
Kinder Morgan G.P., Inc.	Delaware
Kinder Morgan Galena Park West LLC	Delaware
Kinder Morgan Gas Natural de Mexico, S. de R.L. de C.V.	Mexico
Kinder Morgan Heartland ULC	Alberta (Canada)
Kinder Morgan Illinois Pipeline LLC	Delaware
Kinder Morgan IMT Holdco LLC	Delaware
Kinder Morgan Keystone Gas Storage LLC	Delaware
Kinder Morgan KMAP LLC	Delaware
Kinder Morgan Las Vegas LLC	Delaware
Kinder Morgan Linden Transload Terminal LLC	Delaware
Kinder Morgan Liquids Terminals LLC	Delaware
Kinder Morgan Liquids Terminals St. Gabriel LLC	Delaware
Kinder Morgan Louisiana Pipeline Holding LLC	Delaware
Kinder Morgan Louisiana Pipeline LLC	Delaware
Kinder Morgan Marine Services LLC	Delaware
Kinder Morgan Materials Services, LLC	Delaware
Kinder Morgan Mexico LLC	Delaware
Kinder Morgan Mid Atlantic Marine Services LLC	Delaware
Kinder Morgan NatGas O & M LLC	Delaware
Kinder Morgan NGPL Holdings LLC	Delaware
Kinder Morgan North Texas Pipeline LLC	Delaware
Kinder Morgan Operating L.P. "A"	Delaware
Kinder Morgan Operating L.P. "B"	Delaware

Exhibit 21.1

Kinder Morgan, Inc.

Subsidiaries of the Registrant as of December 31, 2019

Entity Name	Place of Incorporation
Kinder Morgan Operating L.P. "C"	Delaware
Kinder Morgan Operating L.P. "D"	Delaware
Kinder Morgan Pecos LLC	Delaware
Kinder Morgan Pecos Valley LLC	Delaware
Kinder Morgan Petcoke GP LLC	Delaware
Kinder Morgan Petcoke LP LLC	Delaware
Kinder Morgan Petcoke, L.P.	Delaware
Kinder Morgan Petroleum Tankers LLC	Delaware
Kinder Morgan Pipeline LLC	Delaware
Kinder Morgan Pipeline Servicios de Mexico S. de R.L. de C.V.	Mexico
Kinder Morgan Port Manatee Terminal LLC	Delaware
Kinder Morgan Port Sutton Terminal LLC	Delaware
Kinder Morgan Port Terminals USA LLC	Delaware
Kinder Morgan Portland Jet Line LLC	Delaware
Kinder Morgan Production Company LLC	Delaware
Kinder Morgan Products Terminals LLC	Delaware
Kinder Morgan Rail Services LLC	Delaware
Kinder Morgan Resources II LLC	Delaware
Kinder Morgan Resources III LLC	Delaware
Kinder Morgan Resources LLC	Delaware
Kinder Morgan Scurry Connector LLC	Delaware
Kinder Morgan Services International LLC	Delaware
Kinder Morgan Seven Oaks LLC	Delaware
Kinder Morgan SNG Operator LLC	Delaware
Kinder Morgan Southeast Terminals LLC	Delaware
Kinder Morgan Tank Storage Terminals LLC	Delaware
Kinder Morgan Tejas Pipeline GP LLC	Delaware
Kinder Morgan Tejas Pipeline LLC	Delaware
Kinder Morgan Terminals Wilmington LLC	Delaware
Kinder Morgan Terminals, Inc.	Delaware
Kinder Morgan Texas Pipeline LLC	Delaware
Kinder Morgan Texas Terminals, L.P.	Delaware
Kinder Morgan Transmix Company, LLC	Delaware
Kinder Morgan Treating LP	Delaware
Kinder Morgan Urban Renewal II, LLC	New Jersey
Kinder Morgan Urban Renewal, L.L.C.	New Jersey
Kinder Morgan Utica LLC	Delaware
Kinder Morgan Utopia Holdco LLC	Delaware
Kinder Morgan Utopia LLC	Delaware
Kinder Morgan Utopia Ltd.	Alberta (Canada)

Exhibit 21.1

Kinder Morgan, Inc.

Subsidiaries of the Registrant as of December 31, 2019

Entity Name	Place of Incorporation
Kinder Morgan Vehicle Services LLC	Delaware
Kinder Morgan Virginia Liquids Terminals LLC	Delaware
Kinder Morgan Wink Pipeline LLC	Delaware
KinderHawk Field Services LLC	Delaware
Kiowa Lateral LLC	Delaware
KM Canada Terminals ULC	Alberta (Canada)
KM Crane LLC	Maryland
KM Decatur LLC	Delaware
KM Eagle Gathering LLC	Delaware
KM Express LLC	Delaware
KM Gathering LLC	Delaware
KM Insurance Texas Inc.	Texas
KM Kaskaskia Dock LLC	Delaware
KM Liquids Terminals LLC	Delaware
KM North Cahokia Land LLC	Delaware
KM North Cahokia Special Project LLC	Delaware
KM North Cahokia Terminal Project LLC	Delaware
KM Phoenix Holdings LLC	Delaware
KM Ship Channel Services LLC	Delaware
KM Treating GP LLC	Delaware
KM Treating Production LLC	Delaware
KM Utopia Operator Limited	Alberta (Canada)
KM Utopia Operator LLC	Delaware
KMBT Legacy Holdings LLC	Tennessee
KMBT LLC	Delaware
KMGP Services Company, Inc.	Delaware
KN Telecommunications, Inc.	Colorado
Knight Power Company LLC	Delaware
KW Express, LLC	Delaware
Liberty Pipeline Group, LLC	Delaware
Lomita Rail Terminal LLC	Delaware
Mesquite Investors, L.L.C.	Delaware
Midco LLC	Delaware
Midcontinent Express Pipeline LLC	Delaware
Mid-Ship Group LLC	Delaware
Mid-Ship Oil Brokers LLC	Delaware
Milwaukee Bulk Terminals LLC	Wisconsin
MJR Operating LLC	Maryland
Mojave Pipeline Company, L.L.C.	Delaware
Mojave Pipeline Operating Company, L.L.C.	Texas

Exhibit 21.1

Kinder Morgan, Inc.

Subsidiaries of the Registrant as of December 31, 2019

Entity Name	Place of Incorporation
Natural Gas Pipeline Company of America LLC	Delaware
NGPL Finance LLC	Delaware
NGPL Holdings LLC	Delaware
NGPL Intermediate Holdings LLC	Delaware
NGPL PipeCo LLC	Delaware
North Cahokia Industrial, LLC	Delaware
North Cahokia Real Estate, LLC	Delaware
North Cahokia Terminal, LLC	Delaware
Paddy Ryan Crane, LLC	Louisiana
Palmetto Products Pipe Line LLC	Delaware
Permian Highway Pipeline LLC	Delaware
PI 2 Pelican State LLC	Delaware
Pinney Dock & Transport LLC	Delaware
Plantation Pipe Line Company	Delaware and Virginia
Plantation Services LLC	Delaware
Queen City Terminals LLC	Delaware
Rahway River Land LLC	Delaware
Red Cedar Gathering Company	Colorado
River Terminals Properties GP LLC	Delaware
River Terminals Properties, L.P.	Tennessee
Ruby Investment Company, L.L.C.	Delaware
Ruby Pipeline Holding Company, L.L.C.	Delaware
Ruby Pipeline, L.L.C.	Delaware
Sage Refined Products GP, LLC	Texas
Sage Refined Products, Ltd.	Texas
ScissorTail Energy, LLC	Delaware
SFPP, L.P.	Delaware
Sierrita Gas Pipeline LLC	Delaware
SNG Pipeline Services Company, L.L.C.	Delaware
Sonoran Pipeline LLC	Delaware
Southern Dome, LLC	Delaware
Southern Gulf LNG Company, L.L.C.	Delaware
Southern Liquefaction Company LLC	Delaware
Southern LNG Company, L.L.C.	Delaware
Southern Natural Gas Company, L.L.C.	Delaware
Southern Natural Issuing Corporation	Delaware
Southern Oklahoma Gathering LLC	Delaware
SouthTex Treaters LLC	Delaware
Southwest Florida Pipeline LLC	Delaware
SRT Vessels LLC	Delaware

Exhibit 21.1

Kinder Morgan, Inc.

Subsidiaries of the Registrant as of December 31, 2019

Entity Name	Place of Incorporation
Stevedore Holdings, L.P.	Delaware
Tejas Gas, LLC	Delaware
Tejas Natural Gas, LLC	Delaware
Tennessee Gas Pipeline Company, L.L.C.	Delaware
Tennessee Gas Pipeline Issuing Corporation	Delaware
Texan Tug LLC	Delaware
TGP Pipeline Services Company, L.L.C.	Delaware
The Pecos Carbon Dioxide Pipeline Company	Texas
TransColorado Gas Transmission Company LLC	Delaware
Transload Services, LLC	Illinois
Transport USA, Inc.	Pennsylvania
Utica Marcellus Texas Pipeline LLC	Delaware
Webb/Duval Gatherers	Texas
Western Plant Services LLC	Delaware
WYCO Development LLC	Colorado
Wyoming Interstate Company, L.L.C.	Delaware
Young Gas Storage Company, Ltd.	Colorado

Maxey Engineering, LLC

John C. Maxey P.E.

Mailing: P. O. Box 1361 • Physical: 400 Penn Plaza, Suite 230 • Roswell NM 88202

Office Phone: 575-623-0438 • Email: jcm@maxeyengineering.com

Currently

A consulting Petroleum Engineer based in Roswell, NM working primarily in the Permian Basin of West Texas and Southeast New Mexico. I have multi-basin experience in the Permian, East Texas, Mid-Continent, and Rocky Mountain regions, and also have worked projects in the Bowen and Pedirka basins of Australia. I've worked these areas with a variety of clients ranging from operators, oil and gas investors, to capital providers.

Petroleum Engineering Experience

Maxey Engineering LLC – Roswell NM, Senior Petroleum Engineer 2011 - current

- Perform reserve and engineering evaluations on oil and gas assets up to $50 million in size.
- Prepare drilling and completion procedures for both vertical and 1 to 2 mile lateral horizontal wells, cemented and un-cemented casing, utilizing perf and plug, or packer and port completions.
- Prepare multi-stage acid and fracture stimulation treatment procedures for slick water, cross linked gel, and hybrid treatments.
- Plan and supervise drilling and completing slim hole horizontal laterals from existing producing wells having 5 ½" production casing.
- Source drilling and completion consultants for certain clients and supervise both drilling and producing field operations.
- Prepare engineering field studies focusing on exploitable reserves and best practices in various plays.
- Prepare secondary recovery, pressure maintenance, and produced water disposal permits and expert witness testimony for NMOCD regulatory hearings. Plan and execute injection and disposal well drilling, completions, and workovers/reentries and trouble shoot facilities.
- Collaborate with geological and land teams providing reservoir engineering and economics for new exploration projects and participate in presenting to capital providers and oil and gas investors.

Read & Stevens Inc – Roswell NM, Senior Petroleum Engineer to President 1988 - 2011

- Manage 134,000 BOE/month of operated vertical production, and numerous multi-basin non-operated company properties either performing or supervising all engineering functions. Manage 264,000 bbl per month of produced water injection and disposal.
- Manage multi-rig drilling programs, one program developing 7.1 million BOE of primary vertical reserve discovered from a recommended recompletion of a deep well to the shallower discovery pay, experiencing a 44% annualized reserve growth.
- Manage reserve base and 3rd party engineering evaluations having prepared under my supervision.
- Maintain multiple investor and capital provider relationships.
- Generate cash flow forecasts, CAPEX and LOE budgets.
- Manage 30 professional, staff, and field employee positions, and multiple contractor relationships.

BEFORE THE OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Exhibit No. K
Submitted by: **New Mexico Oil & Gas Association**
Hearing Date: January 4, 2021
Case No. 21528

Foran Oil Company – Amarillo TX, Petroleum Engineer – Operations Manager 1985 – 1988

- Participate as Operations Manager in startup oil company with initial asset value of $6 million sold 15 years later for $373 million to Tom Brown Inc.
- Manage and oversee start up requirements for new operating company. Responsible for drilling, completion, and producing operations in the Permian Basin for young growing company. Responsible for service bids and contracts, material procurement, CAPEX and LOE budgeting.
- Provide engineering support in evaluation of developmental and exploratory drilling projects. Also provide engineering support presenting new drilling projects to working interest partners.

Mesa Petroleum, Petroleum Engineer – Roswell NM & Amarillo TX 1982 – 1985

- Mid Continent Division Production Engineer responsible for division wide production optimization, budgeting, and forecasting. Extensive experience w/ rod pump, gas lift, plunger, and submersible pumps.
- Design and install various production and SWD injection facilities. Identify, budget, recommend, and oversee various remedial and optimization projects.
- Designed surface facilities, SCADA configuration, and performed completion engineering of injection wells for development of the Lexington Morrow Waterflood Unit in Clark County KS.
- Evaluate division wide non-operated drilling proposals and make recommendations to Vice President of Engineering.

Chevron USA, Drilling Representative - Midland TX & Snyder TX 1980-1982

- Onsite drilling and completion supervisor, West Texas and panhandle, Southeast New Mexico, and Oklahoma. Responsible for drilling execution, mud systems, pressure control, wireline operations, running and cementing casing, completion and workover operations, fishing operations. Attended 4 week Chevron drilling training school in New Orleans, LA.
- Worked 6 months in SACROC Unit dealing with a variety of both surface and downhole issues dealing with CO2 injection wells. Extensive experience fishing submersible pumps and cable.

Software Skills

Applications: PHD Win, Aries, Lasser Production Data, IHS Enerdeq, Surfer, Didger, Petra, BlueView, Recon8, Autocad, Word, Excel, PowerPoint.

Leadership and Involvement - Education and Certification

Past member New Mexico Oil and Gas Association Executive Committee, current President of the New Mexico Energy Library, current board member SPE Roswell section, member American Association of Drilling Engineers, member Roswell Geological Society. Licensed Professional Engineer #11991 in the state of New Mexico, Bachelor of Science in Petroleum Engineering Technology from Oklahoma State University.

New Mexico Oil and Gas Producing Well Summary

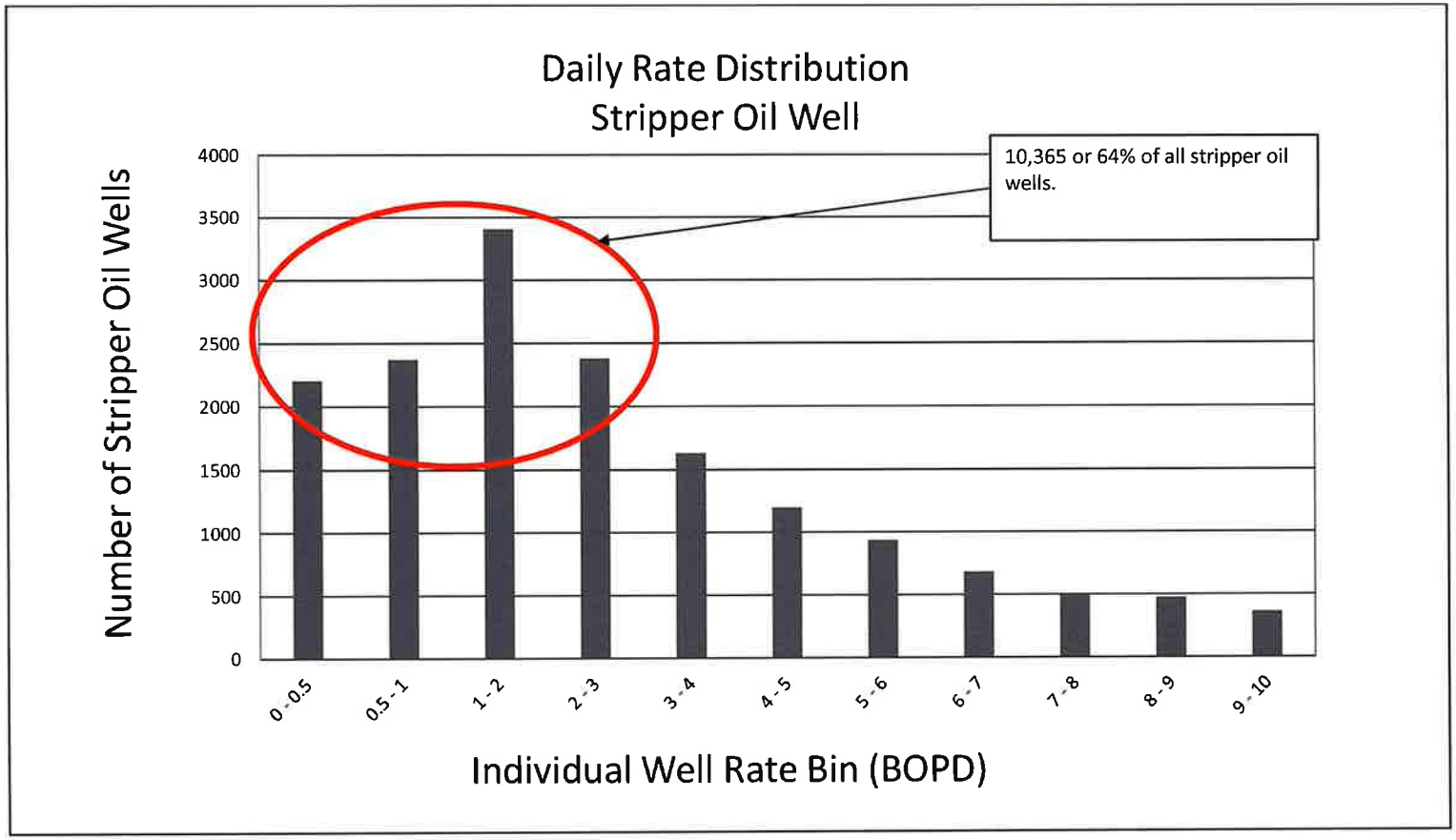
Description	Oil*	Gas*
Statewide Production (bbl, Mcf)	331,502,852	1,820,861,198
Statewide Stripper Production (bbl, Mcf)	**14,302,254**	**130,498,062**
Stripper/Statewide	4.3%	7.2%
Statewide Total Well Count	27,107	27,649
Statewide Stripper Well Count	16,157	15,129
Stripper Well /Total Well	**60%**	**55%**
Daily Average Production per Stripper Well	**2.8 Bopd**	**26 Mcfd**

Data Source: http://www.emnrd.state.nm.us/OCD/statistics.html
http://www.emnrd.state.nm.us/ADMIN/publications.html

*Annualized 2019 Data

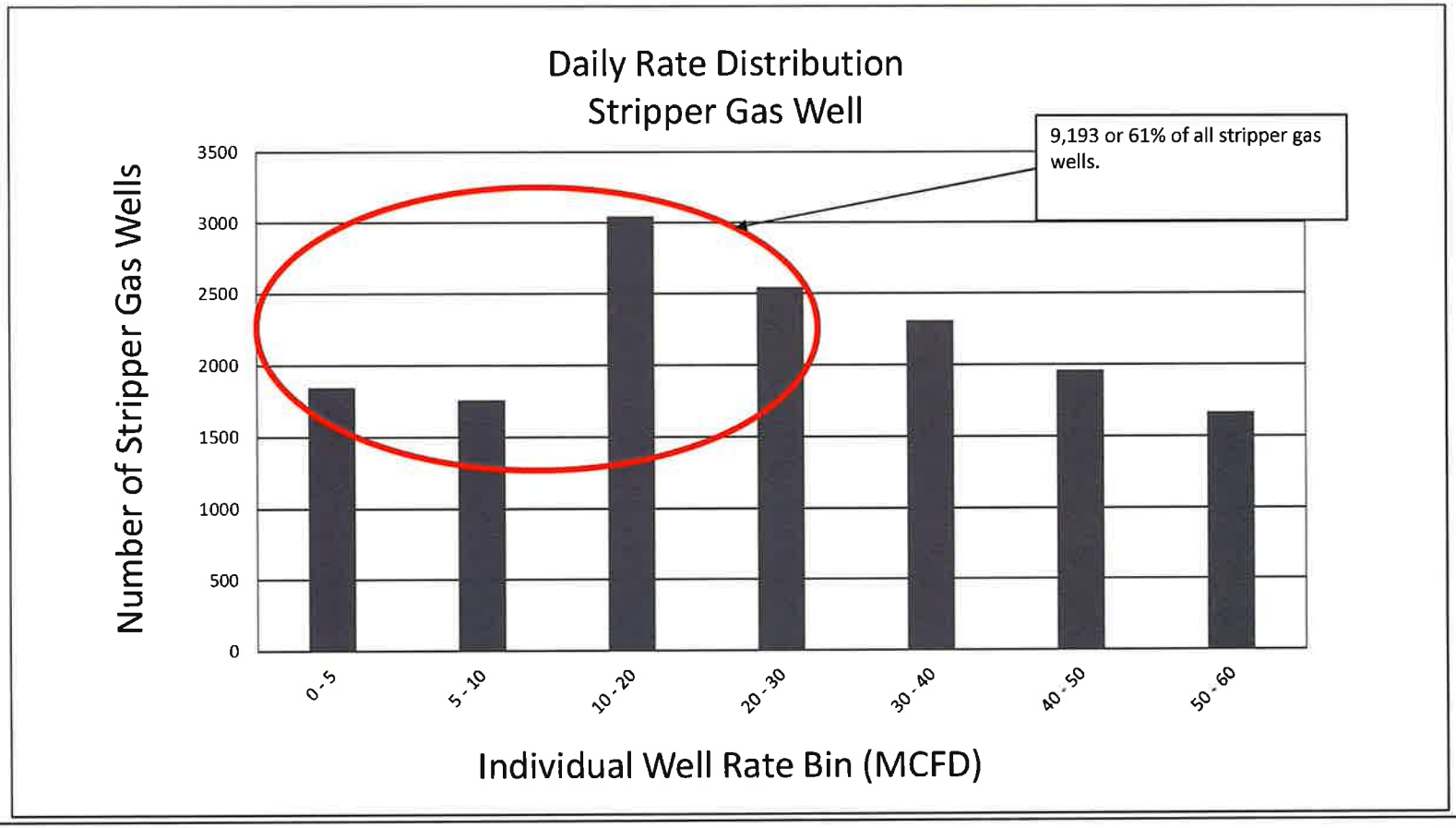
NMOGA

New Mexico Stripper Well Producing Rates



NMOGA

New Mexico Stripper Well Producing Rates



NMOGA

Operating New Mexico Oil and Gas Stripper Wells

Stripper wells represent a low decline rate, long lived, stable base of revenue for operators, earnings to employees, income to servicing firms, payments to royalty owners, and tax revenue to federal, state, and local governments.

- Of all actively producing wells in New Mexico, 25% are on state land and 52% are on federal land, therefore New Mexico receives royalties from 77% of all actively producing wells in the state.
- New Mexico receives severance tax revenue for all stripper wells which are located on state, federal, fee lands and tribal lands.
- For services performed on stripper wells, New Mexico receives gross receipts tax, as well as state income taxes collected on wages and salaries of those employed by the stripper well segment of the oil and gas industry, and those employed by the oil and gas service industry.

NMOGA

Operating New Mexico Oil and Gas Stripper Wells

Revenue is generated by stripper wells while operating at a reduced profit margin as compared to non-stripper wells.

- Stripper wells are usually well advanced in their productive life and have gone through cycles of divestment. Many are burdened beyond the original royalty rate, with a 25% total royalty burden not being uncommon. I have seen as high as 37.5%.

- When a 25% royalty burden is combined with the severance tax burden the operator receives revenue on approximately 69% of the products sold, with which to pay 100% of the cost of producing.

NMOGA

Operating New Mexico Oil and Gas Stripper Wells

Per the latest IOGCC Marginal Well Report, the economic impact caused by the loss of New Mexico marginal oil and gas production would be as follows:

	Direct Impact			Total Impact		
	Lost Output ($)	Earnings Lost ($)	Employment Lost	Lost Output ($)	Earnings Lost ($)	Employment Lost
Oil	616,982,858	137,525,479	1,895	892,527,402	236,392,546	4,411
Gas	364,123,420	81,163,110	1,118	526,740,939	139,511,270	2,603
Total	**981,106,278**	**218,688,589**	**3,013**	**1,419,268,341**	**375,903,816**	**7,014**

Data source: https://iogcc.ok.gov/publications

NMOGA

Yolanda Perez
P.O. Box 323 East Bernard, TX 77435
Work: (713) 497-2069

HIGHLIGHTS OF QUALIFICATIONS

44 years experienced regulatory expert, including 13 years in field operations, with track record of designing, implementing and overseeing regulatory processes in both large and small, public and private environments including:

- *Experienced with state and federal onshore regulatory in: TX, NM, OK, LA, CO, AR, KS, AL, FL, WY, and MI*
- *Has 22 years of experience working New Mexico regulatory issues*
- *Serve as NMOGA Regulatory Practices Co-chair advocating for oil and gas industry positions on existing and emerging regulatory NM issues*
- *Served as NMOGA representative on NMOCD Industry Advisory Group (2015-18)*
- *Served as member of the NM SLO Industry Advisory Committee (2016-18)*
- *Served as a member of the NMOCD & NMED Methane Advisory Panel (2019)*

Sr. Regulatory Affairs Consultant – Dec. 2014 – present
Occidental Oil and Gas Corporation, Houston, Texas

- Monitor regulatory developments, interpret impact, advocate and provide guidance on strategic direction and develop plans for implementation of existing and emerging State, and Federal regulations
- Develop and maintain working relationships with governmental agencies to build reputation for Occidental as a prudent operator

Regulatory Manager – 2011 to 2014
Quantum Resources Management, LLC, Houston, Texas

- Responsible for all oil and gas regulatory compliance and permitting for 5,500 operated wells in ten different state and federal jurisdictions
- Develop Regulatory processes to ensure compliance while quadrupling company size
- Achieved zero production loss due to regulatory interruption for three consecutive years
- Manage, recruited and developed a Regulatory Department from two persons to five
- Oversee selection and management of outside consultants and counsel
- Monitor regulatory developments, interpret impact, provide guidance on strategic direction and develop plans for implementation of existing and emerging State, Federal, Tribal, and Local regulations.
- Develop and maintain working relationships with governmental agencies to build reputation for Quantum as a prudent operator.
- Represent company on trade association committees including NM Oil & Gas Association and Texas Oil & Gas Association

Sr. Regulatory Advisor (final position) – 1998 to 2011
ConocoPhillips Company, Houston, Texas

- Managed Gulf Coast Business Unit Regulatory group
- Monitored regulatory developments, interpret impact, shape corporate position and provide guidance on strategic direction and develop plans for implementation of existing and emerging State, Federal, Tribal, and Local regulations and legislative issues.
- Develop and maintain working relationships with governmental agencies to maintain ConocoPhillips' excellent reputation as a prudent operator.
- Develop Regulatory processes and guidance documents to ensure compliance and provide training on same to all affected entities
- Served as Regulatory representative on internal project teams
- Served as TXOGA and NMOGA representative including Co-Chair for NMOGA Regulatory Practices Committee
- Worked cooperatively with other Eagle Ford Operators to develop current field rules

- Developed Regulatory process and documents on wetland permitting
- Worked closely with other Texas operators in drafting and developing House Bill 2259 and Statewide Rule 15 and the processes to comply with new inactive well requirements
- Lead the Lower 48 Regulatory Knowledge Network for ConocoPhillips.

E&P Specialist – 1993 to 1998
Unocal Corporation, Houston, Texas

- Responsibilities included: Regulatory permitting for Texas and Louisiana, maintaining production data base, maintained well work records, input AFE Data, prepared field expense and capital budgets, and maintained run tickets and meter maintenance records

Field Operator II – 1980 to 1993
Unocal Corporation, Ganado, Texas

- Responsibilities included gauging tanks, meter reading, well testing, preparing daily production reports, maintaining emergency shutdown systems, compressor and pump repairs, maintenance of separators and heater-treaters, and chemical inventory record keeping

Field Clerk – 1976 to 1980
Unocal Corporation, Ganado, Texas

- Responsibilities included daily and monthly production reports, RRC correspondence, processing of invoices and delivery tickets and maintaining run ticket records

EDUCATION & TRAINING

Attended Wharton Junior College studying Business
Graduated Ganado High School – Ganado, Texas
Trained on various E&P operations and economic systems
Microsoft programs experienced

Part 27 & 28 Vented & Flared Notification v. Part 29 Release Notification

Part 27.8.G.(1) Venting or flaring caused by an emergency, malfunction, or of long duration (C-129)	**Part 29.10 – Release Notification Reporting Requirements (C-141)**
(a) Notify if event >50 MCF and results from an emergency, malfunction, or lasts longer than 8 hours	
(a)(i) If event is 50 MCF but < 500 MCF notify district office by filing C-129 no later than 15 days following discovery or commencement	B. Minor releases (>50 MCF but <500 MCF) Notify district office within 15 days of discovery of the release by completing and filing form C-141
(a)(ii) If event >500 MCF provide district office within 24 hrs following discovery or commencement the information required by C-129 and file C-129 no later than 15 days following discovery or commencement	A. Major releases (>500 MCF) (1) Notify environmental bureau chief & district office within 24 of discovery & provide information required on C-141 (2) File -141 within 15 days of discovery
(a)(iii) No later than 15 days following the termination of the event file final C-129 with district office	

NMOGA Proposed C-129 Causes and Non-Transported C-115 Disposition Codes

Parts 27.8.G.(1)(b)(vii) and 27.8.G.(2)

Category	Vent Code	Flare Code
(a) emergency	A	E
(b) non-scheduled maintenance or malfunction	M	J
(c) routine repair and maintenance, including blowdown and depressurization	B	P
(d) insufficient availability or capacity in a natural gas gathering system during production operations	C	I
(e) natural gas that is not suitable for transportation or processing because concentration of impurities exceeds pipeline quality specifications	N	H
(f) venting or flaring in excess of eight hours that is caused by an emergency, unscheduled maintenance, or malfunction of a natural gas gathering system as defined in 19.15.28 NMAC	V*	F*
(g) delineation well	Q	D

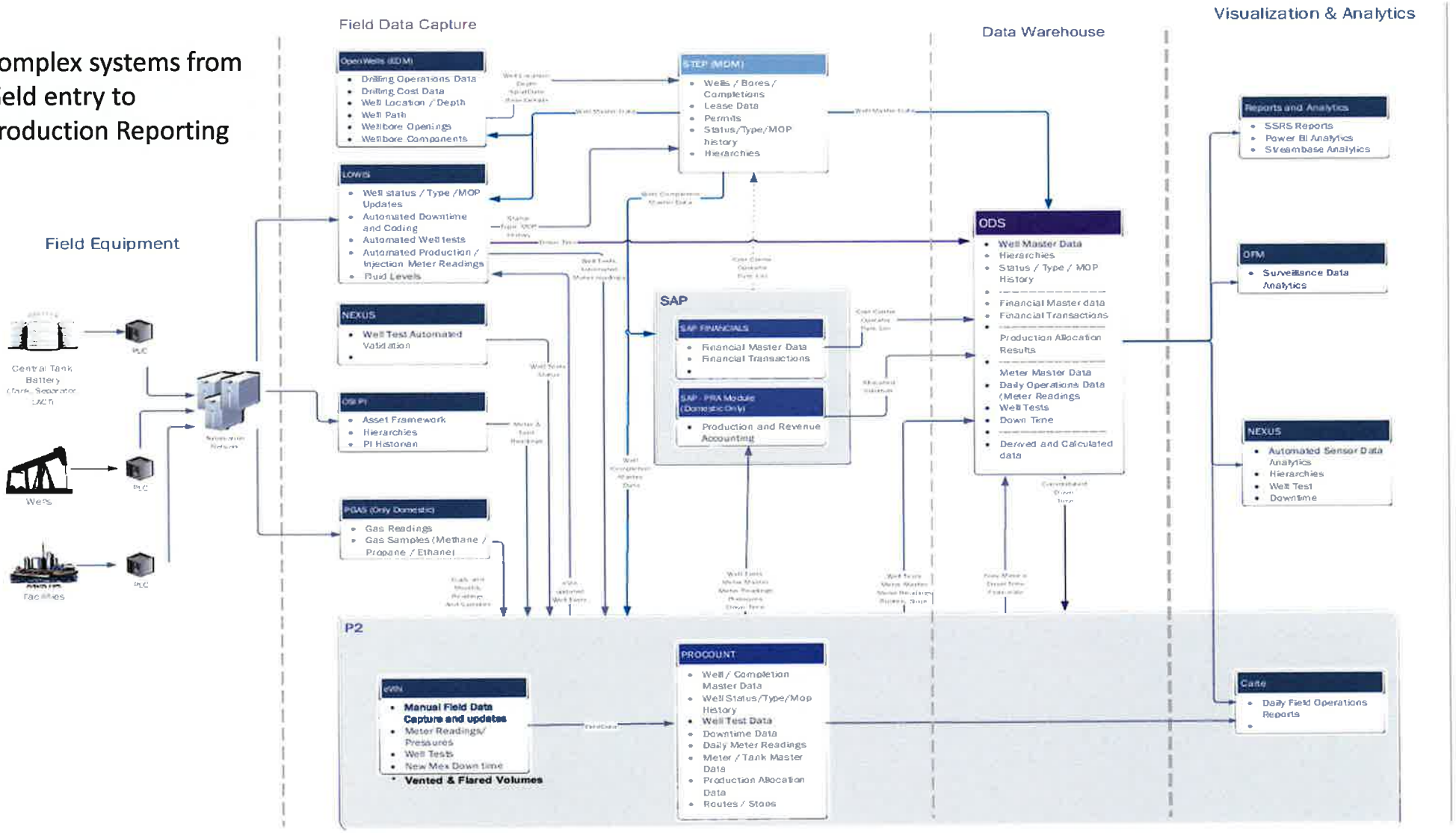
*Existing Non-transported Gas Disposition Code which complements current use on C-115

NMOGA

NMOGA's Enhanced C-129 & C-115 Reporting vs. Division's Proposed C-115B Parts 27.8.G.(1)(b) & 27.8.G.(2)

NMOGA Enhanced C-129	C-115 as proposed by NMOGA	C-115B - Duplicative
Report measured or estimated volumes	Report measured or estimated volumes	Report measured or estimated volumes
Cause and nature of venting or flaring by category	Report volumes by category	Report volumes by category
Report by event	Report monthly	Report monthly

Complex systems from Field entry to Production Reporting



NMOGA Part 27 & Part 28 Lost Gas and Gas Capture Percentage Formulas

19.15.27.8.G.(3)(a) & (b)
Lost Gas = Simply add: • Non-Scheduled maintenance and malfunction, • Routine repair and maintenance, • Insufficient availability or capacity, and • Excess of eight hours caused by emergency, unscheduled maintenance, or malfunction by natural gas gathering system. NMOGA believes summing categories that count against your gas capture is clear and simple.
Monthly Gas Capture % = (Produced gas – Lost gas)/ Produced Gas
19.15.27.9.B.
Annual Gas Capture % = (Produced gas – (Lost gas - **ALARM**))/ Produced Gas Alarm is credited for annual gas capture

19.15.28.8.F.(3)(a) & (b)
Lost Gas = Simply add: • Non-scheduled maintenance and malfunction, • Routine repair and maintenance, • Gathering pipeline blowdown and purging • Gathering pipeline pigging This follows the same clear and simple approach as Part 27.
Monthly Gas Capture % = (Total gas gathered – Lost gas)/Total gas gathered
19.15.28.10.G.B.
Annual Gas Capture % = (Total gas gathered – (Lost gas – **ALARM**))/Total gas gathered Alarm is credited for annual gas capture

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(405) 308 - 2290 • mike.smith@dvn.com

MICHAEL SMITH

EDUCATION

1998-2002 Juris Doctor
University of Oklahoma College of Law; Norman, Oklahoma

1994-1998 Bachelor of Science
Biology, Environmental Science, Natural Resources
Kansas State University; Manhattan, Kansas

EXPERIENCE

2015-Present **Devon Energy**
EHS Professional - Environmental Policy
Engage with internal and external stakeholders on corporate, state, and federal regulatory and environmental policy issues.

EHS Supervisor
Supervised the corporate group responsible for all air permitting, emission inventory, and greenhouse gas reporting activities in multiple states including New Mexico, Oklahoma, Texas, and Wyoming.

2011-2015 **Chaparral Energy**
Air Quality Manager
Developed and managed the Air Quality Department responsible for all air permitting, emission inventory, greenhouse gas reporting, and air compliance activities in multiple states including Oklahoma, Texas, New Mexico, Kansas, Louisiana, Arkansas, and Wyoming. Developed and implemented compliance strategies for various regulatory programs including NSPS JJJJ, OOOO, and NESHAP ZZZZ. Hired and managed staff and consultants charged with carrying out these activities. Worked with multiple departments throughout the company to achieve and maintain compliance and provided guidance to the company executive team for planning and budgeting.

2008-2011 **DCP Midstream, LP**
Environmental Specialist IV
Worked within the DCP Midstream Air Permitting Group. Responsible for permitting more than 200 facilities in Oklahoma, Kansas, and Michigan, including PSD, Title V, and minor source permitting. Worked closely with management and workgroup leaders to evaluate and implement new and changing environmental regulations. Responsible for completing the annual air emission inventory for Oklahoma and Michigan.

2006-2008 **StanTech Environmental Services**
Air Quality Program Manager
Provided air quality consulting services, primarily for Oklahoma oil

and gas facilities. Responsible for managing and coordinating air projects including: PSD, Title V, and minor source permitting; NSPS and NESHAP compliance auditing and applicability; Annual Emission Inventory; Spill and Release Reporting; Applicability Determinations; Leak Detection and Repair (LDAR) programs; Regulatory compliance; Supplemental Environmental Projects; Due diligence and legal research. Corresponded with state and federal agencies including the Oklahoma Department of Environmental Quality and EPA Region VI.

2002-2006 **Oklahoma Department of Environmental Quality**

Air Quality Compliance and Enforcement Section

As an Air Quality Compliance and Enforcement Section Inspector for the Oklahoma Department of Environmental Quality, worked closely with oil and gas and other industries on a variety of air quality compliance and permitting issues, including Title V, NESHAP, and NSPS requirements. Conducted air quality compliance inspections at many Oklahoma facilities, including refineries, natural gas processing plants and compressor stations. Prepared technical reports and legal documents, and provided technical review of inspection and enforcement-related documents. Reviewed Title V annual and semi-annual compliance certifications, NESHAP and NSPS periodic reports, compliance plans, test results, and monitoring data submitted to ODEQ.

The Division Should Avoid Redundant or Conflicting Regulation

"EMNRD and NMED shall jointly develop a statewide, enforceable regulatory framework to secure reductions in oil and gas sector methane emissions and to prevent waste from new and existing sources and enact such rules as soon as practicable."

- Governor Michelle Lujan Grisham

STATE OF NEW MEXICO
Environment Department

MICHELLE LUJAN GRISHAM, GOVERNOR
James C. Kenney, Cabinet Secretary
Jennifer J. Pruett, Deputy Secretary

The Environment Department's mission is to protect and restore the environment and to foster a healthy and prosperous New Mexico for present and future generations.

NEWS RELEASE
For Immediate Release
July 20, 2020

Contact: Maddy Hayden, Communications Director
New Mexico Environment Department
505.231.8800 | maddy.hayden@state.nm.us

Environment Department releases draft ozone precursor emissions rules for public comment
Rules will reduce VOCs, NOx, methane emissions

NMED and the Energy, Minerals and Natural Resources Department (EMNRD), which also released draft rules today, worked closely together throughout the process to ensure the draft rules are complementary and do not result in redundant or conflicting requirements.

NMOGA

Removal of reporting categories: (d), (e), (f), (i), and (j) from 19.15.27.8(G)(2); (g), (h), and (i) from 19.15.28.8(F)(2)

Routine Downhole Maintenance - 27.8(G)(2)(d)

- Downhole maintenance, including operation of workover rigs, swabbing rigs, coiled tubing units and similar specialty equipment, is necessary in order to maintain production and avoid early abandonment of the well
  - Pressure must be relieved to ensure the well can be worked on safely
- Accurate direct measurement is difficult or infeasible and can result in backpressure that will impede the process of unloading or blowing down a well
- The volumes are not recoverable or saleable
- Estimated greenhouse emissions are reported to the EPA per 40 CFR Part 98, Subpart W
  - Assumptions in the calculation methodology may result in an overestimation of emissions
  - Volumes derived from these calculation methodologies will not reflect the actual volume of natural gas released and would not be appropriate for the purposes of production accounting and reporting
  - The New Mexico Environment Department is conducting an emission inventory per 20.2.73.300 NMAC, including greenhouse gas emissions if the parent company is required to report to EPA
- The New Mexico Environment Department is proposing standards for workovers in 20.2.50.24 NMAC, including best management practices to minimize emissions, consistent with well site conditions and good engineering practices

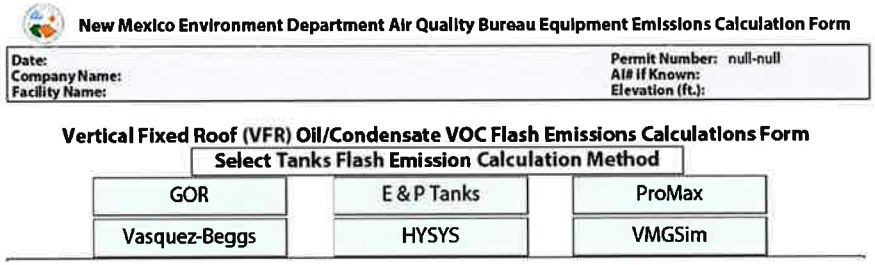
NMOGA

Manual Liquid Unloading - 27.8(G)(2)(e)

- When the accumulation of liquid results in the slowing or cessation of gas production, removal of fluids (i.e., liquids unloading) is necessary in order to maintain production
- Accurate direct measurement is difficult or infeasible and can result in backpressure that will impede the process of unloading a well
- The volumes are not recoverable or saleable
- Estimated greenhouse emissions are reported to the EPA per 40 CFR Part 98, Subpart W
  - Assumptions in the calculation methodology may result in an overestimation of emissions
  - Volumes derived from these calculation methodologies will not reflect the actual volume of natural gas released and would not be appropriate for the purposes of production accounting an reporting
  - The New Mexico Environment Department is conducting an emission inventory per 20.2.73.300 NMAC, including greenhouse gas emissions if the parent company is required to report to EPA
- The New Mexico Environment Department is proposing standards for liquids unloading in 20.2.50.17 NMAC, including best management practices to minimize emissions, consistent with well site conditions and good engineering practices

Uncontrolled Storage Tanks - 27.8(G)(2)(f), 28.8(F)(2)(g)

- Storage tanks that are not required to route working, breathing, and flashing vapors to a control device release low volumes that are generally below the minimum requirements of available capture and destruction technology
- The vapors that exist at these tanks result from very low production volumes where all the natural gas that is economically recoverable has been recovered
- Volumes derived from these calculation methodologies will not reflect the actual volume of natural gas released and would not be appropriate for the purposes of production accounting reporting
  - Owners and operators of these tanks evaluate and, if necessary, properly authorize these emissions with the New Mexico Environment Department
  - Multiple acceptable calculation methodologies exist to estimate the emissions from storage tanks that do not require emission controls

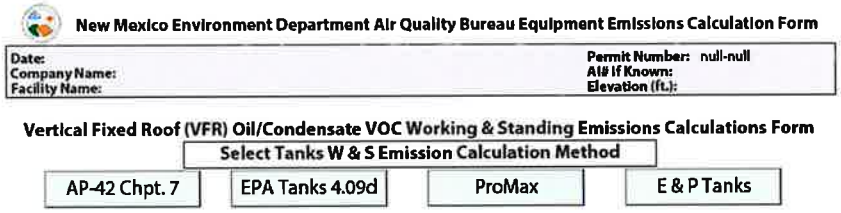

New Mexico Environment Department Air Quality Bureau Equipment Emissions Calculation Form

Date:
Company Name:
Facility Name:
Permit Number: null-null
AI# if Known:
Elevation (ft.):

Vertical Fixed Roof (VFR) Oil/Condensate VOC Flash Emissions Calculations Form

Select Tanks Flash Emission Calculation Method

GOR	E & P Tanks	ProMax
Vasquez-Beggs	HYSYS	VMGSim


New Mexico Environment Department Air Quality Bureau Equipment Emissions Calculation Form

Date:
Company Name:
Facility Name:
Permit Number: null-null
AI# if Known:
Elevation (ft.):

Vertical Fixed Roof (VFR) Oil/Condensate VOC Working & Standing Emissions Calculations Form

Select Tanks W & S Emission Calculation Method

AP-42 Chpt. 7	EPA Tanks 4.09d	ProMax	E & P Tanks

- The New Mexico Environment Department is conducting an emission inventory per 20.2.73.300 NMAC, which will include the estimated emissions from storage tanks that do not require emission controls

Pneumatic Controllers and Pumps - 27.8(G)(2)(i), 28.8(F)(2)(h)

- Pneumatic devices are used throughout the oil and natural gas industry as part of the instrumentation to control the position of valves (controllers), and used to inject chemicals into the wellbore, to circulate glycol in cold climates/weather and to move liquids from one place to another (pumps)
  - Natural gas driven pneumatic devices emit natural gas as part of their normal operation and provide a beneficial use
- Direct measurement of natural gas pneumatic controllers is not feasible in most cases, and direct capture may inhibit the controller's ability to function
- Estimated emissions from natural gas pneumatic controllers and pumps are reported to the EPA per 40 CFR Part 98, Subpart W
  - The NMED is conducting an emission inventory per 20.2.73.300 NMAC, including greenhouse gas emissions if the parent company is required to report to EPA
  - Volumes derived from these calculation methodologies will not reflect the actual volume of natural gas released and would not be appropriate for the purposes of production accounting and reporting
  - Studies have shown a wide range of emission factors
- Regulation of Pneumatic controllers and pumps:
  - 40 CFR Part 60, Subparts OOOO/OOOOa restricts the use of high bleed pneumatic controllers after August 2011
  - As per 40 CFR Part 60, Subpart OOOOa, wellsite pneumatic pumps must control natural gas emissions by 95% if a control device or process is on site and it is feasible to tie in the pump emissions
  - The NMED is proposing standards for all new and existing natural gas-driven pneumatic controllers and pumps located at wellhead sites, tank batteries, gathering and boosting sites, natural gas processing plants, and transmission compressor stations in 20.2.50.22 NMAC.

NMOGA

Pneumatic Controllers and Pumps - 27.8(G)(2)(i), 28.8(F)(2)(h)

- Field studies have shown a wide range of emission factors

Study Name	# PC Samples	Application	Duration of Measurement	Whole gas (avg ER) (scf/hr)
EDF/UTexas 2014	377	Well pads natural gas production, several U.S. basins	15 minutes	5.7
EPA – Thoma Utah Study 2016	80	Unitah Basin well pads, oil and gas production	1 hour or more	0.36
Oklahoma Independent Producers Association	680	Oil and gas production in Oklahoma	NA	1.05 (calc)
Prasino 2013	601	British Columbia oil and gas sites, measured high bleeds only	30 minutes	8.7 – 9.2

NMOGA

Improperly Closed/Maintained Thief Hatches - 27.8(G)(2)(j), 28.8(F)(2)(i)

- Where working, breathing, and flashing vapors are routed to a flare by design, the natural gas that is deemed economically recoverable has been recovered
  - These same vapors that escape due to an improperly closed or maintained thief hatch are not economically recoverable and therefore not a waste
- Were vapors are routed for capture rather than combustion by design, engineering estimates required to determine the potential volume of vapors released in these situations will not produce results appropriate for production accounting purposes
  - Generally accepted calculation methodologies are not appropriate for short duration event level estimations due to inherent operational complexity and would produce an estimate that is conservatively high
- Owners and operators of storage tanks that are required to route working, breathing, and flashing vapors to a control device have evaluated these tanks for applicability and compliance with 40 CFR Part 60, Subpart OOOOa and, if necessary, properly authorized these emissions with the NMED
  - The NMED is conducting an emission inventory per 20.2.73.300 NMAC, including greenhouse gas emissions if the parent company is required to report to EPA
  - A leak from a thief hatch would be identified and corrected through an EPA leak detection and repair program

NMOGA