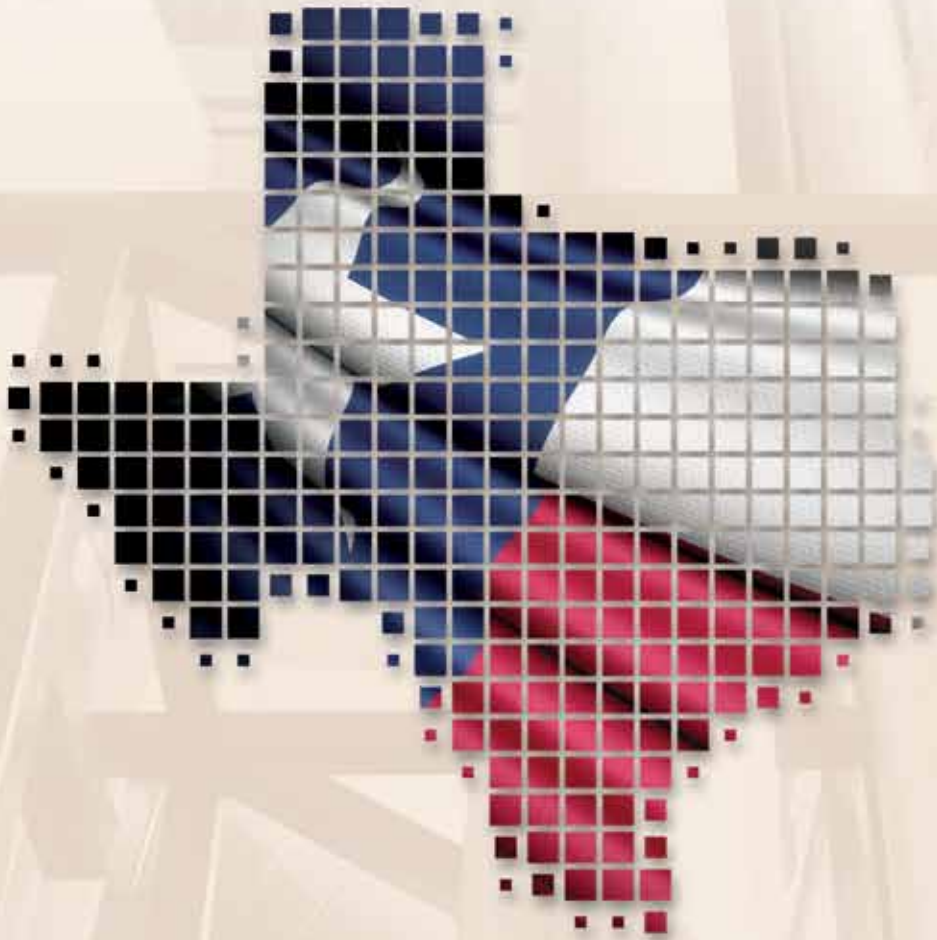


O I L A N D G A S I N T E X A S



A Joint Association Education Message

F R O M T H E T E X A S O I L A N D G A S I N D U S T R Y



A Joint Association Message

FROM THE TEXAS OIL & GAS INDUSTRY

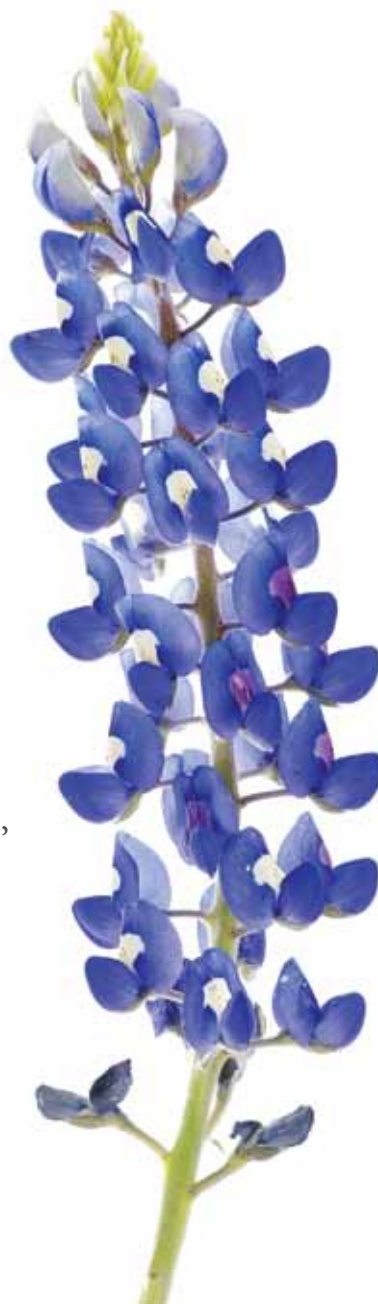
Your Questions Answered

Advances in proven technologies are delivering new opportunities in oil and gas exploration and production around Texas. While much of Texas is familiar ground to oil and gas development, many Texans are now experiencing oil and gas operations in their neighborhoods for the first time. As oil and gas operations extend into previously untapped regions of the state, area residents and local elected officials are likely to have questions and want to learn more.

As part of ongoing statewide educational efforts, several non-profit and trade associations have come together to provide factual information about oil and gas operations to the public, local leaders, and elected officials. The oil and gas industry continues to work closely with communities and state and local officials to raise awareness about operations and to share information about the extensive precautions taken to maintain the safety of workers, local communities, and the environment.

This booklet aims to answer your questions and provide useful resources. Participating organizations include the Texas Oil and Gas Association, the Texas Independent Producers and Royalty Owners Association, the Texas Alliance of Energy Producers, the Permian Basin Petroleum Association, the Panhandle Producers and Royalty Owners Association, the Texas Pipeline Association, the Foundation for Energy Education, and the American Royalty Council.

A TEXAS JOINT ASSOCIATION EDUCATION MESSAGE





A Joint Association Education Message

FROM THE TEXAS OIL AND GAS INDUSTRY

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WHO REGULATES...? WHO REGULATES...? WHO REGULATES...?

S E C T I O N I

Who Regulates Oil and Gas Operations?

WHO REGULATES...? WHO REGULATES...? WHO REGULATES...?



A TEXAS JOINT ASSOCIATION EDUCATION MESSAGE

WHO REGULATES...? WHO REGULATES...? WHO REGULATES...?

There are comprehensive regulations governing Texas oil and gas exploration and production. State agencies have been delegated authority to enforce federal programs and Texas laws establish additional requirements to protect the environment and public health. Within local municipalities there are often additional regulations that dictate site location, well design, well spacing, operational limitations, noise levels, water management, waste handling and disposal, air emissions, surface water protection and storm water controls, groundwater protection, site safety, and other measures to ensure public health and safety. Local ordinances may also address permit fees and assurance of operators' financial responsibility.

“The Railroad Commission of Texas (RRC) and the Texas Commission on Environmental Quality (TCEQ) are the two state agencies with most of the responsibility for establishing standards and enforcing regulations for oil and gas exploration and production.”

The Railroad Commission of Texas (RRC) and the Texas Commission on Environmental Quality (TCEQ) are the two state agencies with most of the responsibility for establishing standards and enforcing regulations for oil and gas exploration and production. The RRC oversees all aspects of the drilling activity such as well spacing, well design, groundwater protection during drilling and completion, surface water protection, wastewater handling and disposal, and operational and public safety. TCEQ's primary role during oil and gas exploration and drilling relates to control of air emissions, required depth of each well's steel casing and cement, and ensuring that off-site impacts, if any, are consistent with standards developed to protect public health and safety.

The Railroad Commission, the Texas Commission on Environmental Quality, the General Land Office, the Texas Department of Transportation and several federal agencies regulate oil and gas pipelines. Regulation of intrastate pipeline safety is the responsibility of the Texas Railroad Commission. For interstate pipelines, the Pipeline and Hazardous Materials Administration (PHMSA), a division of the United States Department of Transportation, oversees pipeline safety regulation. TCEQ regulates air emissions associated with pipeline operations.



HYDRAULIC FRACTURING HYDRAULIC FRACTURING

S E C T I O N I I

Hydraulic Fracturing

HYDRAULIC FRACTURING HYDRAULIC FRACTURING



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HYDRAULIC FRACTURING HYDRAULIC FRACTURING

What is hydraulic fracturing?

Also known as “fracking,” hydraulic fracturing is a proven technology that has been used for more than 60 years to safely enhance the production potential of natural gas and oil from more than one million wells in the United States.

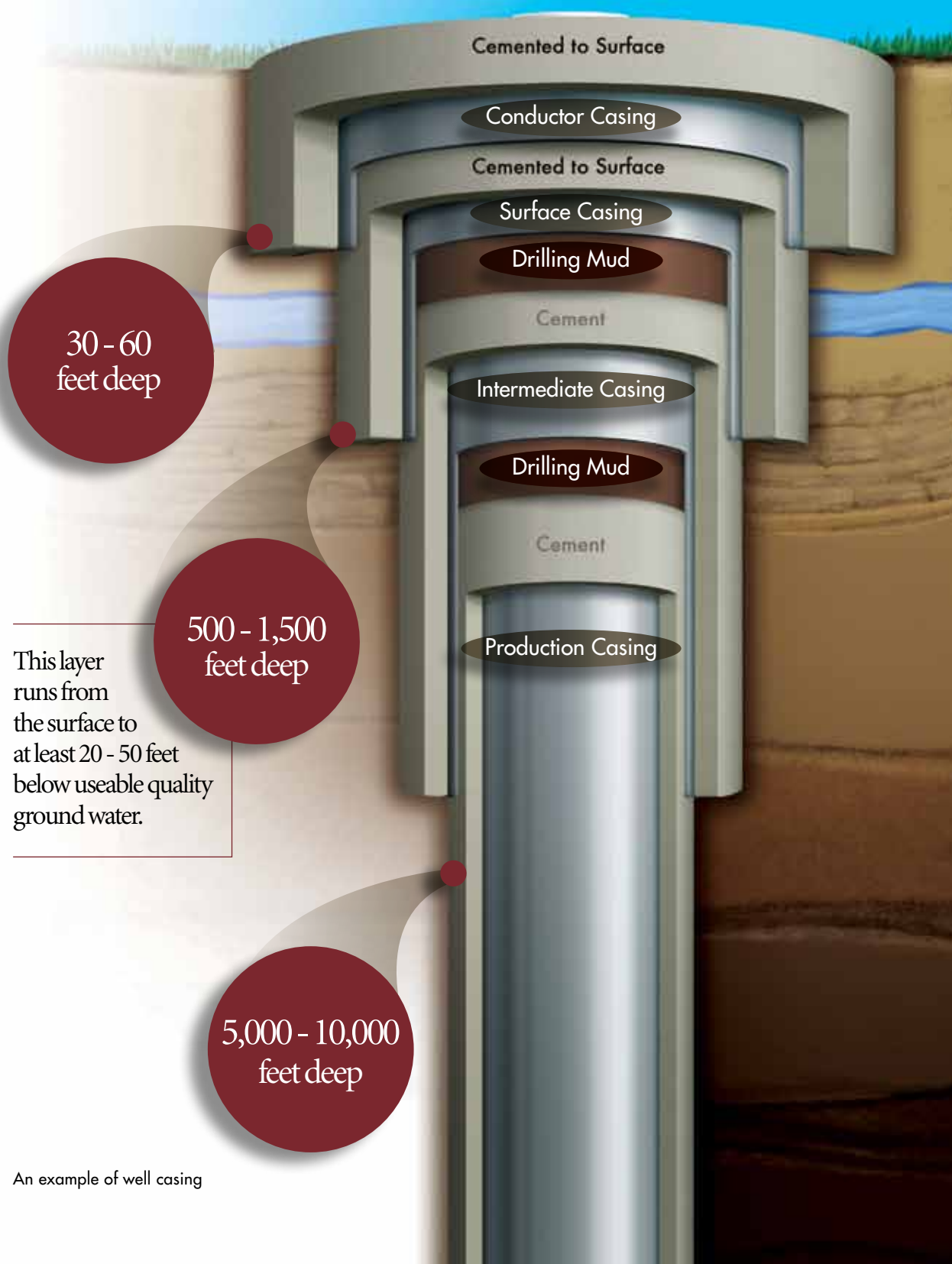
For years, oil and gas deposits in certain rock formations, like Texas shale formations, were thought to be uneconomic. Advances in drilling and completion technology, like fracking, changed that perception and allow operators to develop these natural resources. Advances in technology allow operators to drill thousands of feet below freshwater supplies and then turn horizontally into rock formations where hydraulic fracturing releases vast oil and gas deposits that were once considered unreachable. While the fracking technique has been used for decades, the process has been continuously refined to be even more effective.

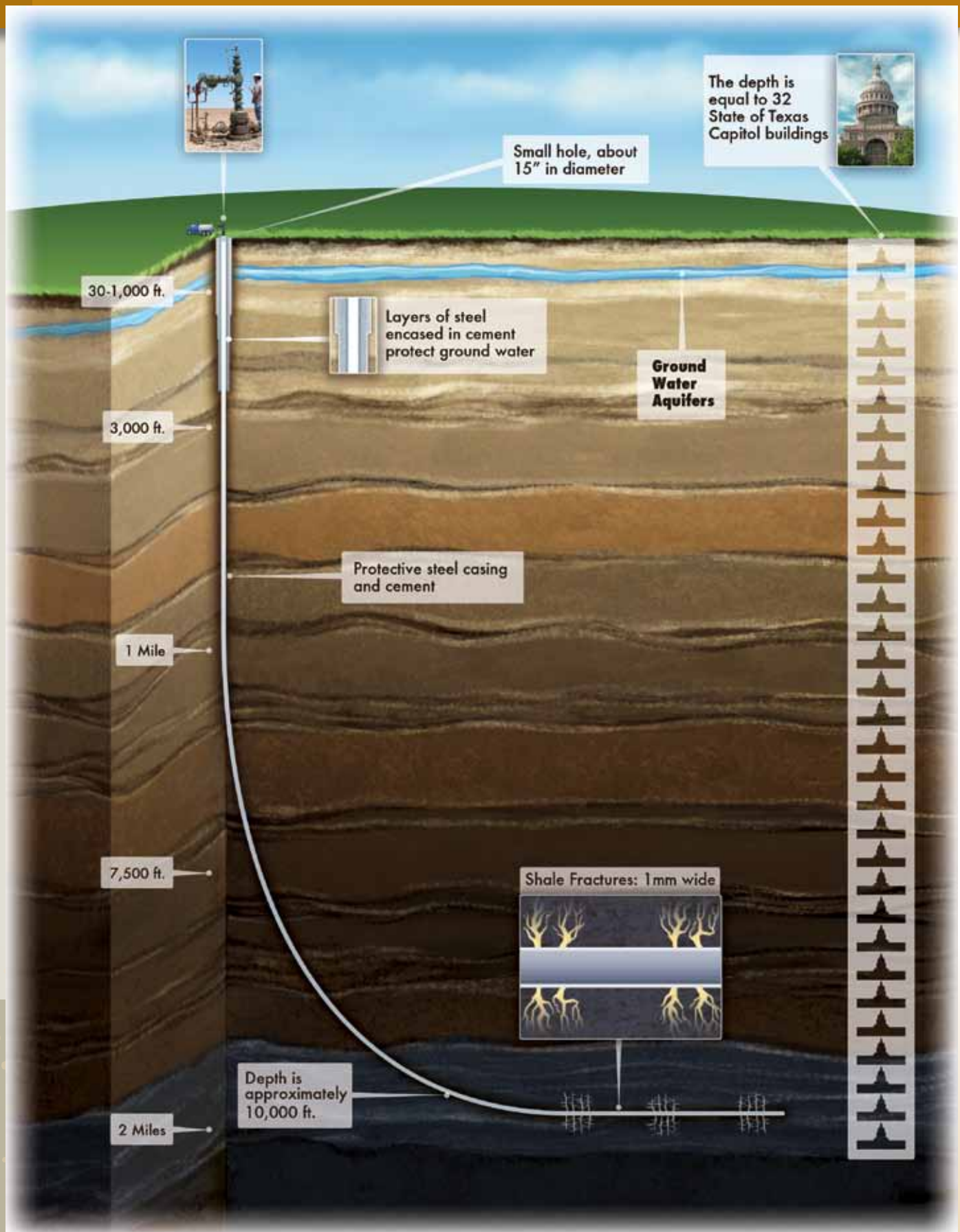
How does well construction protect freshwater supplies?

For decades, state regulators have imposed strict, comprehensive requirements for how oil and gas wells must be constructed. Each well must be encased in multiple layers of protective industrial-grade steel casing, which is surrounded by cement to create a redundant safeguard for underground freshwater supplies. The casing and cementing process may be repeated as the well deepens. This highly regulated safety system - and thousands of feet of rock - keeps oil and gas out of the freshwater and freshwater out of the oil and gas.



The Railroad Commission regulations include stringent quality and monitoring requirements for steel casing and cementing to ensure that fresh groundwater zones are protected. The casing must remain in place even after a well becomes inactive to ensure continued fresh groundwater protection.





Hydraulic fracturing occurs at great depths – generally a mile or more underground, thousands of feet below freshwater supplies. With the safety system of steel casing and cement in place, operators drill vertically thousands of feet down then drill horizontally into the targeted rock formation. Then a mixture of pressurized water, sand, and a specifically formulated fracturing compound is pumped thousands of feet down into the formation to create tiny, millimeter-thick, fissures in carefully targeted sections of the host rock. The tiny fractures free the trapped oil or natural gas. Natural gas operators in the Barnett Shale area typically use a fracturing compound (or fracking fluid) that is 99.5% water and sand and 0.5% chemically-based additives. The sand helps to prop open the fractures to facilitate the flow of oil or gas.

Is hydraulic fracturing safe?

Yes. Hydraulic fracturing has a 60-year track record of safe operations. The U.S. Environmental Protection Agency, the Groundwater Protection Council (composed of state water pollution control officials), and the Interstate Oil and Gas Compact Commission have all studied hydraulic fracturing and found that existing regulations addressed and mitigated potential risks.

Advances in technology significantly reduce the environmental impacts of drilling for oil and natural gas. Operators can produce more oil or gas from each site using less surface area, less water, and with fewer air emissions. In addition, hydraulic fracturing is essential to shale gas development and has helped to dramatically increase domestic natural gas supplies.

What are the benefits of hydraulic fracturing?

Less surface area.

The average well site today is 30 percent of the size it was in 1970 and an average well can now access up to 60 times more below-ground area than previously possible.

Fewer wells.

Today, operators can drill as few as six to eight wells on a single site to access the same amount of natural gas that once required 16 or more wells drilled from separate locations. Some modern rigs have the capability to drill more than 20 wells from a single drilling site.

Increased water efficiency.

Some companies have instituted water recycling programs that capture a significant volume of water required for the hydraulic fracturing process for reuse in future operations.

Reduced air emissions.

Greater equipment and engine efficiency and improved technologies mean less energy consumption per unit of natural gas produced, and thus lower air emissions per unit produced.

What happens to water after it's used for hydraulic fracturing?

An increasing amount of fracking fluid is being recycled and reused for future operations. Other “produced” water from the fracking process is collected and disposed of according to stringent state regulations via approved underground injection wells deep beneath the surface, far below freshwater sources. These disposal wells must comply with programs delegated to the Texas Railroad Commission and use steel and cement casing during drilling and completion to protect freshwater supplies. (See Waste Chapter for more information.)

How much water are oil and gas operators using?

According to a 2007 study by the Texas Water Development Board, groundwater use associated with gas well development in the Barnett Shale area accounts for only about three percent of the total groundwater use in the study area. Oil and gas operators continue to work closely with state regulators and water management experts to develop innovative ways to reduce the amount of water used in oil and gas operations.

What happens if there's an incident like water spilled on the drill pad?

Accidents are rare. Oil and gas companies place a high priority on safety and constantly monitor operations. In the event of an incident, each site is required by the Railroad Commission to have an emergency response plan in place. This plan details the proper steps needed to immediately “contain and clean” the area, minimize any impact on the environment, and notify the proper authorities.

Is Texas doing a good job regulating hydraulic fracturing?

Yes. Steve Heare, former director of the EPA's Drinking Water Protection Division, has said publicly that state regulators are doing a good job of overseeing hydraulic fracturing. The Railroad Commission of Texas has effectively regulated hydraulic fracturing for decades.

Basics of Drilling

What happens before companies drill a well?

Before a company drills a well, geologists and engineers study the size, structure, and thickness of the rock formations to scientifically determine how and where drilling should take place. Operators must obtain information on the depth and location of all freshwater zones from the Texas Commission on Environmental Quality to ensure that protections for the entire zone of freshwater are in place. Operators must file for all necessary state and local permits. Many operators reach out to local neighborhoods to share information about their plans and timelines.

How are wells constructed to protect freshwater supplies?

Each well is encased in multiple layers of protective industrial-grade steel casing, which is surrounded by cement to create a redundant safeguard for underground freshwater supplies. (See page 5 for detailed diagram.)

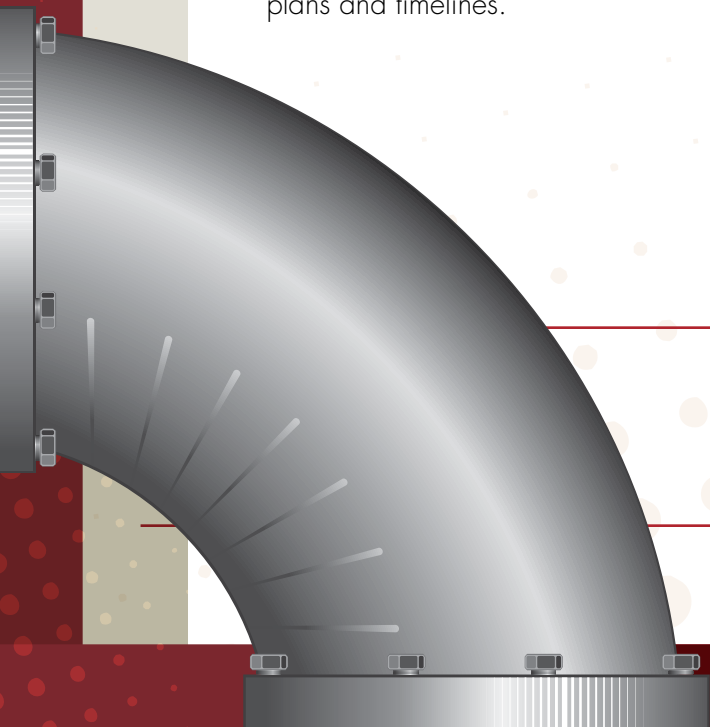
How long does it take to drill a well?

It takes several weeks to prepare a well site. This time frame includes pad site construction, moving equipment on and off site, well preparation, and actual drilling, casing, cementing, and completion. The rig and the equipment are temporary and are removed when the well is finished. Once completed, the production sites average about 300 x 600 feet. Completed well sites are often screened or landscaped according to local ordinances.

After construction, a well can produce for 20 to 40 years, providing long-term local jobs and tax revenues.

Questions about hydraulic fracturing or drilling?

Visit www.rrc.state.tx.us



WATER WATER WATER WATER WATER WATER WATER

S E C T I O N I I I

Water



WATER WATER WATER WATER WATER WATER WATER



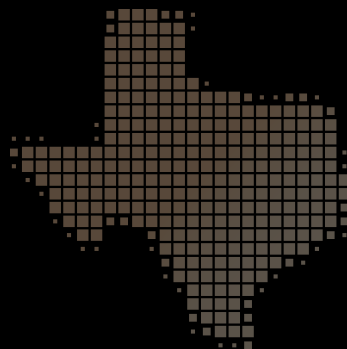
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WATER WATER WATER WATER WATER WATER WATER

Who oversees the rules oil and gas operators must follow to protect the water in Texas?

The Railroad Commission of Texas has wide-ranging regulations designed to protect the surface, subsurface, and coastal waters of Texas during oil and gas drilling, completion, and production operations.

Any operator with plans to drill or produce oil and gas in Texas must apply for a permit and file an annual organization report with the Railroad Commission. The pre-drilling permit application provides the Commission with detailed well construction information before a well is drilled. Once a permit is filed, the Railroad Commission notifies the proper entities concerned with local water issues.



water



“Each well must be encased in multiple layers of protective industrial-grade steel casing, which is surrounded by cement to create a redundant safeguard for underground freshwater supplies.”

How does well construction protect fresh water supplies?

For decades, state regulators have imposed strict, comprehensive requirements for how oil and gas wells must be constructed. Each well must be encased in multiple layers of protective industrial-grade steel casing, which is surrounded by cement to create a redundant safeguard for underground freshwater supplies. The casing must remain in place even after a well becomes inactive to ensure continued fresh groundwater protection. (See page 5 for detailed diagram.)

What about ongoing testing of water and well construction?

Companies are required by the Railroad Commission to regularly conduct tests and submit detailed logs to state regulators. These logs provide graphic evidence that the steel and cement well casings are sound. And they allow the industry to precisely pinpoint any potential problem areas and quickly work to prevent incidents or to contain and clean them.

The Railroad Commission's Statewide Rule 8 expressly prohibits pollution of surface and subsurface waters from oil and gas drilling, completion, and production activities.

Does Texas have specific rules that prohibit water pollution?

Yes. The Railroad Commission's Statewide Rule 8 expressly prohibits pollution of surface and subsurface waters from oil and gas drilling, completion, and production activities. This rule applies to water sources including rivers, streams, creeks, surface drainage, and coastal waters.

How do oil and gas operators work with local Groundwater Conservation Districts?

Some parts of the state have a local "Groundwater Conservation District" or GCD, which is responsible for local planning of groundwater supplies as part of regional and state plans. Their local authority varies from district to district. Oil and gas operators must comply with applicable GCD rules and fees.

Can a GCD pass a rule just for oil and gas operations?

No. A GCD can pass rules that apply to all members of a usage category, such as residential or industrial users, but can not pass a rule to apply to a single individual or industry.



What happens to inactive or “orphaned” wells?

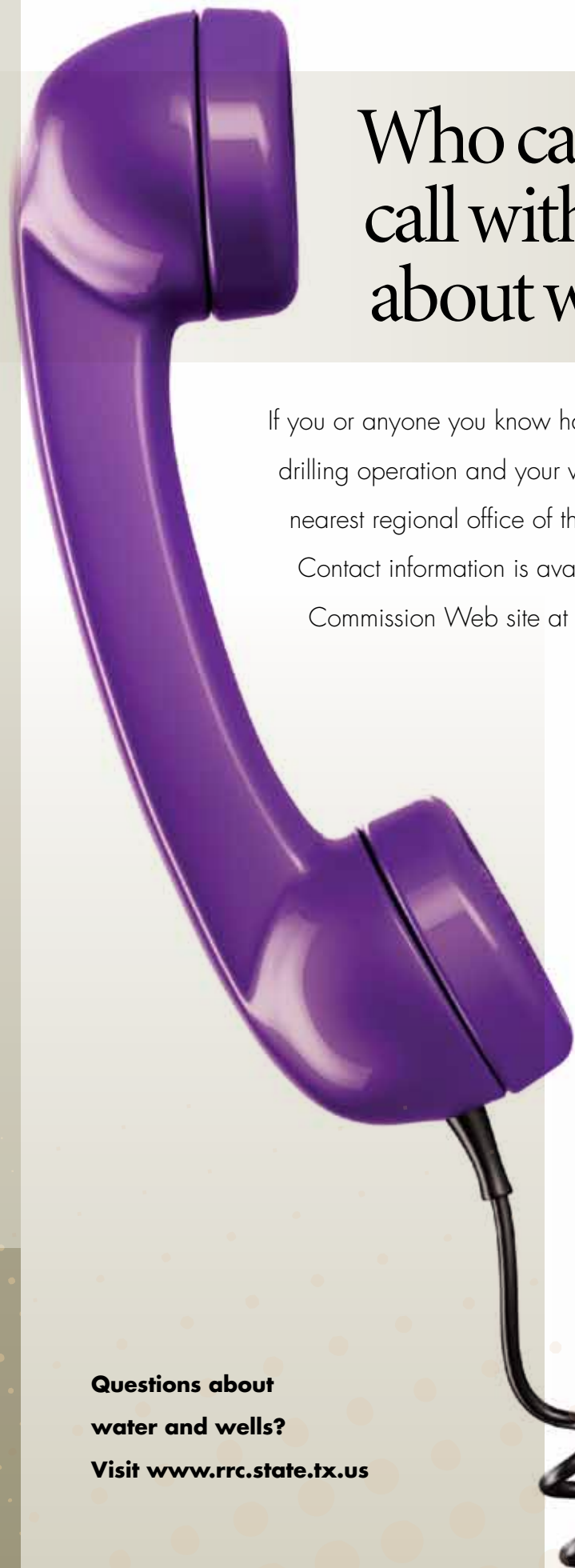
When a well is no longer economically viable and is no longer actively used, operators must follow the Railroad Commission’s specific procedures and requirements to properly plug the well to protect surface and groundwater. Operators that do not properly plug such wells may face stiff fines and sanctions, including having their licenses to operate revoked.

In 1991, the oil and gas industry, in conjunction with the Texas Legislature and Railroad Commission, initiated and implemented a program called the Oil Field Cleanup Fund, which pays for the protection of surface and groundwater by properly plugging wells and cleaning up oil and gas sites that have been orphaned. In 2009, oil and gas operators in Texas paid \$28.1 million into the Oil Field Cleanup Fund with zero cost to other Texas taxpayers. Additional requirements for operator financial responsibility and state enforcement tools have been added to the program since 2000.

Operator Cleanup Programs

Although operators maintain performance-based procedures to prevent incidents like surface spills, the Railroad Commission oversees an Operator Cleanup Program to provide direction and oversight in the unlikely event that a complex environmental cleanup project is necessary. Under the program, the Commission’s Site Remediation Section would work with the responsible oil and gas operator to determine the scope, methods, and cleanup targets for the site.





Who can the public call with questions about water wells?

If you or anyone you know has questions about a drilling operation and your water well, contact the nearest regional office of the Railroad Commission. Contact information is available on the Railroad Commission Web site at www.rrc.state.tx.us.

**Questions about
water and wells?**

Visit www.rrc.state.tx.us

AIR AIR AIR AIR AIR AIR AIR AIR AIR AIR AIR

S E C T I O N I V

Air

AIR AIR AIR AIR AIR AIR AIR AIR AIR AIR AIR



A TEXAS JOINT ASSOCIATION EDUCATION MESSAGE

AIR AIR AIR AIR AIR AIR AIR AIR AIR AIR AIR

Who regulates air quality associated with oil and gas operations?

The Texas Commission on Environmental Quality (TCEQ) has primary authority and jurisdiction to ensure that oil and gas operations comply with federal and state air quality rules and regulations.

TCEQ administers rules and programs that stem from Texas laws that predate the Federal Clean Air Act, but are designed to implement federal requirements.

How can the public check on their air quality?

Texas state regulators have installed continuous air monitors across the state, including the Barnett Shale area, which provide live readings online, 24 hours a day. Anyone is able to check the air quality hour-by-hour at any time.

As of September 2010, continuous air monitors are located in Barnett Shale areas with dense natural gas operations including the town of DISH, Eagle Mountain Lake (North of Fort Worth), and Meacham Airport in Fort Worth. The monitor at Dallas-Hinton (Central Dallas, south of Love Field airport) is not located near natural gas sites. State regulators will expand the network of continuous air monitors during the next year.

Additional continuous air monitors are located in other regions including Midland-Odessa, Houston-Galveston-Brazoria, Beaumont-Port Arthur, El Paso, and Corpus Christi-Victoria.

Data from continuous monitors is available at:

www.tceq.state.tx.us/cgi-bin/compliance/monops/agc_daily_summary.pl

State regulators also created an online interactive map that allows users to pinpoint at street level where air samples were collected and see the results of those tests. The interactive map is available at:

www.tceq.state.tx.us/implementation/barnettshale/bshale-viewer

Tools to inspect equipment for leaks include infrared cameras and handheld emission detection devices.

What are oil and gas operators doing to protect the air?

All oil and gas operators must strictly comply with TCEQ regulations established to control air emissions.

Depending on the nature of the operation and the potential to emit, oil and gas operators may be subject to specific permitting requirements. Companies also must comply with regulations that cover emissions from engines and generators at well sites. (See Air Regulations on the Books on page 22.)

The pressure in pipelines and other production equipment can be monitored from remote sites using computerized systems. Additional tools to inspect equipment for leaks include infrared cameras and handheld emission detection devices. Operators have a proven track record for quickly identifying and repairing faulty equipment. They may install additional air quality equipment to reduce the risk of leaks.



The Texas Department of State Health Services took blood and urine samples from residents near natural gas facilities in DISH. The residents' sample results were no different from the rest of the U.S. population.

How does the State keep track of air emissions?

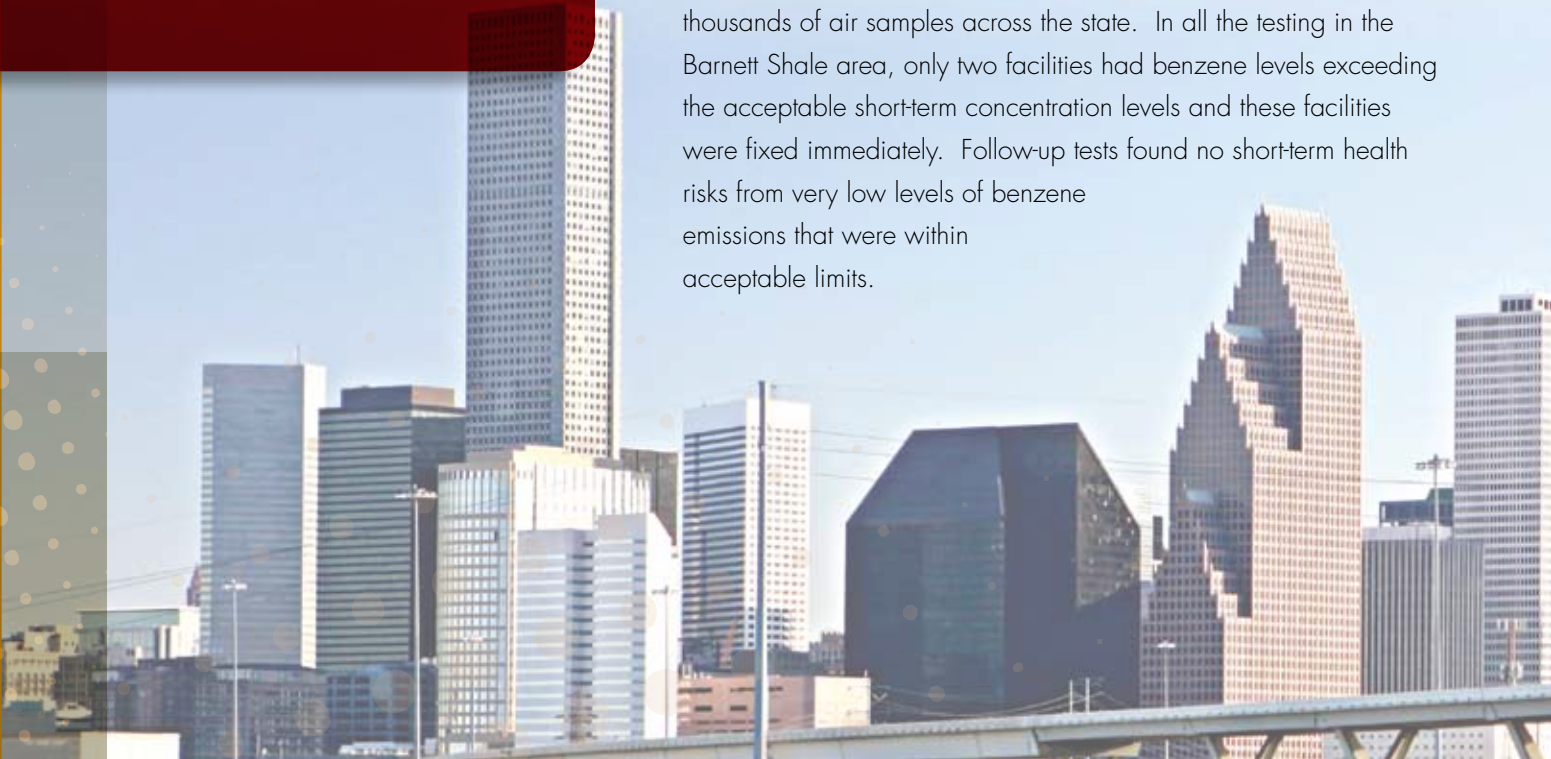
All oil and gas facilities in Texas with emissions above a minimum threshold must submit an annual air emissions inventory to state regulators. The annual air emissions inventory allows the State to review air quality conditions and trends and provides a basis for focusing regulations and manpower on high-priority areas. State regulators also use continuous air monitors, hand-held air monitoring equipment, mobile laboratory equipment, air-sampling canisters, infrared cameras, helicopter fly-overs, and windshield surveys to assess air emissions at oil and gas operations across the state.

Is the air near oil and gas facilities safe?

Yes. In response to public concerns about benzene levels in the air, numerous state agencies and local governments have conducted independent air and biological sampling. For example, the Texas Department of State Health Services took blood and urine samples from residents near natural gas facilities in DISH, Texas. The residents' sample results were no different from the rest of the U.S. population.

What have the State's repeated air tests determined?

State regulators have monitored hundreds of sites and taken thousands of air samples across the state. In all the testing in the Barnett Shale area, only two facilities had benzene levels exceeding the acceptable short-term concentration levels and these facilities were fixed immediately. Follow-up tests found no short-term health risks from very low levels of benzene emissions that were within acceptable limits.



There was some confusion with recent air testing conducted by the State. What happened?

You may have heard that state regulators recently did not disclose that air quality testing found low levels of benzene in the Barnett Shale area. State regulators did not report the results of these tests because the amounts of benzene were so low they were considered scientifically insignificant and did not pose a health threat. State regulators are actively sharing information to help the public better understand air quality and safety issues.

What about other air quality tests?

Beyond continuous air monitoring, several additional air quality tests have been conducted in the Barnett Shale area, including Flower Mound, Arlington, and Fort Worth. All tests have shown that the air quality is in compliance with TCEQ limits established to protect public health. The latest report funded by the City of Flower Mound stated, "In general, the concentrations appear to be consistent with published background ambient air concentrations observed in similar urban environments and consistent with the early sampling in Flower Mound."

“The results show me that our air is no different than (other) urban/suburban areas, regardless of gas drilling. This is the seventh study we’ve received this year, and we have yet to hear anything that exceeds TCEQ or EPA standards. To me, this is good news.”

Mike Wallace - Flower Mound council member*

*Source: Dallas Community Newspapers

REPEATED 2010 AIR TESTS SHOWED AIR QUALITY IN COMPLIANCE

WHEN	WHERE	TEST PERFORMED BY	TEST FUNDED BY	RESULTS
Jan. 13	Flower Mound	TCEQ	State of Texas	Compliance
Jan. 21	Flower Mound	TCEQ	State of Texas	Compliance
Feb. 5-6	Flower Mound	Kleinfelder Central	City of Flower Mound	Compliance
Feb. 17	Flower Mound	W&M Environmental Group	Williams Exploration	Compliance
March 4	Flower Mound	TCEQ	State of Texas	Compliance
May 18	Flower Mound	Kleinfelder Central	City of Flower Mound	Compliance
June 1-5	Fort Worth/Arlington	TITAN Engineering, Inc.	Barnett Shale Energy Education Council	Compliance
June 10	Flower Mound	TCEQ	State of Texas	Compliance
June 23	Flower Mound	TCEQ	State of Texas	Compliance

Air Regulations on the Books

Oil and gas operators must ensure that each of their sites complies with all state statutes, rules, and regulations, including those federal requirements delegated to state agencies for oversight. In some cases, Texas' state requirements are more stringent than federal requirements. All oil and gas operators must obtain appropriate air authorizations from the Texas Commission on Environmental Quality.

Minor Source Programs

De Minimis – De Minimis refers to activities that emit very minor amounts of air emissions and would cause no adverse health effects off-site. If an oil and gas operator determines that an operation or activity meets the requirements of the De Minimis Rule, then no other state air authorization is required.

Permits by Rule (PBR) – Some oil and gas facilities that meet TCEQ's extensive recordkeeping requirements and whose emissions are defined as insignificant and fall below pre-set limits may operate with an authorization known as a Permit by Rule.

Standard Permit – Certain oil and gas sites with higher level (yet still insignificant) emissions than established for the previous types of authorizations may be required to apply for a Standard Permit (a permit for a specific, well-characterized type of facility).

Site Specific Permit – Certain oil and natural gas sites require an individual permit to cover emissions from facilities located at the well site.

Major Source Programs

Title V Permit – Large oil and gas production facilities and natural gas processing plants typically have a "potential to emit" significant air emissions at such a level that a major source air permit is required for their construction and operation. This permit is known as the federal Clean Air Act Title V permit, a program delegated to TCEQ to administer. Major source facilities undergo a stringent "New Source Review" process to ensure that local and regional ambient air quality is not impaired. Title V permits contain strict pollution control requirements that are validated through regular and frequent emissions testing and reporting to TCEQ. Major-source facilities are under the regular and careful scrutiny of TCEQ, which commonly conducts recordkeeping and emissions measurement audits.

Questions about air issues?
Visit www.tceq.state.tx.us



S E C T I O N V

Air Quality Terms - What does it all mean?

DICTIONARY



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Parts per billion

The air is made up of many different elements and compounds. The concentration of any given compound in the air is measured as “parts per billion” or ppb.

One part per billion is an extremely low concentration. The following examples put “parts per billion” in context:

1 part per billion is like 1 second in 32 years

1 part per billion is like 1 teaspoon in a million gallons of water

AutoGC

Automated Gas Chromatograph is the official term for the TCEQ continuous air monitoring stations like those in DISH, Eagle Mountain Lake, Meacham, and Dallas-Hinton.

It is scientifically appropriate to compare one-hour data (from the continuous air monitoring station in DISH for example) to the short-term AMCV. It is not appropriate to compare one-hour data to the long-term AMCV.

AMCV

Air Monitoring Comparison Values are concentration levels that are used to evaluate the potential for effects to occur as a result of exposure to concentrations of compounds in the air. The TCEQ has developed two types of AMCVs, short-term AMCVs and long-term AMCVs, specifically designed for comparison with short-term and long-term monitoring data, respectively.

Short-term AMCVs are intended to protect against the adverse effects of short-term exposures – defined as exposures occurring over a period of hours to a few days.

These values are defined as concentrations at or below which no adverse effects are anticipated for short-term exposure. Readings above these levels do not necessarily indicate health effects, but instead serve as a screening tool for state and health officials to investigate further.

Long-term AMCVs are intended to protect against the adverse effects of long-term exposures – defined as continuous or repeated exposure over a long period of time (70 years). These values are defined as concentrations of compounds at or below which no adverse health effects are anticipated for long-term exposure.

It is not scientifically appropriate to compare the long-term AMCV to one-hour data (from the continuous air monitor in DISH for example).

Since substantial margins of safety are incorporated into both types of AMCVs – accounting for the elderly, children, and pregnant women – exceeding either type of AMCV does not automatically indicate an adverse health impact. Rather, it would trigger a more in-depth review.

WASTE WASTE WASTE WASTE WASTE WASTE WASTE

S E C T I O N V I

Waste

WASTE WASTE WASTE WASTE WASTE WASTE WASTE



A TEXAS JOINT ASSOCIATION EDUCATION MESSAGE

WASTE WASTE WASTE WASTE WASTE WASTE WASTE

Who oversees waste from oil and gas operations?

The Railroad Commission of Texas oversees the management of solid waste at oil and gas operation sites such as drilling mud, produced water, salt water, or drill cuttings (the soil and rock that come out of the ground when a well is drilled).

Operators planning to drill or produce oil and gas in Texas must file an annual organization report with the Railroad Commission. The Commission promptly identifies the proper local entity responsible for any waste management or disposal issues associated with a particular oil and gas lease or facility.



How is on-site waste regulated?

Operators must get a permit from the Railroad Commission to dispose of waste, such as drill cuttings, in on-site earthen pits and must demonstrate that the pit will not pollute surface or groundwater. Landowners and other parties that could be affected must be notified and they have the right to a hearing before the Railroad Commission on any pit permit application.

How is off-site waste regulated?

The Railroad Commission and the Texas Commission on Environmental Quality have worked together for at least 40 years to ensure that oil and gas waste is stored, treated, and disposed of at properly permitted off-site waste handling facilities. Waste haulers must maintain records of the identity of the property from which oil and gas waste is hauled; the type and volume of waste sent for off-site disposal; and the off-site waste disposal facility to which the waste is delivered. Commercial recycling and surface disposal facilities must obtain permits to receive oil and gas waste.

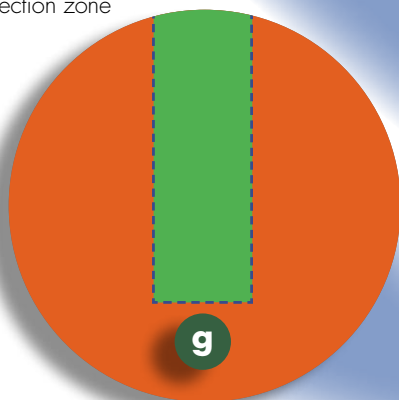
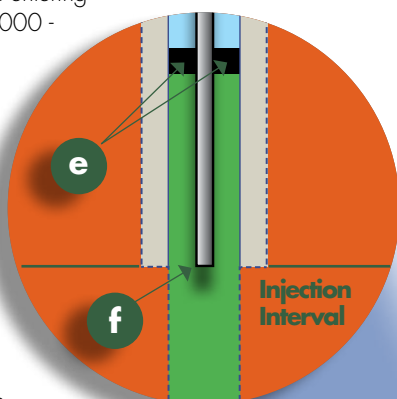
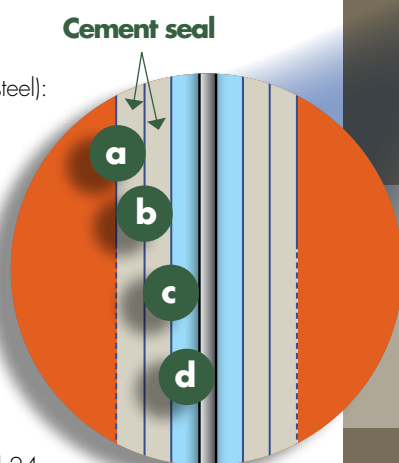
Below Ground Safety Features

- a.** Conductor casing (steel): 30 - 60 feet deep
- b.** Surface casing (steel): 500 - 1,500 feet deep
- c.** Injection casing (steel): 3,000 - 10,000 feet deep
- d.** Annulus fluid: Pressurized water surrounds the injection tubing and is monitored 24 hours a day to protect against leaks

- e.** Packer: Seals injection casing and prevents waste from entering annulus 3,000 - 10,000 feet deep

- f.** Injection tubing (steel): 3,000 - 10,000 feet deep

- g.** Final depth: Completion borehole at injection zone



Example injection well not to scale

What is an injection well?

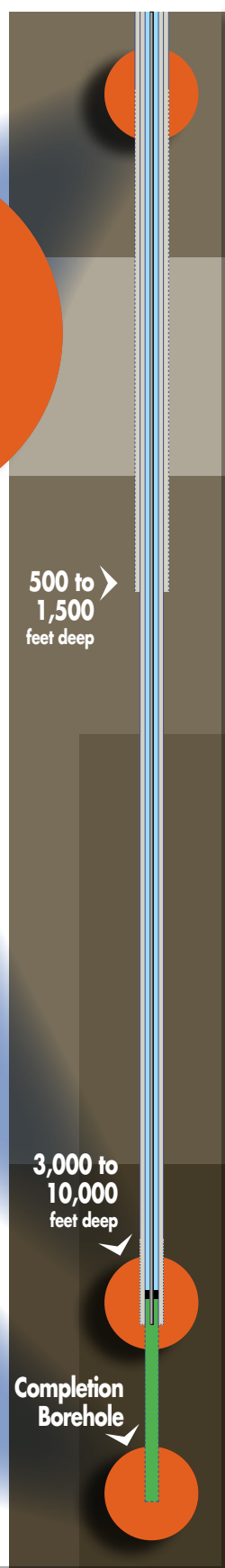
When oil and gas is produced and brought to the surface at a well site, naturally-occurring salt water is also brought to the surface and must be

separated and disposed. All water returned from a well is called "produced water." The Railroad Commission regulates the disposal of this "produced" water. The most common method of disposal is to safely inject the produced water via permitted disposal wells thousands of feet below freshwater supplies. Most often, produced water is returned to naturally-occurring salt water formations deep within the earth.

Permit applicants must provide comprehensive plans to protect groundwater including details about adequate separation and impervious rock formations between the proposed injection zone and shallow freshwater formations as well as the volume and injection pressures to be used during the disposal process. An "area of review" is required to identify all plugged, unplugged, or improperly orphaned wells penetrating the injection zone within a ¼ mile radius of the proposed disposal well. Appropriate landowners are notified and can request a Railroad Commission hearing on any disposal well permit application.

How does injection well construction and monitoring protect freshwater supplies?

The Railroad Commission maintains rules and requires permits that specify stringent disposal well construction standards that require several layers of steel casing surrounded by cement. Disposal well operators are required to constantly monitor multiple pressure gauges, to closely monitor and record injection pressure and rate, and to perform periodic mechanical integrity tests on the disposal well. Operators must maintain and report this monitoring and testing information to the Railroad Commission.



SAFETY SAFETY SAFETY SAFETY SAFETY SAFETY

SECTION VII

Pipeline Safety

SAFETY SAFETY SAFETY SAFETY SAFETY SAFETY

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SAFETY SAFETY SAFETY SAFETY SAFETY SAFETY

In Texas, dial
811 before you
dig to reach the
local “one call”
center.

What Can You Do to Promote Pipeline Safety?

Call 811 before
you dig.

Wait the time
required (48
hours in Texas)
to receive the
locations of any
underground
pipelines and
other facilities.

Respect
the marks.

Dig with care.

What is the “One-Call” System?

It is very important for anyone planning an excavation project to know the location of pipelines and other underground facilities before digging begins. The Railroad Commission estimates that more than 75% of pipeline incidents in Texas are caused by excavation or digging. In Texas, anyone digging near a pipeline is required to take specific safety measures before and during excavating.

The first requirement is to call the local “one-call” center at least two days before excavation begins. This applies to anyone who will be digging, such as homeowners, commercial contractors, fence builders, and road maintenance crews. “One-call” centers serve as a clearinghouse for digging or excavation activities near pipelines or other underground facilities. Underground facilities operators will then mark their facilities using paint, flags or stakes to designate the location of the buried facility. In Texas, dial 811 to reach the local one-call notification center.

What are Pipeline Operators Doing to Promote Safety?

Pipelines are constructed or buried at different depths depending on the type and location of the line, with the majority of pipelines being at least three feet deep when initially built. Pipeline operators take extensive steps to protect the integrity of their systems and the safety of the communities where they operate. This includes building pipelines to specific construction standards, taking measures to prevent internal and external corrosion, monitoring the pipeline rights-of-way, and conducting public awareness efforts in the communities where they operate.

Additionally, transmission and distribution operators are required to implement integrity management programs to assess the greatest risks to the integrity of their systems. To inspect for leaks and confirm the integrity of the pipe, pipeline operators routinely walk and fly over the pipeline right of way, and conduct other testing on a periodic basis.

Pipeline operators often mark the route of a pipeline with signs or markers that list the name of the operator, the type of product being transported, and an emergency phone number to contact the operator.

Texas Landowner Bill of Rights: The Texas Legislature passed the Texas Landowner Bill of Rights.
To learn more visit www.oag.state.tx.us/agency/Landowners_billofrights.pdf

Questions about pipelines? Visit www.rrc.state.tx.us and www.phmsa.dot.gov

SECTION VIII

Oil and Gas by the Numbers

Jobs, Taxes & Royalties



A TEXAS JOINT ASSOCIATION EDUCATION MESSAGE

Taxes

Better Jobs, Better Wages

Oil and gas
companies paid
\$8.5
BILLION
in state and
local taxes
and royalties.

Taxes

The oil and gas industry paid over \$8.5 billion in Texas state and local taxes and royalties in fiscal 2009. The taxes paid go toward funding Texas schools, textbooks, Medicaid and children's health insurance programs, child protective services, roads and first responders such as police and firefighters. The oil and gas industry includes exploration and production, pipelines, refining, petrochemicals, natural gas distribution, petroleum products wholesaling, and oilfield equipment manufacturing.

Oil and gas companies pay far more in state and local taxes and royalties on a per worker basis than does the average private sector company. In fiscal 2009, oil and gas companies paid an average of \$27,000 per employee in state and local taxes and royalties. By comparison, other private sector companies averaged only \$4,800 per job. **This five-fold difference highlights the critical role oil and gas plays to keep the Texas economy - and Texas government - viable and resilient.**



Oil and gas companies pay 5 TIMES MORE state and local taxes and royalties on a per job basis than the average private sector company.

State and Local Taxes and State Royalties Paid
Per Job in Texas - Fiscal 2009



Taxes

Better Jobs, Better Wages

Taxes & Royalties Paid Per Job (Fiscal 2009)*

	Oil and Gas	All Other Industries
Property taxes	\$10,620	\$2,493
Sales (state and local)	\$3,990	\$1,391
State franchise	\$1,678	\$456
Production of oil	\$2,805	\$0
Production of natural gas	\$4,464	\$0
Oil and gas well servicing	\$115	\$0
Other taxes	\$690	\$424
Royalties	\$2,596	\$5
Total:	\$26,958 per job	\$4,769 per job

*Calculations by Tax & Fiscal Consulting, Austin, TX based on data from the Texas Comptroller's Office and Texas Workforce Commission

Better Jobs,
Better Wages

Oil and gas employers provide more than 315,000 high-quality, high-paying jobs in Texas. The average oil and gas worker earns about \$107,000 a year; the rest of the private sector workforce earns an average of \$44,000 a year.



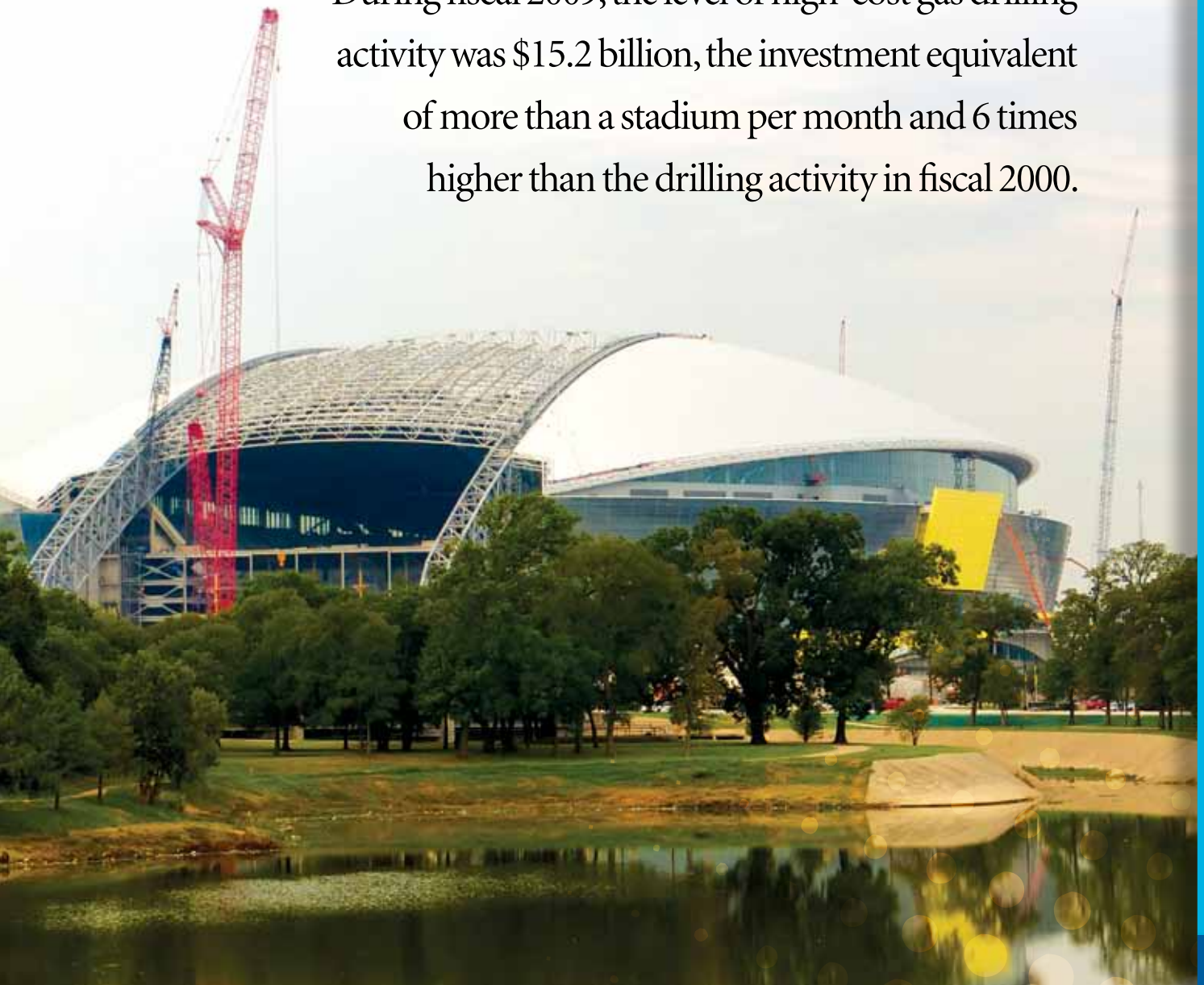
Jobs Creating Jobs

Given the large capital outlays and other expenditures that accompany oil and gas jobs, each job tends to generate many other jobs in Texas, creating a "ripple effect." According to one economic model, the highest job multiplier in Texas is in petrochemical manufacturing, at nearly 17 additional jobs created for every oil and gas job. The second highest multiplier in Texas is in petroleum refining, creating 14 additional jobs for every refining job. (Source: IMPLAN model) This ripple effect stems from the purchases that oil and gas companies make, including for machinery, pipe, fuel, raw materials, concrete, steel, engineering services, legal services, well services, electricity, maintenance, construction, and land, as well as pay to their employees.

Oil & Gas Investment in Context – Like Building the Cowboys Stadium *Every Month!*

According to data provided by the Texas Comptroller's Office, oil and gas companies have invested at least the equivalent of a new, \$1.2 billion Cowboys Stadium every month in Texas.

During fiscal 2009, the level of high-cost gas drilling activity was \$15.2 billion, the investment equivalent of more than a stadium per month and 6 times higher than the drilling activity in fiscal 2000.



Taxes

Better Jobs, Better Wages

Oil and Gas by the Numbers

Oil and Gas Jobs in Texas*

315,000

Average Oil and Gas Wage

\$107,289

(more than double the rest of the workforce)

Texas Royalty Owners

418,000

Taxes & Royalties Paid to State & Local Treasuries

(Fiscal Year 2009)

	Oil and Gas
Property taxes**	\$3.3 billion
Sales (state and local)**	\$1.3 billion
State franchise**	\$529 million
Production of oil***	\$885 million
Production of natural gas***	\$1.4 billion
Oil and gas well servicing***	\$36 million
Other taxes**	\$218 million
Royalties to State funds***	\$819 million

Total Taxes & Royalties..... \$8.5 billion

*Source: Texas Workforce Commission **Estimated, Tax & Fiscal Consulting, Austin, TX

***Source: Texas Comptroller's Office

Texas Rainy Day Fund

Texas maintains an Economic Stabilization Fund (ESF) or “Rainy Day Fund” that is funded almost exclusively by oil and gas taxes. In fiscal 2009, the transfer to this “Rainy Day Fund” was a record \$2.2 billion, **all** of which came from oil and gas taxes. The Rainy Day Fund has been used to help close budget shortfalls, provide property tax relief, and to fund public schools; teachers’ compensation and health insurance; Medicaid; children’s health insurance; child protective services; foster child care and adoption services; criminal justice programs; funding for the Emerging Technology and Texas Enterprise Funds; and disaster recovery programs.

The Texas Comptroller estimates that a total of \$8.1 billion will be in the Rainy Day Fund by the end of the current budget period. Additional taxes to be paid by oil and gas companies in the subsequent budget period (fiscal 2012-13) could further benefit the Fund and state programs financed by it.



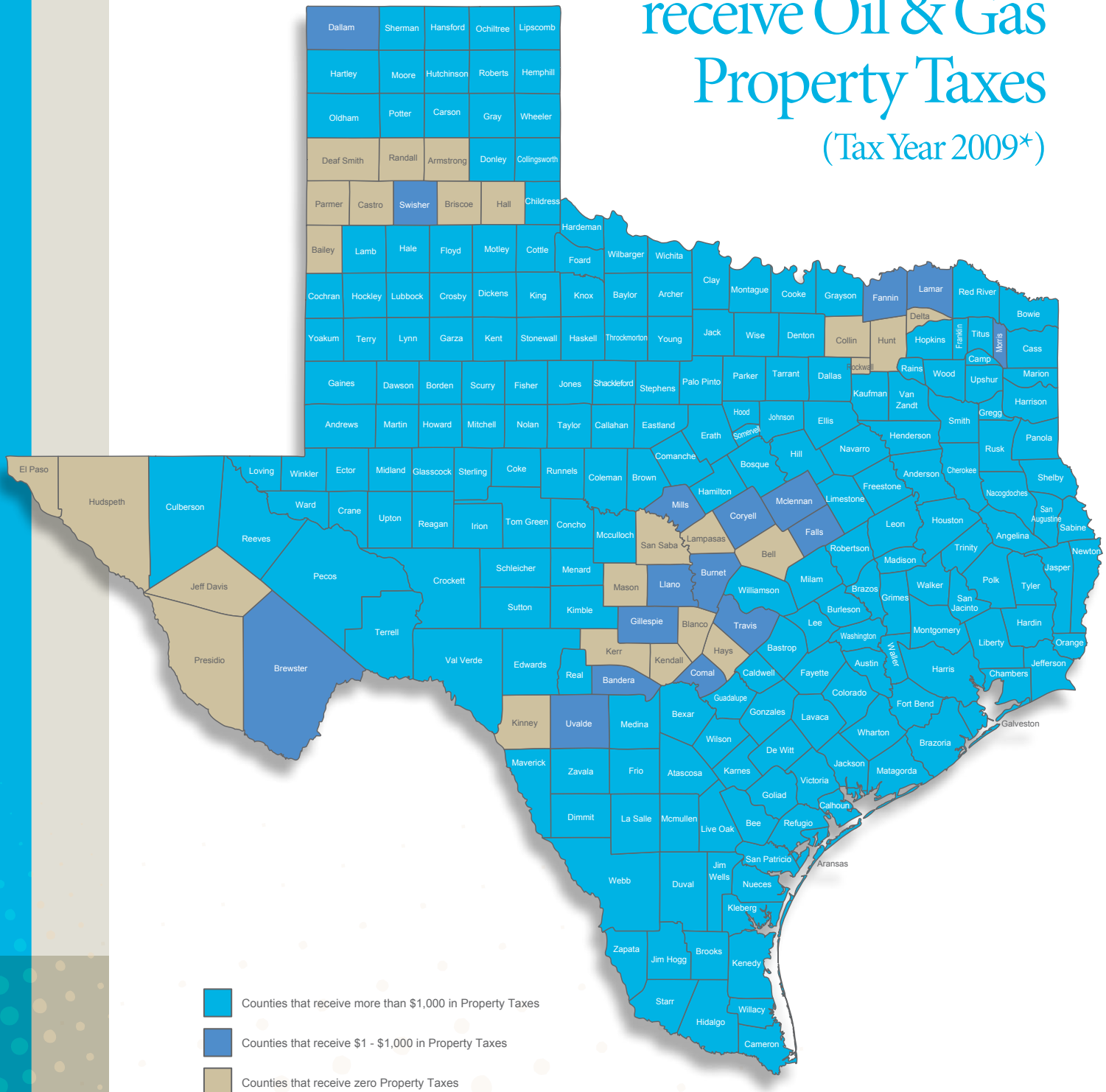
Taxes

Better Jobs, Better Wages

Jobs Creating Jobs

Taxes & Royalties Paid

Counties that receive Oil & Gas Property Taxes (Tax Year 2009*)



* Tax year 2009 covers those taxes imposed during 2009; property taxes are legally due by January 31 of the following year. Collections of tax year 2009 taxes are during state fiscal year 2010. Source of data is "self-report" information from counties provided to Texas Comptroller's Office.



Helpful Resources

America's Natural Gas Alliance

www.anga.us

American Petroleum Institute

www.api.org

American Royalty Council

www.americanroyaltycouncil.com

Barnett Shale Energy Education Council

www.bseec.org

Foundation for Energy Education

www.foundationforenergyeducation.org

Independent Petroleum Association of America

www.ipaa.org

Interstate Oil & Gas Compact Commission

www.iogcc.org

Panhandle Producers and Royalty Owners Association

www.pproa.org

Permian Basin Petroleum Association

www.pbpa.info

Railroad Commission of Texas

www.rrc.state.tx.us

Texas Alliance of Energy Producers

www.texasalliance.org

Texas Commission on Environmental Quality

www.tceq.state.tx.us

Texas Independent Producers and Royalty Owners

www.tipro.org

Texas Oil and Gas Association

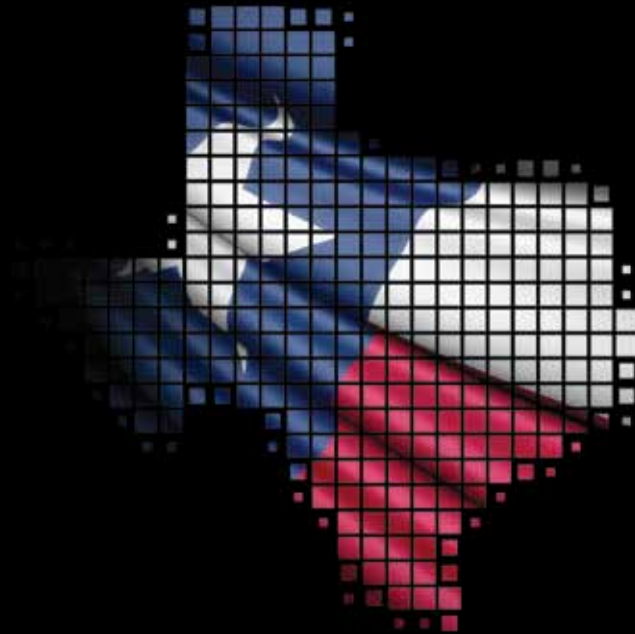
www.txoga.org

Texas Pipeline Association

www.texaspipelines.com

Texas Water Development Board

www.twdb.state.tx.us



O I L A N D G A S I N T E X A S

A Joint Association Education Message

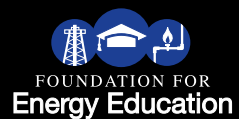
F R O M T H E T E X A S O I L A N D G A S I N D U S T R Y



TEXAS OIL & GAS
ASSOCIATION



Texas Pipeline Association



FOUNDATION FOR
Energy Education



TIPRO



Texas Royalty Council
Completing the Energy Circle



AMERICAN
ROYALTY
COUNCIL

Completing the Energy Circle



