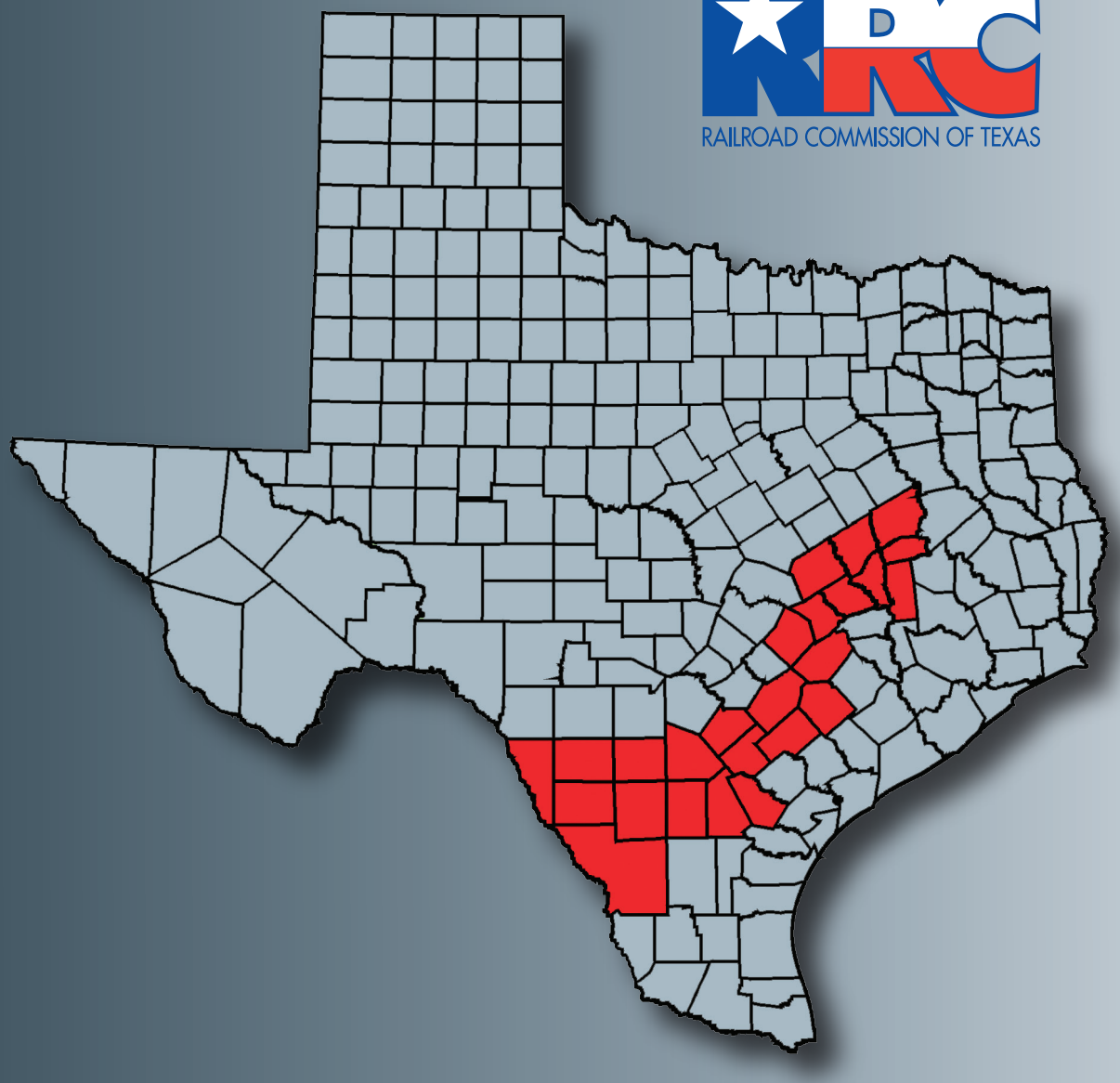
EAGLE FORD SHALE TASK FORCE REPORT

RAILROAD COMMISSION OF TEXAS

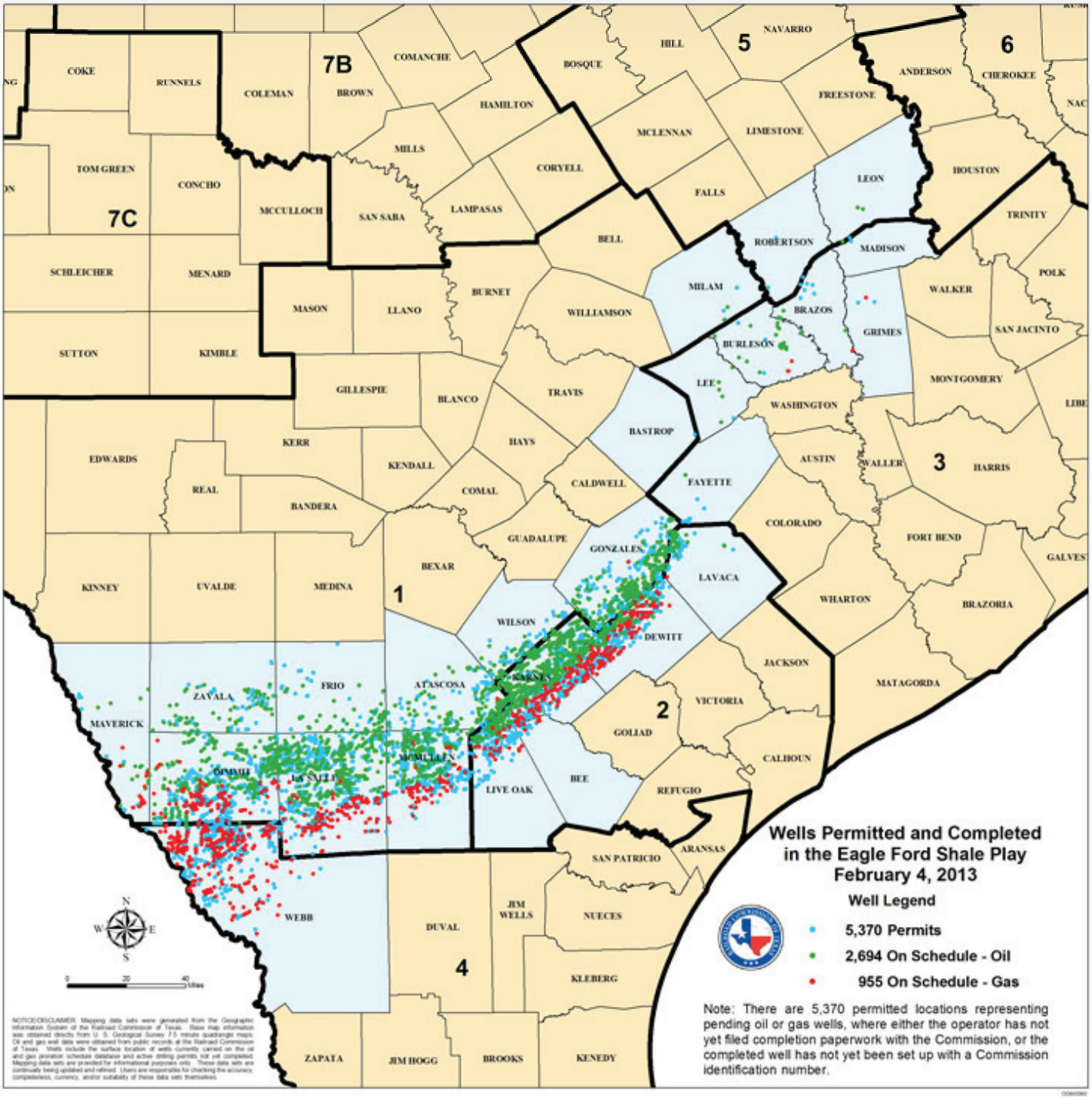


CONVENED AND CHAIRED BY
RAILROAD COMMISSIONER
DAVID PORTER

MARCH 2013

RAILROAD COMMISSION OF TEXAS

EAGLE FORD SHALE



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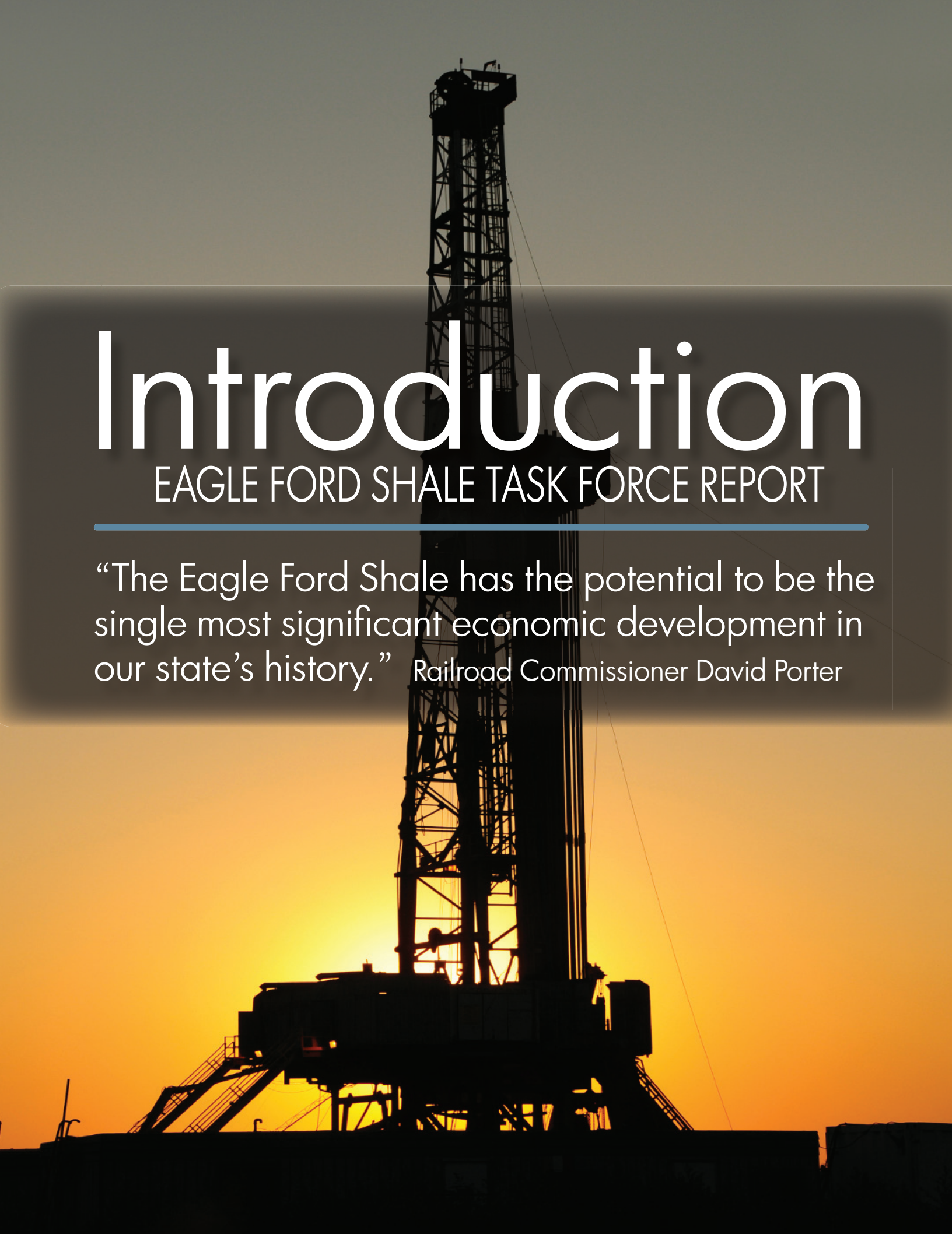


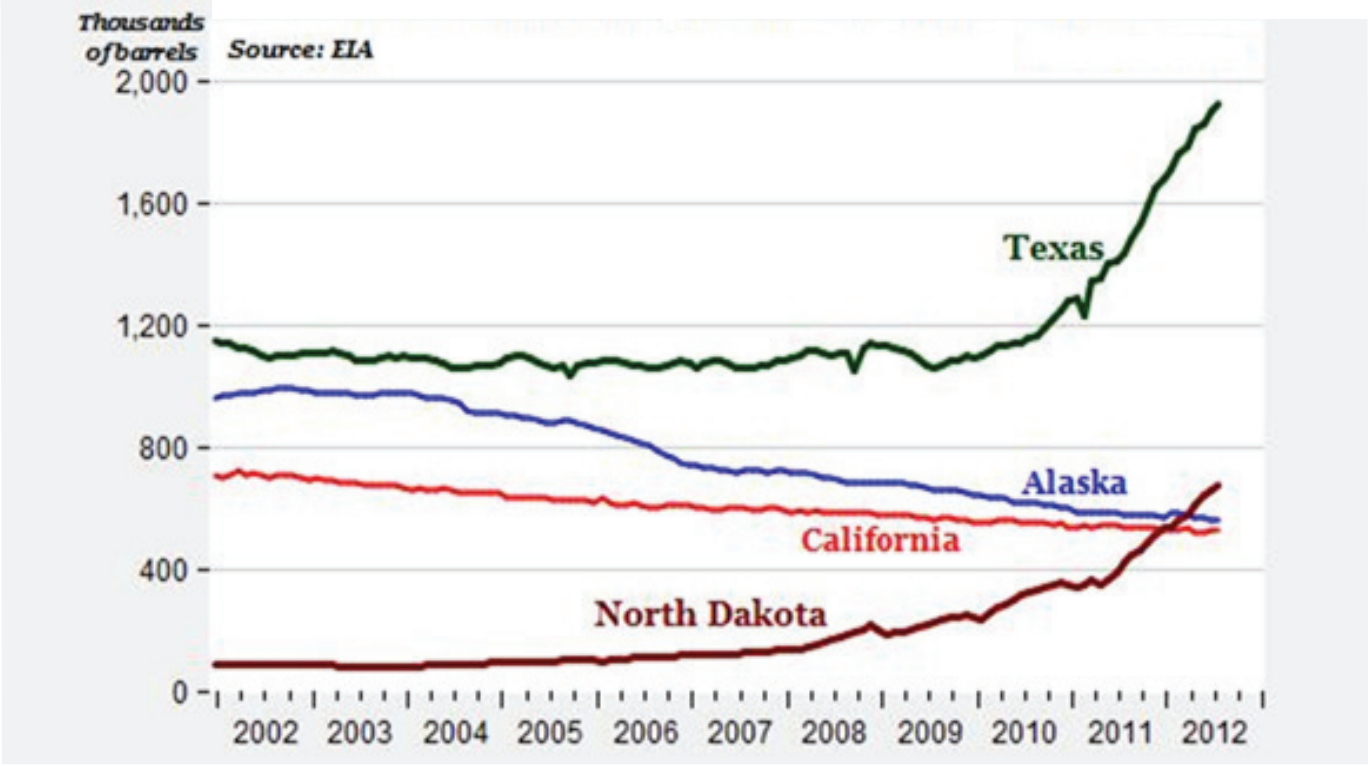
Introduction

EAGLE FORD SHALE TASK FORCE REPORT

"The Eagle Ford Shale has the potential to be the single most significant economic development in our state's history." Railroad Commissioner David Porter

The shale revolution is sweeping the country and revolutionizing energy and the economy, with Texas and the Eagle Ford Shale leading the way. Texas is the nation's top oil and natural gas producing state and leads the country in energy technology and policy. The state is home to a number of prolific oil and gas plays, including the Eagle Ford Shale, Permian Basin, Barnett Shale, Haynesville/Bossier Shale, and Granite Wash. The Eagle Ford Shale has the potential to become the most active oil and gas play in North America, with approximately 235 drilling rigs currently running.[1] Operators forecast that the play will continue to develop for decades to come.

Daily Oil Production in the Top 4 U.S. Oil-Producing States 2002-2012



Source: Data from U.S. Energy Information Administration/Graphic by the American Enterprise Institute (October 28, 2012)

The Railroad Commission ("Commission") regulates the exploration and production of oil and gas in Texas. For more than 120 years, the Commission has played a critical role in the establishment of Texas as an international energy leader. In 2011, the Commission led the way in transparency by formally adopting the Hydraulic Fracturing Chemical Disclosure Rule, one of the nation's first and most comprehensive rules of its kind, requiring operators to report the type and amount of fluids used to hydraulically fracture wells on a national public website.[2] The Commission continues to review its policies and rules to ensure that they account for current

1 Baker Hughes Rig Count. 2012 Baker Hughes Rotary Rig Count. Retrieved from http://investor.shareholder.com/bhi/rig_counts/rc_index.cfm

2 Tex. Nat. Resources Code § 91.851 (Vernon 2011). (The rule implemented forward-looking legislation enacted by the Texas Legislature in 2011.)

technologies and environmental and safety needs in a manner that is efficient and consistent with sound market principles.

These are the Commission's primary responsibilities relative to oil and gas:

1. Prevent waste of oil and gas resources.
2. Protect surface and subsurface water from contamination by oilfield operations.
3. Ensure that all mineral interest owners have an opportunity to recover their fair share of the minerals underlying their property.
4. Ensure that gas utility rates and service are reasonable and non-discriminatory.

The shale revolution is sweeping the country and revolutionizing energy and the economy, with Texas and the Eagle Ford Shale leading the way.

In performing its responsibilities, the Commission oversees the following:

1. All aspects of oil and natural gas drilling and production, including issuing permits, monitoring, and inspecting oil and gas operations
2. Coal and uranium exploration, surface mining, and reclamation, and issues permits for such operations
3. Natural gas and hazardous liquids intrastate pipelines to ensure the safety of the public and integrity of the environment
4. Gas utility rates and service
5. Propane safety and licenses all propane distributors

The Commission no longer has any jurisdiction or authority over railroads, a duty that was transferred to the Texas Department of Transportation in 2005. Moreover, the Commission does not have jurisdiction over roads, traffic, noise, odors, oil and gas leases, pipeline easements, or royalty payments.

The Commission is led by three statewide elected officials who serve staggered, six-year terms. The current Commissioners are Chairman Barry T. Smitherman, Commissioner David Porter, and Commissioner Christi Craddick. The Commission employs approximately 700 staff, 41 percent of whom are in the Commission's district offices, also referred to as field offices. The field staff performs inspections of oil, natural gas, and pipeline operations. (See Appendix A.1 for Commission Organization Chart.)

The productivity of the Eagle Ford Shale in South Texas has been unlocked over the past four years with the application of improved horizontal drilling and hydraulic fracturing techniques, first honed by producers in the Barnett Shale. Upon launching the Eagle Ford Shale Task Force ("Task Force") in 2011, Commissioner

David Porter observed, "The Eagle Ford Shale has the potential to be the single most significant economic development in our state's history."[3] Experts' projections confirm Porter's prediction, with capital expenditure in the Eagle Ford Shale expected to reach nearly $30 billion in 2013.[4]

In 2011, the Eagle Ford Shale supported almost 50,000 full-time jobs in 20 counties and contributed over $25 billion dollars to the South Texas economy.[5] From 2011 to 2013, daily hydrocarbon liquid production, including natural gas liquids, increased from 100,000 to 700,000 barrels per day.[6] These developments have made South Texas one of the most prominent energy producing regions in the United States.

OIL PRODUCTION
Eagle Ford Shale - Annual Growth

	B/D	Growth
2008	358	
2009	844	136%
2010	11,986	1,320%
2011	126,459	955%
2012	338,911	168%

GAS PRODUCTION
Eagle Ford Shale - Annual Growth

	MMCF/D	Growth
2008	8	
2009	47	487%
2010	216	360%
2011	959	344%
2012	964	0.5%

CONDENSATE PRODUCTION
Eagle Ford Shale - Annual Growth

	B/D	Growth
2009	1,423	
2010	13,708	863%
2011	70,934	417%
2012	72,126	1.6%

DRILLING PERMITS
Eagle Ford Shale - Annual Growth

	Permits	Growth
2008	26	
2009	94	261%
2010	1,010	974%
2011	2,826	180%
2012	4,145	46%

PRODUCING OIL WELLS
Eagle Ford Shale - Annual Growth

	Wells	Growth
2009	40	
2010	72	80%
2011	368	411%
2012	1,262	243%

PRODUCING GAS WELLS
Eagle Ford Shale - Annual Growth

	Wells	Growth
2008	67	
2009	158	136%
2010	550	248%
2011	855	55%

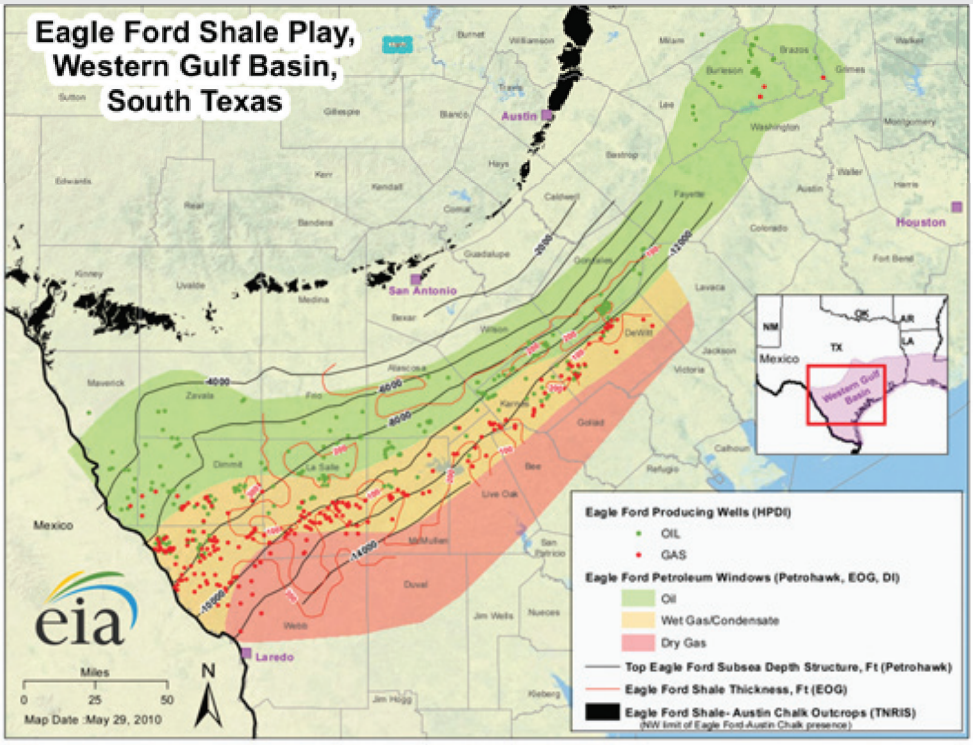
The Eagle Ford Shale takes its name from the town of Eagle Ford, Texas, approximately six miles west of Dallas, where the shale outcrops at the surface as clay soil. The wells in the deeper part of the play produce a dry gas, but moving northeastward

3 Porter, D. (2011, July 27). Stated at the Eagle Ford Shale Task Force introduction and agenda-setting meeting, San Antonio, Texas.

4 McMahon, C. (2012, December 6). Wood Mackenzie: Total Eagle Ford capital expenditure to reach US $28 billion in 2013. Wood Mackenzie. Retrieved from http://www.woodmacresearch.com/cgi-bin/wmprod/portal/corp/corpPressDetail.jsp?oid=10950029

5 Center for Community and Business Research, Institute for Economic Development. (2012, May). Economic impact of the Eagle Ford Shale. San Antonio, TX: The University of Texas at San Antonio, p. 4-5. Retrieved from http://ccbr.iedtexas.org/index.php/Download-document/52-Eagle-Ford-Shale-Final-Report-May-2012.html

6 McMahon, C. (2012). Wood Mackenzie: Total Eagle Ford capital expenditure to reach us$28 billion in 2013. In (Press Release: Energy). Wood Mackenzie. Retrieved from http://www.woodmacresearch.com/cgi-bin/wmprod/portal/corp/corpPressDetail.jsp?oid=10950029



Source: U.S. Energy Information Administration (May 29, 2010)

out of Commission District 1 and updip, the wells produce more liquids. The core counties include an area that stretches from north of Gonzales County west-southwest to Webb County at the Texas-Mexico border. Eagle Ford Shale wells have been tested in Mexico, but results have not been widely reported.

The Eagle Ford Shale contains a high carbonate shale percentage, as high as 70 percent in South Texas. Moving northwest, the formation depth decreases and the shale content increases. The high percentage of carbonate makes the play more brittle and "fracable." The play trends across at least 23 Texas counties, from the Mexican border to East Texas. It is roughly 50 miles wide and 400 miles long, with an average thickness of 250 feet. Cretaceous in age (66 million to 145 million years old), it lies between the Austin Chalk and the Buda Lime at a depth of approximately 4,000 to 14,000 feet. It is the source rock for the Austin Chalk oil and gas producing formation and the massive East Texas Field. The name has often been misspelled as "Eagleford."

The success of the Eagle Ford Shale is primarily due to its greater productivity of both oil and gas, as compared to other traditional shale plays. Oil revenues and petroleum liquid production (i.e., oil, condensate, and natural gas liquids such as ethane, propane, and butane) across the play support economic development, even when natural gas prices are relatively low.

Average General Properties for the Eagle Ford Shale Play

Depth (ft)	7,000
Thickness (ft)	200
Porosity (%)	9
Total Organic Content (% wt)	4.25

Source: U.S. Energy Information Administration, "Review of Emerging Resources: U.S. Shale Gas and Shale Oil Plays" (July 2011)

The Eagle Ford Shale has the potential to become the most active oil and gas play in North America, with approximately 235 drilling rigs currently running.

Over the past four years, the production of oil, gas, and petroleum liquids in the Eagle Ford Shale has accelerated at a record pace, although the growth in natural gas production has been deleteriously affected by lower natural gas prices. Correspondingly, the volume of drilling permits issued by the Commission and the number of oil and gas wells in the region have surged to previously unseen levels.

Petrohawk Energy drilled the first of the Eagle Ford wells in 2008, discovering in the process the Hawkville (Eagle Ford) Field in La Salle County (Commission District 1). The discovery well flowed at a rate of 7.6 million cubic feet of gas per day from a 3,200-foot lateral (first perforation was at 11,141 feet total vertical depth) with 10 fracture stages. Originally there were over 30 fields. Due to field consolidations, the current number of fields has been reduced to 21 active fields located within Commission Districts 1 through 6. The two largest fields, the Eagleville (Eagle Ford-1) in District 1 and the Eagleville (Eagle Ford-2) in District 2, contain only oil wells. Many of the larger Eagle Ford Shale fields are governed by a number of special rules.

Currently, these are the top 20 operators for oil production in the Eagle Ford Shale from largest to smallest:[7]

1. EOG Resources
2. Burlington Resources (a unit of ConocoPhillips)
3. Chesapeake Energy
4. GeoSouthern Energy
5. Anadarko
6. Plains Exploration & Production
7. EP Energy
8. Marathon Oil
9. Murphy Oil
10. Pioneer Natural Resources
11. Carrizo Oil & Gas
12. Goodrich Petroleum
13. Penn Virginia Corporation
14. Hilcorp Energy
15. Petrohawk Energy (a unit of BHP Billiton)
16. Comstock Oil & Gas
17. Rosetta Resources
18. Cabot Oil & Gas
19. Newfield Exploration
20. Matador Resources

7 Railroad Commission Production Data-Query (02/25/2013)

Currently, these are the top 20 operators for gas production in the Eagle Ford Shale from largest to smallest:[8]

1. Anadarko
2. Petrohawk Energy (a unit of BHP Billiton)
3. Burlington Resources (a unit of ConocoPhillips)
4. EOG Resources
5. GeoSouthern Energy
6. Chesapeake Energy
7. SM Energy
8. Rosetta Resources
9. Lewis Energy
10. Pioneer Natural Resources
11. Swift Energy
12. EP Energy
13. Plains Exploration & Production
14. XTO Energy
15. Marathon Oil
16. Talisman Energy
17. Paloma Resources
18. Hilcorp Energy
19. Murphy Oil
20. Carrizo Oil & Gas

EAGLE FORD SHALE TASK FORCE

Railroad Commissioner David Porter took office in 2011 believing that many of the divisive and challenging issues that arose during the development of the Barnett Shale could have been alleviated if the local communities and other involved parties had a forum for open and constructive dialogue. To ensure that development in the Eagle Ford Shale is not hindered by a lack of communication, Commissioner Porter formed the 24-member Task Force, assembling a group of stakeholders from various interests and areas of expertise. He has led the Task Force with a belief in the importance of protecting the health and safety of Texans and properly managing the state's precious natural resources, while encouraging the oil and gas industry to efficiently and economically produce the energy needed to support the Texas and U.S. economies.

The Task Force is comprised of a diverse group of community leaders, local elected officials, water representatives, environmental groups, oil and gas producers, pipeline companies, oil services companies (including a hydraulic fracturing company, a trucking company, and a water resources management company), landowners, mineral owners, and royalty owners.

Commissioner Porter has led the Task Force with a belief in the importance of protecting the health and safety of Texans and properly managing the state's precious natural resources, while encouraging the oil and gas industry to efficiently and economically produce the energy needed to support the Texas and U.S. economies.

8 Ibid.

These are the Task Force members, in alphabetical order:

- **Greg Brazaitis**
  Energy Transfer, Chief Compliance Officer, Houston
- **The Honorable Jaime Canales**
  Webb County Commissioner, Precinct 4, Laredo
- **Teresa Carrillo**
  Sierra Club, Executive Committee Member, Lone Star Chapter, Treasurer, Coastal Bend Sierra, Corpus Christi
- **James E. Craddock**
  Rosetta Resources, Senior Vice President, Drilling and Production Operations, Houston
- **Steve Ellis**
  EOG Resources, Senior Division Counsel, Corpus Christi
- **The Honorable Daryl Fowler**
  DeWitt County Judge, Cuero
- **Brian Frederick**
  DCP Midstream, Senior Vice President, Southern Region, Houston
- **Anna Galo**
  ANB Cattle Company, Vice President, Laredo
- **The Honorable Jim Huff**
  Live Oak County Judge, George West
- **Stephen Ingram**
  Halliburton, Technology Manager, Houston Business Development & Onshore South Texas, Houston
- **Mike Mahoney**
  Evergreen Underground Water Conservation District, General Manager, Pleasanton
- **Leodoro Martinez**
  Middle Rio Grande Development Council, Executive Director, Cotulla
- **James Max Moudy**
  MWH Global, Inc., Senior Client Service Manager, Houston
- **Terry Retzloff**
  TR Measurement Witnessing, LLC, Founder, Campbellton
- **Trey Scott**
  Trinity Mineral Management, LTD, Founder, San Antonio
- **Paula Seydel**
  Dimmit County Chamber of Commerce, Carrizo Springs
- **The Honorable Barbara Shaw**
  Karnes County Judge, Karnes City
- **Mary Beth Simmons**
  Shell Exploration and Production Company, Senior Staff Reservoir Engineer, Houston
- **Kirk Spilman**
  Marathon Oil, Regional Vice President-Eagle Ford
- **Susan Spratlen**
  Pioneer Natural Resources, Vice President, Sustainability & Communication, Dallas
- **Glynis Strause**
  Conoco Phillips, Community Relations Advisor for the Eagle Ford Shale, and former Dean of Institutional Advancement, Coastal Bend College, Beeville
- **Chris Winland**
  Good Company Associates, Associate; The University of Texas at San Antonio, Assistant Director, San Antonio Clean Energy Incubator, Austin/San Antonio
- **Paul Woodard**
  J&M Premier Services, President, Palestine
- **Erasmo Yarrito, Jr.**
  Texas Commission on Environmental Quality, Rio Grande Watermaster, Harlingen

The Task Force established its three major priorities at its first monthly meeting, held at Luciano's on the River in San Antonio on July 27, 2011:

(1) Open the lines of communications among all parties
(2) Provide recommendations and advisements for developing the Eagle Ford Shale in a responsible manner
(3) Promote the economic benefits of the Eagle Ford Shale locally and statewide

The Task Force met 10 times from July 2011 to November 2012 to study the following issues:

- Workforce Development
- Infrastructure – Roads, Pipelines, Housing
- Water Quality and Quantity
- Railroad Commission Regulations
- Economic Benefits
- Flaring and Air Emissions
- Health, Education, and Social Services
- Landowner, Mineral Owner, and Royalty Owner Issues

Chapters reporting on each of these topics follow.

1 WORKFORCE DEVELOPMENT

In 2011, when the nation's unemployment rate was above nine percent, South Texas was generating a windfall of high-paying jobs — and the oil and gas industry's demand for skilled labor in the Eagle Ford Shale will remain strong.

Eagle Ford Shale production has far surpassed previous growth projections. Consequently, job openings directly and indirectly related to the oil and gas industry have exceeded all forecasts. The challenge facing the prolific Eagle Ford Shale is clear: How do we maintain the manpower needed to supply the growing shale play, and how do we ready the local workforce to take advantage of the near limitless job opportunities presented by the play?

In 2011, the Eagle Ford Shale supported 38,000 full-time jobs in its core 14 counties: Atascosa, Bee, DeWitt, Dimmitt, Frio, Gonzales, Karnes, La Salle, Live Oak, Maverick, McMullen, Webb, Wilson, and Zavala.[1] That year, the average income of an oil and gas industry job was $117,000, an 18 percent increase from 2010.[2] At a time when the nation's unemployment rate was above nine percent,[3] South Texas was generating a windfall of high-paying jobs. However, the oil and gas industry is grappling with an acute shortage of well-trained, experienced labor in the region. The existing workforce has a finite capacity to meet industry needs.[4]

> "Strategic alliances among industry, community colleges, universities, and non-profits are essential for supplying an adequately trained workforce in the Eagle Ford Shale."
> (Glynis Strause, Eagle Ford Shale Task Force member and Community Relations Advisor for the Eagle Ford Shale, Conoco Phillips; Former Dean of Institutional Advancement, Coastal Bend College)

OIL AND GAS AVERAGE SALARIES

Geologist	$161,000
Geophysicist	184,000
Engineering Technician	91,000
Geological Technician	89,000
Petrophysicist	176,000
Landman	131,000
Land Technicians	72,000

Source: Fuel Fix, "Salaries Surging in Oil and Gas Industry" June 2012

1 Center for Community and Business Research, Institute for Economic Development. (2012, May). Economic impact of the Eagle Ford Shale. San Antonio, TX: The University of Texas at San Antonio, p. 4. Retrieved from http://ccbr.iedtexas.org/index.php/Download-document/52-Eagle-Ford-Shale-Final-Report-May-2012.html

2 Wood, R. (2012, April 18). Stated at the Eagle Ford Shale Task Force meeting on economic benefits, Gonzales, Texas.

3 Hall, K. (2011, August 5). Statement of Keith Hall, Commissioner, Bureau of Labor Statistics before the Joint Economic Committee, United States Congress. U.S. Department of Labor, Bureau of Labor Statistics. Retrieved from http://www.bls.gov/news.release/archives/jec_08052011.pdf

4 Spilman, K. (2011, August 24). Stated at the Eagle Ford Shale Task Force meeting on workforce development, Beeville, Texas.

The Eagle Ford Shale play encompasses a 20,000 square mile landmass that is primarily comprised of sparsely populated rural communities.[5] In 2008, the entire region had less than one million inhabitants,[6] and a very small minority among this modest population possesses oil and gas industry experience or relevant formal education. The Center for Urban and Regional Planning Research ("CURPR") at The University of Texas at San Antonio ("UTSA") confirms that, "… jobs created in the Eagle Ford Shale area require higher skills and education than the average skill-level currently found in the area."[7]

Population and Working-Age by County in 2000

County	Population	Population under 20 years	Population 20-64 years	Population 64 years and over
Dimmit	9,996	3,268	5,309	1,419
Frio	17,217	4,841	10,440	1,936
La Salle	6,886	1,703	4,326	857
Maverick	54,258	20,169	28,362	5,727
Webb	250,304	97,083	133,714	19,507
Zavala	11,677	4,072	6,197	1,408
Total	**350,338**	**131,136**	**188,348**	**30,854**

Population and Working-Age by County in 2010

County	Population	Population under 20 years	Population 20-64 years	Population 64 years and over
Dimmit	10,248	3,718	5,235	1,295
Frio	16,252	5,116	9,417	1,719
La Salle	5,866	1,904	3,280	682
Maverick	47,297	18,987	23,816	4,494
Webb	193,117	76,779	101,682	14,656
Zavala	11,600	4,374	5,919	1,307
Total	**284,380**	**110,878**	**149,349**	**24,153**

Source: The University of Texas at San Antonio, "Strategic Housing Analysis" (July 2012)

5 Ibid.

6 Center for Community and Business Research, Institute for Economic Development. (2011, February). Economic impact of the Eagle Ford Shale. San Antonio, TX: The University of Texas at San Antonio, p. 10. Retrieved from http://www.anga.us/media/content/F7D1441A-09A5-D06A-9EC93BBE46772E12/files/utsa%20eagle%20ford.pdf

7 Kamal, A. College of Architecture, Center for Urban and Regional Planning Research. (2012, July). Strategic housing analysis - sustainable choices for the growing demand for housing in the Eagle Ford Shale area of South Texas. San Antonio, TX: The University of Texas at San Antonio, p. 4. Retrieved from http://web.caller.com/2012/pdf/EFS-Housing-Study_-July-2012.pdf

The shortage of qualified local candidates forces many companies to hire employees from outside the region and relocate them.[8] This influx of transient workers has led to a housing shortage. The supply of temporary housing and hotel rooms is limited. Workers tend to reside in recreational vehicle parks or barracks-style, short-term housing units – also known as "man camps."[9] For additional information regarding Eagle Ford Shale play housing, see Chapter 2: *Infrastructure*.

Research indicates that oil and gas industry demand for skilled labor will continue to remain strong.[10] According to the Center for Community and Business Research ("CCBR") at UTSA, as the play matures, the composition of its labor force will evolve, requiring a workforce capable of accommodating the play's growth:

> The development of the Eagle Ford Shale has distinct phases, during which individual industries will experience varying levels of labor demand and evolving types of labor demanded. Thus, education and training requirements for workers will need to remain flexible enough to accommodate the vacillating needs of industry. For example, **during the exploration phase** counties will see a rise in the *need for occupations dealing with mineral leasing, site construction/management, drilling rig support, and material transport.* **As companies shift into the production and processing phase** of operations, they *require a workforce composed of business management, administrative support and the processing of gas, oil and condensates occupations.*[11]

For the Eagle Ford Shale region to establish and maintain a local workforce capable of meeting industry demand, area residents must acquire technical skills and training.[12] Most of the rural communities within the region rely on local community colleges for affordable training and vocational education, but decreases in enrollment and funding have hindered the ability of these institutions to expand oil and gas-related programs.[13]

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8 Ibid.

9 Center for Community and Business Research, Institute for Economic Development. (2012, May). Economic impact of the Eagle Ford Shale. San Antonio, TX: The University of Texas at San Antonio, p. 56. Retrieved from http://ccbr.iedtexas.org/index.php/Download-document/52-Eagle-Ford-Shale-Final-Report-May-2012.html

10 Kamal, A. College of Architecture, Center for Urban and Regional Planning Research. (2012, July). Strategic housing analysis - sustainable choices for the growing demand for housing in the Eagle Ford Shale area of South Texas. San Antonio, TX: The University of Texas at San Antonio, p. 4. Retrieved from http://web.caller.com/2012/pdf/EFS-Housing-Study_-July-2012.pdf

11 Center for Community and Business Research, Institute for Economic Development. (2012, October). Workforce analysis for the Eagle Ford Shale, executive summary. San Antonio, TX: The University of Texas at San Antonio, p. 3.

12 Kamal, A. College of Architecture, Center for Urban and Regional Planning Research. (2012, July). Strategic housing analysis - sustainable choices for the growing demand for housing in the Eagle Ford Shale area of South Texas. San Antonio, TX: The University of Texas at San Antonio, p. 4. Retrieved from http://web.caller.com/2012/pdf/EFS-Housing-Study_-July-2012.pdf

13 Strause, G. (2011, August 24). Stated at the Eagle Ford Shale Task Force meeting on workforce development, Beeville, Texas.

The Eagle Ford Shale Task Force ("Task Force") met to discuss the play's urgent labor demand, the opportunity to satisfy that demand with local labor, and the challenge of meeting and sustaining industry's diverse workforce needs.

TASK FORCE MEETING

At the Task Force meeting on workforce development, held at Coastal Bend College in Beeville on August 24, 2011, the following people made presentations:[14]

Glynis Strause, Community Relations Advisor for the Eagle Ford Shale, Conoco Phillips; Former Dean of Institutional Advancement, Coastal Bend College

Genetha Turner, Attorney, Board Certified in Labor & Employment Law, Locke Lord LLP

Manuel Ugues, Business Service Director, Workforce Solutions of the Coastal Bend

Larry Demieville, Deputy Director, Workforce Solutions of the Coastal Bend

Kirk Spilman, Regional Vice President-Eagle Ford, Marathon Oil

Susan Spratlen, Vice President, Sustainability & Communication, Pioneer Natural Resources

Task Force member Glynis Strause of Conoco Phillips, who formerly served as Dean of Institutional Advancement for Coastal Bend College, described colleges' assessments of gaps in workforce training, the resources necessary to sustain a qualified force for at least 20 years, and the importance of addressing long-term workforce issues.

Strause identified four notable, industry-supported programs that will help meet the long-term employment goals of the energy sector in the Eagle Ford Shale. These programs are: (1) dual credit (concurrent enrollment in high school and college courses); (2) National Energy Education Development project ("NEED"); (3) Texas Alliance for Minorities in Engineering ("TAME"); and (4) the Danielle Dawn Smalley Foundation's ("Smalley Foundation") safety education programs.

Strause stated that strategic alliances among industry, community colleges, universities, and non-profits are essential for supplying an adequately trained workforce in the Eagle Ford Shale. The Texas Workforce Commission and consortia of Workforce Investment Boards, Strause added, are already implementing joint efforts in the Eagle Ford Shale area.

14 This was the second Eagle Ford Shale Task Force meeting. An introductory and agenda-setting meeting was held on July 27, 2011 in San Antonio. Elected officials in attendance at the introductory meeting: Senator Carlos Uresti, State Representative Tracy King, and State Representative Geanie Morrison. Elected officials in attendance at the workforce development meeting: U.S. Congressman Rubén Hinojosa and State Representative Jose Aliseda.

Manuel Ugues of Workforce Solutions of Coastal Bend presented his organization as a collaborative statewide network that assists both employers and employees during the recruitment and hiring process. Ugues described Workforce Solutions' efforts to connect employers with skilled workers in the Eagle Ford Shale. He urged employers to reach out to the organization for recruiting assistance.

Task Force member Kirk Spilman of Marathon Oil addressed recruitment issues from an industry perspective. Marathon Oil has quickly scaled its workforce to match the increased activity in the Eagle Ford Shale, where only a few years ago they had no employees.[15] Spilman described best practices to meet workforce challenges, such as recruiting locally, partnering with educational institutions, recruiting from untapped or underutilized sources, and remaining competitive. Much of the play's success, Spilman said, can be attributed to the communities within the region, who have embraced the opportunities the play offers by helping the oil and gas industry meet its needs.

Recruitment

Spilman reiterated the recruiting difficulties for companies in the region, including small rural populations, the shortage of experienced labor, and the various issues that arise when relocating workers. According to Spilman, companies must explore previously untapped or underutilized recruitment sources to meet immediate labor needs. For example, Marathon Oil has increasingly hired military candidates. The proximity of the Eagle Ford Shale to San Antonio, a military hub, is conducive to this practice. Marathon Oil's Eagle Ford Asset Team has successfully used military hiring initiatives for recruiting positions in health, environment, and safety; engineering; construction; instrumentation and electrical; and other positions. Marathon Oil values military candidates for their discipline, transferable trade skills, and aptitude for leadership.

> "Energy companies must explore previously untapped or underutilized recruitment sources, for example the military, to meet immediate labor needs."
>
> (Kirk Spilman, Eagle Ford Shale Task Force member and Regional Vice President-Eagle Ford, Marathon Oil)

Marathon Oil has also increased its emphasis on traditional recruitment methods, including local and national advertising, career fairs, the use of recruiting agencies, and retained searches. In order to remain competitive in the recruiting and retention arenas, Spilman said companies must remain alert to shifting market conditions, respond quickly, and make adjustments regularly. Salary surveys show upward trends in base pay for petroleum and reservoir engineers, geologists, and other key field positions. Spilman said that company benefits, such as restricted stock and enhanced vacation, have increasingly become part of general employee and new hire packages, as have work schedules that allow work/life balance.

15 As of November 2012, Marathon Oil had 180 employees and an estimated 3,000 contractors working in the play. (Spilman, K. (2012, November 13). Stated at the Eagle Ford Shale Task Force re-cap meeting, San Antonio, Texas.)

Ugues expanded upon Spilman's endorsement of recruiting agencies and networks. He provided details of the ongoing efforts to identify and recruit candidates capable of meeting industry's qualifications. Workforce Solutions of the Coastal Bend, for example, offers job seekers free training, financial assistance for childcare, and education incentives. The organization serves employers as well, by recruiting, screening, and matching applicants.[16]

Top 35 Occupations: Total impacts (direct, indirect and induced) 2011

Ranking	SOC Occupation Code	Total Impacts 14-County Area Top 35 Occupations Impacted in 2011	Occupational Impact	Percentage
			38,000	100.0%
1	53-3032	Truck drivers, heavy and tractor-trailer	1,864	4.9%
2	47-2031	Carpenters	1,192	3.1%
3	47-2061	Construction laborers	1,127	3.0%
4	47-2073	Operating engineers and other construction equipment operators	1,036	2.7%
5	43-9061	Office clerks, general	969	2.5%
6	47-1011	First-line supervisors/managers of construction trades and extraction workers	914	2.4%
7	41-2031	Retail salespersons	811	2.1%
8	43-3031	Bookkeeping, accounting, and auditing clerks	748	2.0%
9	11-1021	General and operations managers	712	1.9%
10	53-7062	Laborers and freight, stock, and material movers, hand	705	1.9%
11	41-2011	Cashiers, except gaming	689	1.8%
12	53-7032	Excavating and loading machine and dragline operators	685	1.8%
13	49-9042	Maintenance and repair workers, general	596	1.6%
14	43-6014	Secretaries, except legal, medical, and executive	575	1.5%
15	43-6011	Executive secretaries and administrative assistants	564	1.5%
16	13-2011	Accountants and auditors	546	1.4%
17	43-4051	Customer service representatives	500	1.3%
18	51-9021	Crushing, grinding, and polishing machine setters, operators, and tenders	409	1.1%
19	43-1011	First-line supervisors/managers of office and administrative support workers	379	1.0%
20	11-9021	Construction managers	362	1.0%

Source: The University of Texas at San Antonio, "Strategic Housing Analysis" (July 2012)

Spilman and Ugues each reported on how pre-employment screenings, while important, often further narrow the pool of qualified candidates during the hiring process. Spilman cited a lack of adequate medical facilities for pre-employment testing/physicals. Ugues noted that many truck drivers and rig workers fail pre-employment screenings, such as drug tests, making these positions more difficult to fill. In 2011, Workforce Solutions surveyed 10 Eagle Ford Shale employers and determined that one in four applicants failed a company screening.[17]

16 Workforce Solutions of the Coastal Bend. (2010). *About us*. Retrieved from http://www.workforcesolutionscb.org/index.php?option=com_content&view=article&id=49&Itemid=55

17 Ugues, M. (2011, August 24). Stated at the Eagle Ford Shale Task Force meeting on workforce development, Beeville, Texas.

> Finding qualified truck drivers with Commercial Driver's License certification is a struggle for employers; in response, most colleges in the Eagle Ford Shale have expanded their CDL course offerings.

Finding qualified truck drivers with Commercial Driver's License ("CDL") certification is a struggle for employers, according to Ugues. Spilman agreed that drivers are highly sought after in the Eagle Ford Shale, as every phase of development requires their services. According to the CCBR, in 2011, truck drivers had the most significant occupational impact, representing almost five percent of the 38,000 industry jobs supported by the 14 top producing Eagle Ford Shale counties.[18]

Concurring that properly licensed drivers are a crucial component of industry's ability to operate safely and efficiently, Strause reported that most of the colleges in the Eagle Ford Shale play have expanded their CDL course offerings.

Sustainable Workforce Development

Given the obstacles that Eagle Ford Shale-area communities are facing as they attempt to satisfy current labor demand, meeting industry's long-term workforce needs will present similar challenges. To foster sustainable sources of skilled, local candidates, Spilman said Marathon Oil and some industry peers partner with local educational institutions. Spilman explained that these partnerships may not yield immediate results, but they are an integral long-term investment in the region's future workforce. For example, Marathon Oil currently offers scholarships for petroleum technology certificate and degree programs at Coastal Bend College in Beeville, Texas.

A number of colleges in the Eagle Ford Shale region are offering oil and gas-related classes and field training, including: Alamo Colleges, Coastal Bend College, Del Mar College, Laredo Community College, Southwest Texas Junior College, Sul Ross Rio Grande College, The University of Texas at San Antonio, Victoria College, and Texas A&M International University ("TAMIU"). After a successful Eagle Ford Shale Stakeholder's Summit, at which Senator Judith Zaffirini (District 21) stated that TAMIU would be the ideal home for a petroleum engineering program, TAMIU accelerated its plans to launch a petroleum engineering degree program.[19]

18 Center for Community and Business Research, Institute for Economic Development. (2012, October). Workforce analysis for the Eagle Ford Shale, executive summary. San Antonio, TX: The University of Texas at San Antonio, p. 7.

19 Senator Judith Zaffirini held an Eagle Ford Shale Stakeholders Summit in Laredo on October 23, 2012.

Coastal Bend College partners with several organizations to provide what Strause described as "world-class" field training to students, who can currently enroll in courses such as drilling industry introduction (elementary drilling), corrosion basics, petroleum safety and environmental hazards (H2S Training), technology/technician/management (supervisory skills), focused oil spill response training, and CDL/driving safety courses.[20]

The efforts of the region's institutions of higher education do not stop there, Strause reported. Most of the colleges in the Eagle Ford Shale play have expanded the following courses: CDL; Occupational Safety and Health Administration and SafeLand courses for safety training and new hire orientation; HazMat and HazWhopper training; instrumentation and electricity; supervisory leadership skills; and gauging. Strause also highlighted that Pioneer Natural Resources has partnered with Coastal Bend College to provide safety and driver training and helped fund the college's Petroleum Industry Training Room.

However, according to Strause, securing funding for community colleges and other programs that train Eagle Ford Shale employees is an ongoing struggle. Many students choose to directly enter into occupations that require minimal education and training, instead of pursuing a higher-level degree. When students do not enroll in workforce-related courses, state funding for community college workforce education, as well as financing from tuition, are limited.

Continuing the discussion regarding education and training, Strause and Spilman pointed out that many high schools, such as Pleasanton High School in Pleasanton, Texas, are implementing industry-specific course curricula. Strause endorsed dual credit programs, which offer concurrent high school and college enrollment. Students enrolled in such programs receive simultaneous high school and college credit, fast-tracking them toward industry careers or allowing them to enter college with up to 62 hours of college credit. Strause said dual credit programs will help meet the long-term employment needs of industry operating in the shale play.

Strause spotlighted three additional industry-supported, education-based programs that will help facilitate the goal of sustainable employment in the Eagle Ford Shale region: (1) NEED; (2) TAME; and (3) the Smalley Foundation safety education programs.

Strause lauded oil and gas industry companies, such as ConocoPhillips, who have helped fund the NEED Project, which offers an energy-related curriculum and aims to identify and inspire Science, Technology, Engineering, and Math ("STEM") students from kindergarten through high school.[21] Spilman noted that Marathon Oil currently partners with the Karnes City Independent School District Foundation to promote STEM throughout all grade levels.

20 Strause, G. (2011, August 24). Stated at the Eagle Ford Shale Task Force meeting on workforce development, Beeville, Texas.

21 National Energy Education Development Project. (2013). *About NEED*. Retrieved from http://www.need.org/About-NEED

A number of colleges in the Eagle Ford Shale are offering oil and gas-related classes and field training, including Alamo Colleges, Coastal Bend College, Del Mar College, Laredo Community College, Southwest Texas Junior College, Sul Ross Rio Grande College, The University of Texas at San Antonio, Victoria College, and Texas A&M International University.

TAME promotes minority interest and participation in the engineering, science, and computer science professions.[22] Strause explained how these initiatives nurture opportunities for future engineers. For example, third through seventh grade students may be offered an educational precursor to help them distinguish between different types of engineering and acquire a sense of what it means to be an engineer from a professional standpoint.[23]

Strause praised the efforts of the Smalley Foundation, a memorial non-profit formed to promote safety awareness and training for those who live, work, and play near our nation's oil and gas sites and pipelines.[24] The Smalley Foundation indoctrinates first responders in emergency protocols for natural gas leaks and petroleum product spills, as well as the fires that may result from either incident.[25] The foundation also trains industry contractors, such as excavators, and partners with civic and student groups to promote appropriate behaviors and necessary precautions to exercise when encountering oil and gas-related equipment, pipelines, and storage tanks.[26]

22 Texas Alliance for Minorities in Engineering. (2013). *About us*. Retrieved from http://www.tame.org/about

23 National Energy Education Development Project. (2013). *Trailblazer*. Retrieved from http://www.tame.org/programs/trailblazer

24 Danielle Dawn Smalley Foundation, Inc. (2008). Retrieved from http://www.smalleyfnd.org

25 Ibid.

26 Ibid.

2 INFRASTRUCTURE – ROADS, PIPELINES, HOUSING

The increase in Eagle Ford Shale drilling and production is the source of remarkable economic benefits. At the same time, the increased activity has heightened infrastructure challenges for the region's communities. Truck traffic and road quality, pipeline placement and safety, and a shortage of affordable housing are top concerns.

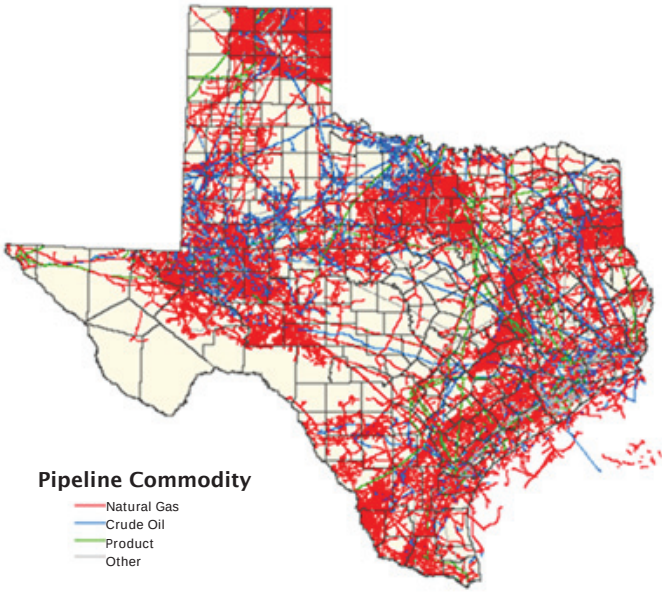
Truck Traffic and Road Quality

Increased drilling and production in the Eagle Ford Shale, compounded by the limited number of existing pipelines, has resulted in an unprecedented amount of truck traffic on state and county roads. According to a study conducted by the Texas Department of Transportation ("TxDOT"), in Webb and La Salle Counties from 2009 to 2012, traffic increased in the least affected areas of Interstate Highway 35 ("IH-35") by 24 percent; it increased in the most affected areas of IH-35 by 86 percent.[1] Until an adequate pipeline network is in place, trucks will be responsible for transporting the vast majority of the region's oil and condensate to market.[2] The need for these heavy transport vehicles throughout the region, particularly in Dimmit and La Salle Counties, has led to an increase in traffic, premature deterioration of roads and bridges, and public safety concerns.

Pipeline Placement and Safety

Pipelines are normally the preferred method for transporting oil, natural gas, petroleum liquids, and refined products because of their transportation efficiency. In addition, pipelines greatly reduce truck traffic and air pollution and have the lowest spill rate of any other type of carrier (e.g., ships, barges, trucks, and railcars).[3] Currently, Texas is home to more than 350,000 miles of pipelines.

TEXAS PIPELINES



Increases in oil and gas production have created an urgent demand for pipelines in the Eagle Ford Shale, and the Railroad Commission ("Commission") projects significant growth as shale play production expands. Already, several billion dollars-worth of energy pipeline projects are under development in the Eagle Ford Shale.[4] Local communities have expressed concerns about how the development of these massive projects will affect them.

1 Texas Department of Transportation, Laredo District. (2012, October 23). Eagle Ford Shale: impacts to the transportation system. Presented by Melissa Montemayor at the Eagle Ford Shale stakeholders summit, Laredo, Texas. Available at http://www.tamiu.edu/adminis/vpia/events/documents/102312TxDOTEFSSSumiitPresentationMMontemayor.pdf

2 Center for Community and Business Research, Institute for Economic Development. (2012, May). Economic impact of the Eagle Ford Shale. San Antonio, TX: The University of Texas at San Antonio, p. 52. Retrieved from http://ccbr.iedtexas.org/index.php/Download-document/52-Eagle-Ford-Shale-Final-Report-May-2012.html

3 American Association of Pipelines. (2012). Why pipelines? Retrieved from http://www.aopl.org/aboutPipelines/?fa=pipelinesInTheUS

4 Center for Community and Business Research, Institute for Economic Development. (2012, May). Economic impact of the Eagle Ford Shale. San Antonio, TX: The University of Texas at San Antonio, p. 33. Retrieved from http://ccbr.iedtexas.org/index.php/Download-document/52-Eagle-Ford-Shale-Final-Report-May-2012.html

Housing

The surge in drilling activity has resulted in a housing shortage across the region. Throughout Eagle Ford Shale counties, there is consistently not enough housing (temporary or permanent) to accommodate the influx of oil field workers. This shortage has led to higher demand for both permanent and temporary housing, such as hotels, apartment complexes, recreational vehicle parks, and barracks-style, short-term housing units – also known as "man camps."[5] As a result of such demand, rent has increased across the Eagle Ford Shale.[6]

The Eagle Ford Shale Task Force ("Task Force") met with representatives from trucking and pipeline industries, the oil and gas industry, state and local governments, and a private developer to engage in a dialogue about these issues and to discuss reasonable solutions.

Housing Stock by County in 2000

County	Housing Units	Occupied Housing Units	Owner-Occupied Housing Units	Renter-Occupied Housing Units
Dimmit	4,350	3,421	2,478	943
Frio	5,846	4,854	3,287	1,567
La Salle	2,746	1,931	1,403	528
Maverick	17,462	15,563	10,830	4,733
Webb	73,496	67,106	43,286	23,820
Zavala	4,283	3,573	2,535	1,038
Total	**108,183**	**96,448**	**63,819**	**32,629**

Housing Stock by County in 2010

County	Housing Units	Occupied housing units	Owner-Occupied Housing Units	Renter-Occupied Housing Units
Dimmit	4,112	3,308	2,444	864
Frio	5,660	4,743	3,271	1,472
La Salle	2,436	1,819	1,358	461
Maverick	14,889	13,089	9,107	3,982
Webb	55,206	50,740	33,322	17,418
Zavala	4,075	3,428	2,506	922
Total	**86,378**	**77,127**	**52,008**	**25,119**

Source: The University of Texas at San Antonio, "Economic Impact of the Eagle Ford Shale" (October 2012)

5 Ibid, p. 58.

6 Kamal, A. College of Architecture, Center for Urban and Regional Planning Research. (2012, July). Strategic housing analysis - sustainable choices for the growing demand for housing in the Eagle Ford Shale area of South Texas. San Antonio, TX: The University of Texas at San Antonio, p. 4. Retrieved from http://web.caller.com/2012/pdf/EFS-Housing-Study_-July-2012.pdf.

TASK FORCE MEETING

At the Task Force meeting on infrastructure, held at the Chisholm Trail Heritage Museum in Cuero on September 28, 2011, the following people made presentations:[7]

Paul Woodard, President, J&M Premier Services

Brian Schoenemann, Area Engineer, Texas Department of Transportation

James Mann, Partner, Duggins, Wren, Mann & Romero, LLP

Brian Frederick, Senior Vice President, Southern Region, DCP Midstream

Greg Brazaitis, Chief Compliance Officer, Energy Transfer

Christian Noll, Manager of Multifamily and Single Family Development Programs, Texas Department of Housing & Community Affairs

Bob Zachariah, Founder, President and CEO, HotelWorks Development, LLC

Truck Traffic and Road Quality

Oil and gas development has significantly increased road traffic by heavy trucks in rural areas, where most roads were originally built for light-duty use. The traffic and specialized equipment associated with drilling and production puts a strain on local roads that leads to premature asphalt wear and tear, ripples, potholes, and torn shoulders. To illustrate the scope of the challenge, Brian Schoenemann, Area Engineer for TxDOT, presented research indicating that almost 1,200 loaded trucks are required to bring one gas well into production; over 350 are required per year for maintenance of a gas well; and almost 1,000 are needed every five years to re-fracture a well.[8]

LOADED TRUCKS PER GAS WELL

Activity	Number of Loaded Trucks
Bring well into production	1,184
Maintain production (each year)	Up to 353
Refracturing (every 5 years)	997

Source: Texas Department of Transportation, "Roads for Texas Energy" (December 2012)

7 State Representative Tracy King and State Representative Geanie Morrison attended the meeting.

8 Barton, J. (2011, September 28). Energy sector impacts to Texas' transportation system. Presented by Brian Schoenemann at the Eagle Ford Shale Task Force meeting on infrastructure, Cuero, Texas.

The activity in the Eagle Ford Shale has also seen a dramatic increase in heavy truck traffic, with a resulting strain on roads and bridges, along with congestion and safety issues. Several methods of financing road needs have been discussed:

> "Severance taxes could be used as a self-regulating funding source, almost immediately available to meet road-financing needs in oil and gas producing areas of the state."
>
> (Judge Daryl Fowler, Eagle Ford Shale Task Force Member and DeWitt County Judge)

> "An alternative funding proposal would be to biennially appropriate a portion of the Rainy Day Fund for a grant-in-aid program to counties, based on need. One measure of need could be oil and gas activity in local counties."
>
> (James LeBas, fiscal consultant to the Texas Oil & Gas Association and other industrial taxpayers)

The service life of highway systems and Farm-to-Market ("FM") roads has been reduced by an average of 30 percent due to natural gas well operations and an average of 16 percent due to crude oil well operations.[9] The original estimated annual impacts are: over $1 billion for the FM road system; $2 billion for the state highway system; and over $1 billion for local roads.[10] To further illustrate the breadth of this issue, the TxDOT study focused on rigs and wells. The infrastructure impact of ancillary activities, notably pipeline construction (as detailed later in this chapter), was not included in these calculations.

At the meeting, Task Force members discussed concerns about the legal, financial, and political limits on the ability of county property tax increases to finance road repair. Some members voiced their support for a plan to return severance tax revenue to the counties to address infrastructure needs.

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9 Ibid.

10 Texas Department of Transportation, Task Force on Texas' Energy Sector Roadway Needs. (2012, December). Report to the Texas Transportation Commission, p. 2. Retrieved from http://ftp.dot.state.tx.us/pub/txdot-info/energy/final_report.pdf

According to Task Force member and DeWitt County Judge Daryl Fowler, DeWitt County's experiences with truck traffic and road quality are a typical example of what is occurring throughout the Eagle Ford Shale play. From 2000 to 2007, prior to the drilling of the first Eagle Ford Shale horizontal well, the Commission issued an annual average of 69 new and amended drilling permits to operators in DeWitt County. The annual permit volume jumped to 355 in 2011 and to 449 in 2012.[11]

Fowler explained that the most significant and visible change occurring with horizontal drilling is the size of the drilling pad. Drilling pads are now larger, in order to support rigs capable of drilling to depths of 18,000 feet (combined vertical and lateral lines) and to utilize hydraulic fracturing completion methods. A typical county-maintained road is within a 40-foot right-of-way and constructed of four to six inches of gravel base. These county roads were not adequately built to handle the present volume of traffic needed to build a pad site, which requires between 270 and 315 loads of gravel, and the weight of transporting a drilling rig, which may reach three million pounds per movement.[12]

According to a 2012 study conducted by Naismith Engineering, Inc. of Corpus Christi, the anticipated oil field traffic demand, including public usage, will require the construction of stronger and wider roads in DeWitt County.[13] The cost of providing a county road system designed to meet the anticipated traffic demand arising from drilling another 3,250 wells in DeWitt County at 65-acre spacing is approximately $432 million.[14] Some roads require annual maintenance at $70,000-80,000 per mile.[15] However, other roads need basic reconstruction at a cost of up to $920,000 per mile, and roads that already handle the traffic meant for an FM system can cost up to $1.9 million per mile to rebuild when the costs of additional right-of-way, engineering, fence building, and utility moving are considered.[16]

Fowler contended that infrastructure costs far outpace a county's ability to raise revenue from a local property tax, even with the increasing tax base created by the new mineral wealth. The Property Tax Code is designed to push property tax rates lower when the tax base increases,[17] thus local tax rates (though not tax revenues) have

11 Search results at www.rrc.state.tx.us for Karnes County and DeWitt County P-4 drilling applications.

12 Fowler, D., Afflerbach, C., Oliver, J., Kuecker, D., & Pilchiek, J. DeWitt County Commissioners Court, Naismith Engineering, Inc. (NEI). (2012). Road damage cost allocation study - DeWitt County. Retrieved from website: http://web.caller.com/2012/pdf/DeWitt-County-Road-Damage-Cost-Allocation-Study.pdf

13 Ibid.

14 Ibid.

15 Ibid.

16 Ibid.

17 See Tex.Tax Code § 26.04(c) (describing formula for determination of a county's effective tax rate); also see Texas Comptroller of Public Accounts (2012), Truth-in-Taxation Guide 9–12. Retrieved from http://www.window.state.tx.us/taxinfo/proptax/tnt11/pdf/96-312.pdf

tended to decline with the development of oil and gas fields.[18] Road and bridge maintenance budgets doubled or tripled in many counties and forced elected officials to exceed tax rollback ceilings in order to meet expanded maintenance needs.[19] The question has been raised whether the county property tax, under current calculations and limits, can or should continue to shoulder such a large share of the burden for financing local road needs.

According to the most recent Biennial Revenue Estimate of the Texas Comptroller ("Comptroller"), sales taxes (including motor vehicle sales taxes) and oil and gas severance taxes will provide the largest sources of tax revenue for fiscal year ("FY") 2015.[20] Severance taxes are imposed on the first sale of every barrel of oil or liquids and every thousand cubic feet ("Mcf") of natural gas.[21] The Comptroller indicates that $323 million was collected on production from 24 Eagle Ford Shale counties in FY 2011.[22]

According to Fowler, there is very cogent reasoning behind arguments favoring the use of severance taxes to fund repair of the county road system and the state highway system. The severance tax correlates with the volume of wells drilled and completed, which in turn corresponds to the damage inflicted upon area road systems. Thus, as the volume of new permitted wells eventually declines, so should the rate of road damage and the revenue from severance tax collections. Also, Fowler noted that the severance tax is collected immediately upon the sale of the taxed oil and gas product, without a delay of up to 23 months, as is the case with the collection of property taxes. Therefore, Fowler said, severance taxes could be viewed as a self-regulating funding source that is almost immediately available to meet road financing needs in oil and gas producing areas of the state.

Oil and gas severance taxes are deposited in the state's General Revenue Fund, but 75 percent of the annual severance tax revenue that exceeds the level of severance tax collections in 1987 is transferred to the Economic Stabilization Fund, also known as the "Rainy Day Fund."[23] Under a proposal being advanced by Fowler, a proportional share of the severance tax revenue would be returned to the counties where the tax was derived and provide timely funds for road repairs at the county level.[24]

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18 Fowler, D. (2012). Testimony before the House County Affairs Committee. Retrieved from http://www.legis.state.tx.us/tlodocs/82R/handouts/C2102012102410001/e5650987-5d8e-4aad-8c33-e7f7f8d225fd.PDF

19 DeWitt County. (2012). Fiscal year ("FY") 2013 proposed budget - DeWitt County, Texas. Retrieved from http://www.co.DeWitt.tx.us/ips/export/sites/DeWitt/downloads/Fiscal_Year_2013_Proposed_Budget.pdf

20 Total state tax collections in the 2014-2015 biennium are estimated to be $96.9 billion. Of this, the sales and motor vehicle sales taxes comprise $63 billion, and oil and gas production taxes comprise $7.1 billion. Retrieved from http://www.window.state.tx.us/finances/Biennial_Revenue_Estimate/bre2014/BRE_2014-15.pdf

21 Tex. Tax Code Ann. § 202001 et seq. (West 2012) (Oil Production Tax).

22 State Comptroller data obtained by open records request (on file with Judge Daryl Fowler, DeWitt County Courthouse). Accessed via personal interview with Fowler. (2012, November).

23 The legislature created the Economic Stabilization Fund in 1988 by adding Section 49-g to Article III of the Texas Constitution; For other statutory provisions governing the Fund, see Tex. Educ. Code ch. 42; Tex. Tax Code §§ 201.404, 202.353.

24 Fowler, D. (2012). Testimony before the House County Affairs Committee. Retrieved from http://www.legis.state.tx.us/tlodocs/82R/handouts/C2102012102410001/e5650987-5d8e-4aad-8c33-e7f7f8d225fd.PDF

An alternative proposal (which would not disturb the century-long arrangement under which counties tax oil and gas in place underground while the state taxes oil and gas when it is produced) would be to biennially appropriate a portion of the Rainy Day Fund for a grant-in-aid program to counties, based on need. One measure of need could be oil and gas activity in local counties.

According to Fowler, local property taxes are the only real revenue source available to local governments seeking funds for infrastructure investment and repairs. However, statutory provisions limit the ability of local government to increase revenue.[25] Fowler explained that over the last two years in DeWitt County, the tax base has doubled in value and the effective tax rate has been cut in half.[26] Using the statutory formulas, DeWitt County would have been limited to a $472,000 increase in tax revenue for its FY 2013 budget, if the tax rate were set at the rollback limit, which yields an eight percent revenue increase.[27]

Knowing that their financial needs were greater than the $472,000 rollback rate calculation, the DeWitt County Commissioner's Court, led by Fowler, elected to hold the county's maintenance and operating tax rate at the previous year's rate, in anticipation of raising $3.6 million new tax dollars.[28] That additional tax revenue represents a 53 percent increase from FY 2012 to FY 2013.[29] This decision resulted from several public hearings and a final vote by the county commissioners to exceed the rollback tax rate.[30] Following the vote, taxpayers have a 90-day window within which to gather signatures on a petition calling for a rollback election.[31] The election, if successful, forces the county to withdraw the higher tax rate and restructure its budget to reflect the limit placed on county revenue collection – an amount no more than eight percent greater than the previous year's revenue collection.[32]

Fowler explained that amid these unique fiscal challenges, the combined road and bridge precinct budgets for DeWitt County will exceed $5 million in FY 2013 – consuming 35 percent of total county appropriations. A decade ago, Fowler noted, the county road and bridge budget was only $1.4 million, comprising less than 26 percent of the county budget.

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25 Notes from November 2012 interview with Judge Daryl Fowler, DeWitt County. (on file with the Railroad Commission).

26 Ibid.

27 Ibid.

28 Ibid.

29 Ibid.

30 Ibid.

31 Tex. Tax Code § 26.07 (West 2013) (describing procedures for a rollback election).

32 Notes from November 2012 interview with Judge Daryl Fowler, DeWitt County. (on file with the Railroad Commission).

Fowler offered a cautionary hypothesis of changes likely to occur in the near future. If market forces create a renewed demand for natural gas drilling within the next few years, an additional 250,000 acres of DeWitt County will be attractive to exploration, subjecting 347 more miles of county road to the forces of rapid decline. Engineers are already developing secondary methods of recovery for extracting the estimated ultimate recovery of 500,000 barrels of oil per drilling unit in the known reservoirs. Methods to reach even deeper formations capable of yielding more hydrocarbons are likely to be discovered as well. Fowler concluded, "Although we cannot know when things will occur, it is apparent to county government officials that the financial needs of providing a public road system capable of supporting the industry and the local needs are far greater than what DeWitt County's $15 million total annual revenue can provide."[33]

In addition to road quality and funding, Task Force members discussed how irresponsible driving behavior, combined with poor road conditions, has impacted public safety. The *Houston Chronicle* reported a significant rise in traffic accidents in the Eagle Ford Shale:

> In the counties most directly affected by Eagle Ford drilling, the biggest jump in fatal traffic accidents has involved commercial vehicles, according to an analysis of TxDOT numbers, increasing from six in 2008 to 24 last year [2011] … At first glance, the increase in crashes - and fatal crashes - appears to be easily explained by math. More people equals more crashes. But officials say there is more to the upswing. It's fatigued drilling workers, driving home after a long shift, sometimes on unfamiliar roads. It's people in a hurry. It's not paying attention. It's bad roads.[34]

At the meeting, the Task Force expressed support for trucking companies partnering with TxDOT to develop a program that will alert companies when their drivers receive moving violations or driver's license suspensions. The Task Force also endorsed the creation of road usage agreements, or trucking plans, between operators and local authorities, which include the following commitments by operators:

1. Avoid peak traffic hours, school bus hours, and community events.
2. Establish overnight quiet periods.
3. Ensure adequate off-road parking and delivery areas at all sites to avoid lane and road blockage.

Subsequent to the meeting, the Task Force voiced its support for the TxDOT Task Force on Texas' Energy Sector Roadway Needs ("TxDOT Task Force"). TxDOT created the task force in March 2012, "…to find ways to address the impact on the state's infrastructure of increased energy exploration and production."[35] The

33 Ibid.

34 Konnath, H. (2012, July 9). Traffic deaths soar in Eagle Ford Shale areas. *Houston Chronicle*. Retrieved from http://www.chron.com/news/houston-texas/article/Traffic-deaths-soar-in-Eagle-Ford-Shale-areas-3691999.php

35 Texas Department of Transporation. (2012). *Roads for Texas energy.* Retrieved from http://www.roadsfortexasenergy.com/

TxDOT Task Force was comprised of representatives from counties and other state agencies and organizations, including the following:

- The Railroad Commission
- The Texas Commission on Environmental Quality
- Texas Department of Public Safety
- Texas Department of Motor Vehicles
- America's Natural Gas Alliance
- Association of Energy Service Companies
- Midland-Odessa Transportation Alliance
- Texas Alliance of Energy Producers
- Texas Competitive Power Advocates
- Texas Farm Bureau
- Texas Independent Royalty Owners Association
- Texas Motor Transportation Association
- Texas Oil and Gas Association
- Texas Pipeline Association
- The Wind Coalition[36]

Pipelines are normally the preferred method for transporting oil, natural gas, petroleum liquids, and refined products because of their transportation efficiency. Texas is home to more than 350,000 miles of pipelines.

The TxDOT Task Force was composed of four subcommittees: (1) Safety; (2) Innovation and Prevention; (3) Public Awareness; and (4) Funding.

Stacie Fowler, the Commission's Director of Government Affairs, and Polly McDonald, the Commission's Pipeline Safety Director, represented the Commission on the TxDOT Task Force, serving on the Safety and Public Awareness Subcommittees. As a result of this partnership, the Commission shares geographic information system (GIS) information on permitted wells so that TxDOT is better equipped to predict future strains on infrastructure. The Commission has also developed a partnership with DPS, through which Commission inspectors and State Troopers patrol together to find drivers who violate regulations, such as illegal waste hauling (which can cause oil slicks and potentially leads to accidents). The Commission's proposed amendments to Statewide Rule 8 would strengthen requirements for waste hauler vehicle operation, design, and maintenance, in order to prevent leaks during transportation. (See Chapter 5: *Railroad Commission Regulations*.)

Pipelines

At the Task Force meeting, Task Force member Greg Brazaitis, Chief Compliance Officer for Energy Transfer, disclosed that the construction of one, 20-inch crude oil pipeline running 50 miles would displace 1,250 tank truck trips per day.[37] Although the pipeline industry is building pipelines at a record pace, demand still outpaces

36 Ibid.

37 Brazaitis, G. (2011, September 28). Stated at the Eagle Ford Shale Task Force meeting on infrastructure, Cuero, Texas.

supply. Brazaitis added that pipeline construction timetables are impacted by new federal permitting regulations and further hampered by the uncertainty surrounding the recent Texas Supreme Court decision in *Texas Rice Land Partners, Ltd. v. Denbury Green Pipeline-Texas, LLC.*[38]

Common carrier pipelines in Texas have a statutory right of eminent domain, subject to the "public use" requirement articulated by the Texas Supreme Court in *Denbury.*[39] Common carrier pipelines may include those that transport oil, oil products, gas, carbon dioxide, salt brine, sand, clay, liquefied minerals, or other mineral solutions. For example, a pipeline transporting hazardous liquids could be a common carrier, and as such, would have the right of eminent domain. Natural gas pipelines (other than certain gathering lines) are generally classified as gas utilities, which also traditionally have the power of eminent domain. The Legislature defines "common carrier" and "gas utility," and the Commission applies the Legislature's definitions when exercising its jurisdiction.[40] The Commission does not regulate any pipelines with respect to the exercise of their eminent domain powers.

Generally, all pipelines operating in Texas must have a T-4 pipeline permit, issued by the Commission. (See Appendix A.2 for Application.) There are two exceptions: lines that never leave an oil or gas production lease, and distribution lines to homes and businesses that are part of a natural gas or LP-gas distribution system.[41] An application for a T-4 Permit must be filed by an operator with an approved Organization Report ("P-5") on file with the Commission. (See Appendix A.3 for P-5 Form Application.) The T-4 Permit application must include a digitized map of the pipeline(s) to be covered by that T-4 Permit. A P-5 and financial security (e.g., bond, letter of credit, cash deposit, or well-specific plugging insurance policy) are required of all companies performing operations within the jurisdiction of the Commission.[42]

The Texas Supreme Court's decision in *Denbury* has created a level of uncertainty regarding the process to determine a pipeline's common carrier status. In its opinion, the Court stated that the filing of a T-4 permit and self-designation as a common carrier alone did not conclusively establish Denbury Green's status as a common carrier and thus confer the power of eminent domain.[43] The Court pointed out that it has long held that "the ultimate question of whether a particular use is a public use is a judicial question to be decided by the courts."[44]

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38 *Texas Rice Land Partners, Ltd. v. Denbury Green Pipeline-Texas, L.L.C.*, 363 S.W.3d 192 (Tex. 2012) (holding that a pipeline company had to show a "public use" in order to exercise the power of eminent domain and that obtaining the designation of "common carrier" from the Commission was not conclusive, at least under present procedures).

39 Tex. Nat. Resources Code § 111.019(a).

40 Tex. Nat. Resources Code § 111.001–111.003.

41 16 Tex. Admin. Code § 3.70. (2013) (Railroad Comm'n of Tex., Pipeline Permits Required).

42 16 Tex. Admin. Code § 3.78. (2013) (Railroad Comm'n of Tex., Fees and Financial Security Requirements).

43 *Denbury,* 363 S.W.3d at 198.

44 Ibid.

As noted above, the Commission does not regulate the exercise of eminent domain by pipelines and does not have authority to determine property rights. Therefore, rather than the final determination resting solely with the Commission, the issue of a pipeline's common carrier status could be subject to challenge in one or more of the 456 district courts across the state. This means that a pipeline traversing several counties may face challenges to its status as a common carrier in multiple district courts. Whether or not a pipeline is for public use is an essential determination for right-of-way acquisition where eminent domain must be used. The determination must be made in a timely manner. The Commission is committed to working with the Legislature to create a remedy for this issue that is fair and reasonable for pipeline companies and landowners alike.

Whether a pipeline is for public use is often an essential determination for right-of-way acquisition. The determination must be made in a timely manner. The Railroad Commission is committed to working with the Texas Legislature to create a remedy for this issue that would allow landowner and pipeline interests to be resolved at the Railroad Commission.

Task Force members, including representatives of pipeline companies, agreed that while it is imperative to build pipelines, local communities must be protected throughout the process. The Task Force members discussed guidelines and adopted the following advisements:

1. The placement of pipelines should avoid steep hillsides and watercourses where feasible.
2. Pipeline routes should take advantage of road corridors to minimize surface disturbance.
3. When clearing is necessary, the width disturbed should be kept to a minimum, and topsoil material should be stockpiled to the side because retaining topsoil for replacement during reclamation can significantly accelerate successful re-vegetation.
4. Proximity to buildings or other facilities occupied or used by the public should be considered, with particular consideration given to homes.
5. Unnecessary damage to trees and other vegetation should be avoided.
6. After installation of a new line, all right-of-way should be restored to conditions compatible with existing land use.[45]

Housing

The final item on this Task Force meeting's agenda was to address housing issues, such as rent increases and the lack of temporary housing – issues that affect many residents in the Eagle Ford Shale. Christian Noll, Manager of Multifamily and Single Family Development Programs for the Texas Department of Housing & Community Affairs, provided an overview of state and federal programs that are available to offset rent increases and assist

45 (September 28, 2011). Eagle Ford Shale Task Force meeting on infrastructure in Cuero, Texas

displaced families. For example, the HOME Investment Partnerships Program, funded by the U.S. Department of Housing and Urban Development, is a program that expands the supply of decent, safe, affordable housing and strengthens public-private housing partnerships between units of general local governments, public housing authorities, non-profits, and for-profit entities.[46]

Several Task Force members expressed a desire to see builders foster community development by placing more emphasis on permanent housing, rather than relying on short-term, temporary, and semi-permanent structures. Bob Zachariah, HotelWorks Development, LLC, a developer in the Eagle Ford Shale region, reported that many developers are reluctant to build permanent housing in certain areas because they are wary of boom and bust cycles. He also spoke about the ways in which local governments and communities can spur private investment in the region.

The Task Force lauded the launching of the Housing and Land Use Analysis study that will be conducted by the Institute for Economic Development and the Center for Urban and Regional Planning Research within the College of Architecture at The University of Texas at San Antonio ("UTSA").[47] The study will analyze 15 counties in the Eagle Ford Shale region and provide them with a Land Use, Infrastructure, and Housing Plan Guide for the upcoming decade, which will include the following:

1. Economic analysis and projections
2. Population analysis and projections
3. Land use studies
4. Housing studies
5. Circulation and transportation
6. Infrastructure (utility systems, school systems production and midstream infrastructure)
7. Administrative controls
8. Quality of life and sustainability indicators

The Task Force also endorses the UTSA-sponsored Municipal Capacity Building Workshop, which began in February 2013. The workshop helps Eagle Ford Shale government officials develop the capability to create comprehensive plans of action for developing sustainable, stable communities amid the fast pace of expansion precipitated by the oil and natural gas boom.

The housing shortage in the Eagle Ford Shale region has led to a higher demand for both permanent and temporary housing, such as hotels, apartment complexes, recreational vehicle parks, and "man camps."

46 Texas Department of Housing and Community Affairs. (2012.) *HOME division*. Retrieved from http://www.tdhca.state.tx.us/home-division/index.htm.

47 The comprehensive study will cost $100,000 in professional and student labor, supply and data costs, and travel for research and presentations. UTSA anticipates that the project will commence in March 2013.

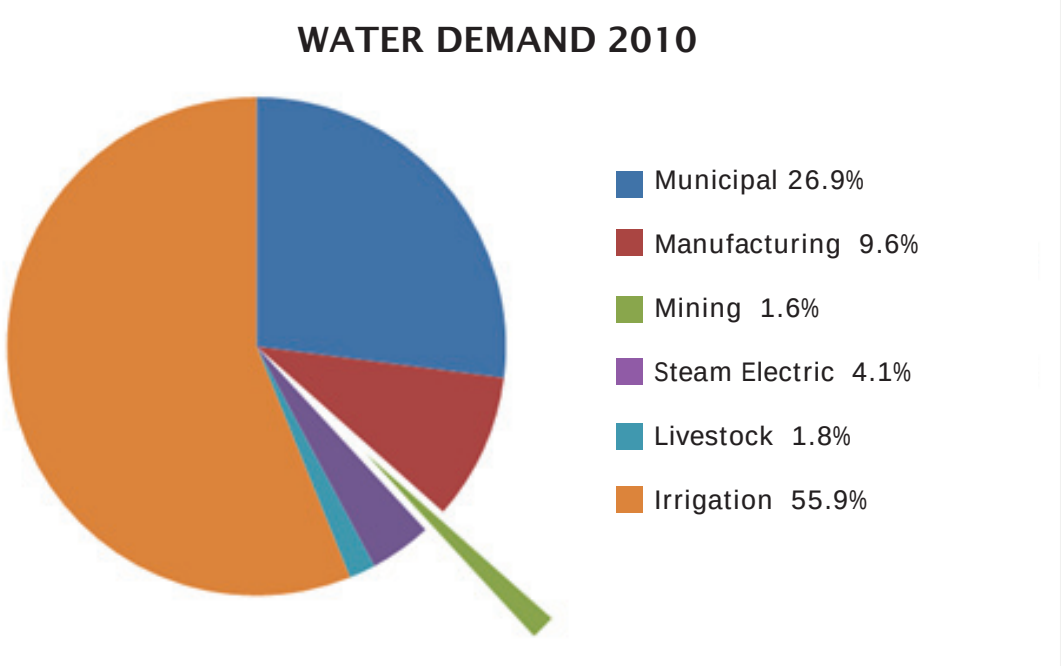
3 WATER QUALITY AND QUANTITY

Railroad Commission records do not include a single documented groundwater contamination case associated with hydraulic fracturing – a process that has been employed in Texas for more than 60 years. Unlike many other states in the nation, Texas has a comprehensive and mature regulatory framework in place to ensure the protection of usable quality groundwater.

Water is an essential part of energy production. Water is used in exploration, drilling, stimulation (including hydraulic fracturing), and enhanced recovery processes.

While the oil and gas industry uses both surface water and groundwater for exploration and production activities, the latter is used more frequently.[1] For example, in the Eagle Ford Shale, groundwater constitutes almost 90 percent of the new (i.e., not reused or recycled) water used for hydraulic fracturing.[2]

According to the most recent data from the Texas Water Development Board ("TWDB"), as presented in the 2012 State Water Plan ("State Water Plan"), "mining water use" (i.e., the water used in the exploration, development, and extraction of oil, gas, coal, aggregates, and other materials) represents 1.6 percent of the state's total water use.[3] In comparison, irrigation and municipal water use collectively represent 82.8 percent of water use in the state.[4]



1 Surface water generally refers to rivers, streams, lakes, bays, and other bodies of water; while groundwater generally refers to subterranean water.

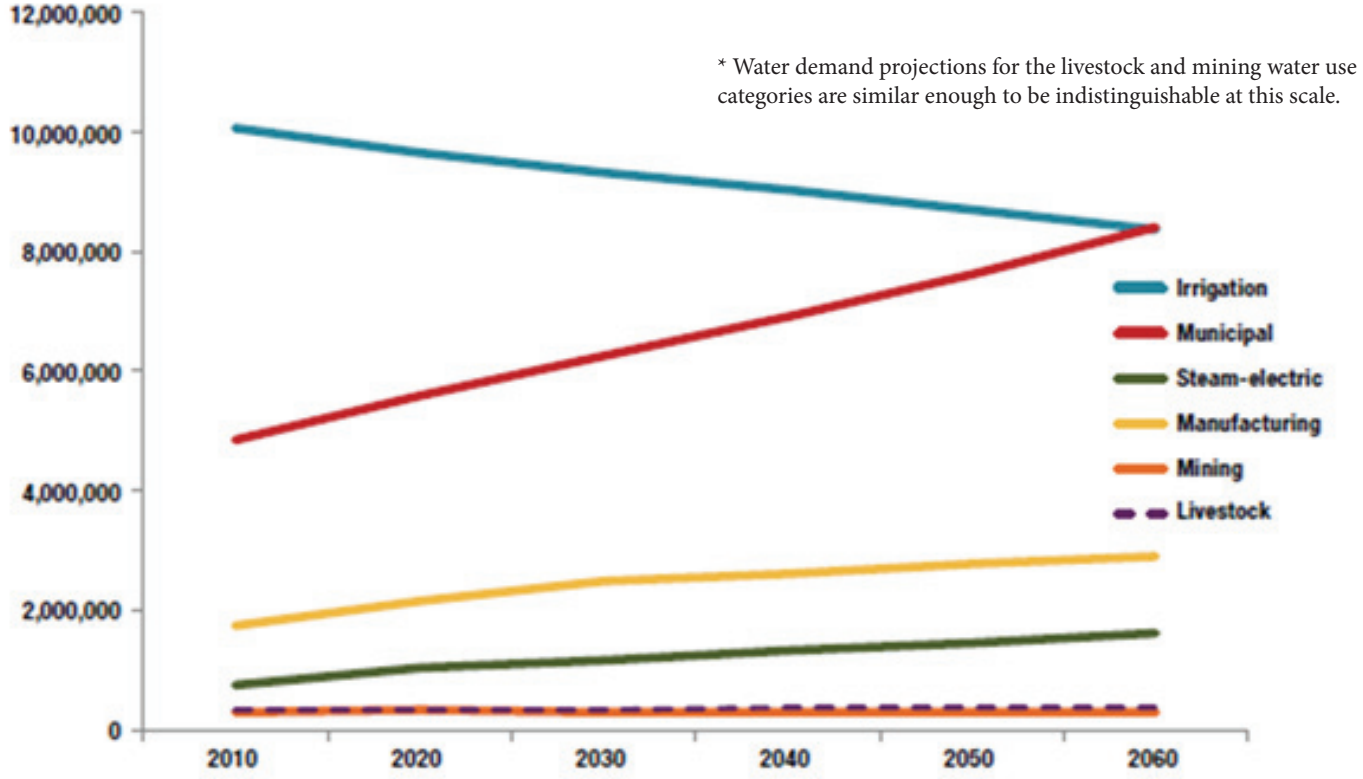
2 Nicot, J., Reedy, R. C., Costley, R. A., & Huang, Y. (2012, September). Bureau of Economic Geology, Jackson School of Geosciences. Oil & gas water use in Texas: update to the 2011 Mining Water Use Report. Austin, TX: The University of Texas, p. 56. Retrieved from http://www.twdb.texas.gov/publications/reports/contracted_reports/doc/0904830939_2012Update_MiningWaterUse.pdf

3 Texas Water Development Board (TWDB). 2012 State water plan, Ch. 3, p. 137 (Table 3.3). Retrieved from http://www.twdb.state.tx.us/publications/state_water_plan/2012/03.pdf

4 Ibid.

In 2011 (the latest year with complete data), the oil and gas industry used approximately 102,500 acre-feet[5] of water.[6] This water use includes approximately 81,500 acre-feet for hydraulically fracturing wells[7] and approximately 21,000 acre-feet for other oil and gas industry purposes.[8]

WATER DEMAND PROJECTIONS BY USE CATEGORY (Acre-Feet Per Year)*



Source: Texas Water Development Board, "Water for Texas 2012 State Water Plan" (January 2012)

According to the State Water Plan, water demands for municipal use, manufacturing, and steam-electric power generation are expected to increase over the next 50 years, while water demand for oil and gas and other mining purposes is expected to remain relatively constant and then decline.[9] By 2060, mining water use is projected to decrease slightly, from 1.6 percent currently, to 1.3 percent of Texas' total water use.[10]

5 One acre-foot is the amount of water needed to cover one acre of land with one foot of water and equals 325,851 gallons.

6 Notes from February 2013 interview with Leslie Savage, Chief Geologist, Railroad Commission of Texas.

7 Nicot, J., Reedy, R. C., Costley, R. A., & Huang, Y. (2012, September). Bureau of Economic Geology, Jackson School of Geosciences. *Oil & gas water use in Texas: update to the 2011 Mining Water Use Report*. Austin, TX: The University of Texas, p. i. Retrieved from http://www.twdb.texas.gov/publications/reports/contracted_reports/doc/0904830939_2012Update_MiningWaterUse.pdf

8 Notes from February 2013 interview with Leslie Savage, Chief Geologist, Railroad Commission of Texas.

9 Texas Water Development Board (TWDB). 2012 State Water Plan, Ch. 3, p. 137 (Table 3.3). Retrieved from http://www.twdb.state.tx.us/publications/state_water_plan/2012/03.pdf

10 Ibid.

The state's growing population – which is expected to nearly double in the next 50 years, from 25.4 million to 46.3 million people[11] – and the state's climate are significant factors in projecting future water demand.[12] According to the State Water Plan, the state does not have enough existing water supplies today to meet the demand for water during times of drought:

> In the event of severe drought conditions, the state would face an immediate need for additional water supplies of 3.6 million acre-feet per year with 86 percent of that need in irrigation and about 9 percent associated directly with municipal water users. Total needs are projected to increase by 130 percent between 2010 and 2060 to 8.3 million acre-feet per year. In 2060, irrigation represents 45 percent of the total needs and municipal users account for 41 percent of needs.[13]

Though total mining water use (which includes hydraulic fracturing) represents 1.6 percent of statewide water use, percentages can be larger in localized areas where there is significant oil and gas production, for example, in the Eagle Ford Shale, in Webb, Karnes, Dimmit, and La Salle Counties.[14]

According to *Oil and Gas Water Use in Texas: Update to the 2011 Mining Water Use Report* ("Update"), water use in Texas has increased as a result of the hydraulic fracturing boom.[15] The Update reports that from 2008 to 2011, the total water use for hydraulically fractured wells in Texas increased from approximately 36,000 in 2008 to 81,500 acre-feet in 2011.[16] However, there was a corresponding increase in the amount of recycling and reuse and the use of brackish[17] water for hydraulic fracturing (approximately 17,000 acre-feet, or 21 percent, in 2011), an approach that conserved a substantial amount of fresh water.[18]

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11 Texas Water Development Board (TWDB). 2012 State water plan, Executive Summary, p. 2. Retrieved from http://www.twdb.state.tx.us/publications/state_water_plan/2012/00.pdf

12 Texas Water Development Board (TWDB). 2012 State water plan, Ch. 4, p. 145. Retrieved from http://www.twdb.state.tx.us/publications/state_water_plan/2012/04.pdf

13 Texas Water Development Board (TWDB). 2012 State water plan, Executive Summary, p. 4. Retrieved from http://www.twdb.state.tx.us/publications/state_water_plan/2012/00.pdf

14 Notes from February 2013 interview with Leslie Savage, Chief Geologist, Railroad Commission of Texas.

15 Nicot, J., Reedy, R. C., Costley, R. A., & Huang, Y. (2012, September). Bureau of Economic Geology, Jackson School of Geosciences. Oil & gas water use in Texas: update to the 2011 Mining Water Use Report. (Dir.). Austin, TX: The University of Texas, p. i. Retrieved from http://www.twdb.texas.gov/publications/reports/contracted_reports/doc/0904830939_2012Update_MiningWaterUse.pdf

16 Ibid.

17 Brackish water has more salinity than fresh water, but not as much as seawater. The TWDB defines fresh water as any water with a total dissolved solids (TDS) content of less than 1,000 mg/L and brackish water as any water with a TDS content of between 1,001 and 35,000 mg/L.

18 Nicot, J., Reedy, R. C., Costley, R. A., & Huang, Y. (2012, September). Bureau of Economic Geology, Jackson School of Geosciences. Oil & gas water use in Texas: update to the 2011 Mining Water Use Report. Austin, TX: The University of Texas, p. i-ii. Retrieved from http://www.twdb.texas.gov/publications/reports/contracted_reports/doc/0904830939_2012Update_MiningWaterUse.pdf

According to the Update, in 2011, hydraulic fracturing water use in the Eagle Ford Shale was approximately 24,000 acre-feet, of which 20 percent was brackish.[19] The Update predicts that hydraulic fracturing water use will gradually increase over the next 10 years, peaking at approximately 35,000 acre-feet and then decreasing as water recycling technologies improve.[20]

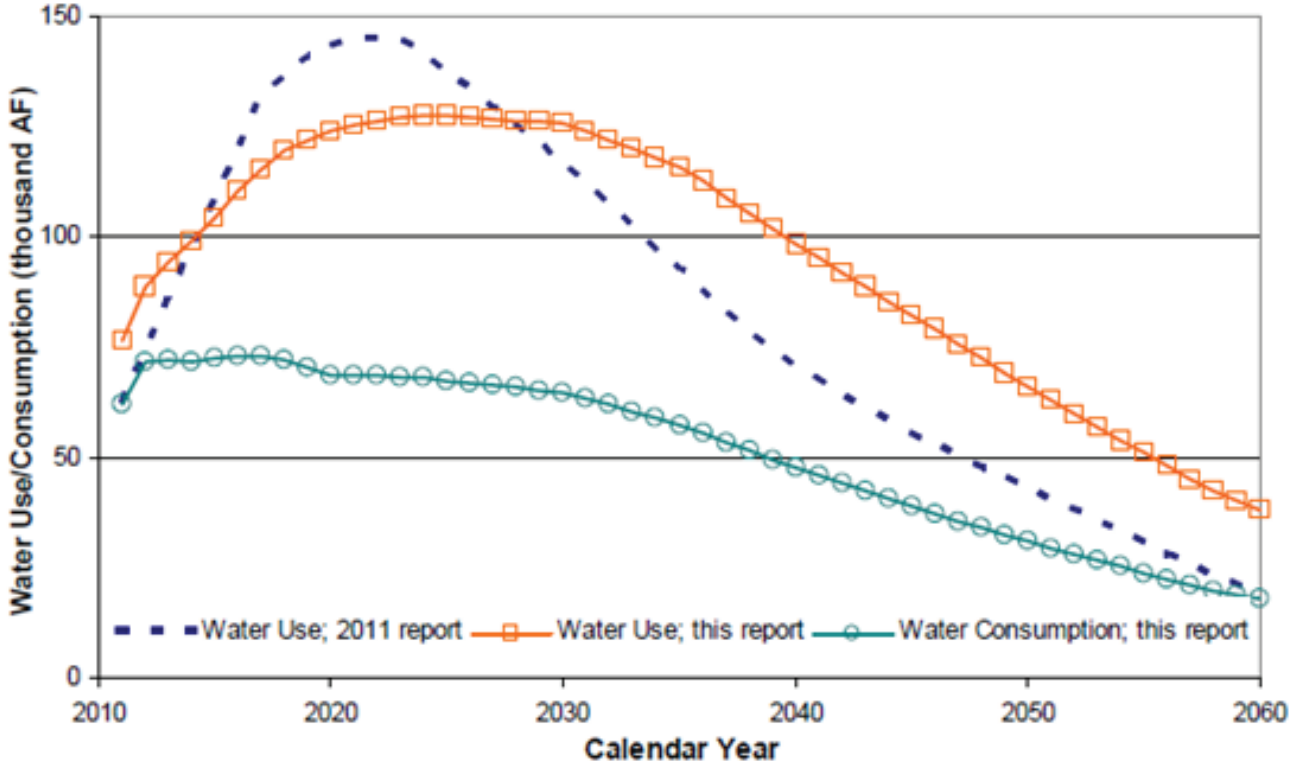


Figure ES2. State-level projections to 2060 of hydraulic fracturing water use and fresh-water consumption and comparison to earlier water projections.

Source: The University of Texas, "Oil and Gas Water Use in Texas: Update to the 2011 Mining Water Use Report" (September 2012)

Hydraulic Fracturing

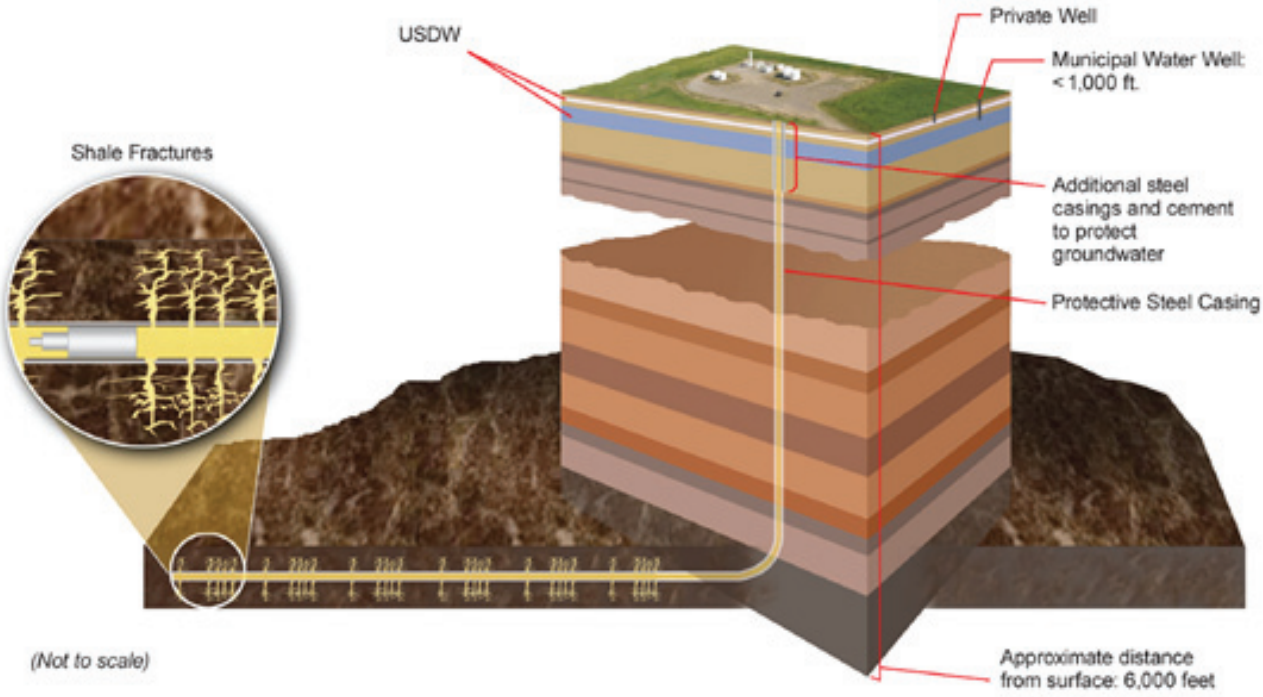
As stated above, mining water use has increased due to hydraulic fracturing. Hydraulic fracturing is the stimulation of a well by the application of pressurized hydraulic fracturing fluid. Such stimulation initiates or propagates fractures in a target geologic formation, in order to enhance production of oil and natural gas. Hydraulic fracturing fluids contain sand or other "proppant" material, which hold open the fractures created by the hydraulic fracturing process. The diameter of these fractures is minute – generally half the size of a human hair.

19 Ibid, p. 11.

20 Ibid, p. 67.

The fracture length is designed to serve the specifics of the reservoir and area characteristics. Depending on the magnitude of the operation, the length of these fractures can range from hundreds to thousands of feet.

Water and proppant material generally constitute 99.5 percent of hydraulic fracturing fluid, and additives generally represent less than 0.5 percent of the total fluid volume. Although there may be more than 200 compounds that can be used in hydraulic fracturing fluid, a single fracturing job may use only a handful of the available additives. Each additive serves a specific, engineered purpose.



Steel casing lines the well and is cemented in place to prevent any communication up the wellbore as the fracturing job is pumped or the well is produced. Shallow formations holding fresh water that may be useful for farming or public consumption are separated from the fractured shale by thousands of feet of rock.

Source: The U.S. Department of Energy's National Energy Technology Laboratory, "Shale Gas: Applying Technology to Solve America's Energy Challenges" (March 2011)

Fracture treatments in shale plays predominantly utilize "slick water" fracturing fluids – water-based fluids mixed with friction reducing additives (primarily potassium chloride, a common table salt substitute). The addition of friction reducers allows fracturing fluids and proppant to be pumped to the target zone at a higher rate and lower pressure than if water alone was used. In addition to friction reducers, other additives may include biocides, which prevent micro-organism growth and reduce biofouling of the fractures; oxygen scavengers and other stabilizers, which prevent corrosion of metal pipes; and acids, which are used to remove drilling mud buildup within or near the wellbore area.

In the Eagle Ford Shale, companies such as Marathon Oil have moved from high volume slick water hydraulic fracturing operations to gel fracturing (also known as gel fracs) that can carry the same amount of proppant with much less water. Since 2007, this operational change in the play has contributed to a sharp decrease in water intensity, decreasing the amount of water needed to hydraulically fracture a well by almost half to approximately 850 gallons per foot.[21] This translates to a decrease in water use of approximately five million gallons per well.[22]

Common concerns expressed about hydraulic fracturing and its associated activities include the following:

1. Potential stress on surface water and groundwater supplies, resulting from the withdrawal of water used in oil and gas operations
2. Potential contamination of drinking water aquifers, as a result of faulty well construction or completion activities
3. Potential compromised water quality due to challenges of managing surface activities and disposing of contaminated wastewaters (i.e., flowback fluid and produced water), which could contain organic chemicals, metals, salts, and naturally occurring radionuclides

While there are concerns, it is important to note that Railroad Commission ("Commission") records do not include a single documented groundwater contamination case associated with the process of hydraulic fracturing in Texas. The process has been employed in the state for more than 60 years. Unlike many other states in the nation, Texas has a comprehensive and mature regulatory framework in place to ensure the protection of usable quality groundwater.

Any time a well (including an oil, gas, injection, or disposal well) is drilled in Texas, Commission rules require that the well's surface casing be set and cemented through all usable quality water to protect water resources. Because the base of usable quality water varies throughout the state, the Commission's Groundwater Advisory Unit determines specific groundwater protection depths for each new well.

The Commission's strict well construction rules require several layers of steel casings and cement to protect groundwater. The first layer of protection for usable quality groundwater in a well is the surface casing – a steel pipe encased in cement that extends from the surface to below the base of the deepest usable quality groundwater. Cement surface casing serves as a protective sleeve through which deeper drilling occurs.

21 Nicot, J., Reedy, R. C., Costley, R. A., & Huang, Y. (2012, September). Bureau of Economic Geology, Jackson School of Geosciences. Oil & gas water use in Texas: update to the 2011 Mining Water Use Report. Austin, TX: The University of Texas, p. 12. Retrieved from
http://www.twdb.texas.gov/publications/reports/contracted_reports/doc/0904830939_2012Update_MiningWaterUse.pdf

22 Ibid, p.12.

The second protective layer for usable quality groundwater is the production casing, which is a steel pipe placed in the wellbore that extends to the well's total depth and is permanently cemented in place.[23] In addition, Commission rules require the placement of gauges at the surface to monitor these casings so that any downhole problem can be easily and quickly identified. For fracturing fluid to escape the wellbore and affect the usable quality water, the fluid would have to go through several layers of steel casing and cement.

The Commission remains steadfast in its determination to protect the state's water resources and is amending its rules to focus on the following (as detailed in Chapter 5: *Railroad Commission Regulations*):

1. Well casing, cementing, and completion standards
2. Surface operations; injection, disposal, and abandoned wells
3. Water recycling and reuse

In addition to strict well construction requirements, the Commission administers one of the nation's most comprehensive rules for disclosure of chemical ingredients used in hydraulic fracturing fluids.[24] The rule is based on historic legislation – House Bill 3328 ("HB 3328"), passed during the 82nd Regular Legislative Session in 2011. State Representative Jim Keffer, Chair of the House Committee on Energy Resources, authored the bill, and Senator Troy Fraser, Chair of the Senate Committee on Natural Resources, was HB 3328's Senate sponsor.[25] The Environmental Defense Fund, Sierra Club, and the oil and gas industry championed the legislation.

The Hydraulic Fracturing Disclosure Rule requires operators to list the specific fluids and additives used in hydraulic fracturing treatments on the FracFocus website, a public website hosted by the Ground Water Protection Council and the Interstate Oil and Gas Compact Commission.[26] Additionally, the Railroad Commission requires Texas oil and gas operators to disclose the total amount of water used in hydraulic fracturing treatments on FracFocus. Prior to passage of the disclosure rule, Texas operators were voluntarily reporting to FracFocus the hydraulic fracturing chemical ingredients used in almost half of all Texas wells undergoing hydraulic fracturing.

In addition to the Commission's strict well construction requirements and rigorous regulatory oversight, the state's geology is conducive to groundwater protection during oil and gas exploration and production activities.

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23 Some operators inject fracturing fluid in the production casing. In some wells, operators also install and cement an intermediate casing string between the surface casing and the production casing. Depending on the fracturing pressure needed, other operators use a third protection layer by injecting fracturing fluid in a tubing string that conducts the fracturing fluid to the zone to be perforated and fractured.

24 16 Tex. Admin. Code § 3.29 (West 2013) (Railroad Comm'n of Tex., Hydraulic Fracturing Chemical Disclosure Requirements).

25 Texas Natural Resources Code §91.851.

26 The GWPC is a national organization comprised of state groundwater regulatory agencies. The IOGCC is a national commission of state oil and gas regulators.

Hydraulic fracturing in Texas typically occurs a mile or more below the base of the deepest usable quality water, with many thousands of feet of isolating rock in between fresh water zones and the hydrocarbon-bearing zones to be hydraulically fractured. For example, in the Eagle Ford Shale, the Carrizo-Wilcox Aquifer can be found in a range varying from the surface to a depth of approximately 6,000 feet. Between the aquifer's base and the zone that is undergoing tight shale hydraulic fracturing (which occurs at depths between 8,000 and 15,000 feet), there is 3,000 to 8,000 feet of isolating layers of rock. The extent of this intervening rock makes it extremely unlikely that the fractures would ever reach fresh water zones.

The Eagle Ford Shale Task Force ("Task Force") was concerned about the effect of oil and gas production on water quality and quantity in the Eagle Ford Shale region of South Texas – an arid part of the state comprised of many rural communities needing large amounts of water for agriculture and ranching. The Task Force met twice to discuss water quality and quantity. The first meeting took place on November 2, 2011, at The University of Texas at San Antonio ("UTSA"), with presentations regarding the legal and regulatory landscape, water quantity and use, and water recycling and reuse. A second meeting was held on December 7, 2011, at Los Patios in San Antonio. During the second meeting, Task Force members deliberated whether the Carrizo-Wilcox Aquifer contains enough water to support oil and gas drilling and completion activities, while meeting all other projected uses. In addition, at this second meeting, the Task Force discussed localized impacts on aquifer water levels and discharges to streams and springs, as well as Commission rules regarding injection and disposal wells.

TASK FORCE MEETING

At the Task Force meeting on water quality and quantity, held at UTSA on November 2, 2011, the following people made presentations:[27]

Dr. Les Shepherd, Director, Texas Sustainable Energy Research Institute, The University of Texas at San Antonio

Ken Ramirez, Managing Partner, Law Offices of Ken Ramirez

Dr. Darrell Brownlow, Principal, Intercoastal Inland Services

Stephen L. Jester, P.E., Senior Principal Environmental Engineer, ConocoPhillips

Mike Mahoney, General Manager, Evergreen Underground Water Conservation District

Erasmo Yarrito, Jr., Rio Grande Watermaster, Texas Commission on Environmental Quality

Brent Halldorson, Chief Operating Officer, Fountain Quail Water Management

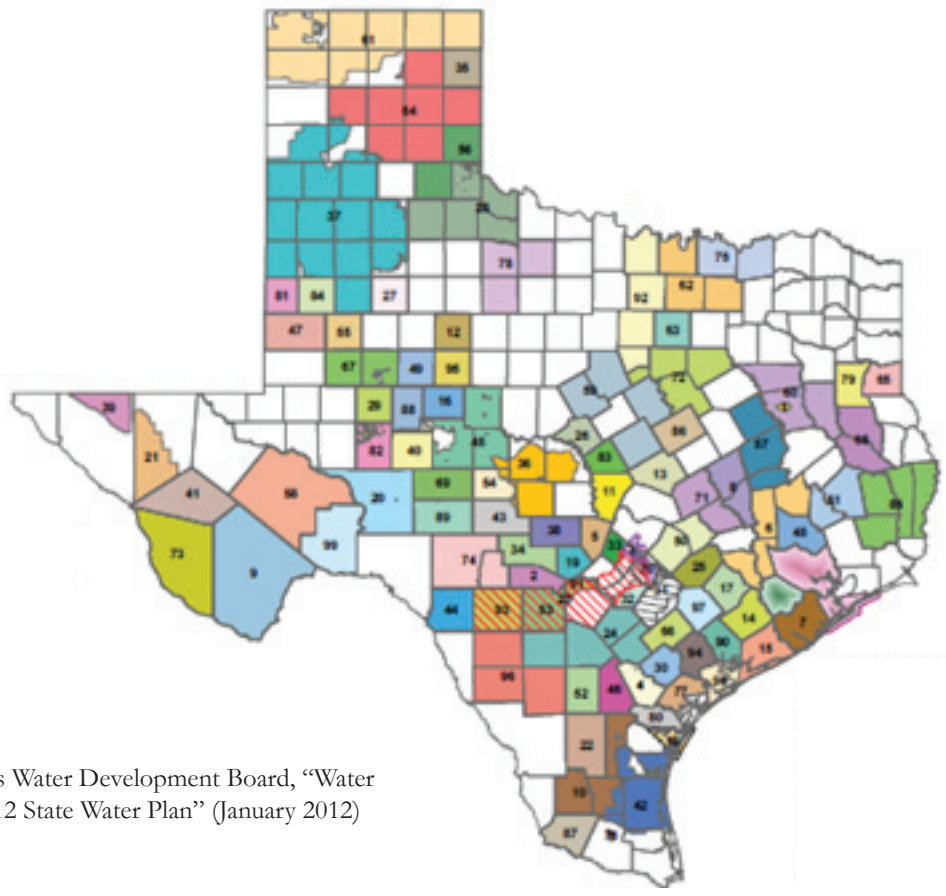
Water used in the exploration, development, and extraction of oil and gas, including hydraulic fracturing, accounts for 1.6 percent of the state's total water use. Irrigation and municipal consumers combine for 82.8 percent of water use in the state.

27 Senator Carlos Uresti was in attendance at the meeting.

Legal and Regulatory Landscape

To enhance their understanding of the regulatory environment as it relates to the protection of groundwater quality, the Task Force spent time reviewing state water law and regulations governing surface water and groundwater. The Texas Commission on Environmental Quality ("TCEQ") serves as the state's primary environmental regulatory agency. The Railroad Commission protects surface and subsurface water from contamination by oil field operations. Groundwater Conservation Districts ("GCDs") are local units of government that are created to manage groundwater resources within their boundaries, with rules providing for conservation, preservation, and protection of groundwater.[28]

GROUNDWATER CONSERVATION DISTRICTS IN TEXAS



Source: Texas Water Development Board, "Water for Texas 2012 State Water Plan" (January 2012)

28 Tex. Water Code Ann. § 36.0015 (Vernon 2011).

Specifically, the Commission preserves water quality through its regulations:

1. Statewide Rule 13 governs well casing, cementing, and completion requirements.
2. Statewide Rule 8 governs water recycling, reuse, and surface waste management and operations, including storage pits and associated transportation.
3. Statewide Rules 9 and 46 govern injection and disposal wells.
4. Statewide Rule 98 governs hazardous oil and gas waste management.

At the Task Force meeting at UTSA, Ken Ramirez, Managing Partner at the Law Offices of Ken Ramirez, distinguished surface water from groundwater, noting that separate bodies of law govern each. Surface water is owned and managed by the state. Ramirez said access to this resource is only gained through a water supply contract with the holder of a TCEQ-issued water right permit. He added that although access to surface water can be obtained through the permitting process at TCEQ, most surface water permits issued today would likely be unreliable, because new permits have a very low priority date and would be subject to curtailment during low flow conditions. For that reason, he asserted that the most realistic and practical way to acquire reliable water supplies is to buy the water from an entity authorized to take and use surface water.

Ramirez also discussed groundwater issues and regulations. He explained that groundwater quantity is either managed by property owners under the Rule of Capture or by GCDs. He said that the Rule of Capture, established in 1904, does not restrict the amount of water a landowner can take, but instead relies on a landowner's discretion. There are very few judicial or legislative restrictions to the Rule of Capture; malice, waste, and negligence are the only exceptions to the rule.[29] Ramirez specified that GCDs regulate the spacing and production of water wells and are the state's preferred method for the management of groundwater resources. GCDs assist the TWDB with long-term water availability planning, the results of which are published every five years in the State Water Plan.

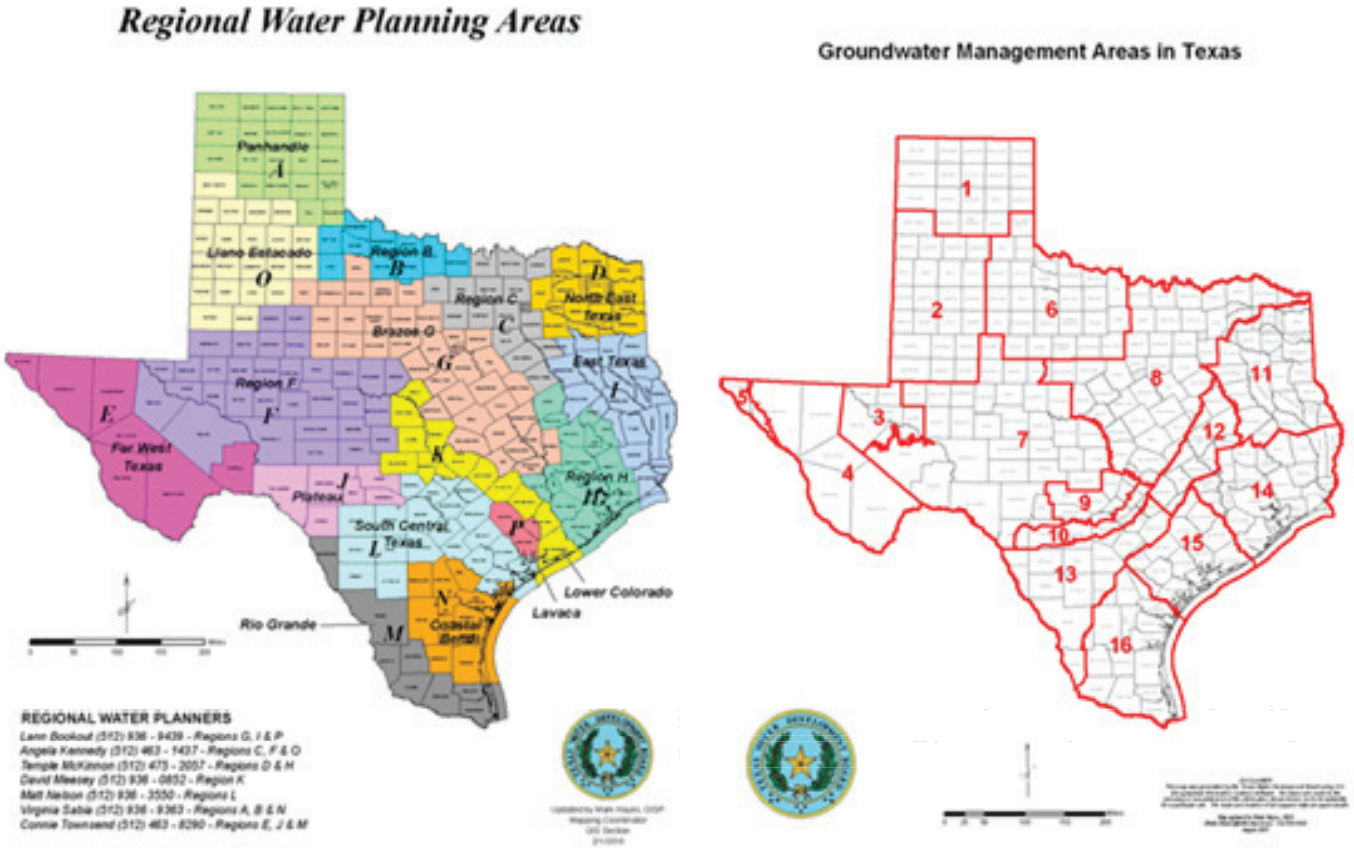
Railroad Commission rules require Texas oil and gas operators to disclose water volumes used in hydraulic fracturing treatments.

At the meeting at UTSA, Task Force member Mike Mahoney, General Manager of the Evergreen Underground Water Conservation District, discussed water planning in South Texas. He also described the evolution of our state water planning process and highlighted key water legislation. From 1954 to 1956, Mahoney said, Texas experienced the worst drought in state history, prompting the creation of the Texas Water Planning Act of 1957. The Texas Legislature passed Senate Bill 1 in 1997, which initiated a "bottom up" water planning process by mandating the creation of Regional Water Planning Groups ("RWPGs"), which are stakeholder groups that

29 Ramirez, K. (2011, November 2). Stated at the Eagle Ford Shale Task Force meeting on water quality and quantity, San Antonio, Texas.

produce regional water plans every five years.[30]

Lastly, Mahoney discussed groundwater management area ("GMA") planning. GMAs are areas designated by the TWDB to facilitate management of groundwater resources by drawing boundaries to encompass the various aquifers within the state. Each GMA may include GCDs, and, like GCDs, GMAs may be created to provide for the conservation, preservation, protection, recharging, and prevention of waste of groundwater, and of groundwater reservoirs or their subdivisions. GMAs may also control subsidence caused by withdrawal of water from those groundwater reservoirs or their subdivisions.[31] He said that every five years, GMAs have to consider groundwater availability models and other data to establish desired future conditions for the relevant aquifers within the management area. Mahoney said GMAs and GCDs may establish desired future conditions for: (1) each aquifer, subdivision of an aquifer, or geologic strata located in whole or in part within the boundaries of the management area, or (2) each geographic area overlying an aquifer in whole or in part or subdivision of an aquifer within the boundaries of the management area.[32]



Source: Texas Water Development Board (retrieved February 2013)

31 Tex. Water Code Ann. § 35.001 (Vernon 2011).

32 Mahoney, M. (2011, November 2). Stated at the Eagle Ford Shale Task Force meeting on water quality and quantity, San Antonio, Texas.

In the Eagle Ford Shale, oil and gas companies are instituting operational changes to decrease by approximately one-half the water needed to hydraulically fracture a well.

Water Quantity and Use

At the UTSA meeting, three speakers presented water data and statistics to the Task Force. Dr. Darrell Brownlow, a Principal with Intercoastal Inland Services, discussed water usage and management strategies in the Eagle Ford Shale. Based on review of regional water planning data from GMAs, RWPGs, and GCDs, he suggested that the existing and future needs for water use in oil and gas operations can be met in the Eagle Ford Shale.

Brownlow began by stating that oil and gas production has historically constituted a small fraction of South Central Texas water use – less than one percent – and that fraction will remain small for decades, even with the advent of hydraulic fracturing.[33]

Brownlow then projected South Central Texas water use for 2060.[34] He said South Texas will need about 1.27 million acre-feet of water, with municipalities using the most water, at 637,236 acre-feet, or 50.1 percent; followed by agricultural irrigation, which will use 301,679 acre-feet, or 23.7 percent; steam-electric power generation, which will use 109,776 acre-feet, or 8.6 percent; industrial needs, which will use 67,016 acre-feet, or 5.9 percent; and livestock, which will use 25,954 acre-feet, or 2.0 percent.[35] Brownlow stated that oil and gas and other mining purposes would be responsible for the least amount of water usage in South Central Texas in 2060, at 18,644 acre-feet, or 1.5 percent.[36]

Brownlow stated that the estimated average water use for drilling and hydraulically fracturing a well in the Eagle Ford Shale is 15 acre-feet, or 116,000 barrels of water (4,875,000 gallons).[37] Approximately one-half acre-foot is required for drilling (162,500 gallons of water) and 14.5 acre-feet are required for hydraulic fracturing (over

33 Brownlow, D. (2011, November 2). Stated at the Eagle Ford Shale Task Force meeting on water quality and quantity, San Antonio, Texas.

34 He noted that his projections on drilling activity and consequent water use are speculative and rely on many variables.

35 Ibid.

36 Ibid.

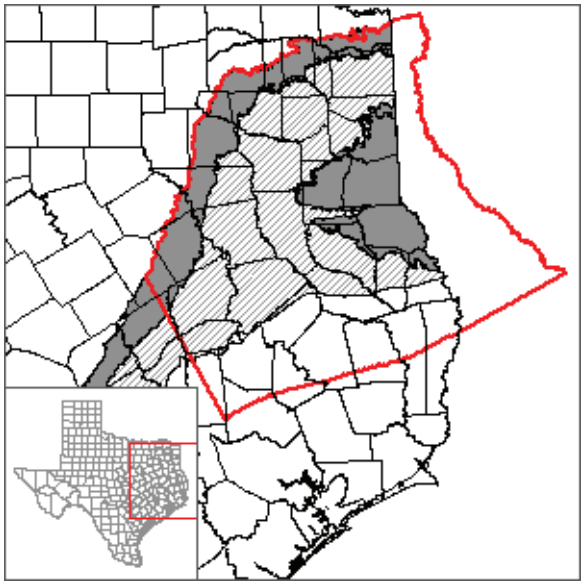
37 Ibid.

4.7 million gallons of water).[38] Brownlow estimated that between 20,000 and 25,000 new wells would be drilled over the next 10 to 20 years, resulting in 300,000 to 375,000 acre-feet of cumulative future water use.[39] Brownlow's estimate does not take into account or address the use of recycled water. He added that many operators have reported decreasing water consumption to an average of 10 acre-feet, or 77,000 barrels, of water per well.[40]

Brownlow discussed the Carrizo-Wilcox Aquifer, which mainly supplies the southern portion of the Eagle Ford Shale play (from Karnes County to Zavala and Dimmit Counties). He said the aquifer is crucial to the success of the play, since approximately 80 percent of the Eagle Ford Shale resides over the Carrizo-Wilcox Aquifer's eight million-acre productive area.[41] He added that the Carrizo-Wilcox Aquifer rests approximately one mile above the shale.

Brownlow noted that the Carrizo-Wilcox is not readily available in the eastern and western areas of the Eagle Ford Shale, and for that reason, operators rely on other local aquifers (such as the Gulf Coast Aquifer in the northern portion of the play), surface water, and liquids transported from other aquifers via truck or pipeline. He said that the use of recycled flowback water could be a key water management strategy in these areas.

Brownlow specified that the Eagle Ford Shale is contained mostly in GMA 13, with a small part of the shale being located in GMAs 15 and 16. Based upon the most recent water planning data, Brownlow reported that the annual groundwater pumpage from the portion of the Carrizo-Wilcox Aquifer located in GMA 13 is 285,000 acre-feet; the total groundwater pumpage in GMA 13 is 426,000 acre-feet per year.[42] He emphasized that if hydraulic fracturing-related water use in the Eagle Ford Shale equals 15,000 acre-feet, then GMA 13's current annual Carrizo-Wilcox usage is approximately five percent.[43]



Source: Texas Water Development Board (Retrieved February 2013)

38 Ibid.

39 Ibid.

40 Ibid.

41 Ibid.

42 Ibid.

43 Ibid.

Continuing, Brownlow said that Eagle Ford Shale oil and gas operations constitute about 3.5 percent of GMA 13's total groundwater usage.[44]

Brownlow anticipated that future demands on water for hydraulic fracturing can be met, since the water for future drilling usage would come from about a dozen aquifers (both shallow and deep), in an area containing more than 17 individual GCDs (spread across six regional water planning areas) and five GMAs. Brownlow determined that estimated water use from the Carrizo-Wilcox Aquifer is relatively minor over the long term. He explained that most of the Eagle Ford Shale play's Carrizo-Wilcox Aquifer usage was less than that of domestic, municipal, and irrigation usage, and pumping would be spread out over a vast area. He also said aquifers other than the Carrizo-Wilcox, as well as surface water, can be utilized.

Brownlow concluded with positive predictions regarding future water use trends:

> Economic benefits to the region are substantial. As Eagle Ford Shale development continues, recycling of flowback water can become an important source of water and will be economically viable in some areas. The Eagle Ford [Shale] play has actually created a 'water market,' providing additional revenue opportunities to area landowners. Will there be challenges? Yes. Local conflicts will occur, particularly in the eastern and western areas, but the 'big picture' is good.[45]

The Railroad Commission remains steadfast in its commitment to protecting groundwater and is currently amending its rules pertaining to injection and disposal wells, casing and cementing, well integrity, and water recycling and reuse.

Stephen L. Jester, P.E., Senior Principal Environmental Engineer at ConocoPhillips, also discussed groundwater supply and availability at the Task Force's UTSA meeting.[46] Citing the 2007 State Water Plan, Jester said the Carrizo-Wilcox Aquifer has one million acre-feet of available water and a demand of 450,000 acre-feet.[47] He

44 Ibid.

45 Ibid.

46 Jester, S. (2011, November 2). Stated at the Eagle Ford Shale Task Force meeting on water quality and quantity, San Antonio, Texas.

47 Subsequent to the meeting the TWDB reported in its 2012 State Water Plan that the Carrizo-Wilcox Aquifer has almost one million acre-feet of water available: Texas Water Development Board (TWDB). *2012 State water plan*, p. Ch. 5, p. 169. Retrieved from http://www.twdb.state.tx.us/publications/state_water_plan/2012/05.pdf

The Eagle Ford Shale Task Force agreed that more education and public awareness about hydraulic fracturing is needed, as there are key differences between the industry's use of the technical term "hydraulic fracturing" and the general public's usage of the term "fracking," which often includes all associated surface and transportation operations, as well as all downhole operations, and at times, carries a negative connotation.

added that the Gulf Coast Aquifer, which supplies a substantial amount of water to the northern portion of the play, has 1.8 million acre-feet of available water per year with a demand of 1.2 million acre-feet per year.[48] Jester agreed with Brownlow's prediction that a sufficient supply of water from aquifers exists to meet the incremental demand from oil and gas operations in the Eagle Ford Shale. He emphasized, however, that local conditions should be monitored.

Task Force member Erasmo Yarrito, Jr., Rio Grande Watermaster for the TCEQ, added at the UTSA meeting that there appears to be sufficient mining water authorized in Rio Grande surface water rights to fulfill the mining water demand, based on current usage.[49]

Water Recycling and Reuse

Water recycling and reuse will reduce the amount of fresh water used in oil and gas development activities. These water management options were significant topics of discussion at the Task Force meetings. The amount of water that flows back from hydraulically fractured oil and gas wells is a function of the formation being hydraulically fractured. Generally, only water flowing back in the first days of the hydraulic fracturing process is reusable, when water infrastructure is still in place. The quality of the flowback water varies. Some of the initial flowback water can be reused with little treatment (e.g., filtration and mixing); other flowback water requires more advanced and expensive treatment. As such, the cost of reuse and recycling of flowback fluid is factored into the overall economics of an oil or gas well, which is dependent on the market price of oil and gas.

48 Subsequent to the meeting the TWDB reported in its 2012 State Water Plan that the Gulf Coast Aquifer has almost 1.9 million acre-feet of water available: Texas Water Development Board (TWDB). *2012 State water plan*, Ch. 5, p. 169. Retrieved from http://www.twdb.state.tx.us/publications/state_water_plan/2012/05.pdf

49 Subsequent to the meeting, Yarrito reported that the TCEQ has permitted 152,094.557 acre-feet of surface water rights designated for use along the Rio Grande in the counties designated as Eagle Ford shale counties. During fiscal year 2012, there was a use of 35,809.6367 acre-feet. So far this fiscal year, there has been a slight increase to 44,639.1944 acre-feet, which is about a 20 percent increase over last fiscal year.

Some oil and gas companies are also exploring the reuse of wastewater generated by other sources, such as municipalities. Additionally, operators are increasingly using brackish water as an alternative to fresh water in the makeup of their hydraulic fracturing fluids. The Task Force agreed that water recycling, reuse, and the use of brackish water are all positive methods for conserving fresh water, and the Task Force supports the energy industry's ongoing development of initiatives and technological advancements designed to further these methods.

To encourage the potential reuse and recycling of flowback and produced water, the Commission is currently amending its water recycling rules. The existing commercial recycling rules consider two categories of commercial recycling facilities: mobile facilities and stationary facilities. However, since the initial adoption of commercial recycling rules in 2006, the Commission has received a growing number of applications for facility permits that do not fit in either category. Commission staff is amending the rule to include five categories of permitted commercial recycling activities. The amendments to the commercial recycling rule are designed to encourage water recycling, streamline the permitting process, and support innovation and technological advancements.

The Commission has issued permits to 14 mobile recycling facilities and one stationary facility. All but two of the mobile recycling operators are allowed to conduct business statewide. The Commission is currently reviewing six pending mobile applications. Moreover, the Commission's Waste Minimization Program can help operators identify recycling options, and the TCEQ provides information on programs that promote recycling and reuse of water – Recycle Texas and RENEW. Recycle Texas lists many of the companies that recycle various wastes, including many wastes that are typical of oil and gas operations. RENEW is a waste exchange, listing companies that generate wastes that are available for recycling and companies that recycle waste.[50]

At the UTSA meeting, Brent Halldorson, Chief Operating Officer of Fountain Quail Water Management ("FQWM"), identified several key water issues in the Eagle Ford Shale and noted that companies such as FQWM provide solutions. He said major water concerns in the Eagle Ford Shale include the following:

1. Disposal
2. Fresh water availability
3. Regulations and community issues at the municipal, state, and federal levels
4. Recycling and reuse
5. Transportation

Halldorson concluded his presentation stating: "Oil and gas is a blessing, providing energy independence and economic growth, and it was pioneered here in Texas. Water is a blessing, and even though water management can be challenging, given the proper tools, industry can innovate."[51]

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50 Information on Recycle Texas and RENEW is available on the TCEQ website.

51 Halldorson, B. (2011, November 2). Stated at the Eagle Ford Shale Task Force meeting on water quality and quantity, San Antonio, Texas.

Conclusion

Based on the research, data, and information presented at the meetings, the Task Force concluded that the Carrizo-Wilcox Aquifer appears to contain sufficient water resources to support oil and gas drilling and completion activities in the Eagle Ford Shale, including hydraulic fracturing, while meeting all other projected uses. The Task Force further agreed that localized impacts on water must be addressed. Commissioner Porter observed that stakeholders should continue to study and implement best practices for water management in South Texas to help mitigate any future issues.

Additionally, the Task Force agreed that more education and public awareness about hydraulic fracturing is needed, as there are key differences between the industry's use of the technical term "hydraulic fracturing" and the general public's usage of the term "fracking," which often includes a vast array of downhole activities, as well as associated surface and transportation operations, and at times, has a negative connotation.

The Task Force concluded that water quality and quantity are critical to the future of Texas, and they stressed that while hydraulic fracturing operations only represent less than one percent of statewide water use,[52] the oil and gas industry must play its part to reduce its water footprint.

The Eagle Ford Shale Task Force concluded that water quality and quantity are critical to the future of Texas, and they stressed that while hydraulic fracturing operations represent less than one percent of statewide water use, the oil and gas industry must play its part to reduce its water footprint.

52 Nicot, J., Reedy, R. C., Costley, R. A., & Huang, Y. (2012, September). Bureau of Economic Geology, Jackson School of Geosciences. Oil & gas water use in Texas: update to the 2011 Mining Water Use Report. Austin, TX: The University of Texas, p. ii. Retrieved from http://www.twdb.texas.gov/publications/reports/contracted_reports/doc/0904830939_2012Update_MiningWaterUse.pdf

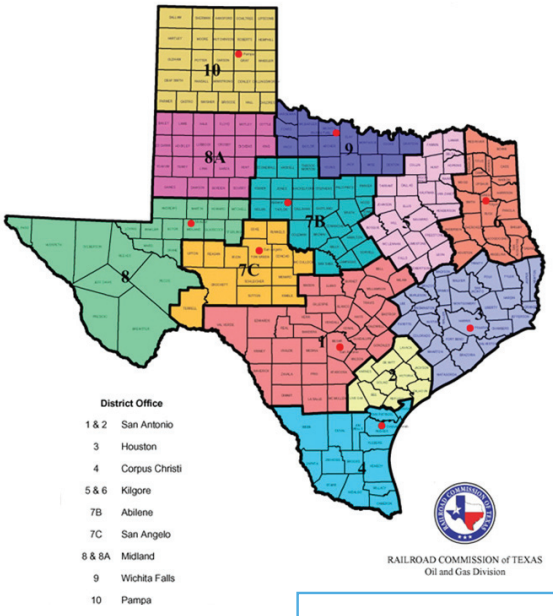
4 RAILROAD COMMISSION REGULATIONS

The Railroad Commission serves Texas by its stewardship of natural resources and the environment, its concern for personal and community safety, and its support of enhanced development and economic vitality for the benefit of Texans.

The Railroad Commission ("Commission") is the oldest regulatory agency in the state and one of the oldest of its kind in the nation. The Commission is recognized as a world leader in developing effective energy regulations that ensure resource recovery operations meet or exceed critical environmental and safety compliance standards. The Commission takes a balanced approach to "its stewardship of natural resources and the environment, its concern for personal and community safety, and its support of enhanced development and economic vitality for the benefit of Texans."[1] This balanced oversight has allowed Texas to thrive as the top oil and natural gas producing state in the country.

The Commission was created by the Texas Constitution and has statutory authority under state and federal law to regulate the state's energy industry. The Commission has primary regulatory jurisdiction over the oil and gas industry, pipelines moving oil and gas, pipeline safety, natural gas utilities, compressed and liquid natural gas, propane safety, and coal and uranium surface mining operations.[2] In addition, the Commission is responsible for sponsoring research and conducting education initiatives that promote the use of liquefied petroleum gas as an alternative fuel in Texas.[3] The Commission's main functions are to: (1) protect the environment, public safety, and correlative rights of mineral interest owners; (2) prevent waste of natural resources; and (3) assure reasonable and non-discriminatory utility rates and service.

Oil and Gas Division District Boundaries



The Commission has additional field offices in Fort Worth and Tyler.

The Commission's field operations staff is located in 11 district offices across the state and comprises approximately 40 percent of the Commission's workforce. The district offices monitor field activities to ensure compliance with Commission rules, regulations, and permit specifications. They conduct more than 100,000 inspections per year.

The Eagle Ford Shale Task Force ("Task Force") met to discuss in more detail the Commission's regulatory responsibilities, including Eagle Ford Shale field rules and permitting processes for injection and disposal wells, flaring, and other environmental activities. Throughout the meeting, the presenters emphasized that due to increased oil and gas exploration within the Eagle Ford Shale, the Commission has directed more resources toward oversight of field operations and the timely processing of permit applications. The Commission's Austin and district offices have hired additional

1 Railroad Commission of Texas. (2013, February). *About the agency – mission statement*. Retrieved from http://www.rrc.state.tx.us/about/mission.php

2 Railroad Commission of Texas. (2012, May). *Railroad Commission authority and jurisdiction – frequently asked questions (FAQs)*. Retrieved from http://www.rrc.state.tx.us/about/faqs/rrcjurisdictions.php

3 Ibid.

field inspectors and support staff, such as geologists, engineers, and administrative assistants, to facilitate the permit application processes.

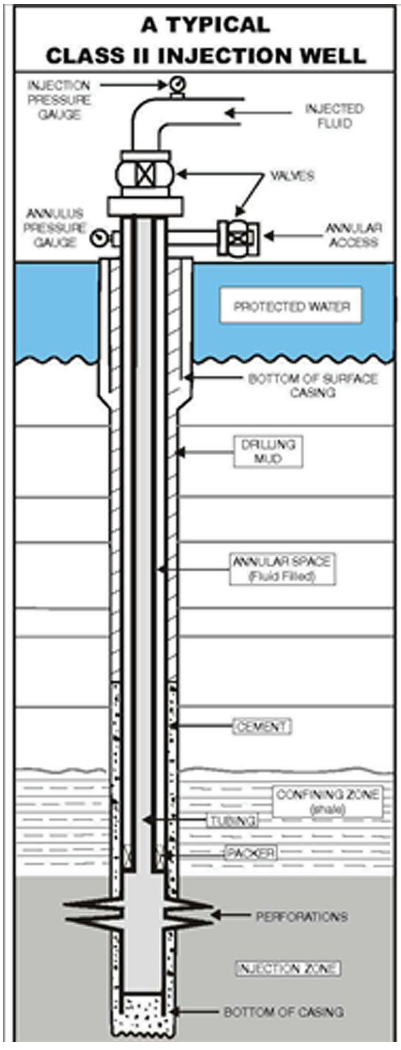
TASK FORCE MEETING

At the Task Force meeting on regulations, held at Remote Logistics International Lodge in Three Rivers on January 25, 2012, the following people made presentations:

Doug Johnson, Manager of Injection-Storage Permits, Oil & Gas Division, Railroad Commission

Michael Sims, Manager of Environmental Permits, Oil & Gas Division, Railroad Commission

Gil Bujano, Director of the Oil & Gas Division, Railroad Commission



Injection and Disposal Well Permitting and Regulations

Injection wells have been regulated by the Commission since 1936. These wells are used for enhanced recovery, disposal of oil and gas wastes, underground hydrocarbon storage, and brine mining. The increase in oil and natural gas production in the Eagle Ford Shale and statewide has increased the demand for disposal of produced and flowback water.

Injection wells are authorized in Texas under Title 3 of the Texas Natural Resources Code[4] and Chapters 26, 27, and 29 of the Texas Water Code.[5] The Commission's injection well regulations are administered by the agency's Technical Permitting Section-Underground Injection Control Program, as delegated by the U.S. Environmental Protection Agency under the Federal Safe Drinking Water Act.[6] The Commission regulates two categories of injection wells: (1) Class II injection wells used to dispose of oil and gas waste, and (2) Class III injection wells for brine mining governed by Statewide Rule 81. The injection wells referenced in this report are exclusively Class II (i.e., Class III injection wells are not discussed in this report).

4 See Tex. Nat. Res. Code Ann. § 91.551 (West); Tex. Nat. Res. Code Ann. § 81.051 (Vernon), for an inclusive definition of oil wells, and the jurisdictional authority of the Commission over these wells.

5 Tex. Water Code Ann. § 26 (West 2011); Tex. Water Code Ann. § 27 (West 2011); Tex. Water Code Ann. § 29 (West 2011).

6 40 C.F.R. § 144.1 (2011).

Statewide Rule 9 governs the disposal of saltwater and other oil and gas waste by injection into porous formations that are not productive of oil, gas, or geothermal resources.[7] To receive a permit, an applicant must complete and file Commission Form W-14. (See Appendix A.4 for W-14 Application.)

Statewide Rule 46 governs the injection of water, steam, gas, oil and gas wastes, or other fluids into porous formations that are productive of oil, gas, or geothermal resources.[8] This injection is frequently used for enhanced recovery operations. To receive a permit, an applicant must complete and file Commission Forms H-1 and H-1A. (See Appendix A.5 for H-1 Application and A.6 for H-1A Application.)

A commercial disposal well is a type of injection well for which an operator or owner is compensated by others for disposal of oil field fluids or other oil and gas wastes trucked to the disposal well. The Commission has additional notice requirements for commercial disposal applications and additional standard conditions for surface facilities associated with waste management.

The Commission's technical staff carefully review all injection well permit applications, including those for disposal wells, to ensure they meet state and federal standards. The permitting process for injection wells is as follows:

1. An applicant must give notice to "affected persons,"[9] including by publication, and file either Commission Form W-14 (for disposal wells) or Commission Forms H-1and H-1A (for fluid injection into productive reservoirs).
2. Commission staff performs a technical review.
3. If no affected persons protest and the application passes technical review, the permit is issued, and a Commission hearing is not required.[10]
4. If there is protest or concern by Commission staff after technical review, the applicant may request a hearing.
5. After the Commission hearing, Commission examiners make recommendations based on the evidence presented and the applicable law and rules. The Commissioners then decide whether or not to issue the permit.

All disposal well applications must provide notice to the surface owners of drill site tracts, all operators within one-half mile, the applicable county and city clerks, and by publication. A commercial disposal applicant must also provide notice to surface owners of offset (i.e., adjacent) tracts and surface owners within one-half mile, even if not directly offset.

7 16 Tex. Admin. Code § 3.9 (West 2013) (Railroad Comm'n of Tex., Disposal Wells).

8 16 Tex. Admin. Code § 3.46 (West 2013) (Railroad Comm'n of Tex., Fluid Injection into Productive Reservoirs).

9 An affected person includes only a person who has suffered or will suffer injury or economic damage other than as a member of the general public. Local governments and surface owners of the drill site tract and the offset tract(s) are presumed affected.

10 A hearing is required for hydrogen sulfide injection under Statewide Rule 36(c) (10).

The Railroad Commission's main functions are to protect the environment, public safety, and correlative rights of mineral interest owners; prevent waste of natural resources; and assure fair and equitable utility rates in natural gas distribution industries.

The sites of proposed injection wells, including disposal wells, must satisfy certain minimum geologic requirements. The permitted injection interval must be isolated from overlying usable quality water by a minimum of approximately 250 feet of shale, clay, or other impermeable strata. The permitted injection interval must be isolated from productive intervals above and below the permitted injection interval to prevent migration of injected fluids into such intervals and interference with production of oil and gas.

All injection wells, including disposal wells, must satisfy the casing and cementing requirements found in Statewide Rule 13.[11] These wells must be cased and cemented to prevent migration of injected fluids into usable quality water zones and to ensure confinement of injected fluids in the permitted injection interval.[12] The applicant for disposal and other injection well permits must perform an analysis covering a specified one-fourth mile area of review to identify all wells within that area and confirm that all abandoned wells within that area are properly plugged. This is required to ensure that injection fluids will not migrate to strata other than the permitted injection interval. Moreover, the Commission imposes specific testing requirements for equipment and mechanical integrity and maintains requirements for operating, monitoring, and reporting.

Other operators in the area of an application for a disposal well who may be affected may protest an application based on whether the disposal well will have an effect on production and operations of other existing and future wells within the area. Landowner protests regarding disposal wells usually include concerns about possible pollution of usable quality water and the configuration and location of surface facilities.

Also, under Section 27.051(b)(1) of the Texas Water Code, before the Commission can issue an injection well permit, it must find that the use or installation of the injection well is in the public interest.[13] The term "public interest" has been interpreted by the Commission to mean a safe and economical mechanism for the disposal

11 16 Tex. Admin. Code § 3.13 (West 2013) (Railroad Comm'n of Tex., Casing, Cementing, Drilling, and Completion Requirements).

12 The Commission's Groundwater Advisory Unit is tasked with determining the depth to which water must be protected.

13 Tex. Water Code Ann. § 27.051 (Vernon 2011).

of oil and gas waste to thereby increase oil and gas production. The term does not include a consideration by the Commission of truck traffic on state roads and highways. The Commission's authority for its interpretation was upheld by the Texas Supreme Court in *Railroad Commission of Texas v. Texas Citizens for a Safe Future and Clean Water*.[14]

At the January Task Force meeting in Three Rivers, Doug Johnson, Manager of Injection-Storage Permits at the Commission, discussed the requirements for obtaining a disposal well or injection well permit, including the required monitoring of such wells to ensure safe operation and the protection of usable quality groundwater.[15] Johnson's presentation included a discussion of permitting-related issues, such as notification requirements, well siting, wellbore construction, and permit parameters. Additionally, the Task Force discussed field-related issues that are outside of the Commission's jurisdiction, such as truck traffic, noise, and odors.

The Commission initiated a rulemaking process prior to the meeting to amend Statewide Rules 9 and 46 with the goal of incorporating additional safeguards.[16] Key changes from the proposed amendments could include additional surface casing requirements to increase protection of usable quality water and increased evaluations of surrounding producing wells and orphaned wells to further eliminate possible conduits for escape of injected fluids from the permitted injection zone.

The Task Force members also discussed well integrity issues. Subsequent to the meeting, the Commission decided to consider amendments to Statewide Rule 13,[17] the rule governing casing and cementing. Through this rulemaking, the Commission is seeking to more clearly outline the requirements for all wells, consolidate the requirements for well control and blow-out preventers, and update the requirements for drilling, casing, cementing, and fracture stimulation.

Environmental Permits

Michael Sims, Manager of Environmental Permits at the Commission, discussed permitting and monitoring requirements for centralized storage facilities (pits), discharges, waste haulers, and commercial recycling facilities.[18]

14 R.R. Com'n of Texas v. Texas Citizens for a Safe Future & Clean Water, 336 S.W.3d 619, 633 (Tex. 2011), reh'g denied (May 27, 2011).

15 Johnson, D. (2012, January 25). Stated at the Eagle Ford Shale Task Force meeting on Railroad Commission regulations, Three Rivers, Texas.

16 RAILROAD COMM'N of Tex., DRAFT FOR INFORMAL COMMENT, 16 Tex. Admin. Code §§ 3.9, 3.36, 3.46, available at http://www.rrc.state.tx.us/rules/inf-comment-rule-text-only-3-9-and-3-36-and-3-46-Nov2012.pdf

17 37 Tex. Reg. 7021 (2012) (to be codified at 16 Tex. Admin. Code §§ 3.13, 3.99, 3.100) (proposed September 7, 2012) (Railroad Comm'n of Tex.).

18 Sims, M. (2012, January 25). Stated at the Eagle Ford Shale Task Force meeting on Railroad Commission regulations, Three Rivers, Texas.

Sims' presentation also included discussion of the following:

1. Permitting and monitoring earthen pits (200,000-300,000 barrel range) functioning as centralized storage facilities
2. Hydrostatic test discharge water related to testing of new pipelines
3. Permitting waste haulers and guaranteeing the integrity of transport vessels to prevent leaks
4. Timely permitting of waste recycling facilities to ensure waste is being properly recycled and/or disposed

Statewide Rule 8 and Chapter 4 of the Texas Administrative Code each specify permitting and monitoring requirements for the management of oil and gas waste at or near the surface.[19]

The Commission requires the design of above-ground storage pits to be prepared under the seal of a registered engineer. Pits requiring permits under Statewide Rule 8 include saltwater disposal pits, collecting pits, skimming pits, brine pits, brine mining pits, washout pits, and any other pit not specifically authorized by the rule.[20] An operator wishing to maintain and use a pit must apply for a permit by filing Commission Form H-11 and supplying additional information. (See Appendix A.7 for H-11 Application.)

The Railroad Commission's Austin and district offices have hired additional field inspectors and support staff, such as geologists, engineers, and administrative assistants, to facilitate the permit application processes.

The application review for hydrostatic test water discharge permits is an administrative process conducted by the Commission's Environmental Permits division. Currently, to discharge oil and gas wastes to surface water in the state, a discharge permit applicant is required to obtain a federal permit and a state permit. Section 26.131(b) of the Texas Water Code prohibits the Commission from issuing a permit for a discharge that will cause a violation of the Surface Water Quality Standards adopted by the Texas Commission on Environmental Quality ("TCEQ"), as required by the Federal Clean Water Act.[21] Although the Commission has the jurisdiction to regulate the disposal of all oil and gas wastes, only a few specific

19 16 Tex. Admin. Code § 3.8 (2004) (Railroad Comm'n of Tex., Water Protection); 16 Tex. Admin. Code § 4 (2004) (Railroad Comm'n of Tex., Environmental Protection).

20 16 Tex. Admin. Code § 3.8 (2004) (Railroad Comm'n of Tex., Water Protection); 16 Tex. Admin. Code § 4 (2004) (Railroad Comm'n of Tex., Environmental Protection).

21 Tex. Water Code Ann. § 26.131 (West 2011).

waste streams are eligible to be discharged to surface water in the state. The Commission regulates three major categories of discharges to surface waters:

1. Hydrostatic test water discharge
2. Gas plant effluent discharge
3. Produced water

The review of waste hauler permits is also an administrative process conducted by the Commission's Environmental Permits section. Any person or party that transports oil and gas waste for hire and for disposal by any method other than by pipeline off a lease, unit, or other oil and gas property, must obtain a specific permit from the Commission. An applicant seeking a waste hauler permit must complete and file Commission Form WH-1 (Application of Oil and Gas Waste Haulers permit), Commission Form WH-2 (Oil and Gas Waste Hauler List of Vehicles), and Commission Form WH-3 (Oil and Gas Waste Haulers Authority to Use an Approved Disposal/Injection System).[22] (See Appendix A.8 for WH-1 Application, Appendix A.9 for WH-2 Application, and Appendix A.10 for WH-3 Application.)

The Railroad Commission is in the process of amending its rules for injection and disposal wells, well integrity, wellhead control, waste management, and water recycling.

Due to the increase in drilling activity statewide, especially in the Eagle Ford Shale play, Commission staff reported an increase in permits issued for waste haulers. The Commission has increased its enforcement efforts to monitor the expanded presence of waste haulers by partnering with the Texas Department of Public Safety. Commission inspectors and state troopers patrol together to find drivers who violate regulations, such as illegal waste hauling, which could potentially cause oil slicks and unsafe road conditions. During such an inspection, Commission staff ensures that the waste hauler is properly permitted and the amount of waste being transported is not above the amount specified in the hauler's permit. The proposed amendments to Statewide Rule 8 (referenced earlier in this chapter) would strengthen requirements for waste hauler vehicle operation, design, and maintenance – all in a concerted effort to prevent leaks.

Commercial recycling permits were also addressed at the meeting. To address the growing demand for commercial

22 Form WH-3 is required if disposing of oil and gas waste at disposal systems other than: (1) disposal systems operated under authority of a minor permit issued by the Commission; and (2) disposal systems permitted by another state agency or another state.

recycling permits, the Commission is considering amendments to the recycling rules.[23] Among other things, the proposed amendments would provide additional guidance for permit applicants as well as establishing separate requirements for solid waste recycling and water recycling.

Flaring Rules and Regulations

Natural gas is often produced in conjunction with crude oil. When pipeline facilities are not available to take the gas, the gas may be burned – flared – at the site of production so that the oil can be produced and taken to market. In addition, flaring may also occur as a result of a gas plant shutdown or well testing and maintenance.

Gil Bujano, Director of the Commission's Oil and Gas Division, discussed the permitting requirements associated with flaring and venting of natural gas governed by Statewide Rule 32.[24] The Commission is charged with balancing the potential waste of natural gas with the need for oil production.[25] While natural gas is a valuable commodity that must be treated in accordance with sound environmental regulation, prohibition of all flaring could halt the production of oil from wells not connected to pipelines. A detailed explanation of the permitting requirements for flaring and venting can be found in Chapter 6: *Flaring and Air Emissions*.

Update on Eagle Ford Shale Field Rules

Bujano also gave an update on field rules at the meeting. He discussed the Eagle Ford Shale's six main fields. He mentioned that in addition to the six main fields there are another 15 active fields, but those 15 fields only comprise two to three percent of Eagle Ford Shale production.[26] He reported that the majority of the drilling in the Eagle Ford Shale is horizontal drilling and explained that the Commission regulates spacing and density to avoid wasting resources and to protect correlative rights. Bujano said the Briscoe Ranch is the only field with permanent field rules, and the other field rules would need review. He also said there has been some movement toward consolidation of fields and field rules. Consideration of consolidation must take into account specific field conditions in determining whether it is warranted. Commissioner Porter noted that some field rules would be extended, but more production history was needed to be able to successfully craft appropriate permanent field rules in the Eagle Ford Shale.

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23 16 Tex. Admin. Code § 3.8 (2004) (Railroad Comm'n of Tex., Water Protection) available at http://www.rrc.state.tx.us/rules/prop-ch4-subchB-comm-recycling-Sept-2012.PDF (the current rule and proposed amendments); 16 Tex. Admin. Code § 4 (2004) (Railroad Comm'n of Tex., Environmental Protection) available at http://www.rrc.state.tx.us/rules/prop-ch4-subchB-comm-recycling-Sept-2012.PDF (the current rule and proposed amendments).

24 16 Tex. Admin. Code § 3.32 (West 2013) (Railroad Comm'n of Tex., Gas Well Gas and Casinghead Gas Shall Be Utilized for Legal Purposes).

25 Bujano, G. (2012, January 25). Stated at the Eagle Ford Shale Task Force meeting on Railroad Commission regulations, Three Rivers, Texas.

26 Bujano, G. (2012, January 25). Stated at the Eagle Ford Shale Task Force meeting on Railroad Commission regulations, Three Rivers, Texas.

Subsequent to the meeting, as of January 2013, the Commission staff reported that there are currently two primary Eagle Ford fields, the Eagleville (Eagle Ford-1), covering all of Railroad Commission District 1 and the Eagleville (Eagle Ford-2), encompassing all of District 2. These two fields have identical rules which were made permanent by Commission order on June 26, 2012. In Commission District 3, there are proceedings pending to establish or amend field rules for three fields in the Eagle Ford formation, namely, Cypress Landing (Eagle Ford); Eagleville (Eagle Ford-3); and Giddings (Eagleford). Smaller Eagle Ford Shale fields with their own field rules include the Briscoe Ranch (Eagleford), Hawkville (Eagleford Shale), Sugarkane (Eagle Ford), and the DeWitt (Eagle Ford Shale). Each of these smaller fields now has permanent field rules including special provisions for horizontal wells.

The Task Force unanimously agreed that the Commission, with input from the public, should continue to review and update rules to reflect field conditions and activities, account for technological advancements, and promote production and exploration.

The Railroad Commission's field operations staff is located in 11 field offices across the state and comprises approximately 40 percent of the Commission's staff.

5 ECONOMIC BENEFITS

According to the International Energy Agency, the U.S. will surpass Russia and Saudi Arabia and lead the world in oil production by 2020. The nation's natural gas production will exceed its consumption in 2020, enabling the U.S. to become a net exporter of the resource. The U.S. will be almost entirely energy independent by 2035.

(World Energy Outlook 2012)

The shale revolution has transformed the oil and gas industry and restored the United States as a global energy leader.

Upon launching the Eagle Ford Shale Task Force ("Task Force"), Railroad Commissioner David Porter predicted, "The Eagle Ford Shale has the potential to become the most significant economic development in Texas history, affording substantial local and state revenue, supporting local markets, and expanding educational and professional opportunities."[1]

Commissioner Porter is right: The shale revolution has transformed the oil and gas industry and restored the United States as a global energy leader. The U.S. satisfies about 80 percent of its energy needs via domestic production, with shale oil and gas representing an increasingly larger share of total production.[2] In 2007, shale gas represented only eight percent of total domestic gas production, but by 2011, that portion had grown to 30 percent.[3] The production of shale oil has also increased, helping the U.S. rank third in oil production worldwide.[4] The International Energy Agency ("IEA") 2012 World Energy Outlook predicts that the U.S. will surpass Russia and Saudi Arabia and lead the world in oil production by 2020.[5] Additionally, the IEA forecasts that U.S. natural gas production will exceed consumption in 2020, enabling the U.S. to become a net exporter of the resource.[6] Finally, due to these shale-related developments in oil and gas production, the IEA estimates that the U.S. will be almost entirely energy independent by 2035.[7]

1 Porter, D. (2011, July 27). Stated at the Eagle Ford Shale Task Force introduction and agenda-setting meeting, San Antonio, Texas.

2 U.S. Energy Information Administration. (2012, October 15). *U.S. energy facts explained*. Retrieved from http://www.eia.gov/energyexplained/index.cfm?page=us_energy_home

3 U.S. Energy Information Administration. (2013, January 7). *Natural gas annual*. Retrieved from http://www.eia.gov/naturalgas/annual/

4 U.S. Energy Information Administration. (2012, October 16). *Countries*. Retrieved from http://www.eia.gov/countries/

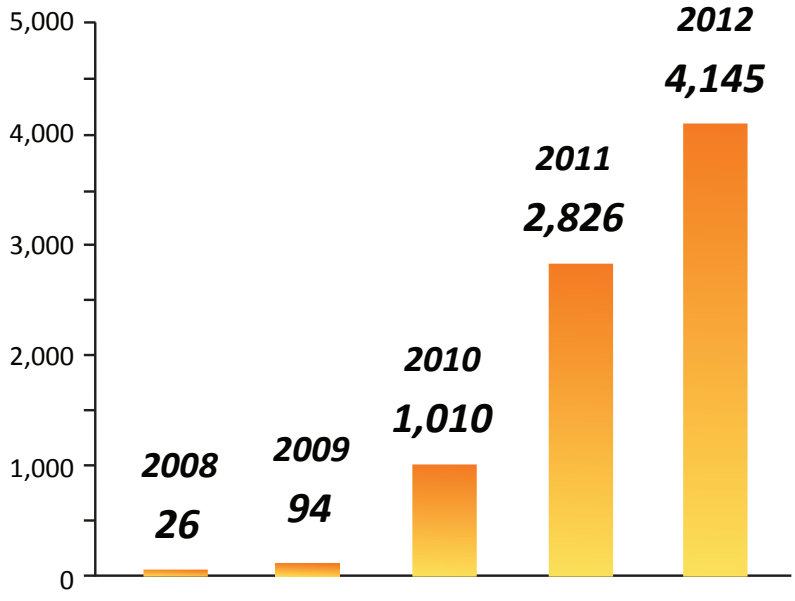
5 International Energy Agency. (2012). World energy outlook 2012 executive summary. IEA Publications: Paris, FR. Retrieved from http://www.iea.org/publications/freepublications/publication/English.pdf

6 Ibid.

7 Ibid.

Texas leads the nation in both oil and natural gas production, and the overall increase in American energy production is greatly attributed to the surge in shale exploration and production in Texas.[8] The Eagle Ford Shale is considered one of the top producing shale plays in North America, serving as the second largest tight oil play and ranking fifth in terms of shale gas production.[9] Since 2011, liquids production ("liquids" includes natural gas) has increased from approximately 100,000 barrels per day to 700,000 barrels per day, and research indicates that production activity is not slowing anytime in the near future.[10]

Capital investments continue to pour into the region. According to an analysis by Wood Mackenzie, the total Eagle Ford Shale capital expenditure for 2013 will be approximately $28 billion.[11] The analysis predicts that between 2013 and 2015, the Eagle Ford Shale will become the largest standalone energy project in the world (as measured by capital expenditures), surpassing the projected capital expenditure of the entire Kashagan project in Kazakhstan, which is currently estimated at $116 billion.[12]



The play's potential was inconspicuous at first. Only 26 drilling permits were issued in 2008; 94 in 2009.[13] The surge in oil and gas activity began in 2010, when the Railroad Commission ("Commission") issued

8 U.S. Energy Information Administration. (2012, October 9). Texas state profile and energy estimates. Retrieved from http://www.eia.gov/beta/state/analysis.cfm?sid=TX

9 McMahon, C. (2012, December 6). Wood Mackenzie: Total Eagle Ford capital expenditure to reach US $28 billion in 2013. Wood Mackenzie. Retrieved from http://www.woodmacresearch.com/cgi-bin/wmprod/portal/corp/corpPressDetail.jsp?oid=10950029

10 Ibid.

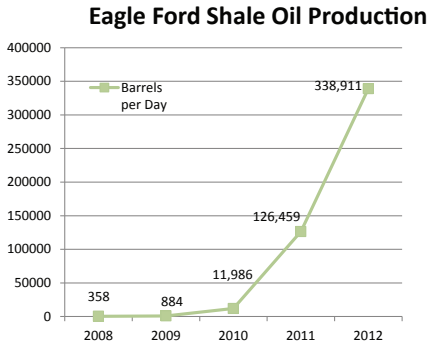
11 Ibid.

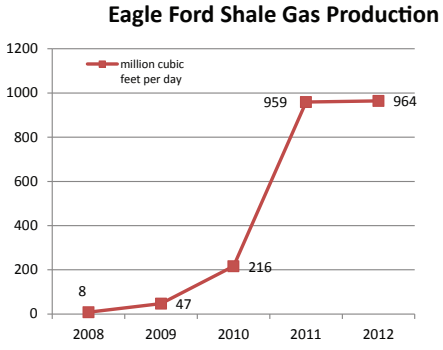
12 Ibid.

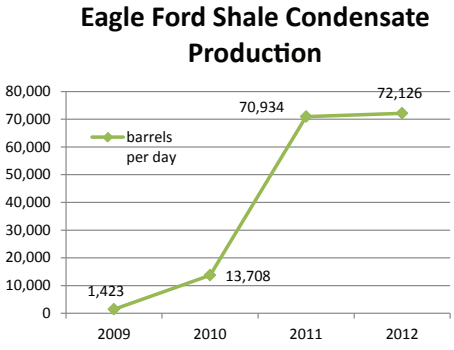
13 Railroad Commission of Texas. (2012). Eagle Ford information, drilling permits issued. Retrieved from http://www.rrc.state.tx.us/eagleford/EagleFordDrillingPermitsIssued.pdf

more than 1,000 drilling permits.[14] New permits exceeded 2,800 in 2011 and topped 4,000 in 2012.[15] From 2010 to 2011, oil production in the region's 14 most actively producing counties sextupled, reaching 28 million barrels.[16] Gas production more than doubled, reaching 271 billion cubic feet.[17] Total condensate production in these counties tripled from 2010 to 2011, reaching 21 million barrels.[18]

Although the Eagle Ford Shale had long been known to contain oil and gas, it was considered non-commercial until Petrohawk Energy drilled a horizontal well with hydraulic fracturing in 2008.[19] The discovery, which occurred as Texas was entering an economic recession, set off the boom that is a testament to the power of enterprise and innovation by individuals and companies. The continuing boom helped minimize the impact of the recession and fostered economic prosperity. On January 7, 2013, Texas Comptroller Susan Combs stated, "It is now becoming clear that shale formation technology, exploration, and production in Texas, as well as in other states, constitutes an extraordinarily important economic driver."[20]







14 Ibid.

15 Ibid.

16 Center for Community and Business Research, Institute for Economic Development. (2012, May). Economic impact of the Eagle Ford Shale. San Antonio, TX: The University of Texas at San Antonio, p. 4. Retrieved from http://ccbr.iedtexas.org/index.php/Download-document/52-Eagle-Ford-Shale-Final-Report-May-2012.html

17 Ibid.

18 Ibid.

19 Geology.com. (2013). Eagle Ford Shale - oil and natural gas. Retrieved from http://geology.com/articles/eagle-ford/

20 Combs, S. Texas Comptroller of Public Accounts. (2013, January 7). Texas Comptroller Susan Combs 2014-2015 biennial revenue estimate [Transcript]. Window on State Government. Retrieved from http://www.window.state.tx.us/newsinfo/speeches/010713_BRE-transcript.html

The Task Force met to discuss the broad-reaching economic opportunities attributable to the shale play. The discussion included analyses of the production numbers, review of the revenue impact on local and state governments, and strategies for local communities pursuing the new business created by the Eagle Ford Shale play.

Texas leads the nation in both oil and natural gas production, and the Eagle Ford Shale is the second largest tight oil play and ranks fifth in terms of shale gas production.

(Wood Mackenzie)

TASK FORCE MEETING

At the Task Force meeting on economic benefits, held at First Lutheran Church Fellowship Hall in Gonzales on April 18, 2012, the following people made presentations:

Dr. Thomas Tunstall, Director, Center for Community and Business Research at The University of Texas at San Antonio, Institute for Economic Development

Robert Wood, Director of Local Government Assistance and Economic Development, Texas Comptroller of Public Accounts

Paula Seydel, Manager, Dimmit County Chamber of Commerce

Dr. Thomas Tunstall, Director of the Center for Community and Business Research ("CCBR") at The University of Texas at San Antonio ("UTSA"), announced the upcoming release of Economic Impact of the Eagle Ford Shale, a study conducted by the CCBR at UTSA. Tunstall compared the study's findings with the 2011 preliminary study, also conducted by the CCBR.[21] He found that economic forecasts were conservative in the initial study, due to limited available information. Eagle Ford Shale production grew at an unprecedented, and therefore unpredictable, rate, and Tunstall said the actual 2010 and 2011 production figures remarkably exceeded his expectations.

To illustrate this point, Tunstall reported the following data: the initial study projected the production of 64 billion cubic feet of gas in 2010, but actual production was 110 billion cubic feet.[22] Likewise, the study forecasted

21 Center for Community and Business Research, Institute for Economic Development. (2011, February). Economic impact of the Eagle Ford Shale. San Antonio, TX: The University of Texas at San Antonio. Retrieved from http://www.anga.us/media/content/F7D1441A-09A5-D06A-9EC93BBE46772E12/files/utsa%20eagle%20ford.pdf

22 Tunstall, T. (2012, April 18). Impact of the Eagle Ford Shale on South Texas: issues and challenges. PowerPoint presented at the Eagle Ford Shale Task Force meeting on economic benefits, Gonzales, Texas.

> "It is now becoming clear that shale formation technology, exploration, and production in Texas, as well as in other states, constitutes an extraordinarily important economic driver."
>
> (Susan Combs, Texas Comptroller of Public Accounts)

122 billion cubic feet of gas in 2011, while actual production was 271 billion cubic feet.[23] The baseline study projected that the Eagle Ford Shale would attract 241 new wells in 2010 and 408 new wells in 2011.[24] The actual number of new wells was more than twice that projection: 554 in 2010 and 1,649 in 2011.[25] Additionally, the early study forecasted 2.1 million barrels of oil in 2010 and 8.7 million barrels in 2011.[26] The shale actually produced 4.4 million barrels in 2010 and 28 million barrels in 2011.[27] The institute did not forecast 2010 condensate production but predicted 5.6 million barrels for 2011 – a year in which over 20 million barrels were produced.[28]

On May 9, 2012, the report summarized by Tunstall at the meeting (Economic Impact of the Eagle Ford Shale) was released by CCBR at UTSA. It provides information about industry activity in the Eagle Ford Shale, a detailed analysis of areas affected by production, and specific reports on relevant counties based on 2011 data. This study is referenced throughout the Eagle Ford Shale Task Force Report.

The report assesses 14 of the region's "most actively producing" counties: Atascosa, Bee, DeWitt, Dimmit, Frio, Gonzales, Karnes, La Salle, Live Oak, Maverick, McMullen, Webb, Wilson, and Zavala.[29] (See table.)

23 Ibid.

24 Ibid.

25 Ibid.

26 Ibid.

27 Ibid.

28 Ibid.

29 Center for Community and Business Research, Institute for Economic Development. (2012, May). Economic impact of the Eagle Ford Shale. San Antonio, TX: The University of Texas at San Antonio, p. 4. Retrieved from http://ccbr.iedtexas.org/index.php/Download-document/52-Eagle-Ford-Shale-Final-Report-May-2012.html

TOTAL IMPACT CHANGES

County	2011 Total Output Impact	County	2021 Total Output Impact
Karnes	$3,277,139,310	Karnes	$10,578,250,837
Dimmit	$2,815,166,006	Dimmit	$8,669,580,570
Webb	$2,483,980,925	Webb	$8,613,859,557
La Salle	$2,256,036,447	La Salle	$7,534,039,742
Live Oak	$2,039,494,418	Live Oak	$6,663,478,243
Gonzales	$1,791,851,850	Gonzales	$6,380,422,557
DeWitt	$1,629,619,284	DeWitt	$3,774,023,887
McMullen	$1,200,730,305	McMullen	$3,349,516,870
Atascosa	$586,391,972	Atascosa	$2,204,221,000
Frio	$354,698,629	Frio	$1,170,090,384
Wilson	$321,343,516	Wilson	$1,098,743,916
Zavala	$217,018,123	Zavala	$636,026,688
Maverick	$165,478,563	Maverick	$314,953,869
Bee	$96,175,544	Bee	$63,523,242

Source: The University of Texas at San Antonio, "Economic Impact of the Eagle Ford Shale" (October 2012)

The report also provides a 20-county assessment, which includes six additional Eagle Ford Shale counties that have experienced "significant non-production" activities: Bexar, Jim Wells, Nueces, San Patricio, Uvalde, and Victoria.[30] For the purposes of this section of the Report, the 20-county assessment will be referenced.

In 2011, the total economic output for the 20-county region was over $25 billion.[31] Additionally, the region supported over 47,000 full-time jobs, paid $3.1 billion in salaries and benefits to workers, generated $12.63 billion in gross regional product, produced $257 million in local government revenues, and paid $358 million in state revenues, including $120.4 million in severance taxes.[32]

30 Ibid, p. 4.

31 Ibid, p. 5.

32 Ibid, p. 4.

The study projects $62.3 billion in economic output from the Eagle Ford Shale region in 2021.[33] By that time, the study predicts that the region will support 116,972 full-time jobs, pay $7.7 billion in salaries and benefits, provide $42 billion in gross regional product, pay $1.09 billion in local government revenues, and provide $1.76 billion in state revenues.[34]

By 2021, the CCBR estimates 25,000 new oil and gas wells will be drilled in the Eagle Ford Shale, and the report projects the production of over 860 billion cubic feet of gas, approximately 121 billion cubic feet of casinghead gas, almost 170 million barrels of oil, and almost 126 million barrels of condensate.[35]

During the Task Force meeting on April 18, 2012, the Director of Local Government Assistance and Economic Development for the Texas Comptroller of Public Accounts, Robert Wood, reported that employment in the oil and gas industry, including the refining of oil, manufacturing of chemicals, and related manufacturing sectors, increased by 11 percent from 2010 to 2011, compared to a growth rate of two percent for all industries.[36] He added that wage and salary income in the oil and gas industry increased by 18 percent from 2010 to 2011 – versus just two percent for all industries.[37] He further reported that the average 2011 income for workers in the oil and gas industry was $117,000, compared to the all-industry average of $49,000.[38]

According to Wood, in fiscal year 2011, the oil and gas industry, and other related industries, paid over $4.2 billion in state sales and use, franchise, production, and pipeline taxes.[39] He said the industry paid $136 million in fees and assessments and over $1.4 billion in royalties and lease bonuses to the state.[40] Wood continued, adding that preliminary data for 2011 suggests the statewide taxable value of oil and gas properties in Texas is $106 billion, representing more than $1.2 billion in property tax dollars for public schools and about $500 million in property taxes for cities, counties, and other taxing units.[41] These property tax values have increased 57 percent from 2005 to 2011.[42]

33 Ibid, p. 8.

34 Ibid.

35 Ibid.

36 Wood, R. (2012, April 18). Stated at the Eagle Ford Shale Task Force meeting on economic benefits, Gonzales, Texas.

37 Ibid.

38 Ibid.

39 Ibid.

40 Ibid.

41 Ibid.

42 Ibid.

Employment Changes in 14-County Region
2009 4th Quarter to 2011 4th Quarter

Industry	Employment 4th Qtr 2009	Employment 4th Qtr 2011	Employment Change	Percent Growth 2009-2011
Natural Resources and Mining	6,357	9,633	3,276	51.5%
Professional and Business Services	8,123	10,067	1,944	23.9%
Public Administration	12,223	14,205	1,982	16.2%
Leisure and Hospitality	13,938	15,683	1,745	12.5%
Trade, Transportation and Utilities	40,004	44,776	4,772	11.9%
Other Services	2,820	2,972	152	5.4%
Manufacturing	4,606	4,797	191	4.1%
Financial Activities	6,509	6,579	70	1.1%
Education and Health Services	52,555	52,878	323	0.6%
Information	1,085	1,064	-21	-1.9%
Construction	5,756	5,560	-196	-3.4%
Unclassified	29	28	-1	-3.4%
Total, All Industries	**154,005**	**168,242**	**14,237**	**9.2%**

Source: Workforce Commission of Texas, Quarterly Employment and Wages Data.

At the meeting, Task Force member Paula Seydel, Manager of the Dimmit County Chamber of Commerce, praised the Eagle Ford Shale for reviving Dimmit County's community and said, "It is the answer to a prayer, the answer to a dream."[43] Seydel shared the positive changes that the Eagle Ford Shale has brought about in Dimmitt County:

> There has definitely been an increase of growth in businesses here in our small communities… We were quiet, little, rural towns before the introduction of the Eagle Ford Shale oil and gas play. The entire population of Dimmit County was a little over 10,000. Now there is probably that number in the area surrounding Carrizo Springs alone. The amount of money generated by the increase in salaries for local people and the people who have moved into the area have added to the sales and use taxes coming into the cities. Records have been set for the amount of money coming in. Due to the increase in sales and population, we are in the process of getting a bigger H.E.B grocery store… The Chamber [of Commerce] business memberships have tripled within the last two years… With the increase in money for the county, they have been able to help the Chamber office with the renovation of the Old County Jail House to use as our office and a museum… Our future projects consist of building a new rodeo arena, a livestock show barn, and a multi-purpose building for use by the Chamber, 4-H organization, Youth Rodeo Association, and Livestock Association.[44]

The revenue increases brought by oil and gas activities have profoundly benefited South Texas communities, as well as the rest of the state. Proper planning enables residents to take advantage of population influxes and increased demand for services. Communities profit from the local sales taxes placed on retail transactions, leases, and taxable services.

Tunstall recommended strategies and long-term goals for communities seeking to pursue the opportunities presented by the Eagle Ford Shale. He suggested that communities should: (1) look for opportunities to diversify the local economy; (2) rediscover their community's history and architecture as a tool for economic development; (3) seize the opportunity to implement form-based zoning that emphasizes mixed-use, flexibility, livability, and sustainability; (4) forge linkages and alliances and engage other Eagle Ford Shale communities and higher education institutions; (5) identify best practices from other shale plays; and (6) work with elected representatives at the municipal, county, state, and national levels on infrastructure planning.[45]

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43 Seydel, P. (2012, April 18). Stated at the Eagle Ford Shale Task Force meeting on economic benefits, Gonzales, Texas.

44 Ibid.

45 Tunstall, T. (2012, April 18). Impact of the Eagle Ford Shale on South Texas: issues and challenges. PowerPoint presented at the Eagle Ford Shale Task Force meeting on economic benefits, Gonzales, Texas.

To improve governance and capacity, Tunstall recommended: (1) revenue and investment strategies, such as dedicating funds for public use early and identifying potential benefactors; (2) medium and long-term planning, particularly land-use and capital outlays; (3) strong institutional management; (4) engaging citizens to ensure balance and transparency; (5) fiscal discipline; (6) commitment to on-going education; and (7) learning from past mistakes.[46]

In conclusion, Tunstall noted the benefits of sustainable infrastructure, which include: (1) better roadways; (2) improved medical facilities; (3) more housing options; (4) adequate water and power supply; (5) improved waste management; (6) better quality K-12 education; (7) improved aesthetics (e.g. bulldozing derelict houses, cleaning-up junkyards, renovating and/or repurposing historical buildings); and (8) additional public attractions that improve the desirability of the community and quality of life, such as lakes, parks, hike and bike trails, and walkable neighborhoods.[47]

> "It is the answer to a prayer, the answer to a dream."
>
> (Paula Seydel, Eagle Ford Shale Task Force member and Manager, Dimmit County Chamber of Commerce)

46 Ibid.

47 Ibid.

6 FLARING AND AIR EMISSIONS

Texas has some of the most stringent air quality regulations in the United States – the Texas Clean Air Act predates the Federal Clean Air Act.

The Eagle Ford Shale is rich in both oil and natural gas. Many oil wells also produce natural gas in conjunction with crude oil. This gas is known as "casinghead gas." The gas is necessarily produced with the oil; the oil cannot be produced without the gas. For this reason, the casinghead gas must be managed if the oil is to be produced. And unlike oil, casinghead gas cannot be efficiently transported in trucks in its natural gaseous state; it must be transported through pipelines. Alternatives for managing the casinghead gas are to build pipeline infrastructure that can take the gas, flare the gas at the wellhead, or use the gas on-lease. Without doing so, wells must be taken out of production, having an adverse effect on the Eagle Ford Shale and its economic contributions to the state and local communities. For example, wells that are shut-in for long periods of time can suffer mechanical problems and cause reservoir damage, both of which may decrease available reserves.

The pipeline industry is building pipelines at a record pace. In the past three years, over 90,000 miles of pipeline have been built in Texas in an effort to keep up with the over 30,000 wells that have been drilled during the same time period. The fact of the matter is it takes longer to build a pipeline than it takes to drill a well, leading to a situation where demand exceeds supply. If pipelines are not in place, as is the case with many areas in the Eagle Ford Shale, the abundant gas will be managed using a technique called flaring: the regulated burning of natural gas.

From an air quality perspective, it is preferable to burn casinghead gas through a flare system rather than vent it directly into the atmosphere. Railroad Commission rules are written to encourage flaring instead of venting, due to potential safety and air quality concerns.

The majority of flaring permit requests received by the Railroad Commission ("Commission") are for flaring casinghead gas after an oil well's initial completion. Flaring of casinghead gas for extended periods of time may be necessary if the well is drilled in an area new to exploration where infrastructure is limited. In existing production areas, flaring also may be necessary because existing pipelines may have insufficient capacity or are otherwise unable to take the gas. Other reasons for flaring include a gas plant shutdown or well testing and maintenance, for example, to repair a compressor, gas line, or gas well. From an air quality perspective, it is preferable to burn the gas through a flare system rather than vent it directly into the atmosphere.

Statewide Rule 32 governs flaring and venting.[1] The rule states that gas releases resulting from routine oil and gas production operations are necessary for the efficient drilling and operation of oil and gas wells. For example, operators may flare gas for a period not to exceed 10 producing days after initial completion of a well, recompletion of the well in another field, or workover operations in the same field. The flared gas must be measured, reported to the Commission, and charged against lease allowable production.

When an operator needs to flare past this 10-day window, a Commission permit is required. The rule also specifies that gas from a well that must be unloaded or cleaned-up to atmospheric pressure may be vented into the air for periods not to exceed 24 hours in one continuous event or a total of 72 hours in one calendar month.

Statewide Rule 32 does not apply to gas transmission or gas distribution facilities or operations. Gas releases exempted from Statewide Rule 32 include the following:

1. Tank vapors from crude oil storage tanks, gas well condensate storage tanks, or salt water storage tanks
2. Fugitive emissions of gas
3. Low pressure separator gas, not to exceed 15 mcfd [2] of hydrocarbon gas per gas well or 50 mcfd of hydrocarbon gas per commission-designated oil lease or commingling point for commingled operations
4. Amine treater, glycol dehydrator flash tank, and/or reboiler emissions
5. Blowdown gas from flow lines, gathering lines, meter runs, pressurized vessels, compressors, or other gas handling equipment for construction, maintenance, or repair
6. Gas purged from compressor cylinders or other gas handling equipment for startup
7. Gas released at a wellsite during drilling operations and prior to the completion date of the well, including gas produced during air or gas drilling operations, or gas which must be separated from drilling fluids using a mud-gas separator, or mud-degasser
8. Gas released at a wellsite during initial completion, recompletion in another field, or workover operations in the same field, including but not limited to perforating, stimulating, deepening, cleanout, and well maintenance or repair operations

Even if gas releases are insignificant, or as the rule states, "not readily measured by devices routinely used in the operation of oil wells, gas wells, gas gathering systems, or gas plants, such as meters," the Commission may require flaring for safety reasons.

Statewide Rule 32 states that all gas releases greater than 24 hours duration shall be burned in a flare, if the gas can be burned safely. Gas releases of 24 hours duration or less may be vented to the air, if the gas can be safely

1 16 Tex. Admin. Code § 3.32 (West 2013) (Railroad Comm'n of Tex., Gas Well Gas and Casinghead Gas Shall Be Utilized for Legal Purposes).

2 Thousand cubic feet per day

vented, and is not required to be flared for safety reasons. Commission rules are intentionally written to encourage flaring instead of venting, due to potential safety and air quality concerns, and for that reason venting is less common. One exception to the rule that allows for venting greater than 24 hours duration is if the operator presents information that shows the gas cannot be both safely and continuously burned in a flare, but the gas can be safely vented. Under Commission district office procedures, notification for gas being flared or vented shall be made to the appropriate Commission district office as soon as possible. Venting is approved or denied on a case-by-case basis, and only after a full inspection by the Commission district office is conducted.

An operator needing to flare or vent for greater than 24 hours of continuous duration, outside of the permitted 10-day window, must obtain an exception under Rule 32. Likewise, if gas is released for 72 hours in one calendar month, the operator must also obtain an exception. The exception application form is called "Statewide Rule 32 Exception Data Sheet," and the Commission requires a filing fee and corresponding documentation showing that progress has been made toward establishing the necessary infrastructure to produce the gas, rather than flaring or venting it. (See Appendix A.11.) This required documentation includes the following:

1. An explanation regarding why the operations cannot be shut-in and the gas must be flared or vented
2. If vented, why the gas cannot be safely and continuously burned; and verification that the gas can be safely vented
3. An explanation of how all legal uses for casinghead gas have been investigated and exhausted
4. The distance to the nearest pipeline and the pipeline's operating conditions (e.g., sweet or sour gas, line pressure)

Additionally, Statewide Rule 58 requires operators to report gas dispositions, including the volumes of gas flared, to the Commission on their monthly production reports ("Form PR").[3] (See Appendix A.12.) The Form PR requires the reporting of actual, metered volumes of both gas well gas and casinghead gas at the lease level. The Oil and Gas Division at the Commission uses an automated program to review the thousands of monthly Form PRs in a timely manner. If flared or vented amounts of gas are reported above the level requiring a permit, another automated check is performed to verify the existence of a permit to flare or vent. If no permit exists, the lease is held in violation. A notice of violation letter is automatically issued to the operator, advising the company of the need to either discontinue flaring or venting or to apply for a permit to do so. If the operator fails to apply for the permit, or the permit application is denied, a pipeline severance is issued (which prevents the operator from selling oil and gas produced at the lease); the well or wells are shut-in; and Commission seals may be placed on the well(s).

The Commission staff is authorized to issue flaring permits for each gas well, oil lease, or commingled vent or flare point for 45 days at a time, potentially for a maximum of 180 days. If a well, lease, or plant is still flaring or

3 16 Tex. Admin. Code § 3.58 (West 2013) (Railroad Comm'n of Tex., Certificate of Compliance and Transportation Authority: Operator Reports).

venting after 45 days, the operator must re-submit a Statewide Rule 32 Exception Data Sheet in order to renew its permit. Applicants seeking an exception must show that efforts are being made to transport the gas to market. If an operator needs to flare longer than 180 days, Statewide Rule 32 requires an administrative hearing and a final order signed by the Commission. The documentation required for a permanent exception includes a cost-benefit analysis, a map showing the nearest pipeline capable of accepting gas, and an estimate of gas reserves.

Rule 32 provides for administrative granting or renewal of an exception due to specific situations, the most common of which is waiting for a pipeline or other marketing facility to be completed by a specific date (for casinghead gas only). Other reasons include the following:

1. Cleaning a well of solids and/or fluids
2. Unloading excess formation fluid buildup in a wellbore
3. Not transporting to a marketing facility due to mechanical, physical, or economic impracticability
4. Avoiding curtailment of gas production which would result in a reduction of ultimate recovery from a gas well or oil reservoir

For operators of a gas gathering system, gas plant, gas compressor facility, or other gas handling equipment not directly associated with lease production of gas, exceptions and renewals may be administratively granted for the following:

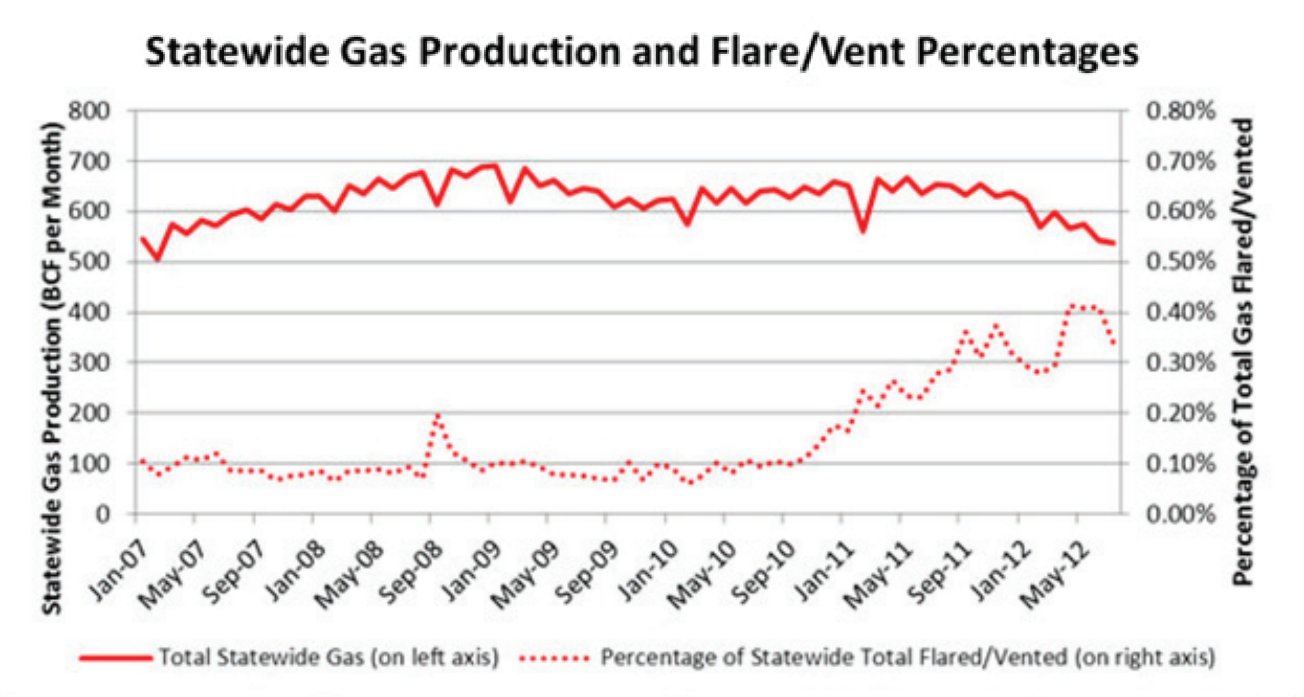
1. The repair, maintenance, or construction of gas gathering systems or gas plants
2. Gas plant turnaround
3. Emergency situations

To renew an exception, an operator is required to file a renewal application and pay a filing fee within 21 days of the expiration of the existing exception. If the requirements for an exemption renewal are completed within the prescribed deadlines, the operator is authorized to continue flaring or venting until final approval or denial of the requested permit extension. Rule 32 exceptions are not transferable upon a change of operatorship. Exception requests must be re-filed when operatorship is transferred.

Commission field inspectors conduct over 100,000 inspections annually, and they specifically check for compliance with Statewide Rule 32. Commission field inspections ensure the Commission is proactive in its

Railroad Commission field inspectors conduct over 100,000 inspections annually, specifically checking for compliance with Statewide Rule 32, governing flaring and venting. These inspections ensure the Railroad Commission is proactive in its efforts to maintain compliance and not solely reliant on automated reviews of operators' monthly production reports.

efforts to maintain compliance and not solely reliant on automated reviews of the operator's monthly production reports.



The number of flaring permits issued by the Commission has paralleled the booming growth of exploration. The Commission issued 107 flaring permits in 2008; 158 permits in 2009; 306 permits in 2010; 651 permits in 2011; and almost 2,000 permits in 2012.[4] However, to put these numbers in context, Texas currently has more than 151,000 active oil wells, and the amount of gas reported to the Commission as flared or vented is only 0.4 percent of the total amount of gas reported to the Commission.[5] Texas's volume of flared gas is substantially lower than flare volumes in Russia, Nigeria, Iraq, Iran, and the Bakken Formation in North Dakota.[6]

Flares are emission control devices. Flaring burns natural gas before returning it to the atmosphere, destroying toxins and the methane that must be controlled in order to help prevent ozone pollution. The effectiveness of flaring depends on burn efficiency. Several variables influence burn efficiency in flares: tip design, flare height,

4 Railroad Commission of Texas. (2012, May). *Flaring Regulation – frequently asked questions (FAQs)*. Retrieved from http://www.rrc.state.tx.us/about/faqs/flaringfaq.php

5 Ibid.

6 The World Bank. (2012, June). Estimated flared volumes from satellite data, 2007-2011. Retrieved from http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTOGMC/EXTGGFR/0,,contentMDK:22137498~pagePK:64168445~piPK:64168309~theSitePK:578069,00.html ; North Dakota Industrial Commission, Department of Mineral Resources, Oil and Gas Division. (2012). Retrieved from https://www.dmr.nd.gov/oilgas/

"We've made it a top priority to make sure operators are in full compliance with Commission flaring and venting rules. I've directed Commission staff to apply a higher level of scrutiny to applications for flaring and venting operations and to shorten time frames for compliance when violations are reported."

(Railroad Commissioner David Porter, upon announcement of his Flaring Initiative)

tip maintenance, Volatile Organic Compounds ("VOC") gas volume, VOC composition, wind conditions, and others. A high rate of burn efficiency ensures the flare has high-destruction efficiency and thereby minimizes emissions to the atmosphere.

While the Commission exercises jurisdiction over oil and gas production, the Texas Commission on Environmental Quality ("TCEQ") is the state agency responsible for regulating air quality. The agencies' jurisdictions differ but are related, due to the Commission's authority to protect public health and safety and to prevent waste of oil and natural gas. The TCEQ controls pollution levels through air permit authorizations and the Texas State Implementation Plan ("SIP") to ensure that industrial facilities that emit contaminants comply with the agency's rules and meet the requirements of the Texas Clean Air Act ("CAA"). The TCEQ permit review process confirms that operators use the best available emission controlling technologies, and considers the effects of each permit's specified emissions on public health and welfare.

TASK FORCE MEETING

Air quality concerns, combined with the increased issuance of flaring permits, prompted the Eagle Ford Shale Task Force ("Task Force") to evaluate flaring technology, practices, and regulations. At the Task Force meeting on flaring, held at the San Antonio River Foundation on May 23, 2012, the following people made presentations:[7]

Erin Selvera, Special Assistant to the Division Director, Air Quality Permits, Texas Commission on Environmental Quality

David Cooney, Environmental Attorney, Railroad Commission

Matt Kuryla, Partner, Baker Botts

Teresa Carrillo, Executive Committee, Lone Star Chapter of the Sierra Club; Treasurer, Coastal Bend Sierra Group

Peter Bella, Natural Resources Director, Alamo Area Council of Governments

7 Senator Leticia Van De Putte was in attendance at the meeting.

Erin Selvera, Special Assistant to the Division Director of the TCEQ's Air Quality Permits Division, reported that the TCEQ issued a record 3,541 air permits in 2011. Approximately one-third of these permits (1,887) were issued to operators in the Eagle Ford Shale.[8] She also detailed the TCEQ permitting requirements for oil and gas facilities, agency rulemaking activities, and new federal air regulations.

On April 17, 2012, the United States Environmental Protection Agency ("EPA") finalized rules related to "Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews," commonly referred to as "NSPS OOOO."[9] The requirements of NSPS OOOO will be implemented in phases and will not apply to wildcat, delineation, and low-pressure wells. However, beginning in 2015, NSPS OOOO requires new hydraulically fractured natural gas wells to be completed using reduced emission completion ("green completion") equipment and processes. This requirement will not impact Eagle Ford Shale oil wells.

The rule also contains requirements for the following:

1. Centrifugal and reciprocating compressors
2. Pneumatic controllers
3. Storage vessels
4. Sweetening units
5. Glycol dehydrators

NSPS OOOO also requires all hydraulically fractured natural gas wells completed after October 15, 2012 to either flare or use green completion equipment during the completion phase. Thus, after this provision's effective date, venting the emissions during well completion is not allowed.

David Cooney, Environmental Attorney at the Commission, stated that flaring should be minimized to prevent wasting natural resources. He discussed the requirements of Statewide Rule 32 and the recent increase in flaring permit extension requests. Cooney also discussed how Commission and TCEQ staff work together on issues of common concern, and how they often find themselves performing corresponding regulatory duties when fulfilling their agencies' missions.

Matt Kuryla, a partner at Baker Botts, discussed the differences of opinion between the federal government and the TCEQ regarding air issues – differences highlighted by litigation over the Texas SIP in *State of Texas, et al. v. EPA*.[10] The Federal Clean Air Act ("FCAA") requires states with areas of non-attainment to submit, and

8 Selvera, E. (2012, May 23). Oil and gas air permitting authorizations in Texas. Presented at the Eagle Ford Shale Task Force meeting on flaring and air emissions, San Antonio, Texas.

9 New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews, 77 Fed. Reg. 49490 (August 16, 2012) (to be codified at 40 C.F.R. Pts. 60 and 63).

10 Texas v. U.S. E.P.A., 690 F.3d 670, 676-77 (5th Cir. 2012).

regularly revise, a SIP to the EPA that details how the state plans to comply with National Ambient Air Quality Standards.[11] In 1994, the TCEQ adopted rules for the Flexible Permits Program ("FPP") as part of the Texas minor new source review permit program.[12] The TCEQ submitted these new rules to the EPA, requesting the EPA's approval of their inclusion in the Texas SIP. Various, additional revisions were submitted in 1998, 2000, 2001, 2002, and 2003.

According to Selvera, a flexible permit allows operators to tailor the permit to their individual needs through the use of emission caps. Despite the CAA mandate that the EPA formally approve or reject revisions within 18 months, the EPA delayed its ruling on the flexible permit for over a decade. Finally, in 2010, the EPA determined that the FPP did not meet federal air quality standards.

Kuryla said that Texas has some of the most stringent air quality regulations in the United States. In fact, the CAA predates the FCAA. Texas has seen dramatic air quality improvements since these programs have been in place, but the EPA continues pushing back on the state's efforts based on asserted issues with regulatory language and definitions. On August 23, 2012, the Fifth Circuit Court of Appeals vacated the EPA's disapproval on the grounds that, "The EPA based its disapproval on demands for language and program features of the EPA's choosing, without basis in the Clean Air Act or its implementing regulations."[13]

Task Force member Teresa Carrillo of the Sierra Club emphasized that regulatory bodies need to ensure that operators flare properly to make certain that all VOCs burn. Otherwise, she said, flares will readily produce smoke and unburned VOC gases. She added that the increase of such emissions could raise public health issues in nearby areas.

Peter Bella, Natural Resources Director at the Alamo Area Council of Governments ("AACOG"), discussed the potential impacts of the Eagle Ford Shale play on San Antonio's ozone levels. He asserted that Eagle Ford Shale development might be partially responsible, should San Antonio exceed the federal standards limit for ozone levels. San Antonio is the largest city in the nation that is in full compliance with all federal air standards, but it has been approaching non-attainment.[14] Accurate Eagle Ford Shale emissions have not yet been quantified. The 2010-2011 design values, used by the federal government to determine air quality, are based on pre-Eagle Ford Shale data, and to estimate shale play development impacts, an accurate inventory of shale play emissions

11 Texas Commission on Environmental Quality. (2012, May). *SIP: Introduction to the Texas state implementation plan*. Retrieved from http://www.tceq.texas.gov/airquality/sip/sipintro.html

12 Texas Commission on Environmental Quality. (2012). *Texas' air permitting program: Notice to the regulated community*. Retrieved from http://www.tceq.texas.gov/permitting/air/announcements/20091109

13 Texas v. U.S. E.P.A., 690 F.3d 670, 682-86 (5th Cir. 2012).

14 Bella, P. (2012, May 23). Stated at the Eagle Ford Shale Task Force meeting on flaring and air emissions, San Antonio, Texas.

must be developed and impacts modeled. AACOG is currently developing an Eagle Ford Emissions Inventory with the assistance of the oil and gas industry active in the Eagle Ford Shale. Bella said voluntary, proactive measures must be taken to maintain air quality and establish the Eagle Ford Shale play as the national model of sustainable development of natural resources.

Commissioner Porter's Flaring Initiative

At the meeting, after the presentations and input from the Task Force, Commissioner Porter introduced his Flaring Initiative, which includes the following goals:

1. Ensure operators fully comply with current Commission flaring and venting rules.
2. Amend Commission flaring and venting rules to correspond with the increased production of the shale plays across the state.
3. Review flaring technologies to encourage the use of efficient, environmentally protective, and energy-saving flares.
4. Work in partnership with all other state regulatory entities to streamline air emission rules, monitoring, and reporting.
5. Work in partnership with Texas electrical energy regulators to identify opportunities for using excess gas as a strategic source of power generation, especially with the threat of weather-induced power curtailment.
6. Study a pilot program to use gas as a source of power for on-lease operations in lieu of flaring the gas.

According to Commissioner Porter, "We've made it a top priority to make sure operators are in full compliance with Commission flaring and venting rules. I've directed Commission staff to apply a higher level of scrutiny to applications for flaring and venting operations and to shorten time frames for compliance when violations are reported."[15]

In addition, on December 17, 2012, Commissioner Porter hosted an on-site generation workshop as part of his initiative.[16] The workshop focused on the ability to use natural gas as a source for power on drilling sites instead of flaring the gas. The workshop consisted of three panels and was moderated by Task Force member Chris Winland of Good Company Associates. The operators on the first panel, Joey Hall of Pioneer Natural Resources and Kirk Spilman of Marathon Oil, presented each of their company's experiences with reducing flaring and other methods for managing excess gas.

15 Porter, D. (2012, May 23). Stated at the Eagle Ford Shale Task Force meeting on flaring and air emissions, San Antonio, Texas.

16 The workshop can be viewed via webcast at http://www.texasadmin.com/agenda.php?confid=RRC_WS121712&dir=txrail

The second panel consisted of representatives whose companies provide on-site generation to oil and gas operators. The panelists included: Pascal Boudreau, President of Mobile Treating LLC; James Gayle, CEO, Red River Compression Services; Scott Weatherford, Director of Project Development, Wood Group PLC; Bryan Hensley, Executive Vice President of Sales, Horizon Power Systems/Capstone Turbine Corporation; and David Walters, President, Walters Power International. They discussed alternative energy sources, such as diesel and natural gas, and exchanged questions and answers with the operators, agencies, and workshop public audience.

The third panel included Commissioner Toby Baker of the TCEQ; Brian Lloyd, Executive Director of the Public Utility Commission; and Ramon Fernandez, Director of Field Operations for the Commission. These panelists detailed the rules, permits, and incentives associated with on-site generation.

Commissioner Porter's Flaring Initiative includes: (1) ensuring operators fully comply with current Railroad Commission flaring and venting rules; (2) amending Railroad Commission flaring and venting rules; (3) reviewing flaring technologies to encourage the use of efficient, environmentally protective, and energy-saving flares; (4) working in partnership with state regulatory entities to streamline air emission rules, monitoring, and reporting; (5) working in partnership with Texas electrical energy regulators to identify opportunities for using excess gas as a strategic source of power generation; and (6) encouraging the use of gas as a source of power for on-lease operations.

7 HEALTH CARE, EDUCATION, AND SOCIAL SERVICES

As the Eagle Ford Shale play develops, the challenges associated with continued economic growth will be best met when industry, state agencies, local governments, and the impacted communities work together to forge solutions that satisfy community needs and support the region's economic success.

The rapid development of the Eagle Ford Shale play has resulted in a number of challenges for community resources, including healthcare, education, and social service systems. As discussed in Chapter 2: *Infrastructure*, the expansion of the shale play is also stretching the capabilities of existing infrastructure, such as roads.

As the play develops, the challenges associated with continued economic growth will be best met when industry, local governments, and the impacted communities work together to adopt solutions that satisfy community needs and support the region's phenomenal growth rate.

The Eagle Ford Shale Task Force ("Task Force") met to discuss the challenges and opportunities facing the region's health care, education, and social services.

The significant economic benefits of the Eagle Ford Shale play bring with them unique challenges for community resources. Regional healthcare, education, and social service systems face multi-faceted challenges caused by population growth, traffic, changes in property values, construction, and industrial development.

TASK FORCE MEETING

At the Task Force meeting on health care, education, and social services, held at Remote Logistics International Lodge in Carrizo Springs on July 18, 2012, the following people made presentations:

Dr. Carlos E. Moreno, CEO, Vida Y Salud Health Systems, Inc.

Monty Small, CEO, Atascosa Health Center

Bill Grusendorf, Executive Director and Founder, Texas Association of Rural Schools

Larry Stavinoha, Field Service Agent, Education Service Center 20, Texas Education Agency

Dr. Deborah F. Dobie, Superintendent of Schools, Carrizo Springs Consolidated Independent School District

Jose Patterson, Director of Strategic Workforce Development, San Antonio Food Bank

Denise Barkhurst, President and CEO, Big Brothers Big Sisters of South Texas

Healthcare

The Eagle Ford Shale oil and gas play has helped bring to light and compounded existing regional public health challenges. The region's healthcare systems lag behind when compared to the rest of Texas:

> Counties in the Eagle Ford Shale have approximately 58 percent less the population proportion of healthcare providers (physicians, registered nurses, dentists, and pharmacists) than the population proportion of healthcare providers statewide. Counties in the Eagle Ford Shale would need an additional 3,848 healthcare providers (626 physicians, 2,711 registered nurses, 202 dentists, and 309 pharmacists) to have the same population proportion of healthcare providers — as compared to the population proportion of healthcare providers statewide.[1]

Only six counties within the entire 20,000 square mile region have full-service health departments (Austin, Brazos, DeWitt, Live Oak, Milam, and Webb); seven of the counties have no hospitals (La Salle, Lee, Leon, Live Oak, McMullen, Robertson, and Zavala); and five lack community health centers (DeWitt, Fayette, Lee, McMullen, and Milam).[2] Eagle Ford Shale infrastructure issues, which are detailed in Chapter 2: *Infrastructure*, exacerbate the accessibility challenges created by limited healthcare resources.

Zavala County, one of the poorest counties in the state,[3] includes the county seat, Crystal City, and small towns like Batesville and La Pryor. According to meeting presenter Dr. Carlos E. Moreno, these communities are located in a designated Medically Underserved Area ("MUA")[4] which means they lack a local hospital and health department and are experiencing a shortage of

Healthcare systems are challenged by prolific growth in industrial occupations and overall population, combined with shortages of adequate facilities, housing, and experienced healthcare professionals. Indeed, even before the Eagle Ford Shale boom began, the U.S. Health Resources and Services Administration identified several communities in the region as Medically Underserved Areas.

1 Gilliam, M. (2012, November 13). Health service presentation. Presented at the Eagle Ford Shale Task Force re-cap meeting, San Antonio, Texas.

2 Ibid.

3 Ibid.

4 Medically Underserved Areas (MUAs) may be a whole county or a group of contiguous counties, a group of county or civil divisions or a group of urban census tracts in which residents have a shortage of personal health services (http://bhpr.hrsa.gov/shortage/).

medical providers.[5] Vida Y Salud, Health Systems, located in Crystal City, is the area's designated Federally Qualified Health Center. Moreno is the CEO of this facility, which has been providing primary medical care services to area residents for the past 40 years.[6] Moreno explained that the influx of shale-related workers has strained healthcare capacity, housing availability, and safety on the county's limited transportation infrastructure.

Moreno listed areas of concern that have arisen during the Eagle Ford Shale expansion, including the following:

1. Overcrowded recreational vehicle parks
2. Greater demands for seasonal flu preparation, especially in work camps that house numerous workers in close quarters
3. A lack of exercise facilities within a 20 mile radius
4. New illnesses that may be introduced to the area, as workers from across the country relocate
5. The need for additional mental health services and resources related to the treatment of depression and substance abuse
6. Inadequate emergency preparedness coordination on a regional scale[7]

Monty Small, CEO of Atascosa Health Center, discussed the healthcare environment in Atascosa County, which has also experienced infrastructure challenges, particularly housing shortages that make it more difficult to bring in new healthcare workers. According to the Center of Community and Business Research at The University of Texas at San Antonio ("UTSA"), rent prices have increased because of "high demand and limited supply…more people are interested in renting homes than ever before."[8] Like Zavala County, the population increase and infrastructure challenges, such as traffic and road quality, have further impacted public health care in Atascosa County.[9] Small reported an increased demand for physicals; greater new patient demands; new medical companies; the arrival of specialized drug testing companies; more patients with the ability to pay for services; and more families utilizing community healthcare services.[10]

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5 Moreno, C. (2012, July 18). Stated at the Eagle Ford Shale Task Force meeting on health, education, and social services, Carrizo Springs, Texas.

6 Ibid.

7 Ibid.

8 Center for Community and Business Research, Institute for Economic Development. (2012, May). Economic impact of the Eagle Ford Shale. San Antonio, TX: The University of Texas at San Antonio, p. 58. Retrieved from http://ccbr.iedtexas.org/index.php/Download-document/52-Eagle-Ford-Shale-Final-Report-May-2012.html

9 Small, M. (2012, July 18). Stated at the Eagle Ford Shale Task Force meeting on health, education, and social services, Carrizo Springs, Texas.

10 Ibid.

Small highlighted challenges facing healthcare systems in the Eagle Ford Shale, including loss of staff to higher paying jobs, higher salary demands, accelerating wear and tear on facilities, traffic congestion, and difficulty recruiting new providers and staff (which is intensified by the housing shortage).[11] At the conclusion of his presentation, Small offered potential solutions, such as local and state governments reinvesting tax revenue into community health centers.

Chesapeake Energy is one of the companies assisting the Eagle Ford Shale communities in which they operate, such as Dimmit County, where the population has quadrupled since 2008.[12] To help alleviate the resulting strain on the local healthcare system, Chesapeake Energy made a significant contribution to the Dimmit County EMS in September 2012, which, according to Chesapeake Energy, "… helped repair one of its fleet vehicles and provided cardiac monitors, stretchers, and other supplies necessary to help them qualify for hospital transportation."[13] Chesapeake Energy extends its philanthropic activities to a number of other organizations in the Eagle Ford Shale region, some of which are further detailed later in this chapter.

Another company with a multi-faceted community outreach strategy is Anadarko.[14] In addition to providing support to area health services organizations, the company has donated funds to Dimmit County for road equipment and to local volunteer fire departments for firefighting foam.[15]

School districts in the region face their own unique challenges. For example, they serve large numbers of migratory students. Further, their funding is complicated by the effects of the state's school finance system on these school districts that face rapid changes in their tax base.

11 Ibid.

12 Ask Chesapeake. (2012, September 26). *Population boom heightens emergency response needs*. Retrieved from http://www.askchesapeake.com/Eagle-Ford-Shale/Articles/Pages/2012092602.aspx

13 Ibid.

14 Notes from January 2013 interview with Adrian Acevedo, Manager of Government Relations-Texas, Anadarko.

15 Ibid.

Education

The development of the Eagle Ford Shale play has also affected regional educational resources. Dr. Deborah F. Dobie, Superintendent of the Carrizo Springs Consolidated Independent School District ("CSCISD"), said that industry's production of shale oil and gas has impacted CSCISD in three areas:

1. Student demographics
2. Housing
3. Finances[16]

These impacts are discussed in further detail below:

1. Demographics: CSCISD enrollment did not increase substantially in 2011-2012 (only 45 additional students enrolled in district schools), but Dobie asserted that a large migratory student population skews the official enrollment numbers.[17] These are students who stay an average of one to five months in the district and tend to fall behind academically because they change schools as often as two or three times a year.[18] Dobie said that CSCISD has experienced surges in the number of special needs students and those with limited English proficiency. These students are generally more expensive to educate, and the migratory patterns of some students have made it difficult for school districts to anticipate future needs and allocate resources accordingly.[19] For example, to serve developmentally challenged special needs students, CSCISD was required to hire a behavior teacher for $60,000.[20] Within five months of that hiring, the students in need of the specialized instruction had moved out of the district.[21]

2. Housing: Dobie provided details of the region's acute housing shortage and its impact on both students and school employees. Due to an influx of oil and gas workers, temporary housing in Carrizo Springs has reached maximum capacity.[22] Dobie drew attention to their homeless student population, which increased from 85

16 Dobie, D. (2012, July 18). Stated at the Eagle Ford Shale Task Force meeting on health, education, and social services, Carrizo Springs, Texas.

17 Ibid.

18 Ibid.

19 Ibid.

20 Ibid.

21 Ibid.

22 Center for Community and Business Research, Institute for Economic Development. (2012, May). Economic impact of the Eagle Ford Shale. San Antonio, TX: The University of Texas at San Antonio, p. 61. Retrieved from http://ccbr.iedtexas.org/index.php/Download-document/52-Eagle-Ford-Shale-Final-Report-May-2012.html

in 2011 to more than 200 in 2012.[23] She defined "homeless" students to include children living with relatives outside of their nuclear family, children inadequately housed in recreational vehicles, and children living in shelters.[24] These students require additional resources from the school district, which provides them with clothing, school supplies, and hygiene kits.[25] The shortage of available local housing, compounded by increased traffic, has forced some CSCISD employees into a commute of up to one hour to and from work.[26] Dobie noted that her interviews with job applicants typically start and finish with housing discussions.

3. Finances: Dobie reported that CSCISD property values multiplied exponentially in a very short span of time, with contrasting consequences.[27] Escalating property values enabled CSCISD to build a new high school and a new intermediate school, which Dobie believes will help foster a more stable, locally-bred future Eagle Ford Shale workforce.[28] However, skyrocketing property values also elevated CSCISD, a traditionally "property poor" school district, to Chapter 41 "property wealthy" status.[29]

Bill Grusendorf of the Texas Association of Rural Schools explained that Chapter 41 of the Texas Education Code identifies "property wealthy" school districts and dictates their contributions to the statewide school finance system.[30] Chapter 41 is commonly referred to as the "Robin Hood" plan, because a portion of the taxes collected by "property wealthy" districts are "recaptured" and distributed to "property poor" districts.[31] According to Grusendorf, sharp increases in Eagle Ford Shale property values have caused several traditionally "property poor" school districts to be reclassified.[32] This year alone, 23 traditionally "property poor" districts, eight of which are in the Eagle Ford Shale region, were moved to the "property wealthy" list[33] and thereby will soon owe millions of dollars to the state.[34]

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23 Dobie, D. (2012, July 18). Stated at the Eagle Ford Shale Task Force meeting on health, education, and social services, Carrizo Springs, Texas.

24 Ibid.

25 Ibid.

26 Ibid.

27 Ibid.

28 Ibid.

29 Ibid.

30 Ibid.

31 Ibid.

32 Ibid.

33 "2012–2013 Chapter 41 Districts." Texas Education Agency. (2013). *Chapter 4: Wealth equalization*. Retrieved from http://www.tea.state.tx.us/index2.aspx?id=6796&menu_id=645

34 Grusendorf, B. (2012, July 18). Stated at the Eagle Ford Shale Task Force meeting on health, education, and social services, Carrizo Springs, Texas.

Larry Stavinoha of the Texas Education Agency contributed to the Task Force's discussion regarding school funding and the consequences of falling under the jurisdiction of Chapter 41.[35] He explained that every school district in the Eagle Ford Shale region is experiencing rising property values, producing a proportionally higher percentage of local revenue to fund their school districts.[36] However, Stavinoha warned that funding windfalls would be short-lived, particularly for districts like Cotulla and Carrizo Springs, whose property values have surged dramatically in such a short period of time.[37] He projected that, in some districts, property values would eventually flatten out or decline.[38] In others, including Cotulla and Carrizo Springs, he said the districts will reach a level of property value "wealth per student" that will subject it to the laws of recapture.[39] Stavinoha clarified the nuances of those laws and concluded that funding for Eagle Ford Shale school districts will eventually return to the levels that existed before the increase in property values.[40]

Stavinoha cited CSCISD as an example of a district that has experienced a large rise in property values. He reported that in the 2010-2011 school year, CSCISD had current year property values of approximately $4.5 million and received approximately $18.3 million in combined state and local funding.[41] Property values increased to just under $2.5 billion over the following two school years, generating approximately $13 million more in local revenue than had been generated during the previous two year span.[42] Stavinoha noted that the "property wealthy" classification would apply to CSCISD for the upcoming 2013-2014 school year.[43] CSCISD will then be required to return an estimated $12 million to the state in the form of recapture, and will revert to the funding levels of 2010-2011.[44]

> Community and social service organizations are feeling the effects of rapid growth and the need to adapt and change.

35 Stavinoha, L. (2012, July 18). Stated at the Eagle Ford Shale Task Force meeting on health, education, and social services, Carrizo Springs, Texas.

36 Ibid.

37 Ibid.

38 Ibid.

39 Ibid.

40 Ibid.

41 Ibid.

42 Ibid.

43 Ibid.

44 Ibid.

Dobie confirmed Stavinoha's statistics and expanded on the issues her district will face when the "property wealthy" recapture process takes effect:

> All Texas school districts need to be funded adequately; however, the districts in the Eagle Ford Shale formation that have become new Chapter 41 (property wealthy) districts will have less money to fund their schools than they did two years ago as property poor districts. During the 2013-2014 school year, Carrizo Springs CISD will have a budget shortfall of $1.5 million. This shortfall is compounded by the fact that school districts must compete with the oil companies for drivers, custodians, cafeteria workers, and clerks. Because of the high wages, increased cost of materials, shipping, and housing paid by the oil companies, our new high school is $7 million over budget.[45]

To alleviate these budget challenges, Dobie reported that the oil and gas industry, such as Anadarko, Chesapeake Energy, SM Energy, and Shell, have made significant contributions to CSCISD. For example, Chesapeake Energy works with public schools throughout its operating region, which currently encompasses six Eagle Ford Shale school districts, providing in-kind donations, volunteer workers, and outreach programs. One such program is Discovering Tomorrow's Leaders ("DTL"), which is designed "to recognize and honor students who demonstrate outstanding leadership qualities in their communities."[46]

The DTL initiative includes countywide contests with weekly prizes, including laptop computers, to recognize and encourage academic excellence and community leadership.[47] Chesapeake Energy awards an annual grand prize that includes higher education scholarship money and technology donations for the student and his or her school.[48] This highly respected initiative has been lauded for promoting academic achievement, community leadership, and college enrollment.[49]

Similarly, Anadarko is a staunch promoter of Science Technology Engineering and Math ("STEM") education, and has worked with the Carrizo Springs and Cotulla school districts to foster education and inspire future generations to pursue STEM careers.[50] Projects include conducting SAYES (science academy) summer courses for elementary school children, sponsoring earth science presentations by Trinity Science Solutions, and consulting

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45 Dobie, D. (2012, July 18). Stated at the Eagle Ford Shale Task Force meeting on health, education, and social services, Carrizo Springs, Texas.

46 Chesapeake Energy. (2012). *Discovering tomorrow's leaders*. Retrieved from http://okdtl.com/

47 Notes from December 2012 interview with Haley Curry, Manager of Corporate Communications, Chesapeake Energy.

48 Ibid.

49 Ibid.

50 Notes from January 2013 interview with Adrian Acevedo, Manager of Government Relations-Texas, Anadarko.

Oil and gas companies, such as Anadarko, Chesapeake Energy, Pioneer Natural Resources, SM Energy, Shell, and others provide both funding and targeted programs to help meet community needs.

with teachers and students to establish a local science club.[51] Anadarko also hosted field tours for over 40 area high school teachers in conjunction with GeoForce, a program designed to encourage high school students to take on math and science curricula.[52] The tours provided teachers with science-based information and a better understanding of the career opportunities for their students.[53] Anadarko supplies oil and natural gas information booths and provides sponsorships to cover the costs of enrichment activities that help broaden the experience of dedicated local educators.[54] The company has also underwritten programs such as the Momma Patrol, which is aimed at keeping students and their families safe on the road when arriving and departing from school campuses.[55]

In addition, Pioneer Natural Resources ("Pioneer") helps local public school initiatives.[56] At Cuero High School, Pioneer has donated funds to the national education program Project SHARP (Strategic, Hands-On After-School Resources and Progress), which helped renovate an old cafeteria into a student center for studying, entertainment, and recreation. In Yorktown Independent School District, donations helped purchase resources such as lab spaces and graphing calculators for ICORE, an interactive, web-based curriculum for math and science students. In 2012, Pioneer gifted approximately 300 Texas Instruments TI-84 calculators to 11 area high schools needing them for students in advanced math classes. Pioneer is the sponsor of the Youth Leadership Conference held each summer, in which young leaders hear from local business representatives and community members and are challenged to develop new skills. Pioneer also provides support for livestock shows in Yorktown and in Bee, Karnes, DeWitt and Live Oak Counties.

51 Ibid.

52 Ibid.

53 Ibid.

54 Ibid.

55 Ibid.

56 Notes from February 2013 interview with Susan Spratlen, Vice President, Sustainability & Communication, Pioneer Natural Resources.

And, in support of youth sports, Pioneer provided funding for significant improvements to area Little League fields.[57]

Social Services

Limited research regarding the condition of social services in the Eagle Ford Shale region makes it difficult to offer a precise, quantitative analysis of the development's impact. However, the quantifiable changes in population, demographics, public health issues, and housing availability suggest a correlation between industry expansion and the expanded need for local social services, which has been reported by a number of organizations.

For example, Jose Patterson, Director of Strategic Workforce at the San Antonio Food Bank ("SAFB"), reported that his non-profit organization fulfilled more requests in 2011 than ever before.[58] That year, the organization provided 50 million pounds of food to South Texas.[59] A large portion of those distributions, 36 percent, went to children under 18 years of age.[60]

Research conducted in a six-county sample suggests that younger households with school-aged children will increasingly represent a high percentage of newcomers to the Eagle Ford Shale.[61] The increasing numbers of children amplify the need for youth support and guidance in the region. Denise Barkhurst, President and CEO of Big Brothers Big Sisters of South Texas, detailed how mentoring programs like hers serve such purposes. The organization, which served over 3,000 South Texas youths last year, "effectively helps children make the positive choices needed in order for them to stay in school, stay out of prison, and to graduate from high school or earn their GED."[62] Their mentoring programs help children build relationships with compassionate role models on both a personal and professional level.[63]

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57 Ibid.

58 Patterson, J. (2012, July 18). Stated at the Eagle Ford Shale Task Force meeting on health, education, and social services, Carrizo Springs, Texas.

59 San Antonio Food Bank. (2012). *About us*. Retrieved from http://www.safoodbank.org/index.php/info/about-us

60 Ibid.

61 Kamal, A. College of Architecture, Center for Urban and Regional Planning Research. (2012, July). Strategic housing analysis - sustainable choices for the growing demand for housing in the Eagle Ford Shale area of South Texas. San Antonio, TX: The University of Texas at San Antonio, p. 4. Retrieved from http://web.caller.com/2012/pdf/EFS-Housing-Study_-July-2012.pdf

62 Big Brothers Big Sisters of South Texas. (2012). *About us*. Retrieved from http://www.bigmentor.org/index.php/aboutus

63 Barkhurst, D. (2012, July 18). Stated at the Eagle Ford Shale Task Force meeting on health, education, and social services, Carrizo Springs, Texas.

Organizations such as the SAFB and Big Brothers Big Sisters of South Texas rely heavily on charitable donations and corps of volunteer workers. To help reduce the financial stress on non-profits seeking to serve the new families who move to the region in search of opportunity, Chesapeake Energy and its employees have made several donations to social service organizations in the Eagle Ford Shale region. For example, in the fall of 2012, Chesapeake Energy employees in San Antonio, Pearsall, and Carrizo Springs helped raise more than $160,000 for United Way of San Antonio and Bexar County, which directly supports organizations such as the SAFB and Big Brothers Big Sisters of South Texas.[64] Chesapeake Energy matches 100 percent of each employee's pledge, and employees were able to designate their pledges to directly fund programs in and around the Eagle Ford Shale. [65]

64 Ask Chesapeake. (2012, November 26). *Helping the United Way.* Retrieved from http://www.askchesapeake.com/Eagle-Ford-Shale/Articles/Pages/2012112602.aspx

65 Ibid.

8 LANDOWNER, MINERAL OWNER, AND ROYALTY OWNER ISSUES

The private property system of oil and gas ownership instead of government ownership, which is almost unique to the United States, encourages and allows the development of valuable energy resources in the Eagle Ford Shale as elsewhere.

TASK FORCE MEETING

The Eagle Ford Shale has enriched South Texas with revenue, employment opportunities, and community development. And with progress comes challenges. Oil and gas exploration and production requires balancing the needs of landowners, mineral owners, and royalty owners with the needs of exploration companies.

The Eagle Ford Shale Task Force ("Task Force") met at La Posada Hotel in Laredo on September 19, 2012 to address four major issues surrounding landowner, mineral owner, and royalty owner rights:

1. Oil and gas exploration and surface ownership
2. Inactive wells
3. Royalty owner issues
4. Right-of-way and common carrier status

The following people made presentations:[1]

Trey Scott, Trinity Mineral Management, LTD

Mark Hanna, Partner, Scott Douglass & McConnico, L.L.P.

Kevin Cruser, Chief of Staff, State Representative Myra Crownover

Ben Sebree, CEO, Sebree & Tintera, LLC

Billy Phenix, Texas Capitol Group

Colin Lineberry, Director of Hearings, Railroad Commission

Terry Retzloff, TR Measurement Witnessing, LLC

Tricia Davis, President, Texas Royalty Council

Teddy Carter, Vice President, Government Affairs, Texas Independent Producers and Royalty Owners Association

Regan Beck, Associate General Counsel, Texas Farm Bureau

Phil Gamble, Law Office of Phil Gamble

Polly McDonald, Pipeline Safety Director, Railroad Commission

1 Senator Judith Zaffirini, State Representative Tracy King, and State Representative Richard Raymond were in attendance at the meeting.

Oil and Gas Exploration and Surface Ownership

When considering landowner, mineral owner, and royalty owner rights, it is crucial to differentiate between surface ownership and mineral ownership. Under Texas law, land ownership includes two distinct sets of rights, or "estates," – the surface estate and the mineral estate.[2] There has been extensive litigation over whether specific substances are part of the mineral estate or of the surface estate. In general, however, the surface includes everything above ground and materials normally found at or near the surface, such as water, sand, caliche, gravel, and limestone.[3] The mineral estate includes oil, gas, and other substances, like uranium, that are ordinarily thought of as minerals under the "ordinary and natural meaning test."[4]

In many areas of Texas, it is common for the mineral estate and the surface estate to be owned by different parties. However, in the Eagle Ford Shale, it is common for the mineral estate and the surface estate to be owned by the same party. The division, or "severance," of the mineral estate and the surface estate occurs when an owner sells the surface and retains all or part of the minerals or, less commonly, when an owner sells the minerals and retains the surface. If an owner does not expressly retain the minerals when selling the surface, the mineral estate is considered to be included in the sale.

Under Texas law, the oil and gas mineral estate is the "dominant" estate and has the right to the reasonable use of the surface for exploration and production. This principle can be modified in oil and gas leases and other agreements to address surface usage issues between surface owners and oil and gas lessee operators.

Regardless of whether the mineral estate and the surface estate are held by one owner or have been severed, the mineral estate is dominant, meaning that the owner of the mineral estate has the right to use the surface estate (also known as the "servient" estate) to the extent reasonably necessary (of a reasonably prudent operator) for the exploration, development, and production of the oil and gas under the surface property.[5] All of this is subject to existing uses of the surface.

2 *Humphreys-Mexia Co. v. Gammon,* 113 Tex. 247, 255-56, 254 S.W. 296, 299 (1923).

3 *Moser v. U.S. Steel Corp.*, 676 S.W.2d 99, 102 (Tex. 1984).

4 Ibid.

5 *Sun Oil Co. v. Whitaker,* 483 S.W.2d 808, 810-11 (Tex. 1972).

Additionally, this right to use the surface estate for the benefit of the mineral estate may be exercised by a company or individual that has been granted a mineral lease from the actual owner of the mineral estate. The company that is granted a lease and actually operates on the property is frequently referred to as the "lessee," and the mineral interest owner who granted the lease is the "lessor." The surface owner is not included in the lease unless identified as an owner of a portion of the minerals.

Lessees, referred to as "operators" when they take on the responsibility for operating a well, have the right to the reasonable use of the surface for the purpose of exploring for and producing oil and gas. Nevertheless, it is common for lessees to negotiate an arrangement to accommodate and pay damages to the surface owner. Unless otherwise agreed to in negotiations with the surface owner, lessees typically have the right to the following:

1. Conduct seismic tests.
2. Drill wells at locations they select.
3. Enter and exit well sites and other facilities.
4. Build, maintain, and use roads for access to and from well sites and facilities.
5. Build and use pipelines to serve wells and facilities on the property.
6. Use water on the leased premises for drilling and production operations.
7. Drill and operate injection wells to enhance lease recovery and dispose of lease-produced water.

The rights to conduct seismic testing and to use surface and subsurface water are not necessarily included in all oil and gas leases. Many oil and gas leases negotiated between lessees and lessors either specifically address these matters or require that separate agreements be negotiated for water usage, seismic exploration, road usage, and the like.

With the limited exceptions discussed below, the lessee has the right to conduct the activities set out above and can otherwise reasonably use the surface without the surface owner's permission and without restoring the surface or paying for any non-negligent damages.[6] However, this practice is not common and is frowned upon by the industry and surface owners alike. On the other hand, if a lessee's use of the surface is found to be negligent, unreasonable, or excessive, the lessee may be liable to pay damages to the surface owner for the resulting injury.[7] Moreover, the general rules regarding use of the surface to benefit the mineral estate may be changed by the specific terms of the mineral lease covering the property, or by the deed that severed the mineral estate from the surface estate. In addition, many cities have municipal ordinances restricting oil and gas activities on property within city jurisdiction.

6 *Brown v. Lundell,* 162 Tex. 84, 87, 344 S.W.2d 863, 866 (1961); Warren Petroleum Corp. v. Monzingo, 157 Tex. 479, 480-81, 304 S.W.2d 362 (1957).

7 *Brown.,* 344 S.W.2d at 866.

The rights of the lessee may also be limited by the "accommodation doctrine."[8] This legal principle requires that the lessee make reasonable accommodations to existing surface uses, such as for existing central-pivot irrigation systems. Further, in certain counties in or near large metropolitan areas, developers can impose restrictions on drilling and operations sites by obtaining a designation of a "qualified subdivision," from the Railroad Commission ("Commission"), as provided by Chapter 92 of the Texas Natural Resources Code.[9]

Oil and gas development relative to surface usage can be managed either by contractual arrangements or by purchase of all, or a significant portion of, the mineral estate by the surface owner. These means allow the surface owner to better manage the timing and manner of oil and gas development. If the mineral estate is already under lease, the surface owner may wish to contact the lessee to negotiate an agreement restricting use of the surface or agreeing to set damages for surface use. Although there is no legal requirement to do so, a lessee may be willing to enter into a reasonable surface use/damages agreement to avoid potential disputes. The Commission generally lacks jurisdiction over these issues and recommends that surface and mineral owners consult with an experienced oil and gas or real estate attorney.

At the Task Force Meeting in Laredo, Mark Hanna of Scott Douglass & McConnico, L.L.P., surveyed the legal landscape of property ownership and highlighted some salient issues deserving of discussion. He said significant public confusion exists regarding ownership terms and definitions, and for this reason, many surface, mineral, and royalty owners are unfamiliar with their rights and should seek legal counsel before purchasing property or leasing their minerals.[10] He explained that a mineral lease is actually viewed by the courts as a sale.[11] If an oil and gas company "leases" a mineral estate, then the operator owns the dominant estate, and the lessor retains a right to a royalty for as long as the lease is in force.

In many areas of Texas, it is common for the mineral estate and the surface estate to be owned by different parties. However, in the Eagle Ford Shale, it is common for the mineral estate and the surface estate to be owned by the same party.

8 *Getty Oil Co. v. Jones,* 470 S.W.2d 618, 622 (Tex. 1971).

9 Tex. Nat. Res. Code Ann. § 92.003 (Vernon).

10 Hannah, M. (2012, September 19). Stated at the Eagle Ford Shale Task Force meeting on landowner, mineral owner, and royalty owner issues, Laredo, Texas.

11 Ibid.

Hanna identified various ownership concerns that arise during oil and gas production. He said lessors may be most focused on maximum royalties while lessees typically focus on maximizing production and complying with regulations. And, surface owners who own no minerals are likely to be concerned with surface use and environmental impacts. Hanna also supported the need to promote interaction between operators and surface owners to diffuse potential tensions between them and to prevent conflict between their varied goals.

Inactive Wells

Landowner concerns regarding surface use and environmental impacts of inactive wells were brought to the attention of the Legislature in 2007, 80th Regular Legislative Session. During the 2006 Panhandle wildfires, an improperly maintained oil field electric line downed by strong winds allegedly caused one of the two largest fires.[12] Additionally, the House Committee on Energy Resources ("Committee") reported a substantial number of oil field leases blighted by abandoned and unused equipment that polluted properties, posing a potential threat to the well-being of humans and farm animals.[13]

The concerns over oil field electric lines, abandoned oil and gas production equipment, and inactive wells were addressed in two proposed bills: Senate Bill 1574 ("SB 1574"), introduced by Senator Robert Duncan (District 28), and House Bill 1904 ("HB 1904"), filed by Representative Myra Crownover (District 64).[14] Existing statutes only required surface cleanup for inactive wells that had been plugged, with the result that old equipment could remain in place on the lease indefinitely for unplugged wells.[15]

Senator Duncan's SB 1574 addressed the Commission's lack of statutory authority over outdated oil field lease contracts and the removal of surface debris. Abandoned equipment was the central focus of Representative Crownover's HB 1904. Due to time constraints and the need for further consideration, neither bill passed, leaving these landowner issues to be addressed in the next legislative session.

The Committee decided to further investigate these issues in the interim. Oil and gas industry representatives and landowner representatives, recognizing the importance of working with the Committee, created an informal

12 Hardcastle, R. Committee on Energy Resources, Texas House of Representatives. (2009). House Committee on Energy Resources: 2008 interim report, p. 7. Retrieved from http://www.house.state.tx.us/_media/pdf/committees/reports/80interim/CommitteeonEnergyResources.pdf

13 Ibid.

14 Ibid. p. 7 & 16.

15 Sebree, B. (2012, September 19). Inactive wells: or get this junk off my land. Presented at the Eagle Ford Shale Task Force meeting on landowner, mineral owner, and royalty owner issues, Laredo, Texas.

coalition designated as the Inactive Wells Study Group ("IWSG").[16] In 2008, the Committee reported the existence of 110,000 inactive wells.[17] Collaborative efforts between the IWSG and the Committee resulted in the passage of House Bill 2259 ("HB 2259") during the 81st Regular Legislative Session in 2009.[18] The solutions implemented by the passage of HB 2259 were later amended by House Bill 3134 ("HB 3134"), which passed during the 82nd Regular Legislative Session in 2011.[19] Representative Crownover authored both HB 2259 and HB 3134, commonly referred to as the "Inactive Well Statute."[20]

One of the provisions of the Inactive Well Statute is a requirement to perform certain cleanup activities based on the length of time during which a well has been inactive. It also requires additional steps related to approval of plugging extensions and that those actions be taken to complete the renewal of an operator's P-5 by the Commission.[21] (The P-5 is the "Organization Report" – essentially the license to operate in the oil and gas business in Texas; see Appendix A.3 for P-5 Form.)

The Inactive Well Statute prohibits the Commission from renewing or approving an operator's P-5 if the operator fails to comply with the legislation. The initial rules implementing the Inactive Well Statute were adopted by the Commission on September 13, 2010.[22] These rules establish further requirements and alternatives for financial assurance and require that operators do one of the following for each inactive well: (1) restore the well to active operation; (2) plug the well in compliance with Commission rules; or (3) obtain an approved plugging extension.[23]

In addition to these requirements, operators must remove surface equipment on the lease within a specified timeframe.[24] Moreover, electrical service must be disconnected from the inactive well site.[25] Unless the operator owns 100 percent of the surface property, all of a well's piping and tanks must be purged after five years of

16 Hardcastle, R. Committee on Energy Resources, Texas House of Representatives. (2009). House Committee on Energy Resources: 2008 interim report, p. 7. Retrieved from http://www.house.state.tx.us/_media/pdf/committees/reports/80interim/CommitteeonEnergyResources.pdf

17 Ibid. p. 16.

18 H.B. 2259, 81st Leg., Reg. Sess. (TX. 2009).

19 H.B. 3134, 82nd Leg., Reg. Sess. (TX 2011).

20 Cruser, K. (2012, September 19). Stated at the Eagle Ford Shale Task Force meeting on landowner, mineral owner, and royalty owner issues, Laredo, Texas.

21 Tex. Nat. Res. Code Ann. § 91.142 (Vernon 2013).

22 Lineberry, C. (2012, September 19). Stated at the Eagle Ford Shale Task Force meeting on landowner, mineral owner, and royalty owner issues, Laredo, Texas.

23 Ibid.

24 Ibid.

25 Ibid.

inactivity; after 10 years of inactivity, all equipment (e.g., pump jacks, piping, tanks, etc.), except for the wellhead, must be removed.[26]

The Commission adopted new rules to implement HB 3134 provisions on June 29, 2012.[27] Under the amended Inactive Well Statute and rules, an operator who is not in compliance with all P-5 renewal requirements will be granted a 90-day extension to its inactive organization status, allowing the operator to complete the work needed to comply.[28] Further, if the Commission determines that an operator has not achieved compliance by the end of the 90-day period, the operator may request a hearing on the matter before renewal of the P-5 is denied.[29]

At the meeting, Ben Sebree, CEO of Sebree & Tintera, who represented the Texas Oil and Gas Association on the IWSG, discussed industry's mixed support for HB 2259. He said responsible operators: (1) believe the problem of abandoned wells and oil field sites is an industry problem, (2) want irresponsible operators to do their fair share, and (3) want to protect land and water. However, according to Sebree, industry disputed the enforcement procedures outlined in HB 2259, specifically the provision that prevents the Commission from renewing an operator's P-5. He referred to this decree as the "death penalty" because it prevents producers from operating in Texas.[30] Sebree explained that under HB 2259, a minor infraction on one well could result in an immediate "death penalty." For this reason, he said, industry advocated the passage of HB 3134.

Kevin Cruser, Chief of Staff for State Representative Myra Crownover, helped draft the Inactive Well Statute. He spoke of the legislative history:

> In 2007, Representative Myra Crownover decided to look into the abandoned well problem in Texas, and she quickly discovered that no matter how successful the Oil Well Cleanup Fund was, it could not ever fully address the problem. We had to address 'inactive wells.' The original proposed solution was to up the requirements for financial assurance that accompanies every well. That bill was actually picketed in committee. It started a process, and the stakeholders all sat down together during the interim, and [HB] 2259 was the result of that hard work. The goal of [HB] 2259 was to force operators to make a business decision: plug it, prove it, assure it. There were some growing pains, and in 2011, we came back to the table to try and address those pains with [HB] 3134.[31]

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26 Ibid.

27 Ibid.

28 Ibid.

29 Ibid.

30 Sebree, B. (2012, September 19). Inactive wells: or get this junk off my land. Presented at the Eagle Ford Shale Task Force meeting on landowner, mineral owner, and royalty owner issues, Laredo, Texas.

31 Cruser, K. (2012, September 19). Stated at the Eagle Ford Shale Task Force meeting on landowner, mineral owner, and royalty owner issues, Laredo, Texas.

Cruser said that legislation is about striking the right balance between competing public interests, and he hopes the Inactive Well Statute has met that objective.

Colin Lineberry, Director of Hearings at the Commission, noted that the new law gives operators a number of options for bringing inactive wells into compliance and appears to be encouraging operators to plug inactive wells that do not have any future utility.[32] For the last 20 years, reported well pluggings by industry have trended downward – from 11,366 wells reported plugged by industry in fiscal year ("FY") 1991 to a low of 4,192 in FY 2010.[33] However, well pluggings reported by industry increased modestly in FY 2011 to 4,799, and they increased dramatically in FY 2012 to 8,055.[34] While a number of the wells reported plugged in FY 2012 are likely attributed to late reporting from prior years, there was clearly a significant increase in plugging activity by industry in FY 2012, the year of full implementation of the Inactive Well Statute.[35]

Billy Phenix of the Texas Capitol Group, who consults for the Texas Land and Mineral Association ("TLMA"), explained that inactive wells are not a new issue, as they precede Eagle Ford Shale development by 20 years. He said the Inactive Well Statute is a huge step in the right direction. Phenix expressed that TLMA was very supportive of the legislation and applauded the Commission for its enforcement. He concluded, "Hopefully, there will be a significant amount of surface cleanup as a result."[36]

Royalty Owner Issues

A royalty is a right to a specified fraction of production, or value thereof. A royalty interest is "cost-free," meaning that the royalty owner does not have to bear drilling or production costs. By leasing the mineral rights beneath their property to oil and gas operators, royalty owners encourage exploration and help advance production across the state.[37] The private property system of oil and gas encourages and allows the development of these valuable energy resources. The Eagle Ford Shale drilling boom has produced a number of first-time royalty owners, creating new wealth in the region and generating significant economic benefits. In 2011, royalty

32 Subsequent to the meeting, Colin Lineberry reported that since September 1, 2010, the Commission has received 61,187 certificates of electric disconnection, 40,190 certifications of compliance for purging requirements, and 31,246 certifications of compliance for equipment removal. The 363 operators whose P-5s were due by July 1, 2012, were the first group required to show full compliance with all provisions of the new inactive well law.

33 Lineberry, C. (2012, September 19). Stated at the Eagle Ford Shale Task Force meeting on landowner, mineral owner, and royalty owner issues, Laredo, Texas.

34 Ibid.

35 Ibid.

36 Phenix, B. (2012, September 19). Stated at the Eagle Ford Shale Task Force meeting on landowner, mineral owner, and royalty owner issues, Laredo, Texas.

37 Texas Independent Producers and Royalty Owners Association (TIPRO). (2013). Royalty owners ~ vital to the ongoing success of oil and gas development. Retrieved from http://www.tipro.org/current-issues/royalty-owners

owners in the Eagle Ford Shale were paid close to $933 million.[38] These payments create a total output impact of $59.9 million and a total gross regional product impact of $35.5 million.[39]

Until recent times, a royalty of one-eighth was common. More recently, royalties have tended to be a higher percentage, often as much as one-fifth or one-forth. According to Section 91.402(a) of the Texas Natural Resources Code, initial royalty payments must be made 120 days after the end of the month of first sale.[40] Under the statute and unless otherwise specified in the oil and gas lease, ongoing payments must be made 60 days after the end of the calendar month in which oil production sold and 90 days after the end of the calendar month in which gas production sold.[41] Market conditions, regulatory or contractual changes, increases or decreases in production rates, and seasonal conditions impact the amount of royalty payments.[42]

Section 91.504 of the Texas Natural Resources Code gives an owner of oil and gas royalty interests the right to request information from the operator concerning itemized deductions, the heating value of the gas, and the Commission's identification number for the lease, property, or well.[43] An owner of an oil and gas royalty interest may obtain information regarding production that has been reported to the Commission by contacting the Commission's Oil and Gas Division or accessing the Commission's website.[44]

At the meeting, Task Force member Trey Scott of Trinity Mineral Management said one of the biggest challenges in oil and gas exploration is balancing the needs and concerns of land, mineral, and royalty owners and those of exploration companies. These issues should be addressed in the oil and gas lease or within a surface use agreement, which may be a stand-alone document or incorporated into the lease. He explained that a great majority of these new royalty owners have little or no experience in production and lease negotiation, nor adequate knowledge of the law. Consequently, many do not have a full understanding of these contracts.

Scott added that the sheer number of wells, volume of production, and complexity of operations has made it challenging for oil and gas companies to abide by the terms set forth in the leases. Scott said: "Communication is paramount. Transparency on the part of the exploration company can go a long way to avert issues

38 Center for Community and Business Research, Institute for Economic Development. (2012, May). Economic impact of the Eagle Ford Shale. San Antonio, TX: The University of Texas at San Antonio, p. 39. Retrieved from http://ccbr.iedtexas.org/index.php/Download-document/52-Eagle-Ford-Shale-Final-Report-May-2012.html

39 Ibid.

40 Tex. Nat. Res. Code Ann. § 91.142 (Vernon 2013).

41 Ibid.

42 Texas Independent Producers and Royalty Owners Association (TIPRO). (2013). Royalty owners ~ vital to the ongoing success of oil and gas development. Retrieved from http://www.tipro.org/current-issues/royalty-owners

43 Tex. Nat. Res. Code Ann. § 91.504 (Vernon 2013).

44 To access production data, visit http://webapps.rrc.state.tx.us/PDQ/home.do

> The Eagle Ford Shale drilling boom has yielded a number of first-time royalty owners, creating new wealth in the region and generating significant economic benefits. In 2011, royalty owners in the Eagle Ford Shale were paid close to $933 million. These payments create a total output impact of $59.9 million and a total gross regional product impact of $35.5 million.
>
> (Center for Community and Business Research, The University of Texas at San Antonio Institute for Economic Development)

before they arise and help build a relationship of cooperation."[45] Additionally, Scott commented, "Personal property rights are a serious concern, and two issues of much apprehension for mineral and royalty owners center around allocation wells and non-participating royalty interests."[46]

Task Force member Terry Retzloff of TR Measurement Witnessing addressed royalty-related concerns regarding gas volume loss in the southern region of the Eagle Ford Shale. He said that several oil companies have modified their operations to be more efficient by installing central production facilities off-lease, rather than employing the traditional stand-alone tank battery at each well site. Retzloff explained that in those instances when production is consolidated at central production facilities, the oil (or condensate) and gas is typically measured on-lease as required by Commission rules, then reintroduced back into gathering lines often owned by the respective midstream companies. He added that oil and gas is gathered to the central production facilities where final separation, storage, and sales occur.

According to Retzloff, with this type of facility configuration, the oil or condensate is measured on-lease (or on one of the tracts in the unit or the immediate area) with a coriolis meter while the natural gas is measured with a traditional orifice meter.[47] He explained that in the southern fringes of the Eagle Ford Shale, where gas ratios are higher, the condensate is metered at higher operating pressures, often exceeding 1000 pounds per square inch gauge ("psig").[48] In several instances, he reported, the resultant allocation process results in royalties being paid on

45 Scott, T. (2012, September 19). Stated at the Eagle Ford Shale Task Force meeting on landowner, mineral owner, and royalty owner issues, Laredo, Texas.

46 Ibid.

47 Retzloff, T. (2012, September 19). Stated at the Eagle Ford Shale Task Force meeting on landowner, mineral owner, and royalty owner issues, Laredo, Texas.

only 65 percent of condensate metered at 1000 psig or higher.[49] Retzloff stressed that this excessive shrinkage is applicable primarily to wells in the most southern regions of the Eagle Ford Shale, where gas volumes are high, and operators employ the central production facility model.

Retzloff stated that using central production facilities reduces traffic on leases and provides more efficient operations. For example, no flaring or emissions occur on-lease. However, computing royalty payments becomes more complex when using central production facilities. He recommends that royalty owners communicate with the oil companies, requesting data and clarifications, so that they can better understand the entire allocation process. Retzloff believes that the oil companies are willing to explain the allocation process and that they recognize the benefits of such transparency.

Additionally, Retzloff reported that, in some cases, ad valorem taxes appear to have been calculated on 100 percent of condensate measured, rather than on 65 percent of volume paid for condensate.[50] He explained that in order to determine if these taxes have been computed properly, it is essential for royalty owners to better understand condensate characteristics and natural gas liquids, and to examine how each specific oil company reports production to the Commission. He emphasized that the shrinkage (or volume loss/allocation) is not nearly as excessive in the northern areas of the Eagle Ford Shale because oil ratios are higher.

Tricia Davis, President of the Texas Royalty Council ("TRC"), discussed impediments to oil and gas development. She cited the Endangered Species Act, specifically the federal government's efforts to list the Dune Sagebrush Lizard ("DSL") as threatened or endangered. Davis said the TRC challenged the federal government on the grounds that sound science was not used in its decision-making process. Ultimately, the DSL was not listed as endangered. However, she said that the problem remains, as the federal government is considering hundreds of other species for the endangered species list, which could critically impact oil and gas development. She said the TRC supports plans that protect these species, as long as the federal government ensures access to land and protects property rights.

Davis also discussed water conservation as it relates to mineral development. She explained that the vast majority of royalty owners are also landowners, whose water resources are an important property right. Davis said the TRC is working with the oil and gas industry to reduce water usage and increase the amount of available water. She applauded Texas water districts for leading the nation in the development of conservation tools, and she said the TRC would continue working with all stakeholders to ensure a clean water supply for all Texans. Davis said taxes (i.e., property, sales, and severance taxes) significantly impact royalty owners. She explained

48 Ibid.

49 Ibid.

50 Ibid.

that when production taxes increase, drilling typically decreases, which can affect retired royalty owners, who typically acquire royalty interests to obtain a fixed income. Davis added, "This is also distressing to the soccer moms, plumbers, and farmers, to name a few, who were left royalties by parents or grandparents with the expectation of paying, for instance, for college, the light bill, medical insurance, and other important personal expenses."[51] She said that many tax structures designed to make high-cost drilling economically feasible for industry have been incorrectly viewed by the general public as tax breaks for oil and gas companies. Davis warned that modifying these tax structures could hinder drilling activity in the state. She also added that current production measurement techniques accurately account for correct production volumes, thereby enabling proper payment of royalties and ad valorem taxes.

Teddy Carter, Vice President of Government Affairs for the Texas Independent Producers and Royalty Owners Association, spoke of the inherent responsibilities of producers and royalty owners.[52] He urged producers to proactively reach out to municipal, county, and community leaders in areas of high industry activity to provide information on shale drilling, and thereby help allay fears or uncertainties. He expressed concern that these fears or uncertainties derive from anti-industry messaging in the media. Royalty owners, Carter said, must also ensure they are treated fairly and equitably as they deal with industry representatives. By taking the time to educate themselves on shale development, by hiring legal representation when negotiating with companies, and by maintaining open lines of communication with industry representatives and elected officials, royalty owners could enhance the benefits they receive from shale development.

Right-of-way and Common Carrier Status

Landowner rights were an important element in the 2012 eminent domain decision by the Texas Supreme Court in *Texas Rice Land Partners, Ltd. v. Denbury Green Pipeline-Texas, LLC.*[53] The Court began its decision by reiterating that "[t]he Texas Constitution safeguards private property by declaring that eminent domain can only be exercised for 'public use' and that there can be no taking of property for private use."[54] In that context, the Court rejected the argument that merely obtaining a T-4 pipeline permit that stated that the pipeline was a "common carrier," at least where the permit was obtained from the Commission purely as an administrative matter, was-conclusive on the "public use" issue.[55] (See Appendix A.2 for T-4 Application.)

51 Davis. T. (2012, September 19). Stated at the Eagle Ford Shale Task Force meeting on landowner, mineral owner, and royalty owner issues, Laredo, Texas.

52 Carter, T. (2012, September 19). Stated at the Eagle Ford Shale Task Force meeting on landowner, mineral owner, and royalty owner issues, Laredo, Texas.

53 *Texas Rice Land Partners, Ltd. v. Denbury Green Pipeline-Texas, LLC,* 363 S.W.3d 192 reh'g denied, 381 S.W.3d 465 (Tex. 2012).

54 Ibid. p. 198.

Although *Denbury* involved a carbon dioxide pipeline, many have expressed the concern that it does not appear limited to such pipelines. In that context, it has been suggested that changes in the T-4 permitting process at the Commission might be appropriate and could become part of the "public use" determination necessary for the exercise of eminent domain.

In this regard, it is worth noting that the Commission does not regulate the exercise of eminent domain by pipelines, and that it does not have the authority to determine property rights. At the same time, the Commission recognizes that pipelines are a critical part of the infrastructure to transport produced oil and gas. With these important elements at the fore, the Commission is committed to working with the Legislature to address these issues in a manner that is fair and reasonable for pipelines and landowners alike.

At the meeting, Regan Beck, Assistant General Counsel of Public Policy for the Texas Farm Bureau, contended that property owners should retain the right to challenge common carrier status in our Courts, stricter definitions must be placed on what constitutes public use, and the power of eminent domain should not be used for private business purposes.[56] Beck said declaring use public or private is a judicial decision, and property owners should continue to have the right to challenge eminent domain.

Under the Texas Constitution, eminent domain can only be exercised by pipelines to condemn private property for pipeline right-of-way if it is for a "public use." That determination, along with determinations such as whether a pipeline is a common carrier, is integral to the acquisition of right-of-way. These questions, in light of a recent Texas Supreme Court decision, have caused much concern for industry and landowners. The Railroad Commission is committed to working with the Texas Legislature to address these issues in a manner that works for both landowners and pipeline companies.

55 Ibid. p.194-195.

56 Beck, R. (2012, September 19). Stated at the Eagle Ford Shale Task Force meeting on landowner, mineral owner, and royalty owner issues, Laredo, Texas.

Phil Gamble, an attorney with extensive experience in Commission proceedings, explained that the energy industry in Texas depends upon a consistent regulatory environment, and contended that *Denbury* decision has created a tremendous amount of regulatory uncertainty. He said unless the uncertainty of *Denbury* is resolved, the ruling could significantly hinder the development of pipeline infrastructure in the state and will likely cause a corresponding impact on existing and new oil and gas development. Gamble asserted: "Our state's energy needs continue to grow at an incredible rate. Oil and gas operators will delay drilling new wells if there is no pipeline to move production to processing plants, refineries, or other markets."[57] He suggested that the appropriate action is to grant exclusive venue to the Commission and establish a process with notice, opportunity for hearing, and the right of appeal, in order to ensure that common carrier status meets the legislative definition and is done so in an administratively efficient manner.

At the end of the meeting, all parties agreed that communication and transparency among all stakeholders is vital for the proper resolution of landowner, mineral owner, and royalty owner issues. This will allow their mutual and independent concerns to be addressed and help maintain public support for shale plays.

57 Gamble, P. (2012, September 19). Stated at the Eagle Ford Shale Task Force meeting on landowner, mineral owner, and royalty owner issues, Laredo, Texas.

Appendix

A.1 Railroad Commission Agency Organization Chart A-3

A.2 T-4 (Application for Permit to Operate a Pipeline in Texas) . . . . . A-4 –A-5

A.3 P-5 (Organization Report) . . . . . A-6 – A-9

A.4 W-14 (Application to Dispose of Oil and Gas Waste by Injection into a Formation Not Productive of Oil and Gas) . . . . . A-10 – A-11

A.5 H-1 (Application to Inject Fluid into a Reservoir Productive of Oil and Gas . . . . . A-12 – A-13

A.6 H-1A (Injection Well Data) . . . . . A-14 – A-15

A.7 H-11 (Application for Permit to Maintain and Use a Pit) . . . . . A-16 – A-17

A.8 WH-1 (Application for Oil and Gas Waste Hauler's Permit) . . . . . A-18 – A-19

A.9 WH-2 (Oil and Gas Waste Hauler's List of Vehicles) A-20

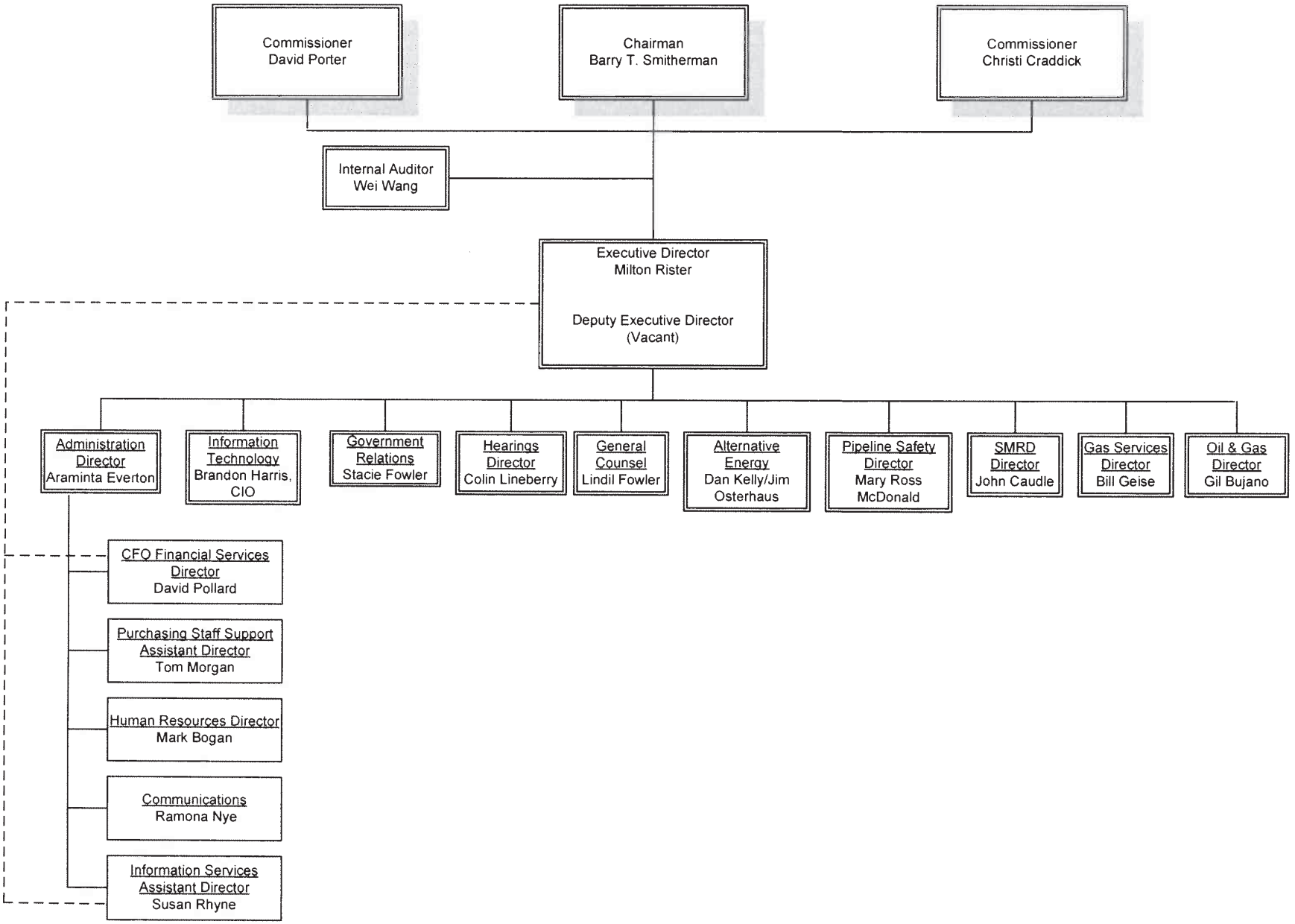
A.10 WH-3 (Oil and Gas Waste Hauler's Authority to Use Approved Disposal/Injection System) . . . . . A-21 – A-22

A.11 Statewide Rule 32 Exception Data Sheet A-23

A.12 Form PR (Monthly Production Report) A-24

A.1 RAILROAD COMMISSION AGENCY ORGANIZATION CHART

The Railroad Commission of Texas – Overview
Effective February 1, 2013



A.2 T-4 (APPLICATION FOR PERMIT TO OPERATE A PIPELINE IN TEXAS)

APPLICATION FOR PERMIT TO OPERATE A PIPELINE IN TEXAS
(See 16 TAC 3.70)

FORM T-4
(8/06)

Railroad Commission of Texas
Gas Services Division
License & Permits Section

Permit No._____

ORGANIZATION INFORMATION

1. Operator (Applicant) (See Instruction 1) — Address

P5#_____

2. Does the above named operator own pipeline? ☐ Yes ☐ No If "No", give name and address of owner.

3. Does the above named operator conduct or control the economic operations on the pipeline? ☐ Yes ☐ No
If "No", give name, address and P-5# of economic operator. (See Instruction 2)

P5#_____

PIPELINE INFORMATION

1. Mark appropriate block for each of the following questions:
   a) Are the pipelines covered under this permit ☐ Interstate ☐ Intrastate
   b) Fluid transported:
   ☐ Crude ☐ Condensate ☐ Gas (*) ☐ Products (*) ☐ Full Gas Well Stream ☐ Full Oil Well Stream ☐ Other (*)
   * Specify _____
   c) Does fluid contain H_2S? ☐ Yes ☐ No If yes, at what concentration? _____ ppm
   d) Pipeline classification:
   If answer to (b) is other than natural gas, will the pipeline be operated as ☐ a common carrier or as ☐ a private line?
   (Ch. 111, Texas Natural Resources Code)
   If answer to (b) is natural gas, will the pipeline be operated as a ☐ gas utility or as a ☐ private line?
   (Texas Utilities Code)
   NOTE: A natural gas pipeline permit will not specify whether the pipeline is a gas utility or a private line. The Gas Services Division Gas Utility Audit Section will make that determination and notify the operator of its status.
   e) Does pipeline use any public highway or road, railroad, public utility, or other common carrier right-of-way? ☐ Yes ☐ No
   f) Will the pipeline carry only the gas and/or liquids produced by pipeline owner or operator? ☐ Yes ☐ No
   If answer to (f) is "No", is the gas and/or liquids:
   ☐ Purchased from others. ☐ Owned by others, but transported for a fee. ☐ Both purchased and transported for others.

2. a) New installation? ☐ Yes ☐ No New Construction Report Number _____
   b) Renewal for same operator? ☐ Yes ☐ No (see 16 TAC 8.115 for applicability)
   c) Extension or modification? ☐ Yes ☐ No
   If there has been a change in operator or ownership, give name and address of previous operator, owner, or lessor: (Attach form T4B)

3. Check detailed purpose(s) for which described pipeline will be used:
   ☐ Transmission ☐ Terminal (Storage Field) ☐ Industrial Distribution
   ☐ Gathering ☐ Gas Lift ☐ Manufacturing Feed Stock (Own Consumption)
   ☐ Gas Injection ☐ Gas Plant ☐ Other (explain) _____

4. U.S.G.S. 7.5 Minute Quad attached? (Scale 1" = 2,000 feet) ☐ Yes ☐ No
   Overview map (24" x 24" / 1" = 20 miles or less) attached and digital data sent? ☐ Yes ☐ No

I declare, under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that data and facts stated therein are true, correct, and complete, to the best of my knowledge.

_____ _____
(Type or Print Name of Person) (Date)

_____ _____
(Title) (Signature)

Inquiries regarding this application should be directed to:

Name: _____ Address: _____ Phone: (A/C) _____

Fax (_____) _____ E-mail _____

The Railroad Commission does not discriminate on the basis of race, color, national origin, sex, religion, age, or disability in employment or the provision of services. TDD/TDY (512) 463-7284

A.2 T-4 (APPLICATION FOR PERMIT TO OPERATE A PIPELINE IN TEXAS)

INSTRUCTIONS - Form T-4

1. Operator. The individual or organization responsible for daily operation, maintenance, safety and emergency response functions on the pipeline. The Operator must also have Form P-5 Organization Report on file with the Commission's Oil and Gas Division prior to the issuance of the T-4 permit.

2. The Economic Operator (line 3, if different from the Operator (line 1) is the individual or organization responsible to the Commission for reporting the transmission of gas or liquids through the pipeline(s). Economic Operator must also have a Form P-5 Organization Report on file with the Commission's Oil & Gas Division prior to the issuance of the T-4 Permit if different entity than the Operator.

3. Operator must file a Form T-4 for each classification of pipeline(s) and/or gathering system(s); i.e., interstate, or intrastate, gas or liquid, or common carrier or private.

4. Operator (applicant) will file a revised Form T-4 as often as necessary to show the true status of each pipeline or gathering system subject to permit indicating therein any modification in the physical installation made whether such modifications relates to extension, abandonment, or transfer of lines. If no changes are made, annual certification that the pipeline or gathering system subject to permit was in no way modified during the year, must be filed by the 15th of the refiling month showing the status of each pipeline or gathering system as of the 1st of that month.

5. This application will not be processed if it is not completely and/or properly filled out with an entire, clear and detailed plat (U.S.G.S. 7.5 minute Quad Map -Scale 1"=2000'), obtainable from the U.S.G.S. website http://store.usgs.gov/ or Texas Natural Resources Information System website http://www.tnris.state.tx.us/DataCatalog.php showing the size of line or an overview map (24" x 24" / 1" = 20 miles or less) and digital data.

DEFINITIONS

1. Abandoned Line. A line is considered to be abandoned when it is not in current use, the operator or owner does not plan to use it in future operations, and line has been cleared of all hydrocarbons. A line does not have to be removed or stripped of pumping or compressor equipment in order to be abandoned. The Commission should be notified by letter immediately when line is abandoned.

2. Liquid. Any substance that exists in liquid phase in the pipeline under current operating conditions.

Questions?
For Operators A through L, please call (512) 463-7194
For Operators M through Z, please call (512) 463-7211

Please mail completed form to:

RAILROAD COMMISSION OF TEXAS
GAS SERVICES DIVISION
LICENSE & PERMITS SECTION
P.O. BOX 12967
AUSTIN TX 78711-2967

A.3 P-5 (ORGANIZATION REPORT)

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division

READ INSTRUCTIONS ON BACK

ORGANIZATION REPORT

FORM P-5

(Rev. 09/2011)

1. Purpose of Filing ☐ New Filing ☐ Annual Refiling ☐ Change of Officers/Resident Agent ☐ Address Correction

2. RRC Operator No. (if assigned)

3. ORGANIZATION

Name of entity: (If the name of the organization has changed, see Instructions on back)

Mailing Address:

Street Address:

Organization Phone Number:

Emergency (after hours) Phone Number:

4. Plan of Organization (select one) ☐ A. Corporation ☐ B. Limited Partnership ☐ C. Sole Proprietorship ☐ D. Partnership ☐ E. Trust ☐ F. Joint Venture ☐ G. Estate ☐ H. Ltd Liability Co. (LLC) ☐ I. Other (specify):

5. TEXAS RESIDENT AGENT

Name of Texas Resident Agent:

Street Address

Mailing Address

A Texas Resident Agent is required for any foreign or nonresident organization pursuant to Statewide Rule 1(a)(4)(D).

6. Attachments:

P-5O - Officer Listings:	Information for each controlling entity of the organization as required by Statewide Rule 1(a)(4)(C).
P-5A - Agent Listings:	(optional) - Designation of non-employee agents authorized to sign certain Forms P-4 and P-5 pursuant to Statewide Rule 1(a)(4)(E).
Filing Fee	Required for all "New Filing" and "Annual Refiling" submissions. See instructions on back.
Financial Assurance	If the operator is required to maintain financial assurance, the Organization Report will not be approved until it is in place.

7. Reorganization ☐ Check here if this is a reorganization of an existing registrant.
If checked, provide the current name and RRC P5 Number:

8. Comments: (optional)

Organization reports for operators of inactive wells: The Commission may not approve the P-5 Organization Report for an operator of one or more inactive wells unless the operator has complied with Commission rules and Texas statutes concerning the approval of plugging extensions for such inactive wells, including disconnection of electrical service and any required surface equipment removal.

Organization reports for operators with outstanding enforcement orders/judgments: The Commission may not approve the P-5 Organization Report for an operator if that operator is the subject of a final and unappealable order related to a violation of a Commission rule, order, license, permit, or certificate relating to safety or the prevention or control of pollution. Organization Reports for organizations with officers who are subject to such outstanding orders through their involvement with other organizations similarly may not be approved.

If the organization has used, or reported use of, a well for which the Certificate of Compliance has been canceled, the Commission may refuse to approve an Organization Report until the operator has paid any requried reconnect fees and the Certificate of Compliance has been reissued for the well.

An organization must file an amended Organization Report within 15 days after a change in any information required to be reported in the Organization Report.

Signature

Title

Filer's Name (Printed)

( )
Filer's Telephone Number

Email Address (OPTIONAL - SEE INSTRUCTIONS FOR IMPORTANT INFORMATION)

Date

Certificate: I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that data and facts stated therein are true, correct, and complete, to the best of my knowledge.

FOR RRC USE ONLY

Approved by

Remarks

A.3 P-5 (ORGANIZATION REPORT)

INSTRUCTIONS

Organization Report (Form P-5)

REFERENCES: Oil & Gas Statewide Rules 1 (*Organization Report; Retention of Records; Notice Requirements*), 14 (*Plugging*), 15 (*Inactive Wells and Surface Equipment Requirements*), and 78 (*Fees, Performance Bonds and Alternate Forms of Financial Security Required To Be Filed*); and Pipeline Safety Statewide Rule 58 (*Organization Report*). The Railroad Commission's rules may be found on our website at http://www.rrc.state.tx.us/rules/rule.php.

WHO MUST FILE FORM P-5: Any entity performing operations within the jurisdiction of the Commission's Oil & Gas Division in accordance with Oil and Gas Statewide Rule 1; and each gas and/or liquids company and each master meter operator performing operations within the jurisdiction of the Commission's Safety Division in accordance with Pipeline Safety Statewide Rule 58. (Master meter operators filing solely as required by the Safety Division, see "Special Instructions For Master Metered System Operators" section below.)

WHEN TO FILE FORM P-5:

- INITIAL FILING – Your initial Organization Report must be filed prior to beginning operations within the Commission's jurisdiction.
- RENEWAL FILINGS – Your Organization Report must be refiled annually. The Commission will notify you before your refiling date by mailing you computer-generated Organization Report forms pre-printed with the information currently shown on your Organization Report record. Review the information carefully, update as needed, and then sign and submit the Organization Report renewal to the Commission.
- CHANGES - If any information provided on your organization report changes, you must submit a revised organization report within fifteen (15) days of the change, except as noted below:

  ADDRESS CHANGES - If the only change is to the organization's address or telephone number, then you may update that information by sending a signed letter to the P-5 Financial Assurance Unit. No other information may be updated by letter.

  ORGANIZATION NAME CHANGE – If the name of the organization has changed (due to reorganization or change in the form of business), you must file a new Organization Report in the new name and obtain a new operator number. A new filing submitted for this purpose should reference the prior name by entering that information in Item No. 7.

SPECIFIC ITEMS ON FORM P-5

No. 1: Check the proper block to show the purpose of filing. More than one block may be checked.

No. 2: Your permanent RRC operator number is assigned after the initial filing of your P-5. Your operator number will be required on most reports and forms you file with the Commission.

No. 3: "Name of Entity": For new filings, enter the full name of your organization. If you are required to register with the Texas Secretary of State, your name shown in Box 3 on the Organization Report should exactly match your name as shown on your Secretary of State registration, including punctuation. (Due to space limitations, the Commission may abbreviate your name for entry into Commission systems.)

No. 4: Check the appropriate plan of organization on all filings. Select only one plan of organization.

No. 5: If you are a foreign or non-resident organization (i.e., your organization is located outside of the State of Texas as indicated by the street address in No. 3), you must designate and maintain a Texas resident agent within the state. A Texas Resident Agent with an address different from that of the organization may also be designated as an alternative to providing separate addresses for the officers on Form P-5O (Organization Report Officer Listing).

No. 7: If you have reorganized and changed your organization name, check the box and provide the previous name and operator number.

SPECIAL INSTRUCTIONS FOR MASTER METERED SYSTEM OPERATORS: If the operation of one or more master metered systems is the only activity for which the Organization Report is being filed, then you should note that in Item No. 8 (Remarks), and observe the following requirements:

- The required filing fee for New Filings and Annual Renewals is $225.00.
- No financial assurance is required for master meter operators.
- The Organization Report must be filed in the name of the legal entity operating the master meter.
- The system manager(s) must be identified among the officers on Form P-5O.
- A listing of all systems for which the filing entity is responsible must be attached to the Organization Report filing.

FILING FEE: Except as noted above, the filing fee for a New Filing (the initial Organization Report filed by an entity) is $300.00. The filing fee for an Annual Renewal of an entity's Organization Report will be based on the activities in which the organization is engaged, and may be up to $1,350.00. See Rule 78. (There is no filing fee for an Organization Report filed solely to update officers, agents and/or addresses.)

FINANCIAL ASSURANCE: Most Commission regulated activities, including the operation of wells and pipelines, will require the operator to file and maintain some form of financial assurance (such as a bond, letter of credit, or cash deposit) in varying amounts. If the filing operator is required to maintain financial assurance, any renewal documentation for the financial assurance must be on file for the period covered by the P-5 Organization Report (plus any additional period following expiration of the Organization Report that may be required by your financial assurance documents) before the Organization Report renewal can be approved and processed.

EMAIL ADDRESS: YOU ARE NOT REQUIRED TO PROVIDE AN EMAIL ADDRESS when completing and filing this form. Please be aware that information provided to any governmental body may be subject to disclosure pursuant to the Texas Public Information Act or other applicable federal or state legislation. IF YOU PROVIDE AN EMAIL ADDRESS, YOU AFFIRMATIVELY CONSENT TO THE RELEASE OF THAT EMAIL ADDRESS TO THIRD PARTIES. Other departments within the Railroad Commission also may use the email address you provide to communicate with you.

Mail to: Railroad Commission of Texas
P-5 Financial Assurance Unit
P O Box 12967
Austin, Texas 78711-2967

A.3 P-5 (ORGANIZATION REPORT)

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division

ORGANIZATION REPORT OFFICER LISTING

FORM P-5O
(Rev. 09/2011)

(File as attachment to Form P-5 Organization Report)

Page ____ of ____

1. Current operator name exactly as shown on P-5 Organization Report

2. RRC Operator No. (if assigned)

PURSUANT TO Oil & Gas Statewide Rule 1(a)(4)(C), information must be provided "for each officer, director, general partner, owner of more than 25% ownership interest, or trustee (hereinafter controlling entity) of the organization."

Instructions:

Attach as many sheets as are needed to identify all required officers.

Full Legal Name: The entity's or individual's full legal name. Please do not use initials.

ID Number: If the filing organization is a Sole Proprietorship (i.e., an individual), you must provide the owner's social security number. Otherwise, you may provide (at your choice) the officer's social security number, driver's license number, or Texas State Identification number. (Note: The Railroad Commission considers such ID numbers to be confidential information.)

Addresses: You must provide an address for each officer that is different from the address for the organization UNLESS: 1) you have shown a Texas Resident Agent on your Organization Report, and that agent has an address different from that of the organization; or 2) the organization is being operated out of the officer's home.

If an entity is identified as an officer on this form, you must also identify each officer of that entity.

3. OFFICERS

Full Legal Name: | Title:

Street Address: ☐ Check here if operating out of this officer's home. | Mailing Address (if different from Street Address)

☐ Driver's Lic. ☐ State ID ☐ Social Security No. State (if not SSN): Number:

Full Legal Name: | Title:

Street Address: ☐ Check here if operating out of this officer's home. | Mailing Address (if different from Street Address)

☐ Driver's Lic. ☐ State ID ☐ Social Security No. State (if not SSN): Number:

Full Legal Name: | Title:

Street Address: ☐ Check here if operating out of this officer's home. | Mailing Address (if different from Street Address)

☐ Driver's Lic. ☐ State ID ☐ Social Security No. State (if not SSN): Number:

Full Legal Name: | Title:

Street Address: ☐ Check here if operating out of this officer's home. | Mailing Address (if different from Street Address)

☐ Driver's Lic. ☐ State ID ☐ Social Security No. State (if not SSN): Number:

A.3 P-5 (ORGANIZATION REPORT)

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division

ORGANIZATION REPORT
NON-EMPLOYEE AGENT LISTING

FORM P-5A

(Rev. 09/2011)

1. Current operator name exactly as shown on P-5 Organization Report

2. RRC Operator No. (if assigned)

PURSUANT TO Oil & Gas Statewide Rule 1(a)(4)(E), the organization must provide the name of any non-employee agent that the organization authorizes to act for the organization in signing Oil and Gas Division certificates of compliance which initially designate the operator or change the designation of the operator. Organizations may designate non-employee agents to execute subsequent organization reports. **That designation shall be authorized by the organization and not by a non-employee agent.**

Instructions:

DO NOT USE THIS FORM TO DESIGNATE A TEXAS RESIDENT AGENT. (Your Texas Resident Agent is identified on Form P-5 to which this is attached.) This Form P-5A must ONLY be used if you have designated a non-employee agent with authority to sign operator-change Forms P-4 and/or P-5 renewals. If you have not designated any non-employee agents for that purpose, then you should not file Form P-5A.

THIS FORM MAY BE FILED AT ANY TIME. If a change in an organization's representation has occurred, a revised Non-Employee Agent Listing may be filed at any time to update the commission's records.

IF ANY NON-EMPLOYEE AGENTS LISTED ON THIS FORM ARE NOT CURRENTLY DESIGNATED ON YOUR ORGANIZATION REPORT RECORD, THEN THIS FORM P-5A MUST BE SIGNED BY A DULY AUTHORIZED COMPANY OFFICER OR EMPLOYEE. (If no changes have been made to the information on this form and it is being filed in connection with the annual renewal of the organization's P-5, then a previously designated non-employee agent listed below may sign it.)

EMAIL ADDRESS: YOU ARE NOT REQUIRED TO PROVIDE AN EMAIL ADDRESS when completing and filing this form. Please be aware that information provided to any governmental body may be subject to disclosure pursuant to the Texas Public Information Act or other applicable federal or state legislation. IF YOU PROVIDE AN EMAIL ADDRESS, YOU AFFIRMATIVELY CONSENT TO THE RELEASE OF THAT EMAIL ADDRESS TO THIRD PARTIES. Other departments within the Railroad Commission also may use the email address you provide to communicate with you.

3. DESIGNATED NON-EMPLOYEE AGENTS (authorized to file operator-change Forms P-4 and renewal Forms P-5.)

Agent's Name:

Street Address:

Mailing Address (if different from Street Address)

Agent's Name:

Street Address:

Mailing Address (if different from Street Address)

Agent's Name:

Street Address:

Mailing Address (if different from Street Address)

Agent's Name:

Street Address:

Mailing Address (if different from Street Address)

Signature

Title

Filer's Name (Printed)

( )
Filer's Telephone Number

Email Address (OPTIONAL - SEE INSTRUCTIONS FOR IMPORTANT INFORMATION)

Date

Certificate: I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that data and facts stated therein are true, correct, and complete, to the best of my knowledge.

FOR RRC USE ONLY

Approved by

Remarks

A.4 W-14 (Application to Dispose of Oil and Gas Waste by Injection into a Formation Not Productive of Oil and Gas)

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

Form W-14
05/2004

APPLICATION TO DISPOSE OF OIL AND GAS WASTE BY INJECTION INTO A FORMATION NOT PRODUCTIVE OF OIL AND GAS

1 .Operator Name _____ **2. Operator P-5 No.** _____

3. Operator Address: _____

4. County _____ **5. RRC District No.** _____

6. Field Name _____ **7. Field Number** _____

8. Lease Name _____ **9. Lease/Gas ID No.** _____

10. Well is _____ **miles in a** _____ **direction from** _____ **(center of nearest town).** **11. No. acres in lease** _____

12. Legal description of location including distance and direction from survey lines_____

13. Latitude/Longitude, if known (Optional) **Lat.** _____ **Long.** _____

14. New Permit: **Yes** ☐ **No** ☐ **If no, amendment of Permit No.** _____ **UIC#** _____

15. Reason for amendment: **Pressure** ☐ **Volume** ☐ **Interval** ☐ **Commercial** ☐ **Other (explain)** _____

16.Well No.	17.API No.		18.Date Drilled			19.Total Depth		20.Plug Date, if re-entry
Casing	**Size**	**Setting Depths**	**Hole Size**	**Casing Weight**	**Cement Class**	**Cement Sacks (#)**	**Top of cement**	**Top Determined by**
21. Surface								
22. Intermediate								
23. Long String								
24 .Liner								
25. Other								

26. Depth to base of Deepest Freshwater Zone _____ **27.Multiple completion?** **Yes** ☐ **No** ☐

28. Multistage cement? **Yes** ☐ **No** ☐ **If yes, DV Tool Depth:** _____**ft.** **No. Sacks:** _____**Top of Cement:** _____

29. Bridge Plug Depth: _____ **ft.** **30. Injection Tubing Size:** _____ **in. and Depth** _____ **ft.** **31. Packer Depth:** _____**ft.**

32. Cement Squeeze Operations (List all giving interval and number of sacks of cement and cement top and whether Proposed or Complete.):

33. Injection Interval from _____ **to** _____ **ft.** **34. Name of Disposal Formation** _____

35. Any Oil and Gas Productive Zone within two miles? **Yes** ☐ **No** ☐
If yes, Depth _____ **ft. and Reservoir Name** _____

36. Maximum Daily Injection Volume _____ **bpd** **37. Estimated Average Daily Injection Volume** _____**bpd**

38. Maximum Surface Injection Pressure _____ **psig** **39. Estimated Average Surface Injection Pressure**_____ **psig**

40. Source of Fluids (Formation, depths and types): _____

41. Are fluids from leases other than lease identified in Item 8? **Yes** ☐ **No** ☐ **42. Commercial Disposal Well?** **Yes** ☐ **No** ☐

43. If commercial disposal, will non-hazardous oil and gas waste other than produced water be disposed of? **Yes** ☐ **No** ☐

44. Type(s) of Injection Fluid: **Salt Water** ☐ **Brackish Water** ☐ **Fresh Water** ☐ **CO_2** ☐ **N_2** ☐ **Air** ☐ **H_2S** ☐

LPG ☐ **NORM** ☐ **Natural Gas** ☐ **Polymer** ☐ **Other (explain)** _____

CERTIFICATE

I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that the data and facts stated therein are true, correct, and complete, to the best of my knowledge.

_____
Signature Date

_____
Name of Person (type or print)

Phone _____ Fax _____

FOR OFFICE USE ONLY	*REGISTER NO.*	*AMOUNT $*

APPLICANT ALSO MUST COMPLY WITH THE INSTRUCTIONS ON THE REVERSE SIDE

A.4 W-14 (Application to Dispose of Oil and Gas Waste by Injection into a Formation Not Productive of Oil and Gas)

05/2004

FORM W-14 INSTRUCTIONS

1. File the original application, including all attachments, with Environmental Services, Railroad Commission of Texas, P.O. Box 12967, Austin, Texas 78711-2967. File one copy of the application and all attachments with the appropriate district office.

2. Include with the original application a non-refundable fee of $100 payable to the *Railroad Commission of Texas*. Submit an additional $150 fee for each request for an exception to Statewide Rule 9(9) relating to Special Equipment.

3. Provide the current field name (Item 6) and field number (Item 7) designated in Commission records for an existing well. If the application is for a new well, provide the nearest producing field name and number.

4. Check in Item 14 the appropriate box for a new permit or an amendment of an existing permit. If an amendment, check the applicable boxes in Item 15 to indicate the reason for amendment and provide a brief explanation if "other" is checked.

5. If the application is for a new permit, attach a complete electrical log of the well or the log of a nearby well.

6. Attach a letter from the Texas Commission on Environmental Quality (TCEQ) or its predecessor or successor agency stating that the well will not endanger usable quality water strata and that the formation or stratum to be used for disposal does not contain usable quality water. To obtain the TCEQ letter, submit two copies of the Form W-14, a plat with surveys marked, and a representative electrical log to TCEQ, MC 151, P.O. Box 13087, Austin, Texas 78711-3087. NOTE: If the application is for an amendment, a new TCEQ letter is required only if the amendment is for a change in the disposal interval.

7. Attach a map showing the location of all wells of public record within one-half (1/2) mile radius of the proposed disposal well. On the map show each Commission-designated operator of each well within one-half (1/2) mile of the proposed disposal well. NOTE: For a commercial disposal well application, the map shall also show the ownership of the proposed disposal well tract and the surface tracts that adjoin the proposed disposal well tract.

8. Attach a table of all wells of public record that penetrate the disposal interval and that are within one-quarter (1/4) mile radius of the proposed disposal well. The table shall include the well identification, date drilled, depth, current status, and the plugging dates of those wells that are plugged. Identify any wells that appear to be or that you may know are unplugged or improperly plugged and penetrate the proposed injection interval. Alternatively, an applicant may request a variance under Rule 9(7)(B). NOTE: If the application is for an amendment, a table of wells within a one-quarter (1/4) mile radius is required only if the current permit was issued before April 1, 1982, or if the amendment is for a shallower disposal depth.

9. Attach a list of the names and mailing or physical addresses of affected persons who were notified of the application and when the notification was mailed or delivered. Include a signed statement attesting to the notification of the listed affected persons. Notice shall be provided by sending or delivering a copy of the front and back of the application to the surface owner of record of the surface tract where the well is located, each Commission-designated operator of any well located within one-half (1/2) mile of the proposed well, the county clerk, and the city clerk, or other city official, if the proposed well is located within municipal boundaries. In addition, notice of a commercial disposal well also shall be provided to surface owners of record of each surface tract that adjoins the surface tract where the proposed well will be located. NOTE: If the application is for an amendment, notification of the county clerk and the city clerk are required only if the amendment is for disposal interval or for commercial status.

10. Attach an affidavit of publication signed by the publisher that the notice of publication has been published in a newspaper of general circulation in the county where the disposal well will be located. Attach a newspaper clipping of the published notice. If the application is for a commercial disposal well, that fact must be stated in the published notice. NOTE: If the application is for an amendment, notification by publication is required only if the amendment is for disposal interval or for commercial status.

11. Attach any other technical information that you believe will facilitate the review of the application. Such information may include a cement bond log, a cementing record, or a well bore sketch.

Additional information is available in the *Underground Injection Control Manual*, which is available on the Railroad Commission's website: www.rrc.state.tx.us

No public hearing will be held on this application unless an affected person or local government protests the application, or the Commission administratively denies the application. Any protest shall be in writing and contain (1) the name, mailing address, and phone number of the person making the protest; and (2) a brief description of how the protestant would be adversely affected by the activity sought to be permitted. If the Commission or its delegate determines that a valid protest has been received, or that a public hearing is in the public interest, a hearing will be held upon written request by the applicant. The permit may be administratively issued in a minimum of 15 days after receipt of the application, published notice, or notification of affected persons, whichever is later, if no protest is received.

A.5 H-1 (Application to Inject Fluid into a Reservoir Productive of Oil or Gas)

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

Form H-1
05/2004

APPLICATION TO INJECT FLUID INTO A RESERVOIR PRODUCTIVE OF OIL OR GAS

1.Operator name _____ 2. Operator P-5 No. _____
(as shown on P-5, Organization Report)

3.Operator Address _____

4. County _____ 5. RRC District No. _____

6. Field Name _____ 7. Field No. _____

8. Lease Name _____ 9. Lease/Gas ID No. _____

10. Check the Appropriate Boxes: New Project ☐ Amendment ☐

If amendment, Fluid Injection Project No. F-_____

Reason for Amendment: Add wells ☐ Add or change types of fluids ☐ Change pressure ☐

Change volume ☐ Change interval ☐ Other (explain) _____

RESERVOIR DATA FOR A NEW PROJECT

11. Name of Formation _____ 12. Lithology _____
(e.g., dolomite, limestone, sand, etc.)

13. Type of Trap _____ 14. Type of Drive during Primary Production _____
(anticline, fault trap, stratigraphic trap, etc.)

15. Average Pay Thickness _____ 16. Lse/Unit Acreage _____ 17. Current Bottom Hole Pressure (psig) _____

18. Average Horizontal Permeability (mds) _____ 19. Average Porosity (%) _____

INJECTION PROJECT DATA

20. No. of Injection Wells in this application _____

21. Type of Injection Project: Waterflood ☐ Pressure Maintenance ☐ Miscible Displacement ☐ Natural Gas Storage ☐

Steam ☐ Thermal Recovery ☐ Disposal ☐ Other _____

22. If disposal, are fluids from leases other than the lease identified in Item 9? Yes ☐ No ☐

23. Is this application for a Commercial Disposal Well ? Yes ☐ No ☐

24. If for commercial disposal, will non-hazardous oil and gas waste other than produced water be disposed? Yes ☐ No ☐

25. Type(s) of Injection Fluid:

Salt Water ☐ Brackish Water ☐ Fresh Water ☐ CO_2 ☐ N_2 ☐ Air ☐ H_2S ☐ LPG ☐ NORM ☐

Natural Gas ☐ Polymer ☐ Other (explain) _____

26. If water other than produced salt water will be injected, identify the source of each type of injection water by formation, or by aquifer and depths, or by name of surface water source:

CERTIFICATE
I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that the data and facts stated therein are true, correct, and complete, to the best of my knowledge.

_____
Signature Date

_____
Name of Person (type or print)

_____
Phone _____ Fax _____

For Office Use Only	*Register No.*	*Amount $*

See Reverse Side for Required Attachments

A.5 H-1 (Application to Inject Fluid into a Reservoir Productive of Oil or Gas)

05/2004

INSTRUCTIONS FOR FORM H-1

1. **Application**. File the original Form H-1 application, including all attachments, with Assistant Director, Environmental Services, Railroad Commission of Texas, P. O. Box 12967, Capitol Station, Austin, Texas 78711. File one copy of the application and all attachments with the appropriate Railroad Commission District Office. Include with the original application a non-refundable fee of $200, payable to the Railroad Commission of Texas. Submit an additional $150 for each request for an exception to Statewide Rule 46(g)(3) and/or (j)(5)(B).

2. **Well Logs**. Attach the complete electric log or a similar well log for one of the proposed injection wells or for a nearby well. Attach any other logging and testing data, such as a cement bond log, available for the well that supports this application.

3. (a) **For a new project**, attach a map with surveys marked showing the location and depth of all wells of public record within one-quarter (1/4) mile radius of the proposed injection well(s).
(b) **For an amendment to add wells to a previous authority**, attach a map with surveys marked showing the location and depth of all wells of public record within one-quarter (1/4) mile radius of the additional wells, unless such data has been submitted previously for the project.
(c) **Table of Wells**. For those wells in 3(a) or 3(b) that penetrate the top of the injection interval, attach a table of wells showing the dates drilled and their current status. The Commission may adjust or waive this data requirement in accordance with provisions in the "Area of Review" section of Statewide Rule 46 (Rule 46(e)).

4. **Water Letter**. Attach a letter from the Texas Commission on Environmental Quality (TCEQ) or its predecessor or successor agencies for a well within the project area stating the depth to which usable quality water occurs.

5. **Form(s) H-1A**. Attach Form H-1A showing each injection well to be used in the project. Up to TWO wells can be listed on each Form H-1A.

6. **Use of Fresh Water**. Attach Form H-7, Fresh Water Data Form, for a new injection project that includes the use of fresh water. An updated Form H-7 must be attached to Form H-1 for an expansion of a previously authorized fresh water injection project unless the fresh water is purchased from a commercial supplier, public entity, or from another operator.

7. **Plat of Leases, Notice and Hearings**

(a) Plat of Leases. Attach a plat of leases showing producing wells, injection wells, offset wells and identifying ownership of all surrounding leases within one-half (1/2) mile.

(b) Notice.
(1) Send or deliver a copy of the application to the owner of record of the surface tract on which the well(s) is located; each Commission-designated operator of any well located within one-half (1/2) mile of the proposed injection well(s); and the clerk of the city and county in which the well(s) is located. If this is the initial application for fluid injection authority for this reservoir, send copies of the application to all operators in the reservoir. Attach a signed statement indicating the date the copies of the application were mailed or delivered and the names and addresses of the persons to whom copies were sent.

(2) Attach an affidavit of publication signed by the publisher that notice of the application has been published in a newspaper of general circulation in the county where the well(s) will be located. Notice instructions and forms may be obtained from the Commission's Austin Office, the Commission's website (www.rrc.state.tx.us) or the District Offices. Attach a newspaper clipping of the published notice.

(c) Protests and Hearings. An affected person or local government may protest this application. A hearing on the application will be held if a protest is received and the applicant requests a hearing, or if the Commission determines that a hearing is in the public interest. Any such request for a public hearing shall be in writing and contain: (1) the name, mailing address and phone number of the person making the request; and (2) a brief description of how the protestant would be adversely affected by the granting of the application. If the Commission determines that a valid protest has been received, or that a hearing would be in the public interest, a hearing will be held after issuance of proper and timely notice of the hearing by the Commission. If no protest is received within fifteen (15) days of publication or receipt in Austin of the application, the application may be processed administratively.

A.6 H-1A (Injection Well Data)

05/2004

RAILROAD COMMISSION OF TEXAS -- OIL AND GAS DIVISION

Form H-1A

INJECTION WELL DATA (attach to Form H-1)

1. Operator Name (as shown on P-5) 2. Operator P-5 No.

3. Field Name 4. Field No.

5. Current Lease Name 6. Lease/Gas ID No.

7. Lease is _____ miles in a _____ direction from _____ (center of nearest town).

8. Well No.	9. API No.	10. UIC No.	11. Total Depth	12. Date Drilled	13. Base of Usable Quality Water (ft)

14. (a) Legal description of well location, including distance and direction from survey lines:

(b) Latitude and Longitude of well location, if known (optional) Lat. _____ Long. _____

15. New Injection Well ☐ or Injection Well Amendment ☐ Reason for Amendment: Pressure ☐ Volume ☐ Interval ☐ Fluid Type ☐

Other (explain) _____

Casing	Size	Setting Depth	Hole Size	Casing Weight	Cement Class	# Sacks of Cement	Top of Cement	Top Determined by
16. Surface								
17. Intermediate								
18. Long string								
19. Liner								

20. Tubing size	21. Tubing depth	22. Injection tubing packer depth	23. Injection interval _____ to _____

24. Cement Squeeze Operations (List all)	Squeeze Interval (ft)	No. of Sacks	Top of Cement (ft)

25. Multiple Completion? Yes ☐ No ☐	26. Downhole Water Separation? Yes ☐ No ☐	*NOTE: If the answer is "Yes" to Item 25 or 26, provide a Wellbore Sketch*

27. Fluid Type	28. Maximum daily injection volume for each fluid type (rate in bpd or mcf/d)	29. Estimated average daily injection volume for each fluid type (rate in bpd or mcf/d)

30. Maximum Surface Injection Pressure: for Liquid _____ psig for Gas _____ psig.

8. Well No.	9. API No.	10. UIC No.	11. Total Depth	12. Date Drilled	13. Base of Usable Quality Water (ft)

14. (a) Legal description of well location, including distance and direction from survey lines:

(b) Latitude and Longitude of well location, if known (optional) Lat. _____ Long. _____

15. New Injection Well ☐ or Injection Well Amendment ☐ Reason for Amendment: Pressure ☐ Volume ☐ Interval ☐ Fluid Type ☐

Other (explain) _____

Casing	Size	Setting Depth	Hole Siz	Casing Weight	Cement Class	# Sacks of Cement	Top of Cement	Top Determined by
16. Surface								
17. Intermediate								
18. Long string								
19. Liner								

20. Tubing size	21. Tubing depth	22. Injection tubing packer depth	23. Injection interval _____ to _____

24. Cement Squeeze Operations (List all)	Squeeze Interval (ft)	No. of Sacks	Top of Cement (ft)

25. Multiple Completion? Yes ☐ No ☐	26. Downhole Water Separation? Yes ☐ No ☐	*NOTE: If the answer is "Yes" to Item 25 or 26, provide a Wellbore Sketch*

27. Fluid Type	28. Maximum daily injection volume for each fluid type (rate in bpd or mcf/d)	29. Estimated average daily injection volume for each fluid type (rate in bpd or mcf/d)

30. Maximum Surface Injection Pressure: for Liquid _____ psig for Gas _____ psig.

A.6 H-1A (Injection Well Data)

FORM H-1A INSTRUCTIONS

05/2004

1. File as an attachment to Form H-1 to provide injection well data for each application for a new injection well permit or to amend an injection well permit.

2. Complete the current field name and number (Items 3 and 4) with the current field designation in Commission records.

3. Complete the current lease name and number (Items 5 and 6) with the current lease identification in Commission records for each well in the application. Use separate H-1A Forms for each lease.

4. Provide the current well number(s) for existing wells in Item 8. Provide the proposed well numbers for wells that have not yet been drilled.

5. Check in Item 15 the appropriate box for a new injection well permit or an amendment to an injection well permit. If an amendment, check the appropriate boxes for the reason(s) for the application(s) for amendment. If “other” is checked, provide a brief explanation.

6. Provide complete well construction information (Items 16 through 26), including all proposed re-completion (e.g. liner, cement squeeze, tubing, packer). Attach additional sheets if necessary. For Item 19, if the liner was not to the surface, indicate both the top and the bottom depth of the liner as the “Setting Depth.”

A.7 H-11 (Injection Well Data)

☐ New Application
☐ Application for Renewal

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division
Application for Permit to Maintain and Use a Pit

Form H-11
May 1984
Comply with Instructions on Reverse Side

1. Operator's Name (As shown on Form P-5, Organization Report)	2. RRC Operator No.	3. RRC Dist. No.	4. County of pit site

5. Operator's Address (Street, City, State and Zip Code)

6. Name of Lease, Project or Facility of Pit Location

7. RRC Oil Lease No. or 8. RRC Gas ID No.

9. Pit Location
- Section _____ Block _____ Survey _____ Abstract No. A- _____
- Location is _____ miles _____ (direction) from _____ (nearest town)

10. a. Is pit bottom below ground level?
☐ Yes ☐ No
b. Artificial liner?
☐ Yes ☐ No
c. If lined, equipped with a leak detection system?
☐ Yes ☐ No

11. Name and Address of Surface Owner

12. Are wastes or fluids from operations other than your own?
☐ Yes ☐ No

13. Type of pit (refer to item F of instructions)

14 a. Describe land use surrounding pit location:

b. Is land surrounding pit location productive agricultural land?
☐ Yes ☐ No

15. a. Briefly explain the need for this pit:

15. b. Type of waste or fluid:

15. c. Chloride concentration: _____ mg/l

16. Pit is
☐ Proposed ☐ Existing
If existing, date constructed _____

17. Dikes
a. Height above ground level _____ feet Width at base _____ feet
b. Are dikes designed to keep wastes or fluids in the pit? ☐ Yes ☐ No
c. Are dikes designed to keep stormwater runoff out of the pit? ☐ Yes ☐ No
d. Source of Dike Material: ☐ Excavated from pit ☐ Adjacent borrow pit
☐ Off-site excavation (describe material):

18. Pit capacity (barrels)
_____

19. Inside pit dimensions two feet below top of dike
Length _____ feet Width _____ feet
Depth:
from ground level to deepest point _____ feet

20. Wastes or fluids are transported to pit by (check all that apply):
☐ Contract Hauler ☐ Applicant's truck ☐ Pipe ☐ Other: _____

21. a. Distance to nearest water well within one-mile of pit
_____ feet

21. b. Depth of this water well
_____ feet

22. Depth to shallowest fresh water _____ feet
Source of information:
☐ measured/observed ☐ well owner ☐ electric log ☐ TDWR

23. Have you included all attachments required by the Instructions on the reverse side of this form?

CERTIFICATE

I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that data and facts stated therein are true, correct, and complete, to the best of my knowledge.

_____
Signature

Name of Person (type or print) Title

Telephone _____ Date _____
Area Code Number

• RRC DISTRICT USE ONLY •

Application Information Review

Date received _____
Date inspected _____
Inspector _____
Comments:

☐ Location ☐ Liner ☐ Agricultural Land ☐ Dimensions
☐ Grade Construction ☐ Type Pit ☐ Capacity ☐ Dikes ☐ Waste Transport

• RRC AUSTIN USE ONLY •

Date received _____ Pit code _____ Pit type _____ Permit no. _____ Permit date _____

A.7 H-11 (Injection Well Data)

Instructions to Pit Application

Authority: Statewide Rule 8, Water Protection

A. File the application, including all attachments, with the Railroad Commission, Oil and Gas Division, P.O. Drawer 12967, Capitol Station, Austin, Texas 78711. On the same day file one copy of the application and its attachments with the appropriate District Office. This form is not required for a minor permit.

B. Notify the surface owner of the land where the pit will be located by mailing or delivering a copy of the application form, both front and back, but excluding the attachments. If the land where the pit is proposed is within corporate limits, also notify the city clerk or other appropriate city official. If application is for renewal of an existing permit, notice is not required.

C. Attach a plat showing the size of the lease or tract and the location of the pit within the lease or tract. Give approximate perpendicular distance to nearest intersecting lease/unit lines and section/survey lines.To avoid confusion, distinguish between the two sets of lines. Indicate scale on this plat.

D. Attach a county highway map (scale: 1" = 4 miles) showing the location of the pit. County highway maps are available from the Texas Department of Highways and Public Transportation, P. O. Box 5051, Attn: Map Distribution File D-10, Austin, TX 78763.

E. If application is for renewal of a permit for an existing pit, attach a copy of your current authority to use the pit.

F. Identify the type of pit in item 13 using one of the following as defined in Statewide Rule 8(a): Emergency Saltwater Storage Pit, Collecting Pit, Gas Plant Evaporation/Retention Pit, Brine Pit (located at underground hydrocarbon storage facilities only), Saltwater Disposal Pit, Skimming Pit, Washout Pit, Drilling Fluid Disposal Pit, Drilling Fluid Storage Pit, or other (specify in item 13 and explain in item 15a).

G. Attach a drawing of two perpendicular, sectional views of the pit showing the pit bottom, sides, dikes and the natural grade. For an existing pit, dimensions below fluid level may be approximated.If the pit length and width are irregular, include a top view to show pit dimensions and dike widths. Indicate scale on all views.

H. **If pit is lined,** attach data on liner material, thickness, and installation procedures.

I. Attach an identification and description of the soil or subsoil that will make up the pit bottom and sides. The information shall describe the soil by typical name, appropriate proportion of grain sizes, texture, consistency, moisture condition, and other pertinent characteristics. (Example: clayey silt, slightly plastic, small percentage of fine sand, firm and dry in place.) Identify the source of soil information. Information on how to classify soils is available from the District Office or Austin Office upon request. If application is for renewal of a permit for an existing emergency saltwater storage pit or a lined pit with a leak detection system, this attachment is not required.

J. **If pit is equipped with a leak detection system,** attach engineering design drawing of the pit and leak detection system.

K. **If lined pit is not equipped with a leak detection system,** describe procedures for periodic maintenance and determining liner integrity, including any special monitoring.

L. **If pit is an emergency salt water storage pit,** attach justification for pit size based on water production, lease water storage capacity, and anticipated well or equipment shut-down time.

Note: The Director of the Oil and Gas Division may require the applicant to provide the Commission with any additional engineering, geological, or other information which the Director deems necessary to show that issuance of the permit will not result in the waste of oil, gas, or geothermal resources or the pollution of surface or subsurface water.

Protests and hearings.

An affected person may file a protest to the application and request a hearing. Any protest to the application should be filed with the Commission in Austin within fifteen days of the date the application is filed with the Commission. Any such protest shall be made in writing and shall include (1) the name, mailing address, and phone number of the person making the protest; and (2) a brief description of how the protestant would be adversely affected by the granting of the permit. If the Commission determines that a valid protest has been received, or that a hearing would be in the public interest, a hearing will be held after the issuance of proper and timely notice of the hearing by the Commission. If no protest is received within fifteen (15) days of receipt of the application in Austin, the application may be processed administratively.

A.8 WH-1 (Application for Oil and Gas Waste Hauler's Permit)

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division
Environment Services
P.O. Box 12967
Austin, TX 78711-2967

APPLICATION FOR OIL AND GAS WASTE HAULER'S PERMIT

WH-1
Rev 4/94
WWW-1

TYPE OR PRINT USING BLACK OR BLUE INK **READ INSTRUCTIONS BELOW**

1. Hauler name and address exactly as shown on P-5 Organization Report, including city, state and zip code.	2. Hauler P-5 Organization No. 3. Purpose of filing ☐ Initial permit application ☐ Amendment of permit no. _____ ☐ Annual renewal of permit no.
4. Number designation of all Railroad Commission districts where the hauler will pick up, transport or dispose of wastes.	5. Number designation of all Railroad Commission districts with yards where hauler vehicles are housed.

CERTIFICATION: I certify that I am authorized to make this application, that this application was prepared by me or under my supervision and direction, and that the data and facts stated herein are true, correct, and complete to the best of my knowledge. If the above-named hauler is a corporation, I further certify that it is either subject to and not delinquent on the State of Texas Franchise Tax or exempt from or not subject to the tax.

Signature _____ Name (type or print) _____

Title _____ Phone _____ Date _____

INSTRUCTIONS
Form WH-1: Application for Oil and Gas Waste Hauler's Permit
Reference: Statewide Rule 8(f)

WHO MUST FILE

A person who transports oil and gas waste for hire by any method other than by pipeline off a lease, unit, or other oil and gas property for disposal as required by Statewide Rule 8(f).
Note: A person may haul oil and gas waste for use in connection with drilling or servicing an oil or gas well without obtaining an oil and gas waste hauler permit.

PERMIT APPLICATION FEE

A non-refundable fee of $100 must be filed with each application for issuance, renewal, or material amendment of an oil and gas waste hauler permit. The check or money order should be made payable to "Treasurer, State of Texas." The following are not considered to be material amendments of an existing permit: addition or deletion of vehicles on the WH-2 and addition or deletion of an approved disposal/injection system on a WH-3.

INITIAL PERMIT APPLICATION

1. File a Form P-5, Organization Report, along with the appropriate financial security with the Commission in Austin.
2. File an original of each of the following forms with the Commission's Director of Environmental Services in Austin as soon as you have received your P-5 organization number.
   a. Form WH-1: Application for Oil and Gas Waste Hauler's Permit
   b. Form WH-2: Oil and Gas Waste Hauler's List of Vehicles
   c. Form WH-3: Oil and Gas Waste Hauler's Authority to Use an Approved Disposal/Injection System

See General Instructions below.

RENEWAL PROCEDURES

The Commission's Austin office will mail a renewal notice to you approximately 60 days before your permit expires. The notice will include a pre-printed Form WH-1, preliminary lists of approved vehicles and approved disposal/injection systems, and instructions on the renewal process. See General Instructions below.

GENERAL INSTRUCTIONS

1. When the completed application is approved, the original Form WH-1 will be returned to you and will serve as your permit. At the same time, you will receive Permit Attachment A (Waste Hauler's Vehicle Identification) and Permit Attachment B (Approved Disposal/Injection Systems). Each vehicle must carry a copy of the permit including those parts of the Commission–issued attachments listing approved vehicles and Commission-permitted disposal systems that are relevant to that vehicle's activities.
2. You must file a Form WH-3 with the Commission in Austin before using any system that is not shown on your current Permit Attachment B (Approved Disposal/Injection Systems). After the Form WH-3 is approved, you will be sent a revised Permit Attachment B with that system included.

FRANCHISE TAX CERTIFICATION: House Bill 175 (70th Legislature) states that a corporation may not be granted a permit unless it is current on Franchise Tax payment or is exempt from or not subject to tax. A false certification will result in permit revocation.

A.8 WH-1 (Application for Oil and Gas Waste Hauler's Permit)

OIL AND GAS WASTE HAULER'S PERMIT
(To be completed by the Commission)

Permit No._____ is hereby issued to_____
subject to the conditions below.

PERMIT CONDITIONS

A. This permit authority is limited to the hauling, handling and disposal of oil and gas waste off a lease, unit, or other oil and gas property.

B. This permit authorizes the permitted hauler to dispose of oil and gas waste only at the following disposal/injection systems:

- Commission-permitted disposal/injection systems for which a Form WH-3 has been submitted and which are listed on Permit Attachment B (Approved Disposal/Injection Systems).
- disposal systems operated under authority of a minor permit issued by the Commission; and
- disposal systems permitted by another state agency or another state provided the Commission has granted separate authorization for the disposal.

C. Each vehicle must be marked on both sides and in the rear with the permitted hauler's name (exactly as shown on the P-5 Organization Report) and permit number in characters not less than three inches high.

D. This permit authorizes the permitted hauler to use only those vehicles shown on the Commission-issued listing of approved vehicles, Permit Attachment A (Waste Hauler Vehicle Identification).

E. Each vehicle must carry a copy of this permit along with a copy of those parts of Permit Attachment A (Waste Hauler Vehicle Identification) and Permit Attachment B (Approved Disposal/Injection Systems) that are relevant to that vehicle's activities.

F. Each vehicle must be operated and maintained in such a manner as to prevent spillage, leakage, or other escape of oil and gas waste during transportation.

G. The permitted hauler must make each vehicle available for inspection upon request by Commission personnel.

H. The permitted hauler must compile and keep current a list of all persons by whom the permitted hauler is hired to haul and dispose of oil and gas waste and furnish such list to the Commission upon request.

I. The permitted hauler must adequately train all drivers to ensure compliance with Commission rules, including record keeping requirements, and adherence to proper emergency response and notification procedures.

J. The permitted hauler must keep a DAILY record of the oil and gas waste hauling operations of each approved vehicle. The daily record, signed and dated by the vehicle driver, must be kept open for Commission inspection and must contain the following information:

1. Identity of the property from which the oil and gas waste is hauled (operator name, lease name and number or other facility name or number, and county; and
2. Type and volume of oil and gas waste received by the hauler at the property where it was generated;
3. Identity of the disposal system to which the oil and gas waste is delivered (operator name, lease name and number or system name, well number or system permit number, and county); and
4. Type and volume of oil and gas waste transported and delivered to the disposal system.

K. This permit is not transferable without the consent of the Commission.

L. This permit expires on _____. This permit, unless suspended or revoked for cause shown, will remain valid until the expiration date.

_____
RRC Contact

(512) 463- _____

_____ _____
Director of Environmental Services **Date of Permit Issuance**

A.9 WH-2 (Oil and Gas Waste Hauler's List of Vehicles)

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division
Environmental Services
P.O. Box 12967
Austin, Texas 78711-2967

OIL AND GAS WASTE HAULER'S LIST OF VEHICLES

WH-2
Rev. 4/94

INSTRUCTIONS: To be completed by the oil and gas waste hauler and filed with the Commission in Austin either

- with the WH-1 for new permit applications, or
- by itself at any time to add vehicles to an existing permit's Attachment A.

NOTE: For the purposes of this form, "vehicle" means any truck tank, trailer tank, vacuum tank, dump truck, garbage truck, or other container in which oil and gas waste will be hauled by the oil and gas waste hauler.

Hauler name (exactly as shown on P-5 organization report)	☐ initial filing ☐ additional vehicle for permit no.	total no. of vehicles	page ___ of ___ / ___

Vehicle Make/Model/Year	Serial No.	Capacity (units)	Current Vehicle License No.

CERTIFICATION:
I certify that the vehicles listed on this form are designed so that they will not leak during transportation.

Signature_____ Name (type or print)_____

Title _____ Phone ( )_____ Date_____

A.10 WH-3 (Oil and Gas Waste Hauler's Authority to Use Approved Disposal/Injection System)

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division
Environmental Services
P.O. Box 12967
Austin, Texas 78711-2967

OIL AND GAS WASTE HAULER'S AUTHORITY TO USE APPROVED DISPOSAL/ INJECTION SYSTEM

WH-3
Rev. 4/94

TYPE OR PRINT USING BLACK OR DARK BLUE INK

READ INSTRUCTIONS ON BACK

I. To be completed by the hauler (1-4)

1. Hauler name (as shown on WH-1 Application for Oil and Gas Waste Hauler's Permit)	2. Hauler P-5 organization no.	3. Hauler permit no., if assigned
4. Hauler address (including city, state, and zip code)		

II. To be completed by the system operator (5-10)

5. System operator name (exactly as shown on P-5 organization report)	6. System operator P-5 organization no.
7. System operator address (including city, state, and zip code)	

8. **Disposal/Injection Wells.** Identify exactly as shown on H-10 Annual Disposal/Injection Well Monitoring Report.

RRC Dist. No.	Field Name / Lease Name	Oil Lease or Gas ID No.	Well Number	UIC Control Number	Check One: non-commercial	Check One: commercial

9. **Other Disposal Systems.** Identify exactly as shown on system's Commission-granted permit.

Dist.	Facility Name and County	RRC-Assigned Permit No.	Type of System
			☐ Land Farm ☐ Pit ☐ Landfill ☐ Other (Specify)
			☐ Land Farm ☐ Pit ☐ Landfill ☐ Other (Specify)
			☐ Land Farm ☐ Pit ☐ Landfill ☐ Other (Specify)

10. CERTIFICATION OF SYSTEM OPERATOR

Signature _____ Name (type or print) _____

Title _____ Phone No. ( ) _____ Date _____

I certify that the waste hauler named above is authorized to dispose of oil and gas waste at the systems identified on this form; that I am authorized to make this report; that this report was prepared by me or under my supervision and direction; and that the data and facts contained herein are true, correct and complete to the best of my knowledge.

RRC USE ONLY

A.10 WH-3 (Oil and Gas Waste Hauler's Authority to Use Approved Disposal/Injection System)

Instructions

Form WH-3: Oil and Gas Waste Hauler's Authority To Use Approved Disposal/Injection System

Reference: Statewide Rule 8(f)

IMPORTANT

- Before this form can be processed, the system operator must have on file in the Commission's Austin office a current Form P-5, Organization Report.
- The disposal system operator must have a Commission disposal permit for each system listed.

WHO MUST FILE THE WH-3

A person who transports oil and gas waste for hire by any method other than by pipeline off a lease, unit, or other oil and gas property for disposal as required by Statewide Rule 8(f). (NOTE: A person may haul oil and gas waste for use in connection with drilling or servicing an oil or gas well without obtaining an Oil and Gas Waste Hauler's Permit.)

COMPLETING THE WH-3

Form WH-3 should be completed as follows:

Part I. To be completed by the hauler.

Part II. To be completed by the system operator. The system operator should return the form to the waste hauler, who will in turn file the WH-3 with the Commission's Director of Environmental Services in Austin.

WHAT TO FILE

The hauler must file a Form WH-3 for each unique system operator name.

CHANGE OF SYSTEM OPERATOR

If there is a change in the operator for any system, a new Form WH-3 must be filed.

CANCELLATION OF AUTHORITY

The system operator should notify the Commission's Director of Environmental Services in Austin in writing when a hauler's authorization to use a particular system is canceled.

A.11 STATEWIDE RULE 32 EXCEPTION DATA SHEET

Instructions to Pit Application

Authority: Statewide Rule 8, Water Protection

A. File the application, including all attachments, with the Railroad Commission, Oil and Gas Division, P.O. Drawer 12967, Capitol Station, Austin, Texas 78711. On the same day file one copy of the application and its attachments with the appropriate District Office. This form is not required for a minor permit.

B. Notify the surface owner of the land where the pit will be located by mailing or delivering a copy of the application form, both front and back, but excluding the attachments. If the land where the pit is proposed is within corporate limits, also notify the city clerk or other appropriate city official. If application is for renewal of an existing permit, notice is not required.

C. Attach a plat showing the size of the lease or tract and the location of the pit within the lease or tract. Give approximate perpendicular distance to nearest intersecting lease/unit lines and section/survey lines.To avoid confusion, distinguish between the two sets of lines. Indicate scale on this plat.

D. Attach a county highway map (scale: 1" = 4 miles) showing the location of the pit. County highway maps are available from the Texas Department of Highways and Public Transportation, P. O. Box 5051, Attn: Map Distribution File D-10, Austin, TX 78763.

E. If application is for renewal of a permit for an existing pit, attach a copy of your current authority to use the pit.

F. Identify the type of pit in item 13 using one of the following as defined in Statewide Rule 8(a): Emergency Saltwater Storage Pit, Collecting Pit, Gas Plant Evaporation/Retention Pit, Brine Pit (located at underground hydrocarbon storage facilities only), Saltwater Disposal Pit, Skimming Pit, Washout Pit, Drilling Fluid Disposal Pit, Drilling Fluid Storage Pit, or other (specify in item 13 and explain in item 15a).

G. Attach a drawing of two perpendicular, sectional views of the pit showing the pit bottom, sides, dikes and the natural grade. For an existing pit, dimensions below fluid level may be approximated.If the pit length and width are irregular, include a top view to show pit dimensions and dike widths. Indicate scale on all views.

H. **If pit is lined,** attach data on liner material, thickness, and installation procedures.

I. Attach an identification and description of the soil or subsoil that will make up the pit bottom and sides. The information shall describe the soil by typical name, appropriate proportion of grain sizes, texture, consistency, moisture condition, and other pertinent characteristics. (Example: clayey silt, slightly plastic, small percentage of fine sand, firm and dry in place.) Identify the source of soil information. Information on how to classify soils is available from the District Office or Austin Office upon request. If application is for renewal of a permit for an existing emergency saltwater storage pit or a lined pit with a leak detection system, this attachment is not required.

J. **If pit is equipped with a leak detection system,** attach engineering design drawing of the pit and leak detection system.

K. **If lined pit is not equipped with a leak detection system,** describe procedures for periodic maintenance and determining liner integrity, including any special monitoring.

L. **If pit is an emergency salt water storage pit,** attach justification for pit size based on water production, lease water storage capacity, and anticipated well or equipment shut-down time.

Note: The Director of the Oil and Gas Division may require the applicant to provide the Commission with any additional engineering, geological, or other information which the Director deems necessary to show that issuance of the permit will not result in the waste of oil, gas, or geothermal resources or the pollution of surface or subsurface water.

Protests and hearings.

An affected person may file a protest to the application and request a hearing. Any protest to the application should be filed with the Commission in Austin within fifteen days of the date the application is filed with the Commission. Any such protest shall be made in writing and shall include (1) the name, mailing address, and phone number of the person making the protest; and (2) a brief description of how the protestant would be adversely affected by the granting of the permit. If the Commission determines that a valid protest has been received, or that a hearing would be in the public interest, a hearing will be held after the issuance of proper and timely notice of the hearing by the Commission. If no protest is received within fifteen (15) days of receipt of the application in Austin, the application may be processed administratively.

A.12 FORM PR (Monthly Production Report)

TYPE OR PRINT USING DARK INK
* ***READ INSTRUCTIONS ON BACK***

MONTHLY PRODUCTION REPORT

Form PR
02/2005 - WWW

Operator Name

Operator Address

City State Zip

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division
(1701 N. Congress)
P.O. Box 12967 – Capitol Station
Austin, Texas 78711-2967
http://www.rrc.state.tx.us

P-5 Operator No. RRC Dist No.

M M / Y Y Y Y
Production Month/Year

Page _____ of _____

Fill here if CORRECTED REPORT

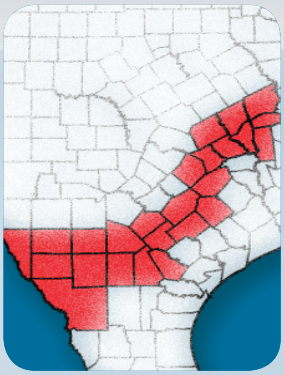
EXACTLY AS SHOWN ON RRC RECORDS (If multiple Volumes/Codes exist, put them on the next line)				OIL/CONDENSATE (whole barrels) – Total for Month * *SEE BACK FOR EXPLANATION OF DISPOSITION CODES* *					CASINGHEAD GAS/GAS WELL GAS (MCF) – Total for Month		
Field Name (list alphabetically) Lease Name (for gas, provide well #)	O/G/P [Oil/Gas/ Pending]	RRC Identifier [Lease/Gas ID/ Drill Permit/API#]	Commingling Permit # or LSE Total (T)	On hand, beginning of month	Production	Disposition		On hand, end of month	Formation Production	Disposition	
						Volume	Code			Volume	Code
1	2	3	4	5	6	7	8	9	10	11	12
DO NOT WRITE IN THIS AREA				DO NOT WRITE IN THIS AREA				DO NOT WRITE IN THIS AREA			
DO NOT WRITE IN THIS AREA				DO NOT WRITE IN THIS AREA				DO NOT WRITE IN THIS AREA			

REMARKS **- Attach sheet if more space needed**

Print Name_____ Signature_____

Title_____ Phone w/AC_____ Date_____

I certify that I am authorized to make this report, that it was prepared by me or under my supervision and direction, and that the information stated herein is true, correct and complete to the best of my knowledge.



Biographies

Texas Railroad Commissioner
David J. Porter

David J. Porter was elected to serve a six-year term as Texas Railroad Commissioner in November 2010.

Since taking office, Commissioner Porter has been appointed to the Interstate Oil and Gas Compact Commission as the Official Representative of Texas by Texas Governor Rick Perry. He has also been appointed as Governor Perry's official representative on the Interstate Mining Compact Commission and currently serves as an advisory board member for the Texas Journal of Oil, Gas, and Energy Law.

Porter created the Eagle Ford Shale Task Force, the first of its kind at the Texas Railroad Commission, to establish a forum that will bring the community together and foster a dialogue regarding drilling activities in the Eagle Ford Shale. The Task Force is comprised of local community leaders, elected officials, industry representatives, environmental groups, and landowners. The goal of the group is to open the lines of communication between all parties involved, establish recommendations for developing the Eagle Ford Shale, and promote economic benefits locally and statewide.

Before taking office, Commissioner Porter built a successful small business around his CPA practice in Midland Texas, providing accounting and tax services to oil and gas producers, royalty owners, oil field service companies, and other small businesses and individuals.

Porter was born in Fort Lewis, Washington in 1956 while his father was serving in the US Army. He graduated magna cum laude from Harding University in May of 1977 with a bachelor's degree in accounting. He passed the CPA exam on his first attempt in November of 1977 and became a Texas CPA in September 1981, the same year he moved to Midland.

David met his wife, Cheryl, while attending Harding University, and they were married in 1979. They are the proud parents of one daughter and are also the proud grandparents of a three-year old granddaughter.

Greg Brazaitis
Energy Transfer, Chief Compliance Officer

Greg Brazaitis joined Energy Transfer in March 2005 and has been the Chief Compliance Officer since 2011. Greg previously served as the Energy Transfer Vice President for Government and State Affairs, and he has retained this responsibility. Greg has over 30 years of experience in the midstream business in various roles, such as planning, operations, commercial development, acquisitions, and commodity trading. Supplementing this domestic experience, Greg spent several years in Saudi Arabia managing the engineering, construction, and startup of world scale midstream facilities. Since joining Energy Transfer, he has given expert testimony on proposed legislation and regulations in several of states where Energy Transfer has assets. In 2009, Greg established Energy Transfer's Political Action Committee.

Greg has a B.S. degree in Mechanical Engineering and an MBA.

The Honorable Jaime Alberto Canales
Webb County Commissioner, Precinct 4

Commissioner Jaime Alberto Canales proudly represents Precinct Four of Webb County, Texas. Commissioner Canales won his bid for Webb County Commissioner in November 2010 and was sworn into office in January 2011.

He obtained a B.A. from The University of Texas at Austin in 1992 and an M.S. at Texas A&M International University in Laredo Texas in 1999. As former principle of the Webb County Juvenile Justice Alternative Education Program, Commissioner Canales has extensive knowledge in science education, inquiry based learning in science, and the development of instructional strategies proven to promote student success in school. Today, he continues to promote student success through educational projects and events held as County Commissioner.

Commissioner Canales also currently serves on various boards and committees, including Texas Railroad Commissioner David Porter's Eagle Ford Shale Task Force, Middle Rio Grande Eagle Ford Shale Consortium, the Webb County Purchasing Board, Border Region MHMR Board, and Veterans Museum Board.

Teresa Carrillo
Sierra Club, Executive Committee Member, Lone Star Chapter, Treasurer, Coastal Bend Sierra

Currently, Teresa Carrillo is the Associate Director of the Coastal Bend Bays Foundation. She and her husband also own TBC Ranch in Duval County, where they raise cattle, goats, horses, and hay. Teresa serves on the Region N Water Planning Group, the Nueces BBASC, the Board of the Gulf Restoration Network, the Nueces Estuary Advisory Council, the Board of the Coastal Bend Bays Foundation, the Executive Committee of the Lone Star Chapter of Sierra Club, and she is also treasurer for the Coastal Bend Sierra Club. Her background includes having worked as the Executive Director of the Coastal Bend Bays Foundation, a biologist for the US Fish & Wildlife Service, and also for the local/regional Health Department.

Teresa's love of the outdoors, which she has sought to pass on to her children, was shaped by her childhood in east Texas and time spent with her parents and grandparents loving nature.

James E. Craddock
Rosetta Resources, Senior Vice President, Drilling and Production Operations

Jim Craddock joined Rosetta as Vice President, Drilling and Production Operations in April 2008 and was amed Senior Vice President, Drilling and Production Operations in January 2011. In this role, he has responsibility for functions related to drilling, completions, production engineering, operations, regulations, procurement, and reserves engineering. Craddock has more than 30 years of industry experience in exploration and production operations, including reservoir and production engineering and unconventional oil and gas exploitation.

Prior to joining Rosetta, he was Chief Operating Officer for BPI Energy, Inc., an exploration and production start-up company focused on coal-bed methane development. For more than 20 years, he held technical and management positions of increasing authority with Burlington Resources, most recently Chief Engineer. He began his industry career with Superior Oil Company.

Craddock serves as a member of Texas Railroad Commissioner David Porter's Eagle Ford Shale Task Force. He received a Bachelor of Science degree in Mechanical Engineering from Texas A&M University.

Steven W. Ellis
EOG Resources, Senior Division Counsel

Steve Ellis is Senior Division Counsel for EOG Resources, Inc. Steve is responsible for managing the legal functions of the Corpus Christi and San Antonio Divisions of EOG, including EOG's Eagle Ford trend operations covering more than 600,000 acres and EOG's operations in South Texas.

Steve is board certified in Oil, Gas, and Mineral Law by the Texas Board of Legal Specialization (1991) and is admitted to practice by the State Bar of Texas and the State Bar of California (inactive). Steve received his J.D. from The University of Texas Law School (1984) and his B.A. (Magna Cum Laude) from Texas A&M University (1981).

While at EOG, Steve negotiated or coordinated more than 2,200 oil and gas leases in EOG's Eagle Ford trend covering some 625,000 acres in six counties. He has been closely involved in legal and operational strategy for the Eagle Ford Shale trend.

The Honorable Daryl L. Fowler
DeWitt County Judge

Judge Daryl L. Fowler was sworn into office on January 1, 2011 as the DeWitt County Judge. He entered public service after a 25-year career in the insurance and financial services industry. His formal education was obtained from Texas Christian University in 1982 when he received a BBA and supplemented

his degree in 2008 with a certificate in Petroleum Land Practices from the same university. In 2011, Railroad Commissioner David Porter appointed him to the Eagle Ford Shale Task Force and, in 2012, he was appointed to the TXDOT Energy Solutions Task Force, serving on the Finance Subcommittee.

When not spending time on his duties as a constitutional county judge, he manages land and cattle operations of a traditional Texas family-owned ranch south of Yoakum and serves as a deacon in his church.

Brian S. Frederick, CFA
DCP Midstream, Senior Vice President, Southern Region

Brian Frederick is Senior Vice President, Southern Region for DCP Midstream, one of the nation's largest natural gas gatherers and processors. In his role, Brian has overall responsibility for 19 gathering and processing facilities in South Texas, East Texas, Louisiana, and Alabama, including six processing plants with over 1 BCF of capacity in the Eagle Ford Shale.

Brian has over 22 years of finance, marketing and trading, and asset management experience in the energy industry. Brian received a degree in finance from Trinity University and an MBA in finance from Texas Christian University. Brian is also a Chartered Financial Analyst.

He and his wife, Amy, live in Houston and have a son and two daughters.

Anna Benavides Galo
ANB Cattle Company, Vice President

Anna Galo graduated from St. Mary's University with a degree in english and is a former educator. Currently, she is very active in her family's business, serving as co-trustee of the family mineral trust, as well as Vice-President and Co-Operations Manager of several companies dealing with oil and gas holdings, commercial real estate, and ranch industries.

Anna is personally involved in many local civic and charitable organizations, such as the Laredo Community College Education Foundation, the AVANCE program, the Laredo Center of Arts, The Washington's Birthday Association, and the International Good Neighbor Council. In 2009, she was the President of the Society of Martha Washington. She is a board member of the South Texas Food Bank and has partnered with the South Texas Food Bank in the Kids Café Programs in Laredo, El Cenizo, and Rio Bravo. She currently serves on the board of directors of the Webb County Children's Advocacy Center and is a board member at United Day School.

The Honorable Jim Huff
Live Oak County Judge

Judge Jim Huff was elected County Judge in 1986 at the age of 30. He has run unopposed since his first election. Jim earned a Bachelor of Science degree from Texas A&M University-College Station, a Bachelor of Arts degree from St. Mary's University, and attended graduate school at Sam Houston State University.

Judge Huff sits on many boards and committees, such as the Coastal Bend Council of Governments, MHMR Board of Trustees, Juvenile Probation Board, Coastal Bend Workforce Development Board CEO Council, Rural Coastal Bend County Judges Planning Council, the Three Rivers Economic Development Corp. (Chairman), Dispute Resolution Board (Chairman), Oversight Committee on Regional Public Defender Program, and many others.

Judge Huff also belongs to the Texas Judicial Academy, County Judges & Commissioners Association, and Texas College of Probate Judges. In addition to numerous awards and recognitions that he has received, in 2005, Judge Huff was awarded the Excellence in Community Service Award by County Progress Magazine of the County Judges and Commissioners Association of Texas.

Stephen Ingram
Halliburton, Technology Manager, Houston Business Development & Onshore South Texas

Stephen Ingram is the North America Technology & Marketing Manager for Halliburton. He provides regional guidance to advance Halliburton as a technology leader with customers, suppliers, and institutions. Stephen is a professional committee member for multiple organizations and is active in the Houston community with Junior Achievement. He holds a B.S. in Chemical Engineering from the University of Missouri-Rolla, and master's degrees from the University of Oklahoma in both Natural Gas Engineering and Business Administration.

Mike Mahoney
Evergreen Underground Water Conservation District, General Manager

Mike Mahoney serves as General Manager of the Evergreen Underground Water Conservation District. The District encompasses all of Atascosa, Frio, Wilson, and Karnes Counties.

Leodoro Martinez
Middle Rio Grande Development Council, Executive Director

Leodoro Martinez is presently the Chairman of the Eagle Ford Consortium and the Executive Director of the Middle Rio Grande Development Council. He has over 40 years in public service, including workforce and economic development experience and has served as Councilman, Mayor, School Board Member, and County Judge.

His experience in policy making has served him in being appointed by different Texas Governors to several statewide positions throughout his career. He has been recognized in the "Who's Who in Energy" by the Business Journal and was recently awarded the John. B. Shepperd "Texas Local Leader Award" by the John B. Shepperd Leadership Institute.

As Consortium Chairman, he is leading a broad based group of business, civic, and technology representatives that focus on the economic and energy impact in South Texas, which will ensure a responsible and sustainable development of clean energy solutions affecting future generations within the Eagle Ford Shale play.

James Max Moudy
MWH Global, Inc., Senior Client Service Manager

Max is currently employed with J&M Premier Services and is responsible for business development in the transportation of oil field heavy equipment. As Sr. Client Service Manager with MWH Americas, he was involved in development of water-related and environmental projects associated with the energy sector and marketing, engineering, and construction services to various industries. At Environmental Compliance Associates, he assisted with due diligence studies supporting the acquisition and divestiture of oil field assets. His legal practice began with the Securities & Exchange Commission and thereafter focused on corporate and securities law. He has also negotiated operating agreements, drafted lease curative and division order title opinions and production contracts, and prepared securities offering documents. At First Houston International, an investment banking group, Max identified and evaluated oil and gas assets and operating and service companies.

Max served in the Navy and graduated from Texas Tech with Bachelor and Juris Doctorate degrees.

Terry Retzloff
TR Measurement Witnessing, LLC, Founder

Terry Retzloff is Founder and President of TR Measurement Witnessing, LLC, a firm that represents mineral and royalty interest owners. Terry also currently serves as National Association of Royalty Owners TEXAS (NARO Texas) President and serves on the NARO National board as well.

Terry's oil and gas experience comes from his 17 years of service in South Texas field operations, working for Conoco from 1982 to 1999. Terry began his career in the oil patch as a Lease Operator near Eagle Pass and finished his career with Conoco as a Production Supervisor in Laredo. Terry's work experience includes areas such as measurement, regulatory compliance, chemical treatment, compressor performance, and production optimization.

Terry's other interests and responsibilities include managing the family ranch, hunting, and deer breeding operations. Terry and his wife Annmarie reside in Campbellton, Texas which is very near the middle of the Eagle Ford Shale.

E.O. (Trey) Scott, III, CPL
Trinity Mineral Management, LTD, Founder

Trey Scott is a Certified Professional Landman with over 30 years of experience in the oil and gas industry. After working on the industry side of oil and gas, he went on to work on the landowner side, where his responsibilities included overseeing and managing all aspects of mineral and royalty ownership, including lease compliance, royalty audits, and surface operations from drilling locations, pipelines, surface facilities, remediation, and environmental issues.

In September 2005, at the request of some key clients, Trey expanded his services by founding Trinity Mineral Management, LTD., where he is currently the Managing Partner.

Trey is a member of the Texas Land and Mineral Owner Association, the American Association of Professional Landmen and San Antonio Association of Professional Landmen, where he served in various capacities.

Paula Campos Seydel
Dimmit County Chamber of Commerce

Paula began her career as a Certified Medical Assistant with a Clinical Specialty. After seven years, she was hired by Principal Financial Group. Paula stayed with the Principal Financial Group for 22 years and worked her way up from Medical Claims Supervisor to National Accounts Benefit Administrator. Her last position was as a consultant with the National Sales Office.

Paula moved back to Carrizo Springs in 2000 and helped establish her husband's small trucking business. She began working with the Dimmit County Chamber of Commerce in 2006. Her community involvements include serving as a board member for the newly created Dimmit County Memorial Hospital District and Treasurer for the Carrizo Springs Lions Club. She is also an active member of First Baptist Church Carrizo Springs, serving on finance, music, and missions committees. She is a member of the Texas Chamber Executives and sits on Railroad Commissioner David Porter's Eagle Ford Shale Task Force.

The Honorable Barbara Najvar Shaw
Karnes County Judge

Karnes County Judge Barbara Najvar Shaw was born and raised in Karnes County, Texas. She graduated from the University of Houston-Victoria Cum Laude with a Bachelor in Science in Interdisciplinary Studies and from Capella University with a Masters in Psychology. After obtaining her bachelor's degree, she worked as a Parole Officer and Programs Manager in a private prison. Judge Shaw then moved to Protective Services as an Investigator for eight years.

At this time, Judge Shaw decided to join a business venture known as Premier Vacuum Service, with her husband, Kyle Shaw, and partners. The business was built into a success and some assets were sold to a publicly

held company. Once non-compete timelines were met, the Shaws and partners decided to rebuild the business in the heart of the Eagle Ford Shale – the same time she won her election bid as County Judge of Karnes County – becoming both the first female and youngest judge in the history of Karnes County.

Mary Beth Simmons
Shell Exploration and Production Company, Senior Staff Reservoir Engineer

Mary Beth Simmons is currently a Senior Staff Reservoir Engineer for Shell. Mary Beth has worked in the Eagle Ford Shale since January 2010 as Shell shifted its focus to the unconventional business in the U.S. and Canada. In her current assignment, Mary Beth takes a lead role in the business planning and reserve reporting processes for Shell's interest in the Eagle Ford Shale.

Mary Beth joined Shell 28 years ago. Her career has included various reservoir engineering roles in the Gulf of Mexico, Michigan, and South Texas. Mary Beth finds acting as a technical coach and mentor to the many new professionals she has worked with throughout her years at Shell as the most gratifying part of her job.

Mary Beth earned a B.S. in Chemical Engineering from Missouri S&T and an MS in Petroleum Engineering from Stanford University. Mary Beth is married with two college-aged children.

Kirk W. Spilman
Marathon Oil, Regional Vice President-Eagle Ford

Kirk Spilman is the Regional Vice President-Eagle Ford. Prior to this position, Kirk was asset manager for Marathon Oil Company's South Texas/Eagle Ford Asset Team, a position he held since November of 2010. He is directly responsible for managing the construction and operational aspects of Marathon Oil's assets in the Eagle Ford Shale in South Texas.

Prior to his position in the Eagle Ford, Kirk was based in Canonsburg, Penn., as asset manager for Marathon Oil's Marcellus Shale business in the Appalachian Basin. He was previously based in London where he was responsible for activities in the Middle East and Africa, was asset manager for Marathon Oil's Central Africa Business Unit, and was a staff engineer for the Senior Vice President of Worldwide Production in Houston.

Kirk began his career as a field engineer with Texaco Exploration & Production. He joined Marathon Oil Company in 1997 and has held various engineering positions in Marathon Oil's upstream business. Kirk graduated from Texas A&M University with a bachelor of Science degree in Petroleum Engineering, and he is a member of the Society of Petroleum Engineers.

Susan A. Spratlen
Pioneer Natural Resources Company, Vice President, Sustainability and Communication

Susan Spratlen has served as Vice President of Pioneer Natural Resources since 1999, having joined the company's predecessor in 1990. Susan is responsible for Pioneer's national, state, and local communication and public relations strategies, and works with others in the company to develop and execute strategies related to sustainability and public engagement regarding sustainable oil and natural gas development practices.

She serves and advises a number of national and state industry organizations and initiatives focused on education and public engagement regarding sustainable development practices and the industry's societal impacts. These initiatives also promote the benefits of expanded use of domestic natural gas for power generation and transportation. Susan serves on national committees with America's Natural Gas Alliance and chairs that organization's public engagement committee for the state of Texas.

Glynis Holm Strause
Conoco Phillips, Community Relations Advisor for the Eagle Ford Shale, and former Dean of Institutional Advancement, Coastal Bend College

Glynis Holm Strause is the ConocoPhillips community relations advisor for the Eagle Ford Shale in Bee, Live Oak, Karnes, and DeWitt counties. She was employed at Coastal Bend College for 34 years as a speech instructor, Director of Continuing Education, and Dean of Institutional Advancement. She initiated the Petroleum Industry Training program, and serves on Railroad Commissioner David Porter's Eagle Ford Shale Task Force and the Eagle Ford Shale Consortium Symposium 2013 planning committee. She retired from Coastal Bend College in July 2012 and began her current position the same month. Strause was named Community College Educator of the Year in 1998 and George West Chamber of Commerce Wall of Honor in 2010.

Chris Winland
Good Company Associates, Associate; The University of Texas at San Antonio, Assistant Director, San Antonio Clean Energy Incubator

Chris Winland is an associate at Good Company Associates, a consulting firm specializing in energy industries, utility markets, and related environmental considerations, primarily in Texas. Good Company has played an important role in the development of energy policy, projects, and programs since 1991. Chris is also currently serving as the assistant director of the San Antonio Clean Energy Incubator at The University of Texas at San Antonio after serving as interim director to successfully get it launched.

Chris joined Good Company from the Office of Texas State Representative Mark Strama, where he was the legislative director and chief of staff. He has also held positions of significant responsibility at IBM Global Services, the Austin Technology Incubator's Clean Energy Incubator, and MTG Management Consultants. Chris has a Bachelor of Science degree in Physics and Political science from Duke University and an MBA from The University of Texas at Austin.

Paul Woodard
J&M Premier Services, President

Paul Woodard has been involved in the oil and gas transportation industry for nine years. Prior to this, he was the Executive Vice President/Chief Lending Officer and Board Member of two independent East Texas banking organizations for over 20 years. He holds a BBA in Finance from Stephen F. Austin State University and an Advanced Banking Degree from the Graduate School of Banking at the University of Wisconsin - Madison.

Erasmo Yarrito, Jr.
Texas Commission on Environmental Quality, Rio Grande Watermaster

Erasmo Yarrito has 27 years of experience in the hydrological field, which includes thorough knowledge of technical field work and administrative practices in both the federal and state governmental sectors.

Erasmo began his professional career in 1986 with the International Boundary & Water Commission (IBWC) at the Falcon Dam Project, Falcon Heights, Texas. In June 1990, he accepted a position with the Texas Water Commission/Texas Commission on Environmental Quality where he has been since.

Erasmo was selected as the Rio Grande Watermaster in 2009, where he is responsible for the management and equitable distribution of water within the Rio Grande Basin in accordance with the adjudicated water rights, preventing the waste or illegal diversion of water and monitoring diversion of water through investigation, enforcement, technical assistance, outreach, and education.

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