

Eliminating Orphan Wells and Sites in Texas

*A Toolkit for Redesigning the Railroad
Commission's Oil and Gas Well
Plugging and Cleanup Programs.*

By Megan Milliken Biven & Virginia Palacios

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Commission Shift is reforming oil and gas oversight by building public support to hold the Railroad Commission of Texas accountable to its mission in a shifting energy landscape.



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Executive Summary

After 150 years of oil and gas production in the United States, the industry's footprint is ubiquitous. Indeed, the Department of Energy estimates that 10 million legacy, abandoned, orphaned, and producing oil and gas wells puncture the lands of the United States.¹ Texas' known share of that national environmental debt is just under 1.7 million wells. While the cumulative debt of the oil and gas industry has been building over decades, the topic of orphan wells has risen to recent prominence.

An orphan well is an unplugged oil or gas well for which no viable responsible party can be located, or where the owner is known but bankrupt. But "orphan well" is just a legal classification. There are legacy wells that operators plugged with inappropriate materials or by using practices that are now obsolete. There are recently abandoned wells whose plugs have failed and will require "re-abandonment." Operators have not plugged idled, inactive wells that have been languishing for years and are likely to be orphaned soon. These wells have crashed into public consciousness partly because they are impacting more and more people and are therefore difficult to ignore. But also because the oil and gas industry is experiencing a systemic decline driven by various factors including the rise of substitute fuels and technologies as well as a wane in investor confidence.² Without proper preparation and regulatory diligence, bankrupt oil and gas companies will leave behind large portions of their asset retirement obligations for the state to plug.

The question of how to safely decommission oil and gas wells has risen into national prominence because there is a countdown. Even without a pending energy transition, oil and gas resources are exhaustible, and as a consequence, the industries they support have an expiration date. Traditionally, oil and gas companies have used the proceeds of today's activity to pay for the mess of yesterday's activity. This model leaves state governments and landowners at a loss when there is no more current activity to finance yesterday's mess. Whether they acknowledge it, oil and gas producing states are now engaged in a race to collect on those debts while they can. The alternative is to pay for this massive inventory of delayed plug and abandonments and monitoring of abandoned wells with tomorrow's firefighter and police pensions, raiding the Texas Permanent School Fund, and siphoning the tax proceeds from sectors unrelated to oil and gas. Texas is on the clock to reform its management of oil and gas wells, or insolvent operators will leave the state with the tab.

On November 15, 2021, President Joe Biden signed the Infrastructure Investment and Jobs Act (H.R. 3684) into law.³ Buried in the 2,740-page statute is a \$4.7 billion federal grant program to state oil and gas regulators to plug orphaned wells,⁴ of which the Railroad Commission of Texas could be eligible to receive potentially more than \$340 million to disperse to private contractors.⁵

Contrary to what its name implies, the Railroad Commission of Texas has no authority over railroads. Instead, the agency oversees oil and gas development, coal and uranium mining, and gas utility service in Texas, among other functions.

To be eligible for a portion of these federal dollars in the new infrastructure law, the Railroad Commission must implement reforms to its Oil Field Cleanup Program, in which the state manages well plugging and site remediation of orphaned wells and sites, and must also improve "regulation of oil and gas wells" more generally. This report provides a suite of tools that the commission can use to meet that mandate and reorient its mission to serve the people of Texas.

An orphan well does not just magically appear on a Railroad Commission of Texas field office doorstep. Divestment of older wells to avoid asset retirement obligations (AROs) is a well-recognized and documented oil and gas industry practice. Texas law and regulation enables this conveyance of the obliga-

tion to plug and remediate these orphans down the “food chain” so that the well inevitably winds up at the people’s doorstep. These orphaned wells are an inevitable and intentional consequence of state law and regulation.

This report identifies critical points at which the Railroad Commission of Texas creates or compounds risk of orphaning during the life of an oil or gas well. We follow each review of current policy with a recommendation for reform.

The good news is that there are clear, actionable ways to reform the Railroad Commission’s policies that lead to orphaning. The following list of reforms is not comprehensive, but it’s a necessary list that would prevent more orphaning and protect the people and resources of Texas.

1. Tighten eligibility and increase scrutiny of operating permits and drilling permits. If you have a leaking bathtub, then the first step is to turn off the faucet. The commission cannot manage its existing inventory of permitted wells, and adding more to its regulatory plate only compounds the crisis. The two most salient metrics for the Railroad Commission of Texas are financial solvency and environmental compliance.

a. Financial Solvency: Use Economic Limit and real time production data to determine well and operator solvency.⁶ For the commission to consider a firm financially solvent, remaining production within a company’s portfolio of wells and assets should be able to fund decommissioning for the entire well population. Financially solvent companies should have more assets than liabilities. Operators submitting an organization report with the commission and applying for permits should submit a report of full, undiscounted cleanup liabilities for all assets.

b. Environmental Compliance: A history of noncompliance is a reliable indicator of the likelihood that an operator will orphan its wells. The commission should not allow plugging extensions for companies with a poor compliance record. Similarly, if operators cannot safely manage their existing wells, they should not be issued additional permits. This disqualification from new permits should extend to individuals who form new legal entities to evade scrutiny. The commission must be empowered to deny permits when the principals are repeated violators.

2. Ensure operators pay for financial assurance that covers the full cost of asset retirement obligations. When the polluter doesn’t pay, everyday Texans do. The Sunset Advisory Commission calculated that bonds only pay for about 16% of well plugging and cleanup costs.⁷ To prevent operators from “dining and dashing” on Texas resources, the commission must implement financial assurance relative to well risk categories and eliminate blanket bonding.⁸ Each well has a different level of risk. Each well should have financial assurance that corresponds to that level of risk without exception. Improved financial security mechanisms include retroactive joint and several liability, an industry wide fee to fund orphan wells, sticky asset retirement obligations, and full cost bonding and trust funds for all Texas wells. Each tool has its place based on the risk a particular well represents. To support these reforms, operators must submit to the commission the bids and actual costs to plug and abandon wells and perform site restoration.

3. Hold operators accountable to their own decommissioning obligations. Existing regulations allow operators to both sell a well and escape decommissioning liability all at once. There should be no exemptions to the legal obligation to safely plug and abandon oil and gas wells in the state of Texas. The commission can embed decommissioning obligations into all permit agreements

including the Organization Report (Form P-5), the Application for Permit to Drill, Recomplete or Re-Enter (Form W-1)⁹ and all other activity permits should be turned into legal instruments and contracts that are not dischargeable by bankruptcy or contracts between private parties.

4. Repeal Inactive Well Plugging Extensions & Reduce the Marginal Well Population. Operators have several incentives to postpone decommissioning to the extent allowed by regulators.¹⁰ It is cheaper to let a well sit, send a worker every few months to produce to the minimum production threshold, than to expend the funds and safely decommission the site. This delay, however, is not costless to the people of Texas. As it stands, Texas operators are able to indefinitely delay decommissioning through a variety of exemptions and “pay to delay” fees. The commission must instead require operators to report when they plan to cease production at least six months prior. Plugging and abandonment should commence and must proceed congruent with wind-down operations. In conjunction with new well solvency monitoring, the commission must also raise the production volume threshold that defines “active” status and end the practice of marginal production. The Railroad Commission of Texas retains authority to “prorate” production and already tracks and monitors proration schedules.¹¹ The commission should consider expedited timelines for decommissioning as an extension of current proration authorities. Operators should not be able to indefinitely “produce” a teaspoon of crude or a cubic foot of gas simply to avoid paying for decommissioning. As a textbook on decommissioning observes, “regulations also play an important role in timing decisions [of decommissioning].” When an operator chooses to decommission does not happen independent of regulation and law, but because of what is allowed by regulation and law.

5. Revise fees and surcharges deposited to the oil and gas regulation and cleanup fund (OGRC) and the General Revenue Fund. Despite Texas being the highest oil and gas producing state in the nation, the Railroad Commission’s monitoring and enforcement program continuously falls short, and the agency maintains a long backlog of orphaned wells and sites. Meanwhile, the state legislature routinely leaves unappropriated funds set aside in the OGRC Fund to certify the state budget. The legislature set aside funding in 2021 for the commission to conduct a study to review sources of revenue to the OGRC Fund through 2025, including any caps on fees and fines. This represents a good opportunity to revise the commission’s fees and surcharges to improve the commission’s capacity to administer the recommendations in this report. Furthermore, the OGRC Fund should be converted into a trust fund, separate from the General Revenue Fund, with the commission having access to the funds to invest in the OGRC Fund’s intended purpose.

6. Repeal tax exemptions and incentives for wells that operators are likely to orphan. Texas cannot with one hand incentivize orphan wells with tax exemptions and incentives, while assuming those liabilities with the other hand. Texas paid over \$370 million in incentives to oil and gas producers in 2020 and is forecasted to spend nearly \$300 million in incentives in 2021.¹² If the state is looking for funding to deal with the massive inventory of orphaned and failing abandoned wells, the laundry list of incentives and tax breaks specific to the oil and gas industry is a good place to start. Severance tax rates have remained flat for decades, and Texans deserve a larger share from Texas resources. Increasing severance tax rates and repealing tax exemptions and incentives would also recoup the mounting costs from orphaned wells and monitoring previously abandoned wells. This additional funding could support a 21st century Railroad Commission of Texas, capable of achieving its mission. The agency has been chronically underfunded, understaffed, and ill equipped to successfully monitor and inspect oil and gas infrastructure across the state.

- 7. Close gaps in the inspection program.** Implement a layered monitoring and inspection program with multiple redundancies to prevent hazards and protect human life. The Railroad Commission should be staffed, equipped and funded to meet its mission, which includes a baseline ratio of staff to infrastructure and increased inspection frequency. Increase the inspector pay scale and pursue all options to increase benefits. The commission should train and equip all of its inspectors with the appropriate equipment and amend rules and regulations to grant RRC inspectors the power to issue “red light” enforcement actions and penalties at the time of inspection. If the commission cannot rise to the level of capacity needed to fulfill all parts of its mission, federal agencies like the U.S. Environmental Protection Agency and U.S. Department of Transportation can withdraw monitoring and enforcement authorities they have delegated to the RRC.
- 8. Develop a strategy to swiftly eliminate orphaned wells and sites.** Landowners, groundwater conservation districts, and neighbors of orphaned wells and sites are bewildered by the Railroad Commission’s slow response to the thousands of locations that need plugging and site cleanup. Many legacy sites are not even on the commission’s list. A true strategic plan for the Oilfield Cleanup Program would forecast growth in orphan wells, estimate total costs to address the problem, evaluate all the regulatory tools available (including those suggested in this report), calculate potential revenue increases through amended fees and surcharges, and make proposals to the legislature for statutory changes if necessary. Moreover, a strategic plan should assess ways to ensure that the state properly funds the execution of its monitoring and enforcement program.
- 9. Bring the public State Managed Well Plugging and Cleanup Program “in-house.”** Despite siphoning nearly half of the commission’s entire budget, the State Managed Well Plugging and Cleanup Program outsources over 80% of the program to private firms, who employ between 90 to 100 oilfield services workers, and plug between 1,000 and 1,477 wells annually. Instead of competing for rigs and crews with drilling firms when prices are high and increasing costs because of profit markups, the commission could directly employ workers and buy its own equipment. More wells could be plugged, costs standardized, and efficiencies realized if the Railroad Commission carried out the plugging and abandonment and site restoration activities itself.
- 10. Create a program to oversee perpetual monitoring of plugged wells and locate legacy wells.** Private plugging and abandonment is a black box. Between 1975-2018, operators drilled over 655,000 oil and gas wells in the state of Texas, and during that same period operators plugged and abandoned about 405,000 oil and gas wells.¹³ The commission treats plugged and abandoned wells as a closed case and does not monitor the conditions of those wells. Yet, cement can degrade, and plugs can fail. There are about 1,210,000 legacy and “recently” plugged and abandoned wells in Texas that the commission does not monitor or oversee. Many wells are not properly located or recorded in commission databases. Only when these wells pollute a lake or threaten a landowner do they appear back on a commission spreadsheet. It is well past time for the Railroad Commission to create a monitoring program for previously abandoned and plugged wells.

Introduction

Over a hundred years ago, Glenn Allen knew one thing - good cattle came from the west Texas sandhills. So, in 1913, with a bit of credit and a bigger belief in himself, he established his business and his family's legacy in the Permian Basin.

Meanwhile in the eastern part of the state, entrepreneurs of another sort were staking their claim en masse. So prolific was this black gold rush, the newly minted Texas oil and gas industry was in danger of committing "competitive suicide" for the entire American oil industry.¹⁴ Small producers and royalty owners had most of the Eastern Texas plays, with the major companies looking for a way in, but also a way to stymie the flow to control production and stabilize prices. In 1919, the Texas Legislature appointed the Railroad Commission of Texas ("RRC" or "the commission") to establish order and regulate all aspects of oil and gas production in Texas.¹⁵

The original commission was not designed nor intended to protect landowners or Texas resources from the oil and gas industry's mistakes or willful actions. The legislature initially formed the Railroad Commission to regulate railroad monopolies. With the rise of oil and gas development in Texas, lawmakers charged the commission with regulating oil pipelines, which presented their own issues as transportation monopolies.¹⁶ By the 1930's, the commission inspired today's Organization of Petroleum Exporting Countries (OPEC) to coordinate production across the state to conserve oil and gas resources and not drive down prices too low.^{17, 18} The commission oversaw the division of the market, while Texas operators voluntarily entered agreements to restrict production and to produce their wells proportionate to market demand, as marketing and transportation facilities were available.¹⁹ The commission itself noted that its mission was to not only conserve these "great natural resources of oil and gas, but likewise, in aiding the operators in the most orderly and successful production of their enterprise."²⁰ The commission is a crude oil and natural gas conservation agency.²¹ As both legal arbiter and industry promoter, the Railroad Commission of Texas would save the oil and gas industry from itself and preserve its primacy within the Texas economy.

Over the years, the state legislature would designate additional statewide rules and missions for the commission. Federal agencies would delegate authority to the state agency to implement and enforce federal rules. The Railroad Commission grew into an amalgamation of conflicting duties and obligations, but the original purposes and loyalties remained. Indeed, in the agency's 2020 budget, the commission describes its organizational objective as to, "increase opportunities for oil and gas resource development" with a strategy to "promote energy resource development opportunities."²² But its current overarching mission statement echoes this inherent tension: Our mission is to serve Texas by our stewardship of natural resources and the environment, our concern for personal and community safety, and our support of enhanced development and economic vitality for the benefit of Texans.

The central question remains: What is "for the benefit of Texans?"

For three generations, Glen Allen's descendants have raised Texas beef. What started out as a single ranch in the middle of the Permian expanded just up the interstate. Allen's granddaughters continued the family tradition on the Sisters Divisions - and added on the 22,000-acre Main Side Antina Ranch. Chevron (and previously Gulf Oil) leased the subsurface rights below the ranch. Gulf Oil acquired the *North Estes Lease* (also referred to as the *Sandhills West Field*) and the *North Wristen Lease* (also referred to as the *Shipley Field*) in 1924 but did not drill the first well until 1943. Throughout the 1950s, Gulf Oil would drill some 400 wells across two lease parcels. In 1984, Chevron acquired Gulf Oil, including those two leases. Throughout the 1990s, Chevron plugged and abandoned dozens of those wells because they failed Mechanical Integrity Testing (MIT), while the rest were either in "temporarily abandoned" status or marginally producing.²³

Today, Allen's great granddaughter Ashley Williams Watt is the steward and owner of Antina Cattle Company just outside of Monahans, Texas. For decades, the surface owners, Allen's descendants, and the subsurface owners, Chevron, shared a tenuous relationship. In May 2021, Watt was surveying her property when she came across one well allegedly plugged and abandoned by Chevron with a mixture of gas and water bubbling to the surface. A pumper discovered another well in early June. With 400 wellbores across this division of the ranch's 22,000 acres, the family was no stranger to routine disturbances from the industry's footprint. In 2002, crude oil bubbled up from a toilet in the ranch house. While the family immediately shut in that water well, the leak and cause of the crude oil intrusion was never located. But in the summer of 2021, there was something even more unusual about two old dormant plugged and abandoned wells on the ranch: investigations found the wells were leaking into groundwater.

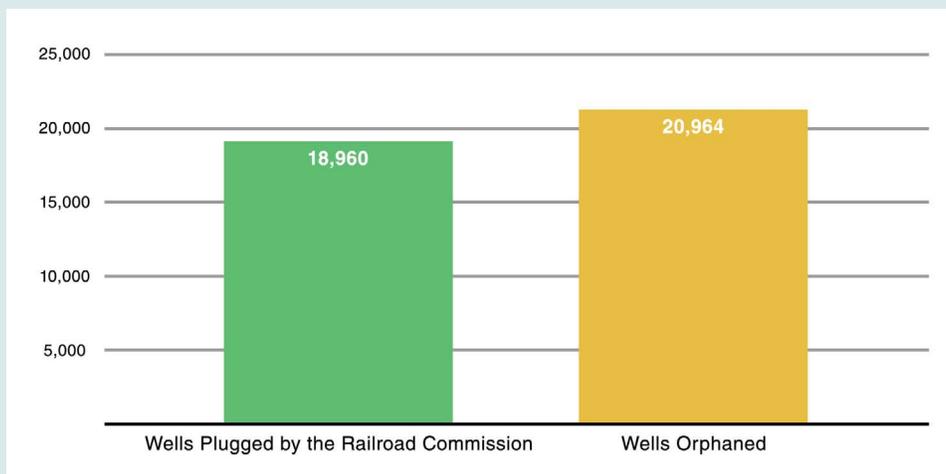


An abandoned well discovered by Ashley Williams Watt bubbles to the surface. Video: Watt, Ashley. @sand_frac. Twitter. June 1, 2021. Accessed on Dec. 7, 2021.

The Sisyphean Task

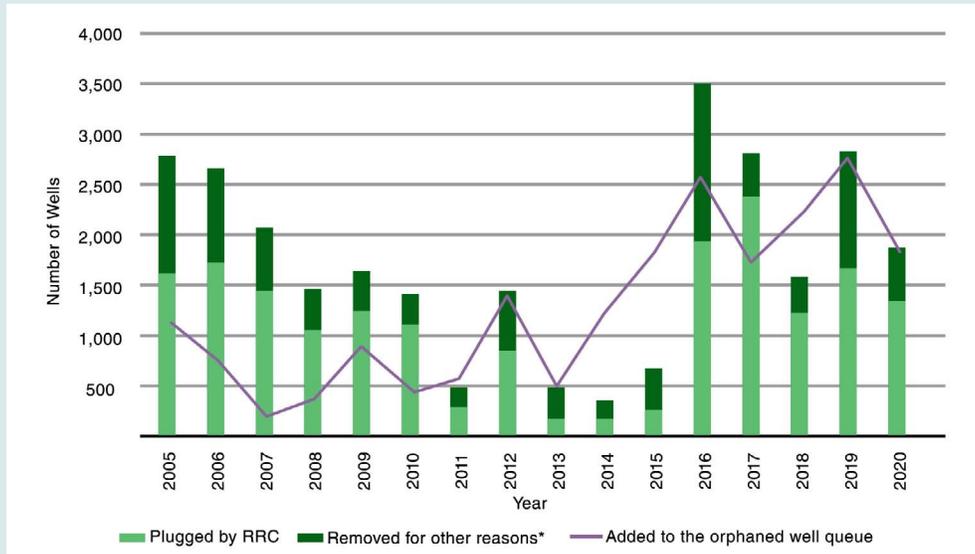
The journey of an oil or gas well from generating profit for a private company to plaguing Texas communities is not one of happenstance. An orphaned well is an oil, gas, or injection well for which no viable responsible party can be located or the owner has declared bankruptcy, thereby shifting liability onto the public.²⁴ From 2005 to 2010, the commission made progress plugging orphan wells, reducing its queue by around half.²⁵ Nonetheless, since 2005, the Railroad Commission of Texas has plugged about 19,000 orphaned wells, but companies orphaned an additional 21,000 wells (Figure 1).²⁶ The state-managed well plugging program has stagnated since 2011, with the commission taking on more wells than it plugs in most years (Figure 2). Similarly, the state-managed cleanup program has not made considerable progress in remediating sites since 2009 (Figure 3). The number of candidate sites has grown since 2003. Cleanup activities declined from 2010 to 2018. The commission remediated more sites in 2019 than any other year, in part because the legislature doubled its funding for the oil field cleanup program.²⁷ Around 2,200 sites were candidates for state-managed cleanup at the end of Fiscal Year 2021.²⁸

Figure 1: Wells Plugged by the State vs. Wells Orphaned by Operators 2005 - 2020.



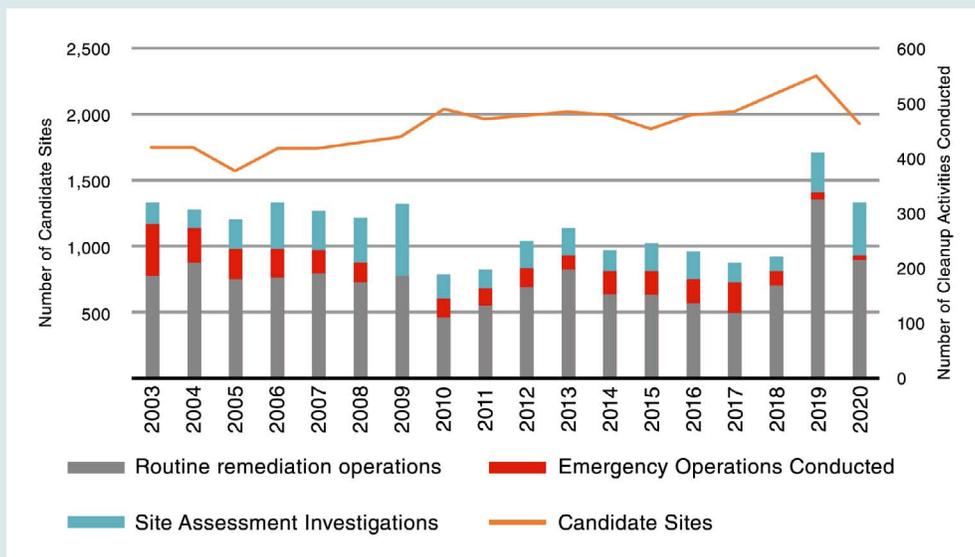
The Railroad Commission’s “Sisyphean task” cannot be understood or solved merely at the backend. An orphan well does not just appear on a commission spreadsheet one day, rather it is a result of numerous steps of mismanagement by companies, courts, and the commission.

Figure 2: Wells added and removed from the RRC’s orphaned well queue by year.



* The commission may remove wells from the orphan wells list for the following reasons: returned to active status, operator change, P-5 renewal, other reasons, or originally delinquent P-5 >12 months changed to < 12 months. Data source: Railroad Commission of Texas. Annual Oil Field Cleanup Program Reports.

Figure 3: State-managed cleanup of abandoned oilfield sites over time.



The commission has around 870 employees and is responsible for implementing dozens of federal and state laws, monitoring, inspecting, responding to emergencies, and enforcing penalties on 250,000 miles of pipelines and an estimated 1,650,000 oil and gas wells of various types and status.^{29,30} There are just 173 inspectors in the oil and gas safety inspection team.³¹ The commission's most recent oil and gas division monitoring and enforcement plan stated that in 2020, 170 inspectors conducted over 347,000 inspections. As one commenter put it, "this is over 2,000 inspections per inspector. Assuming 260 workdays per year, each inspector would have to average nearly 8 inspections per day every single day or nearly 1 per hour of every hour worked."³² There are just 65 inspectors on the pipeline safety team.³³ That's just one site inspector per 3,900 miles of pipeline and one inspector per 9,500 wells across the state. These ratios raise serious doubts about the thoroughness and efficacy of inspections of both active and inactive wells across the state. Moreover, these ratios point to a need for a vastly different strategy at the commission that both prevents orphan wells and ensures that the commission monitors wells in perpetuity.

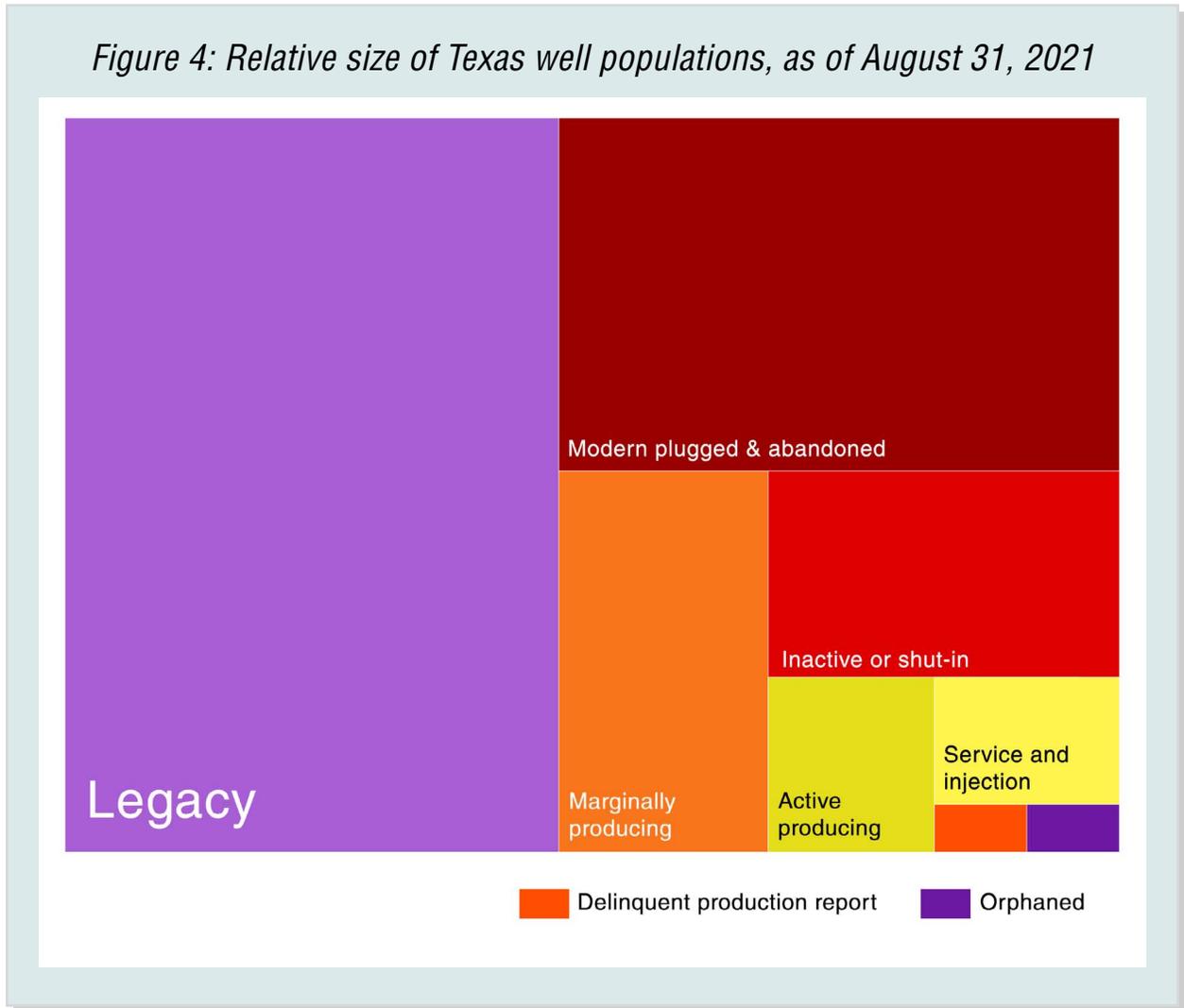
The commission's Oil Field Cleanup Program does not exist in isolation. This report identifies critical points at which the Railroad Commission creates or compounds risk of orphaning during the life of an oil or gas well.

A Taxonomy of Wells

Respective categories of wells have corresponding levels of risk that will require public policy tools appropriate to those risks. Oil and gas wells are not a monolith, and before outlining necessary policy reforms paired to risks, it will be helpful to have a common lexicon. Sources and definitions of well statuses are available in [Appendix A](#). For the purposes of this report, we divide these wells into three general categories with subcategories:

- 1. Legacy and Orphaned Well Inventories (812,000 wells):** These include all oil and gas well categories that are potentially "the government's problem." The government typically bears the responsibility and cost to monitor, abandon or re-abandon, and restore sites for these wells.
- 2. At Risk Wells (732,000 wells):** These wells are in danger of becoming orphaned in the near future. At risk wells may be producing, but there is inadequate financial assurance, or the operator may be close to or currently insolvent. The wells may be idled or inactive for a prolonged period of time. These wells include Inactive and Shut-In Wells, Marginal and Stripper Wells, Insolvent Wells, Modern Plugged and Abandoned Wells, and wells with a Delinquent Production Report.
- 3. Operating Wells (290,000 wells):** A well that is currently producing, injecting, disposing or otherwise in service. Here, we define non-marginal operating wells as unplugged wells with average daily oil and gas production equal to or greater than 10 barrels of oil or 250 Mcf of natural gas. There are roughly 105,000 non-marginally producing Active Wells, and Service and Injection Wells. However, there are over 290,000 operating wells, when Marginal and Stripper Wells and wells with a Delinquent Production Report are included. For planning purposes, it will also be important for the Railroad Commission to consider future wells.

The report authors refined well counts and categories using the commission’s most up-to-date and official well counts.³⁴ We acknowledge that there are data limitations in these counts.³⁵ In total, Texas has an estimated 1,650,000 oil, gas, service, and injection wells of various types and status scattered across its communities, and the commission monitors about 439,000 wells in the population.³⁶ The status of a well is not absolute, rigid, or permanent.³⁷



Organization of Report

We will move through each phase of an oil or gas well’s physical and regulatory life and describe the existing policy followed by Commission Shift’s recommended policy. Each section will discuss the existing authority, the mechanism necessary, and required resources to enact the policy recommendation. A summary of relevant forms, rules, or statutes for each recommendation is included in Appendix E.

I. Preventing orphan wells

A. Qualification & Permitting

Existing Policy

In order to receive a RRC Drilling Permit (W-1) or an Underground Injection Permit (W-14), a company must first file an organization report providing basic information on the company and its principals (Form P-5) and submit financial security.^{38, 39} The P-5 form requires that operators list the name and addresses of the operating entity, a representative of the organization, and the type of organization (e.g. Corporation, Trust, etc.). There is an initial form P-5 filing fee of \$300, and the commission has committed to processing P-5 forms within five business days if there are no errors on the form.^{40, 41}

The commission requires operators to refile the P-5 form each year with an annual renewal filing fee up to \$1,350. Permit holders that do not resubmit a yearly P-5 form are deemed out of compliance. The P-5 Renewal Packet also includes a list of that operator's inactive wells in compliance with HB 2259.⁴² HB 2259 amended the Texas Natural Resources Code in 2009 to establish requirements for all operators to address their inventories of inactive wells annually in order to obtain approval of their yearly organization reports. According to the P-5 form itself, the commission must deny a P-5 of an operator with inactive wells out of compliance or when an operator has outstanding enforcement orders or judgements. But in 2012, the Texas Land and Minerals Association asked the commission how many operators were out of compliance (just under 1,500 operators) and how many were denied a P-5 based on failure to comply.⁴³ In 2015, the commission reported that "164 operators are subject to outstanding enforcement orders relating to these inactive well requirements and have had their renewals denied."⁴⁴

The commission permitted or reviewed 8,750 organizations in 2020. The commission is processing Expedited Permits for drilling in two business days and standard drilling permits within three business days.⁴⁵ In 2020, the commission's 130 Oil and Gas Division Permitting staff (including hearings staff) processed 12,950 horizontal drilling permit applications and 5,500 vertical drilling permit applications.⁴⁶ ⁴⁷ In 2020, the commission monitored 443,000 active wells with each commission analyst responsible for monitoring 37,200 wells.

As it stands, the threshold to become an oil and gas operator in the state of Texas is low, only requiring companies to submit an appointed individual's contact information. The Railroad Commission of Texas does not confirm whether a drilling permit applicant has legal ownership or a contractual right to exploit the fossil fuel resources listed on the permit application. Only in the cases where an operator or individual files a complaint will the commission conduct a contested case hearing, and even then, it can issue a permit based on proof of a "good faith claim."⁴⁸

Quick permitting periods frame the oil and gas regulatory program as one of client and customer instead of as regulated and regulator.⁴⁹ The regulator's task is to process applications as quickly as possible instead of stewarding Texas resources and safeguarding Texas communities. In 2020 alone, the commission processed 20,149 permits for all drilling categories.⁵⁰ In economics, moral hazard occurs when an entity has an incentive to increase its exposure to risk because it does not bear the full costs of that risk. The low barrier to entry for oil and gas operators has created a moral hazard, and the commission is not assessing risks to the state in advance of approving projects.

Recommended Policy

Tighten operators' eligibility by reviewing financial solvency and environmental compliance when operators file P-5 organization reports and drilling permit applications. If you have a leaking bathtub, then the first step is to turn off the faucet.

The overburdened RRC cannot manage its existing inventory of permitted wells, and adding more to its regulatory plate only compounds the crisis. The permit approval phase also offers an opportunity to review and audit existing permit holders seeking additional permits, or to control the transfer of wells from one permit holder to the next. While current regulations require that existing operators demonstrate compliance with Texas regulations prior to transferring a well, the commission does not scrutinize whether proposed operators will be able to take over plug and abandonment liabilities from current operators. The commission should consider amending its rules and regulations to incorporate this financial capacity test into its transfer approval process.

FINANCIAL SOLVENCY

The commission is the only entity with the legal authority to bestow operator status.⁵¹ The Railroad Commission therefore functions as an environmental bank, extending credit on the resources of Texas to private entities. Just as a bank must evaluate a loan applicant's risk before granting a loan, so too must the commission evaluate a permit applicant's risk before awarding a permit. For new permits, the commission should determine if the applicant already operates in other jurisdictions (including consulting with other state regulators) and audit its solvency, performance, and history in those regions. Private equity and privately held hedge fund fueled shale speculation are behind many of the 2020 oil and gas bankruptcies.⁵² In allowing unfettered access to Texas resources, the commission is complicit in this speculation and accumulation of risk. We recommend that the commission work with the federal government and other state programs to create and operationalize a risk assessment process and a uniform barrier to entry to develop oil and gas resources in the United States.

For existing operators, the commission can employ a metric the oil and gas industry itself uses: Economic Limit (EL). The life cycle of an oil well is dependent upon several variables, but most oil and gas firms use Decline Curve Analysis to estimate cash flow, working interest and EL.⁵³ When the working interest (operating cost) of a well equals the income from production, the economic limit is said to be reached; and then firms decide whether to abandon the well and shut-in production, prolong marginal production if the regulator allows low production thresholds, or divest the well and sell to another firm. Decommissioning represents a liability as opposed to an investment, and so in the absence of regulatory enforcement delaying decommissioning frequently has economic value for the firm since it defers expenditure, while allowing the deferred funds to be invested in productive (profit-generating) activities.⁵⁴ Indeed, pushing the decommissioning of a well further into the future increases the Net Present Value of that well and inflates the value of that company. Divestment of mature assets to avoid asset retirement obligations is a well-recognized and documented industry practice.⁵⁵ This is how a large multinational firm knows when to sell an inventory of less producing wells to smaller companies - with the well's remaining profits going to the new company's executives and shareholders. Rystad Energy, an Oslo-based energy consultancy, forecasts that by the end of the decade, the world's largest oil and gas companies will divest from more than \$100 billion of assets as they adjust to the energy transition.^{56, 57} This practice can also be understood as "fraudulent conveyance,"⁵⁸ where a company intentionally discharges environmental and tort liabilities.⁵⁹ One can anticipate that fraudulent conveyance will also be a strategy companies use to remove carbon off the books as pressure to conform to Environmental, Social, and Governance (ESG) standards increases.

While private companies use EL to avoid liabilities,⁶⁰ so too can the Railroad Commission use EL to determine firm solvency and permit adequacy. The commission collects monthly production data from operators. Indeed, the commission already monitors production decline rates.⁶¹ Using these data, the commission can determine the expected Economic Limit of a well, the Economic Limit of a field, and the Economic Limit of an entire company. This is the bright, red line that the commission has had all along (Figure 5).⁶² Only wells above the equivalent of 2EL would be considered bondable at proper levels (i.e., an amount that would cover the cost of plugging and cleanup). Between 1EL and 2EL, a well would only be considered to have enough production available to pay for partial bonding. Any well below 1EL that an operator has not already bonded to proper levels would be deemed a liability to bonding companies. Income from production past 1 EL cannot fund the wells decommissioning and this period represents the riskiest phase of production for the public.

The timeline and “curve” for EL decline rates are determined by technology, prevailing global prices, and the legality of the activity.⁶³ When you aggregate a company’s whole inventory of wells and determine that collectively the wells are beyond their Economic Limit, the company is itself insolvent. If the appraisal reveals that the firm habitually spins off its assets to less capitalized firms, then the commission should flag the company and deny drilling permit requests. The North Dakota Industrial Commission Oil and Gas Division is currently controlling the transfer of wells and forfeiting bonds using Economic Limit. In recent correspondence with an operator, the state regulator asserts, “Our evaluation shows a lack of economic value sufficient to recoup future plugging and reclamation costs in the wells, for this reason the Commission will not consider a transfer to another operator.”⁶⁴ The commission’s current systems are allowing for the continued practice of fraudulent conveyance. The agency can and should use its regulatory powers and authority to prevent fraud and protect the interest of Texans.

Figure 5: Conceptual representation of the Economic Limit of a well

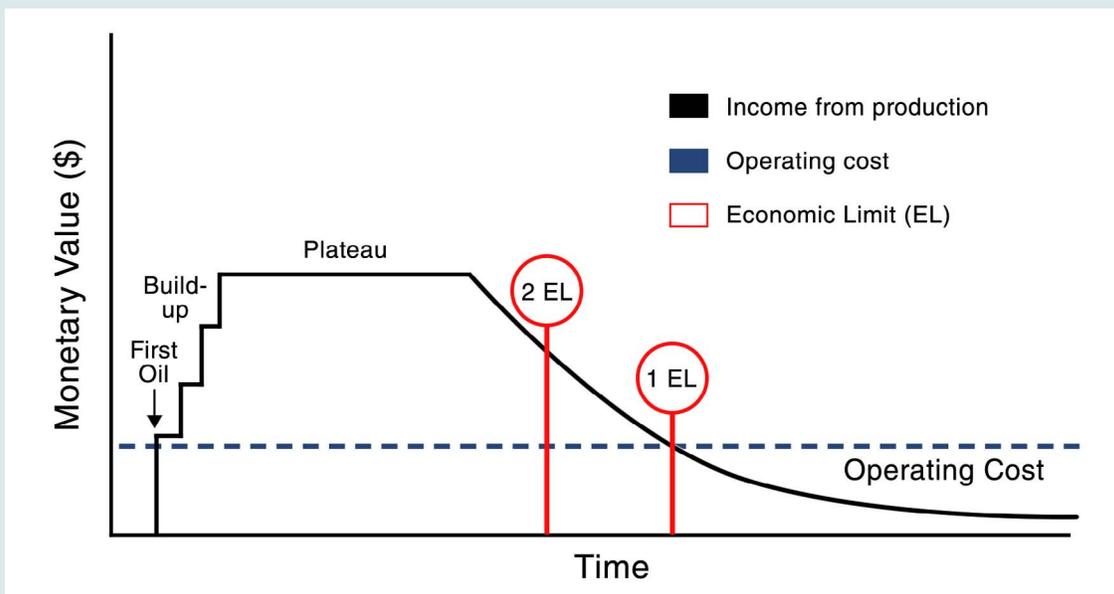


Chart adapted from Höök, M., Davidsson, S., Johansson, S., & Tang, X. (2014). Decline and depletion rates of oil production: A comprehensive investigation. Philosophical Transactions of the Royal Society A, 372, 20120448.

Collect real-time production data. Many oil and gas companies now collect production data in real-time, yet the commission lacks the capability to access this data. These systems monitor production rates as well as wellbore pressure - two critically important metrics for the commission. Currently, operators submit monthly production reports to the commission,⁶⁵ and the state uses that data to determine status of the well, severance tax rates and a host of other regulatory decisions that ultimately influence orphaning rates. By using real-time well data, the commission could ensure that operators are compliant with severance and seal orders and successfully monitor and enforce a well-plugging rule and bonding program based on Economic Limit.⁶⁶ We recommend that the commission require that all wells are outfitted with commission-approved production monitoring systems. This would require the commission to establish a wireless data acquisition program, requiring operators with those systems to share and plug into a new commission platform. Royalty owners, the Texas Comptroller, and the Texas General Land Office all have an interest in determining equitable and true returns.

Require permit applicants to submit their full, undiscounted cleanup liabilities and explain any large variances from the commission's own estimates. Companies maintain balance sheets, and it is in the public interest to shine a light on those balances before anyone approves new drilling permits. We discuss this concept in greater detail in the [Decommissioning Cost Reporting](#) section.

ENVIRONMENTAL RECORD

An operator's observance of statewide rules and federal law are strong predictors of whether the company will also observe decommissioning obligations.⁶⁷ A resourced monitoring and inspection program throughout a well's operating life will mitigate the risks of that well becoming the state's responsibility. We discuss this at greater length in the [Environmental Compliance and Inspections](#) section.

Statutory Revisions and Supporting Resources

Tightening operators' eligibility for P-5 and drilling permit approvals will require some statutory amendments, changes to several railroad commission rules, and potentially some new rules. The commission will likely need to update Form P-4 Certificate of Compliance and Transportation Authority, Form P-5 Organization Report, and Form W-1 Application for Permit to Drill, Recomplete, or Re-Enter.

Collecting real-time production data may require amendments to Texas Natural Resources Code Subchapter C Standard Gas Measurement and Subchapter L Royalty Reporting Standards. The commission will likely need to update Form PR Monthly Production Report, and may need to develop new rules or make amendments to several statewide rules that relate to Form PR.

The commission will also need to revise operators' expectations of the length of time the commission will need to review P-5 reports and drilling permit applications, beyond the typical two to five days.⁶⁸ Establishing Memoranda of Understanding (MOUs) with other state oil and gas regulatory programs would allow the commission to share information and audit firm performance in other state jurisdictions. In order to successfully achieve these reforms, the Railroad Commission of Texas will need a corresponding budget and staffing increase. As of 2020, the commission's total workforce included 873 Full Time Equivalent (FTE) employees. The Administrative Division, which provides risk management services, will need more staff, as will the General Counsel Division, Government Relations Division, Hearings Division, and the Oil and Gas Division. New hires will require skills including forensic accounting, financial modeling, and petrophysical backgrounds to support economic limit modeling.

As a reminder, the commission processed 12,950 horizontal drilling permit applications and 5,500 vertical drilling permit applications in 2020.⁶⁹ The commission's most recent oil and gas division monitoring

and enforcement plan stated that in 2020, 170 inspectors conducted over 347,000 inspections. As one commenter put it, “this is over 2,000 inspections per inspector. Assuming 260 workdays per year, each inspector would have to average nearly 8 inspections per day every single day or nearly 1 per hour of every hour worked.”⁷⁰ The commission must be staffed to its mission, or it will not fulfill its mission. These reforms will also require a pause in new permits until the commission incorporates new thresholds and requirements and the supportive staffing and administrative buildout is complete.

B. Liability

Existing Policy

Texas statute establishes that the duty of a person to plug an unplugged well that has ceased operation ends if the person’s interest in the well is sold or conveyed while the well is in compliance with rules of the commission.⁷¹ The person acquiring the seller’s interest through such a sale or conveyance succeeds the seller as the operator of the well for the purpose of plugging responsibility.

As discussed above, oil and gas companies routinely divest mature assets beyond their economic limit to intentionally avoid asset retirement obligations. Current Texas law encourages this practice and allows operators to “kick the can down the road” to riskier and less capitalized firms. This is sometimes referred to as an asset “moving down the food chain.” As it stands today, Company A can make millions of dollars from one Texas well, and when it has reached its Economic Limit, it can simply sell to Company B. Company B will drain the rest and is less likely to be able to safely plug and abandon that well and restore that site. Texas law encourages fraudulent conveyance and makes the Railroad Commission an active participant in that fraud.⁷²

Both Texas law and the oil and gas industry’s business practices shift the oil and gas industry’s bill for cleanup onto the public - taking from firefighter pensions and school budgets instead of billing the very industry that profited from those resources. These current policies and laws necessarily compound the orphan well crisis Texas currently faces.

Recommended Policy

Apply joint liability retroactively to hold original operators responsible for well plugging and site cleanup along with new operators.⁷³ There is precedent for joint liability of oil and gas wells at both the state and federal level. The state of California holds that “the mineral interest owner shall be held jointly liable for the well if, in the lease or other conveyance, the mineral interest owner retained a right to control the well operations that exceeds the scope of an interest customarily reserved in a lease or other conveyance in the event of default.”⁷⁴ In cases where the restoration costs exceed \$250,000 and the current operator is unable to pay or bankrupt, the state regulator is authorized to pursue prior operators sequentially.

Federally, the Department of the Interior’s Bureau of Ocean Energy Management’s (BOEM) policy is that federal Outer Continental Shelf (OCS) lessees and owners of operating rights are jointly and severally liable and responsible for meeting decommissioning obligations for facilities on leases. This includes the obligations related to lease-term pipelines, as the obligations accrue and until each obligation is met. In other words, all historic operators accrue all subsequent obligations on an existing lease. If Company A sells operating rights to Company B, then Company A is liable for any new infrastructure, pipelines, or wells that Company B installs on that lease. Regardless of what agreements two companies may enter, the contract with the United States federal government remains.⁷⁵ Once an owner accrues decommis-

sioning obligations, it retains those obligations notwithstanding transfer, assignment, or relinquishment of the lease. Indeed, even after an operator plugs and abandons a well, the Bureau of Safety and Environmental Enforcement retains the authority to order a prior operator to “re-abandon” a well if a leak has been detected. In sum, the obligations remain in perpetuity for lessees and operators.

While a “joint and several liability” rule change will free the commission to pursue all prior operators and permit holders, it can create administrative challenges. BOEM, for instance, is agnostic about share of ownership and intercompany contracts. It pursues all debtors to the United States government equally.⁷⁶ The California Geologic Energy Management Division (CalGEM) can proceed with public decommissioning, divide the cost between predecessor operators, and send an equal bill to all prior well operators in the state.⁷⁷ Earlier this year, the Australian government hit all oil producers in the country with a \$200 million dollar levy to cover the cost of removing facilities and cleaning an oil field off northwest Australia, after the small company that owned the project collapsed.⁷⁸ New Zealand has introduced the Crown Minerals (Decommissioning and Other Matters) Amendment Bill,⁷⁹ distinguishing its decommissioning policies as the most robust and comprehensive regulatory program on the planet. In addition to abiding by the polluter-pay principle, imposing trailing liability (joint and several liability), residual liability (liability in perpetuity, meaning that even when a well has been plugged, if it fails the operator is on the hook forever), decommissioning financial securities (bonding and other tools), strict decommissioning requirements, industry provided decommissioning cost estimates, the bill proposed industry wide levies to protect against shortfalls.

There are advantages to all of these strategies. Layering regulatory tools can help to fully protect the public. For example, later in this report we will discuss the need for a Texas-wide “orphan well fee.” Texas, however, is home to one of those most prolific, and therefore populated, hydrocarbon regions on the planet. There is a significant inventory of wells to confront. The commission must embed a polluter pays principle into a regulatory regime that is administratively feasible.

Regan Boychuk of the Alberta Liabilities Disclosure Project has crafted a proposal to equitably administer liability.⁸⁰ Prior operators made considerable wealth from Texas resources and should retain a proportional obligation to their asset retirement obligations (AROs). Indeed, many of those firms continue to enjoy compound interest on those gains, while Texans are left with the compounding debts. Ideally, each predecessor permit holder would be responsible for a share of cleanup proportional to the share of the asset it enjoyed. If a firm produced 40% of a well, then it will be responsible for 40% of that well’s AROs. Sticky AROs boast the simultaneous feature of both “feeling” intuitively fair and being relatively easy to administer. Because the commission retains production data for wells for the purpose of severance tax collection, determining the share of ARO should be a matter of pulling up that data and dividing total production by the time period of each operator. This policy will also have the added benefit of changing firm behavior. Large corporations will be less inclined to fraudulently transfer lower producing wells if sticky AROs obligate them to proportional clean up in perpetuity.⁸¹

Audit operator history for each proposed well transfer and deny the transfer of a well to known bad actors. Just as municipalities can perform a title history on a real estate parcel, so too should the commission be able to trace the full operator history for a well. As the commission carries out this essential audit, it has an opportunity to modernize its own data portals and tools. Commission staff, permit holders, and the general public should be able to easily search and identify data of a well online through intuitive search parameters.

Amend the Form P-5 Organization Report, Form W-1 Application for Permit to Drill, Recomplete or Re-Enter, and all other activity permits into legal instruments and contracts with the state of Texas that state the basic rules and obligations accrued by the permit holder.⁸² Linking plugging and abandonment (P&A) and site restoration obligations to the permit and the individual well, and not simply to the current operator of the well, will help to establish legal clarity and uniform, inescapable obligations. These obligations would need to be applied universally, without exemption and should also include notice of retroactive, current, and future “sticky liability” linked to historic production. There should be no pathways to escape the legal obligation to safely plug and abandon oil and gas wells in the state of Texas.

Statutory Revisions and Supporting Resources

Applying joint liability retroactively will require amendments to Texas Natural Resources Code 89.011, and corresponding changes to Statewide Rule 14. The commission could likely add a new rule requiring an audit of operator history before well transfers without needing to change statute. The commission may also need to update Form P-4 Certificate of Compliance and Transportation Authority.

Turning the organization report, drilling permits, and other activity permits into legal instruments and contracts with the state of Texas could be achieved through amendments to commission rules 3.1, 3.5, and 1.201. Although Texas Natural Resources Code sections 91.114 and 91.142 relate to these commission rules, they do not expressly prohibit the commission from using these permits as legal instruments and contracts. Additionally, the commission will need to update Form P-5 Organization Report, Form W-1, Application for Permit to Drill, Recomplete, or Re-Enter, and other relevant forms.

Aside from statutory changes and rulemakings, the above recommendations will require that the commission issue a “Notice to Operators” informing them of the change. The commission will also need to prepare detailed guidance, education events such as webinars, and prepare for appeals and litigation. In order to successfully achieve these reforms, the Railroad Commission will require a corresponding budget and staffing increase. The commission will need to create a new division and a buildout of the Well Records Research unit to perform “operator history” audits and determine whether they wish to apply joint liability, levy an industry wide fee, or implement Sticky AROs. In any of the above policy regimes, the oil and gas industry will shoulder the costs of the oil and gas industry.

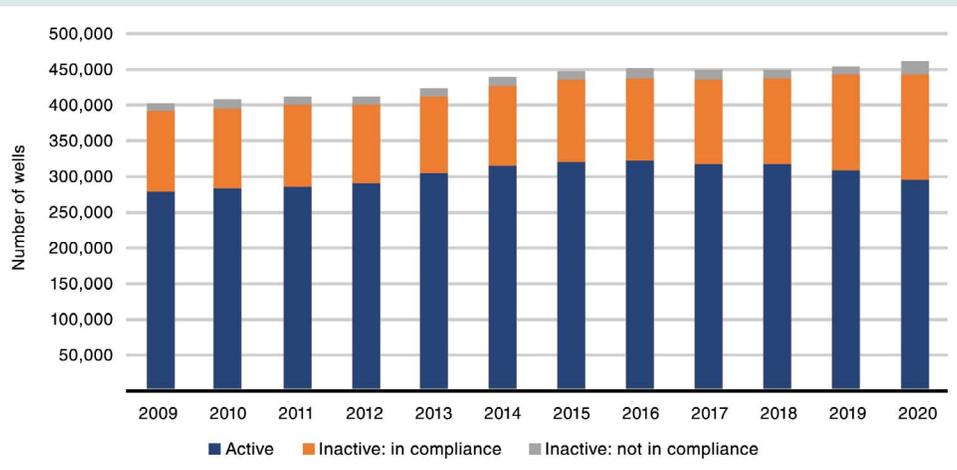
C. Plugging Extensions and Inactive Wells

Existing Policy

In 1923, the commission issued “Oil and Gas Circular No. 13.”⁸³ In addition to rules governing the conservation of oil and natural gas, Article 3 of the circular established unequivocal duties and obligations for the commission, writing: “It shall be the duty of the Railroad Commission...to require dry or abandoned wells to be plugged in such a way to confine oil, gas and water in the strata in which they are found and to prevent them from escaping into other strata, and to establish rules and regulations for that purpose. It is empowered to establish rules and regulations for the drilling of wells and preserving a record thereof, and it shall be its duty to require such wells to be drilled in such manner as to prevent injury to the adjoining property, and to prevent oil and gas and water from escaping the strata in which they are found...”

Today, Texas statute creates an operator obligation and duty to plug and abandon oil and gas wells in the state of Texas,⁸⁴ but P&A and site restoration obligations are currently only a function of the status of the well with corresponding timelines tethered to that status. Shut-in wells are wells that have been shut-in for less than 12 months. Rule 14 requires that plugging operations commence on a dry hole or inactive well within one year of the date drilling or operations cease.⁸⁵ The commission defines “inactive well” as “[a]n unplugged well that has been spudded or has been equipped with cemented casing and that has had no reported production, disposal, injection, or other permitted activity for a period of greater than 12 months.”⁸⁶ The number of inactive wells out of the total well population remained at around 30% from 2009 to 2018, but that percentage increased to about 36% in 2020 (Figure 6).⁸⁷

Figure 6: Unplugged and inactive wells in Texas, not orphaned.



Data sources: Railroad Commission of Texas. Oil Field Cleanup Program Annual Reports.

The commission also allows a company to return an inactive well to “active operation” status, defined as either: (a) 5 barrels each month for 3 consecutive months; or (b) has produced 1 barrel each month for at least 12 consecutive months (Table 2). A gas well is considered active if it produces either (1) 50 Mcf each month for 3 consecutive months; or (2) 1 Mcf each month for 12 consecutive months.⁸⁸

Table 2: Example of active operation for an oil well if the threshold of 5 barrels per month for 3 consecutive months cannot be met.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Production (barrels per month)	5	5	1	1	1	5	5	1	1	1	1	5

Several exemptions and extensions to timelines undermine operators' plugging obligations. Operators are able to indefinitely delay decommissioning. Rule 15 establishes various options for obtaining a plugging extension if the following conditions are met: the commission approves the operator's application for extension (Form W-3X);⁸⁹ the operator has a current organization report (Form P-5) and a good faith claim to operate the well;⁹⁰ the operator is in compliance with all commission rules and orders; and if the well is more than 25 years old, the operator must establish that the well does not pose a potential threat of harm to natural resources, either by a commission-approved fluid test or a hydraulic pressure test. For inactive land wells, the operator must also complete Form W-3C to certify that they have completed the required surface equipment cleanup and removal.⁹¹

In a plugging extension application, an operator need only submit documentation of **one** of the following:⁹²

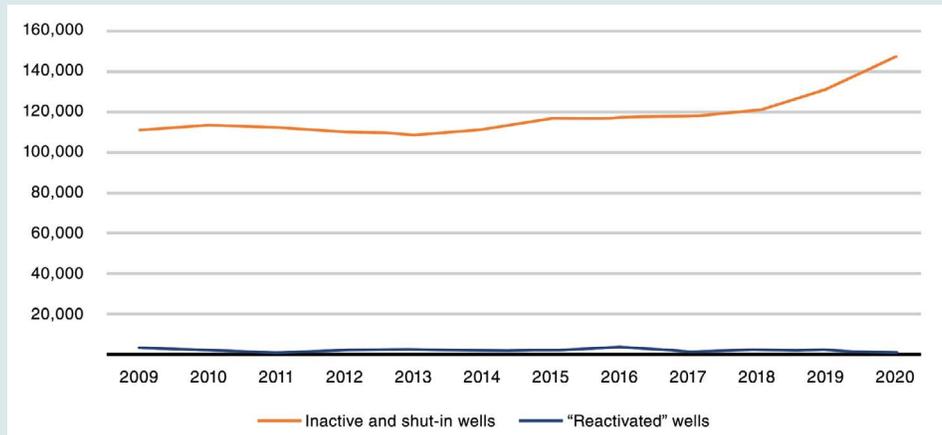
- Plugging or reactivating 10% of the operator's inactive well population in the past year;
- Publicly traded entities:⁹³
 - o A copy of the operator's federal documents accounting for asset retirement obligations;
 - o Filing a blanket bond that is either the lesser of the cost calculation for plugging all inactive wells or \$2 million;
- An approved "abeyance of plugging" report and proof the operator has paid the filing fee; the report must contain a certification from a licensed professional engineer or geoscientists affirming the well has:⁹⁴
 - o Reasonable expectation of economic value greater than the cost of plugging;
 - o Reasonable expectation of being restored to a beneficial use; and
 - o Documentation demonstrating the basis for the affirmation of the well's future utility.
- A statement that the well is part of a commission-approved enhanced oil recovery (EOR) project;
- A successful fluid level test or hydraulic pressure test of the well and proof the operator has paid the filing fee;
- Filed Commission Form W-3X and the commission or its delegate has approved a supplemental bond, letter of credit, or cash deposit in an amount at least equal to the cost calculation for plugging each well in the application; or
- The commission or its delegate has approved an escrow fund deposit in an amount at least equal to 10% of the total cost calculation for plugging an inactive land well.

Only one of the many options above must be satisfied for a plugging extension application to be approved. Two of the financial assurance options allowed in the application process would still allow operators to submit financial assurance less than the cost of plugging. Submitting an "abeyance of plugging" report requires that the expected economic value of the well be "greater than" the cost of plugging, a low threshold that is likely insufficient to ensure an operator would be attracted to reactivate the well. In fact, Railroad Commission data demonstrates that reactivation is a relatively uncommon practice.⁹⁵

The total number of inactive and shut-in wells grew by an average 1% per year from 2009 to 2018.⁹⁶ The rate of growth in inactive wells began accelerating in 2018, by an average 10% per year (Figure 7). A well completion occurs after drilling, and involves the events, equipment, and techniques necessary to bring the well into production.⁹⁷ Recompletion is a process that allows operators to access another zone using the same wellbore.⁹⁸ Re-entry is a similar process, specific to entering a previously plugged well.⁹⁹

Between 2009 and 2020, about 14,000 wells were re-completed,¹⁰⁰ 6,500 orphan wells were taken off the orphan wells list, and another 1,500 plugged wells were re-entered. The number of wells "reactivated" every year is equal to about 2% of all inactive wells. These data indicate that granting repeated plugging extensions under the premise that inactive wells will be "reactivated" may not be worth the risk of environmental contamination, public health impacts, and cost to the state.

Figure 7: Inactive and “reactivated” wells by year.



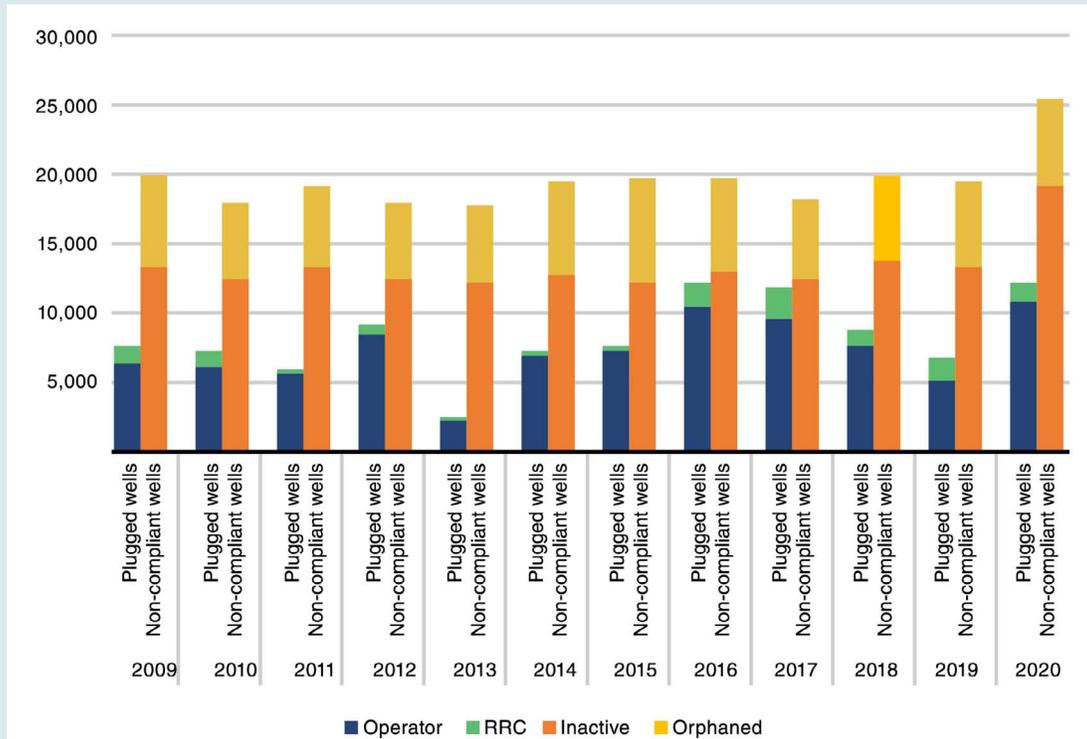
Data sources: Railroad Commission of Texas. Oil Field Cleanup Program Annual Reports.

Operators tend to delay permanent abandonment of wells as long as possible, as money spent later (or not at all) is better than money spent now. Carbon Tracker noted that because Texas allows operators to delay closure of inactive wells in exchange for additional bonding, operators opt to defer closure indefinitely.¹⁰¹ The commission allows companies to file a blanket bond in the amount of the estimated cost to plug all of the operator’s inactive wells or \$2 million, whichever is less.¹⁰² Carbon Tracker collected inactive well data from the Railroad Commission’s website for the 15 largest operators in Texas and determined that the commission’s estimates for P&A costs were 267% too low. Both Carbon Tracker’s estimates and the commission’s in house estimates exceeded \$2 million for each operator. The commission’s Inactive Well policy is a “one-two punch” for risk: 1. Pro-Delay 2. Pay to delay (but the revenue received intensifies the commission’s exposure to the liability).

An independent data analysis courtesy of the Texas Observer and Grist with support by the Pulitzer Center determined that approximately 12,000 Texas inactive wells are nearly statistically indistinguishable from more than 6,000 already on the state’s orphan well rolls.¹⁰³ They predicted that those wells would be orphaned in the next four years. They found that the best metrics to predict whether an operator would orphan a well were time since last production and regulatory compliance. Let’s reconsider the statistic we introduced at the beginning of this report: since 2005, the commission has plugged 19,000 orphaned wells; but during that same time period, companies have orphaned an additional 21,000 wells.¹⁰⁴ Every year, the state plugs orphaned wells, while companies orphan new wells.

Rates of plugging by operators and the commission have oscillated since 2009, but the commission has plugged a growing portion of all plugged wells since 2016 (Figure 8).¹⁰⁵ The number of non-compliant unplugged wells (i.e., those that are inactive and have an operator, and those that are orphaned) remained relatively stable from 2009 to 2019, at just under 20,000 each year. However, that number jumped up to over 25,000 in 2020. Well plugging efforts have failed to reduce the number of non-compliant inactive wells and orphaned wells.

Figure 8: Plugged wells compared to non-compliant inactive and orphaned wells over time.



As it stands, official commission regulations provide various choices and opportunities for operators to indefinitely delay abandonment. The commission’s rules ensconce and encourage indefinite delay and increase the risks of orphaning. Meanwhile, the commission is tightly bound, and required to approve plugging extensions as long as a few simple conditions are met. Although an approved application is required for the commission to be able to grant an extension, the bar is low for required documentation (e.g., amount of financial assurance or economic potential).¹⁰⁶ The commission can only deny an application for a plugging extension if the operator does not have an active organization report at the time they file the application; the operator does not submit all the required filing fees and financial assurances; and the operator has not submitted a signed organization report for the applied-for extension year.¹⁰⁷

The sheer number of exceptions to Rule 15 means that the requirement to plug and abandon within a year of ceasing production does not functionally exist. This awareness is embedded into Rule 15, which establishes criteria that must be met based on the age of the well and the number of years the well has been inactive (Table 1). The inactivity period of each well governs what surface equipment cleanup and removal requirements the operator must meet.¹⁰⁸ If the well is inactive less than five years, the operator is required to disconnect the electricity to that well. If the well has been inactive for at least five years but less than 10 years as of the next P-5 renewal date, then the operator must also purge all fluids from tanks, pipes, and vessels. Any wells inactive for 10 years or longer must remove all surface equipment and related piping, tanks, tank batteries, pump jacks, headers, fences and firewalls; close all open pits; and remove all junk and trash. If the well constitutes a commission-recognized EOR project, the operator may leave equipment intended for future use within the project in place but must still disconnect the electricity and purge the fluids.¹⁰⁹

Table 1: Summary of Rule 15 Inactive Well Requirements.

Years inactive	Operator requirements
< 5 years	Disconnect electricity
5 < 10 years	Purge all fluids from tanks, pipes, and vessels
10 years or more	Remove all surface equipment and related piping, tanks, tank batteries, pump jacks, headers, fences and firewalls; close all open pits; and remove all junk and trash

However, if an operator owns both the subsurface and surface rights of an oil or gas well, they can apply for a plugging extension without affirming that they have emptied or purged all equipment, or that they have removed all equipment from the site and closed all open pits.¹¹⁰ While it stands to reason that the equipment left at the surface may not disturb the surface owner, the failure to purge equipment and close open pits could pose threats to groundwater, air quality, and wildlife.

Recommended Policy

Increase production thresholds that define “active” status for all oil and gas wells. Low production thresholds allow companies to push the decommissioning of a well further into the future, increasing the Net Present Value of that well, and inflating the value of that company. Weber (2021) modeled increasing production thresholds for the state of Pennsylvania and found that an increased and uniform threshold resulted in more uneconomic wells being plugged.¹¹¹ In other words, low production thresholds make uneconomic wells appear economic. Increasing what constitutes economic production would result in market efficiencies, reveal true risks, and force operators to plug languishing wells.

The Railroad Commission defines “marginal wells” as oil wells producing between less than 35 barrels of oil per day (BOPD) to less than 10 BOPD over the preceding 10 days, depending on depth of the well.¹¹² For federal income tax purposes, oil wells producing an average of less than 15 BOPD and gas wells producing less than 90 Mcfd in one year are classified as “Stripper Wells.”¹¹³ Current research finds that, “some stripper wells are venting or leaking 100 percent of the gas they produce,” and that idle and marginal wells could be responsible for as much as “between 5 and 11 percent of methane emissions in the oil and gas production sector.”¹¹⁴ A 2021 study conducted in Pecos County found that half of the 40 measured wells were actively leaking methane.¹¹⁵ If the same percentage of leaking wells were scaled up to all of Texas’ inactive wells, they could be emitting more than 5,500 metric tons of methane into the atmosphere each year, which is equivalent to burning 150 million pounds of coal or putting an additional 23,000 cars on Texas roads. A 2020 study found that women who lived close to inactive wells in rural California were more likely to give birth to underweight and preterm babies.¹¹⁶ The marginal benefits bestowed upon the few owners of these low-producing wells do not justify the mounting costs forced upon our youngest Texans. There is no public benefit to allow operators to delay abandonment through the practice of indefinite marginal production.

In 2020, a Texas company’s tank battery for a shut-in well exploded and killed a child, 14-year-old Zalee Day.¹¹⁷ The child’s family rented a home from the surface right owners and were told that the shut-in well and tank battery were secured and safe enough that the children could have full access to the site. This was not the case, and Zalee died an avoidable death. In Louisiana, the operator was allowed to pay a marginal yearly fee instead of an estimated \$50,000 to plug the well. Indeed, in Texas, the company could pay a \$100 fee for 500 years before reaching that plugging amount. Texas can prevent future deaths by using greater scrutiny before approving plugging extension requests or by eliminating them all together. Along these lines, the commission should consider requiring current shut-in and inactive

wells to be equipped with common sense precautions and required safety standards that should include industrial grade fencing around wells and supporting infrastructure, clear signage that includes warnings, API numbers and date of last production, camera surveillance, and frequent company inspections. Oil and gas infrastructure poses real risks. Fencing and signage are the bare minimum of what the commission should require of operators.

Discontinue plugging extensions. Require plugging and abandonment as soon as production officially ceases. The commission should require operators to file a report six months in advance of the projected last date of production. As explained earlier, operators monitor production decline and depletion rates, while planning and preparing to move equipment and workers offsite. Plugging and abandonment should commence and proceed congruent with wind-down operations. There should be no exception that allows inactive well operators that own both the subsurface and surface rights not to empty and purge equipment and close open pits. Neighboring water aquifers can still be compromised and leaking wells can still menace Texas communities regardless of who owns the surface rights. Resolving these issues will help to reduce risks for these operators' neighbors.

Wells that have a potential "beneficial use" should be employed for that use within 12 months. Operators reactivate wells so seldom that approving plugging extensions indefinitely for this reason is not worth the risk.

It makes more sense to require plug and abandonment when staff and equipment are still at the wellbore site versus the status quo which encourages a company to pack up, delay for years, then maybe return to cleanup. There is no public benefit from allowing private operators to delay their public obligations. There is only accumulating and compounding risk.

Develop a Texas version of the Bureau of Safety and Environmental Enforcement's (BSEE) "Idle Iron" program.¹¹⁸ A Texas "Idle Iron" program would allow the commission to oversee and manage the orderly and timely decommissioning, plugging and abandonment of the state's current inventory of 142,000 inactive and shut-in wells.¹¹⁹ This would include a physical investigation of all inactive wells within two years and the establishment of a minimum 5-year-deadline to plug all inactive wells, ensuring the orderly and managed decommissioning of the inactive well inventory.¹²⁰ BSEE currently uses the economic limit of a well to determine whether a well is "capable of production in paying quantities," a common excuse to forestall plugging and abandonment activities. It is unlikely that even a fraction of these "stripper" wells is capable of production in paying quantities, and it is more likely that the bulk of the inactive well inventory will be required to begin mandatory decommissioning activities.

Statutory Revisions and Supporting Resources

The Railroad Commission can amend Rule 15 production thresholds that define "active operation" without needing a statutory change per Texas Natural Resources Code section 89.023.

Amending and discontinuing plugging extensions and requiring plugging and abandonment as soon as production is officially ceased would require statutory changes in Texas Natural Resources Code sections 89.023 to 89.030. Subsequently, the Railroad Commission would need to revise Statewide Rules 14 and 15, Form W-3X Application for an Extension of Deadline for Plugging an Inactive Well, and Form W-3C Certification of Surface Equipment Removal for an Inactive Well.

In order to implement a Texas "Idle Iron" program, the Railroad Commission will require a corresponding budget and staffing increase. The commission will need to issue a "Notice to Operators" alerting permit holders of the rule and form changes.

II. Paying for plugging and site cleanup

A. Financial Security

Existing Policy

Since 2004, the Texas Legislature has required that all oil and gas well operators provide financial assurance to cover a portion of the cost to plug the well and remediate the site, should the operator go out of business.¹²¹ Each Texas oil and gas well operator should submit and maintain financial security in the form of a performance bond, letter of credit, or cash deposit for the purpose of assuring that the operator will plug and abandon wells and control, abate, and clean up pollution associated with its operations and activities.¹²² There are two options available to operators. The first option is an individual performance bond, letter of credit, or cash deposit that is only available to organizations that have no activities other than operating oil and gas wells. The amount to be filed under this option is calculated by multiplying the depth of all wells by \$2.00 per foot.

The second option available to operators are blanket performance bonds, letters of credit, or cash deposits. These instruments are typically referred to as 'blanket bonds' because they allow operators to bundle wells and bond them in one single basket:

- a. 0 to 10 wells - \$25,000 bond
- b. 11 to 99 wells - \$50,000 bond
- c. 100 wells or more - \$250,000 bond
- d. Bay and Offshore wells - \$60,000 bond

In the current market, surety companies are offering Texas operators bonds at an annual of 0.75% to 3% of the total bonding required.¹²³ Operators with bad credit may pay premiums of up to 20% of the required bond value. For example, an operator with 80 wells is required to hold a blanket bond worth \$50,000. At a typical 2% premium, they would pay a surety company a total \$1,000 per year to bond all 80 wells.

The state of Texas would not be facing an escalating orphan well crisis if current financial security instruments were sufficient. The state of Texas would not be lobbying the federal government via the Interstate Oil and Gas Compact Commission (IOGCC) for federal dollars if these financial instruments were adequate.¹²⁴ Bond revenue collected in 2015 reportedly covered less than 16% of the actual plugging costs.^{125, 126} Something needs to change.

SECURITIZATION OF AGING FIELDS

In the last few years several companies have begun creating tailored financial products to “securitize” oil and gas wells and partition part of those assets into tradable financial products. These products have the explicit purpose of capitalizing on depleted oil and gas fields and exploiting lax American regulation.¹²⁷ Securitization allows the “owner of cash flow-producing assets packages some of those assets and transfers them to a newly-formed, bankruptcy remote, special purpose entity, or “SPE.” The SPE then issues notes in a private placement or public offering. The notes are secured by the SPE’s assets but are non-recourse to the sponsor. The proceeds received by the SPE from the notes’ issuance are then transferred to its parent sponsor company in exchange for the transferred assets.”¹²⁸ These products allow companies to partition up ownership of a well or a field into discrete, tradable financial instruments. Because they are “bankruptcy remote” they are legally outside of the reach of bankruptcy courts, and perhaps the Railroad Commission.

A Note on Surety Companies

“Increase the bonding” has emerged as the clarion call of the American orphan well crisis. While this is an important and necessary policy that must be enacted nationally, there are other dynamics at play. First, bonding is only one public policy tool appropriate only to a category of wells. For wells beyond their economic limit or legacy wells, only increasing bonding may still prove inadequate. Bonding is a complimentary policy tool to a whole palette of tools. Second, the surety market that provides securities to the oil and gas industry is due for a risk assessment.

In an objection to a Chapter 11 filing by offshore oil and gas operator Fieldwood Energy, several insurance companies (who hold millions in decommissioning bonds for Fieldwood) assert, “Confirmation of the [Chapter 11] Plan would set a dangerous precedent for bonding in the Gulf. If sureties have no reasonable expectation that the purchaser of a debtor’s valuable assets in a bankruptcy chase will be required to post its own replacement bonds in order to acquire and operate oil and gas assets but instead can leave the debtor’s surety bonds in place post-confirmation, effectively leaving the surety on the hook while stripping them of their bargained for indemnity rights,¹²⁹ it is likely that surety capacity for such bonding will be severely constrained going forward. It will not only directly result in a chilling of the surety marketplace but will cause serious detrimental impact to the oil and gas upstream sector, which heavily relies on surety bonding to operate.”¹³⁰ In a July 2021 filing, lawyers for the insurers said in court papers asserted that any agreement that allows Fieldwood to rearrange its debt and kick it back to the surety companies would have disastrous consequences, “There is a high likelihood that sureties will exit the market altogether. This would lead to a crumbling of the oil and gas industry, as bonds are required to operate.”¹³¹

There is a real risk that third party insurance companies will exit the oil and gas bonding market entirely.¹³² If that happens, the Railroad Commission needs to have a plan in place to hold the industry accountable to its asset retirement obligations.

The New Mexico State Land Office published a report in April 2021 that estimates the state is holding just \$201.42 million in “financial assurances” versus an \$8.3 billion total price tag for closure and cleanup of roughly 25,000 wells on state and private lands.¹³³ The oil and gas industry’s “insurance coverage” for cleanup of its activities on state trust and private lands in New Mexico is a minuscule 2.4%. We recommend that the Railroad Commission of Texas grant access to its own records for a third-party audit on the total spread of bonding and liabilities. We recommend that the Railroad Commission contract out a study on the health of the bonding market and third-party bonding companies. This study will assess the strength of decommissioning insurance markets and provide necessary context for future policy decisions.

Diversified Gas & Oil, an Alabama-based producer that is publicly traded on a submarket of the London Stock Exchange and controls more than 69,000 gas wells across the United States, is currently expanding into Texas.¹³⁴ The company is one of many firms using oil and gas well asset-backed securities, similar to mortgage-backed securities, to access novel capital. Diversified assets “aren’t mortgage loans, but rather oil and gas wells — specifically, a 22% interest in its portfolio — which mostly consists of shallow, conventional gas wells peppered with a growing [portfolio of shale wells].”¹³⁵ Diversified’s innovations as an operator include taking advantage of the state program’s low “active” production thresholds and prolonging the life of stripper wells indefinitely, ostensibly making those plugging liabilities disappear on their balance sheets, and immediately boosting the company’s Net Present Value. While marginal producing wells create enough cash flow to issue shareholder dividends, many critics worry companies like Diversified will not meet their decommissioning obligations. In a Bloomberg investigative piece on the company, Ted Boettner of the Ohio River Valley Institute remarked, “The model seems like it’s built on abandoning those assets. It looks like a liability bomb that’s destined to explode.”¹³⁶

This is an emerging and evolving market that will create added complexity in reining in an industry with an already overdue bill.

Recommended Policy

Eliminate the use of blanket bonds. Commission Shift has demonstrated that blanket bonds reduce the effective bond rate amount per well for operators with larger well counts in the state and create a gap between bonding and actual liability.¹³⁷ If a permit holder has a bond for ten wells for \$25,000, then each well is bonded for \$2,500. This represents an obvious shortfall, considering the average cost for the commission to plug a well in 2020 was \$21,000.¹³⁸ But if a permit holder has 400 wells bonded at \$250,000, then each well is bonded for just \$625 (an even more glaring shortfall). It is as if a commercial real estate owner is only required to take out one single insurance policy for all of its properties. No banks holding those mortgages would shoulder that type of risk, and yet that is the precise bargain blanket bonds entail for Texas. When one follows the simple arithmetic logic of blanket bonds, it is no mystery on why and how the state wound up with such a bonding shortfall. The continued practice of blanket bonds outsources the oil and gas industry’s risks onto the people of Texas. Each and every oil and gas well must possess its own financial security equal to its actual liability.

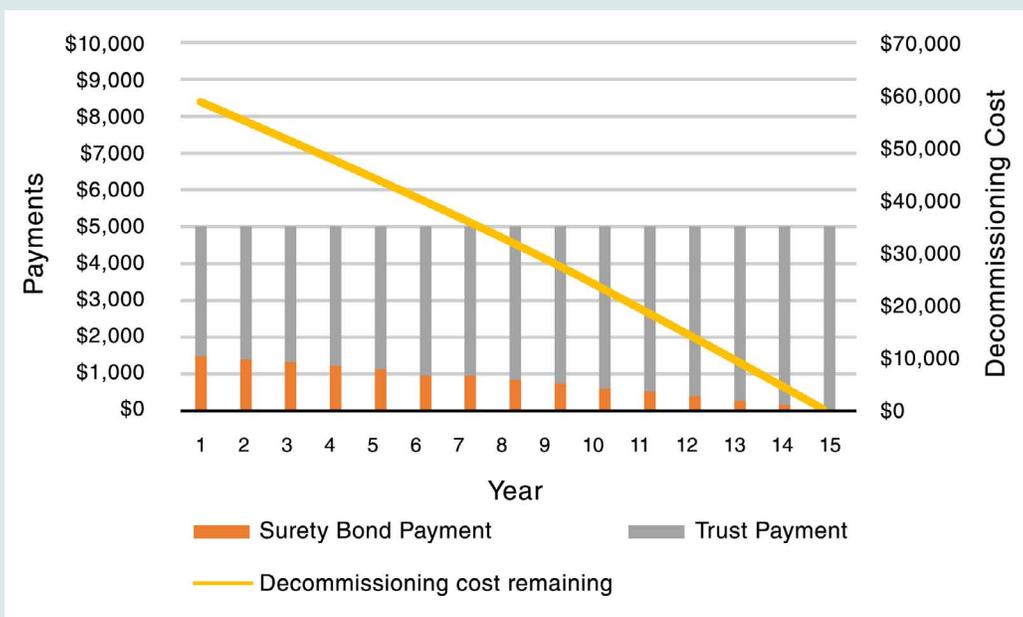
Require individual, sinking trust funds (bankruptcy remote) with the commission as beneficiary for each permitted well. A trust fund is an arrangement whereby the operator deposits sufficient funds for regulatory compliance with an independent trustee, such as the Texas Treasury Safekeeping Trust Company (TTSTC)¹³⁹ The trustee then bears legal responsibility for managing the fund for the benefit of the regulatory authority in accordance with the designated terms of the trust, which include the mandated disposition of the funds for plugging and abandonment. Since 2015, 129 Texas-based oil and gas companies have filed bankruptcy, more than all other states combined, and their combined debt is more than \$117 billion.¹⁴⁰ Often these bankruptcy cases put the state of Texas hat in hand and in line behind other secured creditors. The creation of sinking trusts will ensure that real money is being put aside for future asset retirement obligations and that those funds will be beyond the reach of bankruptcy processes. Once established, the trust fund cannot be terminated without the consent of both the trustee and the beneficiary, in this case the Railroad Commission of Texas.

The permit holder can choose either a lump sum payment upon establishment of the trust that reflects the full costs of decommissioning or pay an annual payment into the fund until it reaches the full cost of decommissioning. Everyone should set aside a little bit each month for retirement. It’s time the oil gas industry is forced to prepare for the inevitable as well.

Require permit holders opting for an annual trust fund payment to purchase a full cost surety bond for each individual well. The surety bond required amount is gradually reduced as the amount in the trust fund with annual payment increases (Figure 9). The two accounts are inversely proportional to minimize the state's exposure to the well's risks. The less funds in the trust fund, the more surety that is required. As the holdings in the trust fund increase, the required annual bonding amount also decreases.

A way to think about this arrangement is a home mortgage and mortgage insurance: the trust fund payment is the mortgage payment a homeowner makes each month, and the bonding is the insurance on that mortgage that protects the lender (e.g., the state of Texas) from borrower (operator) default. This metaphor has two caveats: first, unlike your personal home, Texas operators make money every month from which they can draw upon to set aside inevitable retirement costs. Second, residential real estate has the potential to appreciate in value, meaning the risk to the lender can actually decrease over time. But oil and gas wells are always depreciating in value, so the risk to the lender (the permit issuer) also increases over time. These combined requirements will push the risks back to the operator where they belong and protect the people of Texas.

Figure 9: A hypothetical example of a sinking trust fund with full cost bonding.



Assumes a total decommissioning cost of \$65,000, an initial trust payment of \$2,500, a surety bond rate of 2.5%, and a 15-year term.

Statutory Revisions and Supporting Resources

Current statute allows the commission to set bond amounts that exceed minimum bonding amounts established in statute.¹⁴¹ Nonetheless, Texas statute would need to be revised to eliminate blanket bonding required to file an organization report and the \$2 million blanket bond that publicly traded companies may file with an application for a plugging extension. Corresponding changes would be needed in state-wide rules 15 and 78. The commission would retire Form P-5PB(2) Blanket Performance Bond and Form P-5LC Irrevocable Documentary Blanket Letter of Credit.

The commission would also need to issue a “Notice to Operators” alerting permit holders of the rule change and the new sinking trust fund and full cost bonding requirements described above. The above recommendations will require the commission’s General Counsel to draft new language and promulgate rules that the legislature may need to approve. To successfully achieve these reforms, the Railroad Commission will need a corresponding budget and staffing increase. The commission will need to develop new forms, processes, and tracking systems to implement the new financial security system which will include identifying independent trustees to manage well decommissioning trusts. The commission will also need to prepare detailed guidance, education events such as webinars, and prepare for appeals and litigation.

B. Decommissioning Cost Reporting

Existing Policy

In order to delay plug and abandonment activities, operators must pay a small fee and provide additional security for those wells.¹⁴² Operators use a formula prescribed by the commission to submit a cost estimate for plugging these inactive wells. The “cost calculation for plugging an inactive well” is based on well depth and average actual plugging costs for wells plugged by the commission.¹⁴³ The commission does not require operators to submit actual costs following a plugging and abandonment of an inactive well.

The commission’s bonding rates are based upon estimates from state funded plugging and abandonment operations, which are a narrow subset of total wells plugged in the state. Meanwhile the cost for the commission to plug wells has more than doubled between when the bond amounts were set in 1991 and when the Sunset Commission evaluated the program in 2017.¹⁴⁴ In 2018 and 2019 the commission’s state managed well plugging program plugged 1,364 and 1,710 wells respectively.¹⁴⁵ In 2020, the commission plugged 1,477 abandoned wells.¹⁴⁶ Because the “Orphaned Well Plugging Prioritization Methodology” prioritizes certain kinds of wells and because there is currently a narrow subset of approved oilfield service contractors engaged in the state plugging program - these estimates likely represent only a partial distribution of costs. Additionally, modern wells accessing unconventional shale horizons tend to be much deeper than the conventional wells of the past, increasing plugging costs.¹⁴⁷ Because these estimates will inform recommended trust funds and full cost bonding amounts, it is imperative that they reflect current market rates and actual costs oil and gas companies pay to plug wells.

Recommended Policy

Issue a Decommissioning Costs Reporting Rule to inform bonding and trust requirements. This would involve issuing a “Notice to Operators” ordering all well permit holders to submit full bid data, plug and abandonment costs and site restoration costs to the commission following the completion of private plugging and abandonment and site restoration work. The U.S. Department of the Interior’s Bureau of Safety and Environmental Enforcement’s (BSEE) Decommissioning Costs Rule already does this for federal wells on the Outer Continental Shelf.¹⁴⁸ Because BSEE estimates inform BOEM’s bonding requirements, the rule was issued to keep those bonding amounts current and reflect current decommissioning market costs. The rule requires that lease holders report expenditures for plugging wells, removing platforms and other facilities, and clearing obstructions from sites. This rule also provides a mechanism to confirm verification that the site is clear of obstructions, which also serves as a photographic record for the status at time of plug and abandonment. This record proves useful in the monitoring of these sites. In addition, the final rule authorizes BSEE to require additional supporting information regarding specific decommissioning costs on a case-by-case basis.

Incorporate decommissioning data into a public database that informs the commission’s own “cost calculation for plugging an inactive well” maintained for the commission’s State Managed Well Plugging and Cleanup Program. The commission will maintain and monitor decommissioning cost trends to maintain and update appropriate bonding and trust estimates. There will be an interim period before the commission has adequate data to inform onshore bonding rates. In addition to seeking out bids and full cost decommissioning cost data from other state and federal agencies, the commission should consider consulting with third-party insurance companies and engineering estimation firms to improve estimates and bonding rates.¹⁴⁹ These solutions will help to ensure a fully independent and transparent process for estimating well cleanup costs with scheduled lookbacks on estimates and actual costs.

Statutory Revisions and Supporting Resources

Issuing a Decommissioning Costs Reporting Rule to inform bonding and trust requirements would require permit applicants to submit their full, undiscounted cleanup liabilities and explain any large variances from the commission’s own estimates. Using these data to inform the commission’s own cost calculation estimates for plugging inactive wells would require changes to statewide rules 15 and 78. The statutory definition of the commission’s cost calculation may need to be changed if the commission determines that the costs of plugging should not be based solely on depth of the well.¹⁵⁰ Changes to statute may be needed to the extent that these liabilities factor into financial assurance requirements. The commission may need to update Form W-1 Application for Permit to Drill, Recomplete, or Re-Enter and the Form P-5LC Irrevocable Documentary Blanket Letter of Credit.

The commission will need to create a new form and uniform process for permit holders to submit decommissioning cost data, bid data, site restoration photos, video and precise geographic coordinates. Operators should have the ability to report categorized costs itemized by activity. For bay and offshore wells, we recommend that the commission enter a Memorandum of Understanding (MOU) with BSEE, to formalize the sharing of decommissioning cost data for shallow OCS leases like Texas permitted sites. BSEE already has years of data ready to inform updated full cost bonding requirements. The commission could also consider entering into a similar data sharing arrangement with neighboring state agencies and relevant federal agencies including the Louisiana’s Department of Natural Resources, the New Mexico Oil Conservation Division, and the Bureau of Land Management.

In order to successfully achieve these reforms, the Railroad Commission will need a corresponding budget and staffing increase.

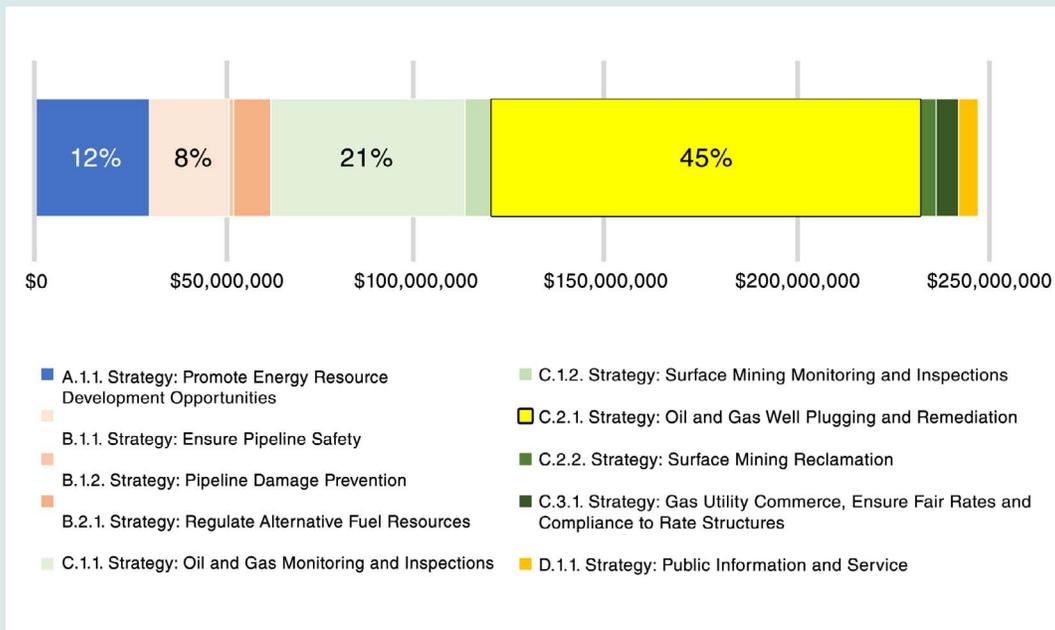
C. State Funding

Existing Policy

The Texas Legislature meets every two years to appropriate funds for the next two years (“biennium”). The state appropriations bill, Senate Bill 1, defines which accounts will fund each state agency’s strategic goals. The bill also defines Performance Measure Targets for each goal.

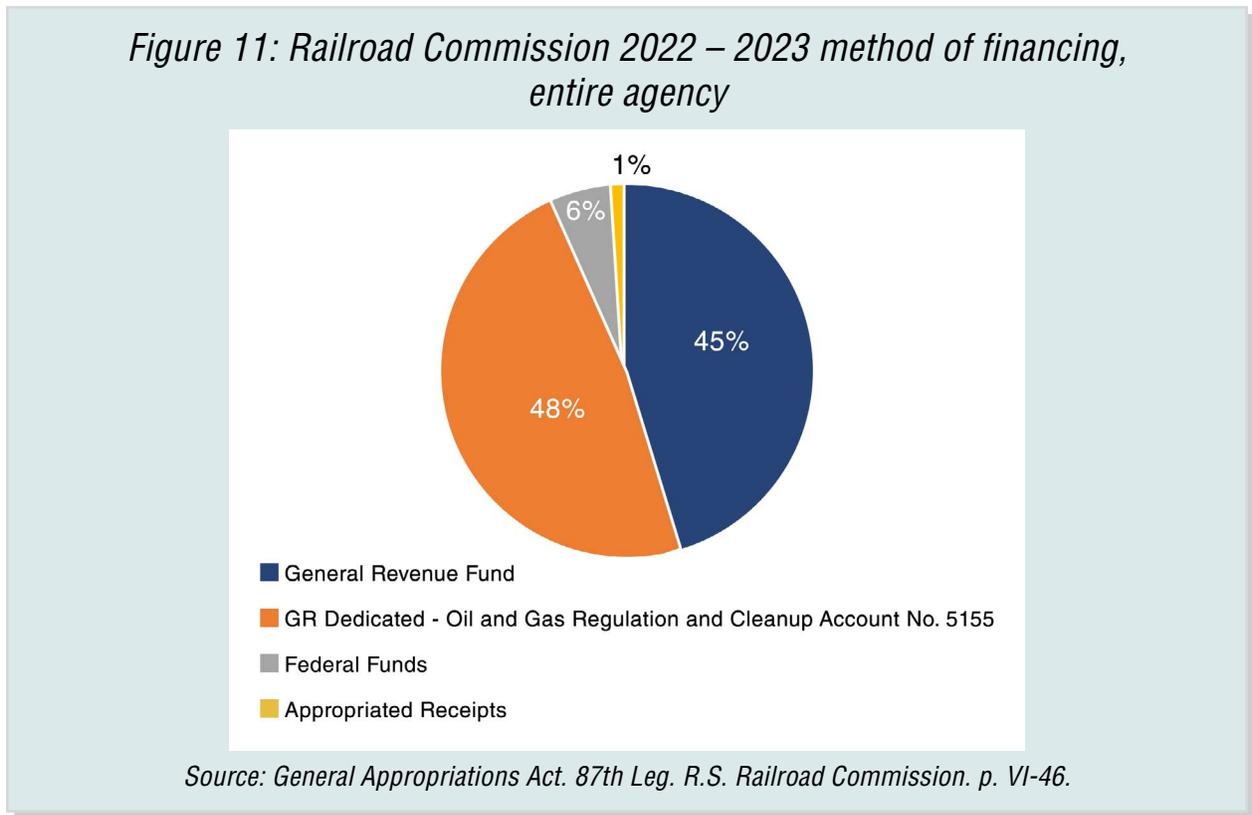
For the 2022 – 2023 biennium, the Railroad Commission was allocated approximately \$124 million per year.¹⁵¹ Out of this, approximately \$56 million per year will be allocated for well plugging and remediation activities for the RRC’s Oil Field Cleanup Program. The commission’s goals include plugging 1,000 wells per year and conducting cleanup activities on 200 sites per year. Cleanup activities may include investigations and assessments, aside from actual remediation. Well plugging and site remediation make up 45% of the commission’s budget (Figure 10), the most expensive strategy in the agency’s budget. In 2020, 82% of expenditures for oil field cleanup activities were spent on contractors.¹⁵² Oil and gas monitoring and inspections make up the next largest strategic expense, at only 21% of the agency’s budget.

Figure 10: Railroad Commission appropriations by strategy, 2022 – 2023 biennium.



Source: General Appropriations Act. 87th Leg. R.S. Railroad Commission. p. VI-46.

The largest method of financing the commission’s budget is through the oil and gas regulation and cleanup fund, which supplies 48% of the agency’s budget (Figure 11). The General Revenue Fund supplies nearly the same amount, at 45%.



The Oil and Gas Regulation and Cleanup Fund (OGRC) is a General Revenue Dedicated (GR-Dedicated) account that collects fees and penalties from the oil and gas industry.¹⁵³ A list of total revenue collected in 2020 from each fee and penalty category is provided in Appendix B. GR-Dedicated accounts are part of the General Revenue Fund but are intended to fund a specific purpose. However, because they sit within the General Revenue Fund, unallocated funds in the GR-Dedicated accounts can be used to certify the state’s budget. As such, GR-Dedicated accounts are routinely underspent for their intended purpose.¹⁵⁴ In 2018, the Legislative Budget Board identified the OGRC fund as one of the top 10 GR-Dedicated accounts with unspent funds used to certify the state’s budget.¹⁵⁵

Some taxes, fees, and penalties the commission assesses are deposited to the General Revenue Fund and not the OGRC.¹⁵⁶ These include the Gas Utility Pipeline Tax, coal industry permit fees and bonds, and registration fees from liquefied petroleum gas, compressed natural gas, and liquefied natural gas operators. A complete list of revenue sources and amounts collected by the Railroad Commission and deposited to the General Revenue Fund are listed in Appendix C.¹⁵⁷ In 2021, total commission-related revenues to the General Revenue Fund were approximately \$70 million (Table 3). About \$66 million was noted as “agency unappropriated receipts swept by the comptroller” resulting in a net revenue of \$3.7 million. These \$66 million in swept funds are greater than the amount the commission was appropriated from the General Revenue Fund for FY 2022, indicating that some oil and gas related revenue is being used by the comptroller to fund other expenses in the state.

Table 3: Comparison of revenues and appropriations to the RRC from the OGRC and the General Revenue Fund.

Revenue/Expense	Amount
2021 OGRC Revenue	\$86,266,207
2022 Appropriations to RRC from the OGRC	(\$59,021,334)
Difference	\$27,244,873
2021 RRC Revenue to General Revenue Fund	\$70,031,906
2022 Appropriations to RRC from the General Revenue Fund	(\$56,981,392)
Difference	\$13,050,514

Sources: General Appropriations Act, 87th Leg. R.S. Railroad Commission, p. VI-46. and Texas Comptroller of Public Accounts Data Visualization Dashboard.

Per Senate Bill 1, the General Appropriations Act, the commission is required to conduct a study on the oil and gas regulation and cleanup fund revenue streams.¹⁵⁸ The study is due September 1, 2022. The Act requires the commission to “present the information to the Legislative Budget Board and make recommendations about any regulatory or statutory changes needed to assure adequate revenues for the commission. The assessment must examine both well bonding and fine levels, as well as permit fees.”

In addition to the study required in Senate Bill 1, House Bill 3973 established a joint interim committee to study abandoned oil and gas wells in Texas and the use of the oil and gas regulation and cleanup fund.¹⁵⁹ The joint interim committee must report the committee’s findings and recommendations to the legislature by December 1, 2022.

Recommended Policy

Revise fees and surcharges deposited to the oil and gas regulation and cleanup fund and the General Revenue Fund. Bonding is just one tool appropriate only to a category of wells. For wells beyond their economic limit or legacy wells, increased bonding will do nothing. The State Managed Well Plugging and Cleanup Program is still needed for currently orphaned wells, current under-bonded wells beyond their economic limit, and previously plugged wells that have failed. As required by the General Appropriations Act of the 87th Legislative Session, the commission will “conduct a review of the different sources that contribute revenues into the Oil and Gas Regulation and Cleanup Fund, as well as expected revenues going forward through 2025 based on its existing fee and fine structure, and review both their rules and statutory caps that determine the amount of those fees and fines.”¹⁶⁰ Importantly, the commission should consider not only the funding needed to achieve the performance metrics established by the legislature for the commission, but the ideal amount of funding needed to meet a higher threshold of service to the public. In addition, the commission should review fees, taxes, and penalties that are deposited to the General Revenue Fund, and explore whether those fees should be deposited to the OGRC Fund instead (Appendix C).

Pending the results of the commission’s study, the legislature should consider increasing the oil-field cleanup regulatory fees on oil and gas to facilitate a faster pace of plugging and site cleanup of these liabilities. Potential federal funds granted to Texas may help to augment the commission’s budget available for these activities; these federal funds should be taken into consideration, but only for the limited time that they will be available.

Convert the OGRC Fund into a trust fund, separate from the General Revenue Fund. The OGRC Fund is currently a General Revenue-Dedicated account. As such, rather than appropriating all the funds available in the account for its intended purpose,¹⁶¹ the legislature has left a high balance in the fund at the end of each biennium, used to certify the state's budget. The Texas Emissions Reduction Plan (TERP) Fund was also a GR-D account, and had been used in a similar fashion, with over \$1.7 billion left in the account at the end of FY 2017 to certify the state's budget.¹⁶² In 2019, the TERP Fund was converted to a trust fund outside the state treasury, administered by the Texas Commission on Environmental Quality as a trustee.¹⁶³ Now, the fund may only be used for its intended purpose, and does not require appropriations for its use.¹⁶⁴

Statutory Revisions and Supporting Resources

Revising fees deposited to the OGRC and the General Revenue Fund would require statutory changes. The commission is already authorized to levy surcharges up to 185% of the fee that is imposed. Depending on the results of the commission's study on fees and surcharges, this statutorily imposed cap may need to be changed. Subsequently, rules that specify the amount of each fee that must be submitted with commission forms will need to be amended.

Converting the OGRC fund into a trust fund would require statutory changes. Likely no rule changes would be needed at the commission. The commission may require additional staffing with appropriate competencies to administer and report on the activities of the trust fund.

D. Taxes, Exemptions, and Incentives

Existing Policy

Current tax treatments of oil and gas activities in the state of Texas incentivize delay and orphaning and reward wasteful and polluting industry practices. They are also the low hanging fruit for recouping the mounting bill for the industry's discarded wreckage.

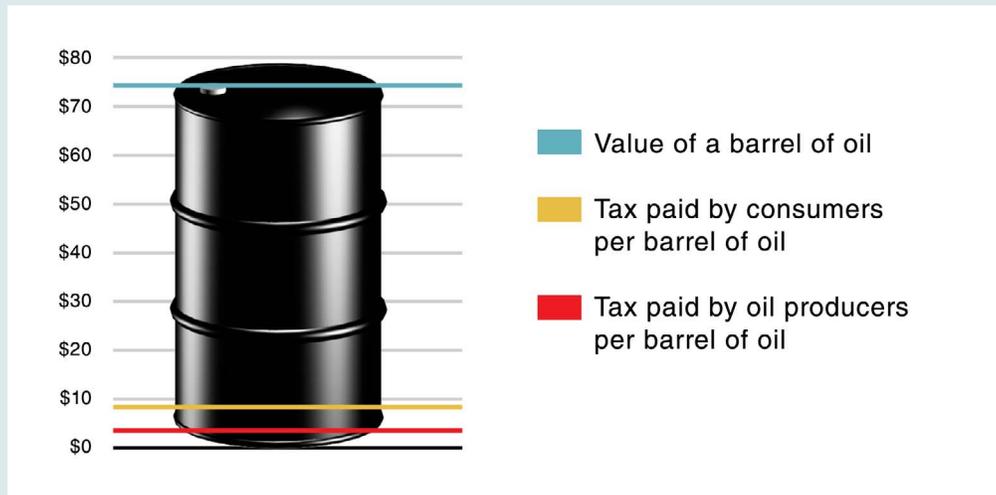
Texas is home to one of the most regressive tax codes in the nation,¹⁶⁵ with the poorest residents shouldering a larger proportion of their earnings towards state coffers than well capitalized companies. For instance, the state's sales tax is a base 6.25%, but can be as high as 8.25%.¹⁶⁶ Meanwhile most businesses in the state are subject to a franchise tax of just one percent, or a rate of 0.575 percent if the business can demonstrate revenues less than \$10 million. The Texas Comptroller found that "sales and use taxes are the state's single largest source of tax revenue, raising about 59 cents of every state tax dollar in fiscal 2020."¹⁶⁷ In addition to this inequitable tax policy are a host of specific tax exemptions and tax credits specifically for oil and gas producers that undermine any efforts to contain the orphan well crisis and the mounting liabilities they represent.¹⁶⁸ Not only does Texas law encourage operators to delay abandonment, but operators are paid to do so.

TAXES

Much is made of the revenues oil and gas production brings to the state. Let's examine the magnitude and sources of these revenues. The oil production tax is a severance tax on the removal of crude oil from Texas land. The tax rate is 4.6% of the oil's taxable market value or 4.6 cents for each barrel of oil produced in the state, whichever is greater.¹⁶⁹ The rate has remained unchanged since 1951, longer than for any other major state tax.¹⁷⁰ Revenue from the oil production tax for fiscal year 2021 was \$3.45 billion. Meanwhile consumers pay a flat 20 cent tax per gallon on gasoline sold in Texas,¹⁷¹ which net the state \$2.6 billion in 2021. There are 42 gallons in a single barrel of oil, at current prices of roughly \$75

per barrel producers pay roughly \$3.45 per barrel while Texas consumers pay \$8.40 in tax for that same barrel (Figure 12). Texas residents pay more tax on oil than Texas oil producers. When you consider that in 2021, Texas consumers paid \$149 million more in motor fuel taxes than producers did in oil production severance taxes (Table 4), it's hard to not take the industry's claim to public funding with a grain of salt.

Figure 12: At current oil prices, consumers pay more than double the tax that producers pay per barrel of oil.



Sources: *Tex. Tax Code. § 202.051. (1982) and Tex. Tax Code § 162.102 (2004)*

Natural gas production is taxed as part of Texas' severance tax structure, which taxes the removal of natural resources from the state at a 7.5% rate.¹⁷² Revenue from this tax for fiscal year 2021 was \$1.6 billion. The gas utility pipeline tax brought in \$59 million to the General Revenue Fund in 2021 and is based on gross receipts by gas utilities and is ultimately charged back to consumers. This is also the primary source of commission revenue that is deposited in the General Revenue Fund (Appendix C). Meanwhile, Texas consumers in just under 800 Texas cities pay a sales tax of at least 6.25%¹⁷³ on their residential use of natural gas.¹⁷⁴

In total, oil and gas production related revenue constituted only 2.9% of the state's total revenue in FY 2021 (Table 4). Producers claim to fill the state's coffers, but Texas consumers supply over 40% of oil and gas related tax revenue to the state.

Table 4: Fiscal year 2021 oil and gas-related revenue to the state budget, in millions of dollars.

Category	Consumer pays?		2021 Total Revenue
	No	Yes	
Land Income	\$2,067		\$2,067
Licenses, Fees, Fines, and Penalties	\$104		\$104
State Energy Marketing Program	\$70		\$70
Subtotal - Non-tax revenue	\$2,241		\$2,241
Natural Gas Production Tax	\$1,569		\$1,569
Gas Utility Pipeline Tax		\$59	\$59
Oil Production Tax	\$3,449		\$3,449
Oil Well Service Tax	\$72		\$72
Motor Fuel Taxes		\$3,598	\$3,598
Subtotal - tax revenue	\$5,089	\$3,657	\$8,746
Total, oil and gas related revenue	\$7,331	\$3,657	\$10,987
Total State Revenue			\$379,449
Oil and gas related revenue as a percent of state revenue			2.9%
Value of oil and gas related tax exemptions or incentives*			\$296

Data source: Texas Comptroller of Public Accounts. Table Notes: Land Income includes only oil and gas related income. Motor Fuel Taxes include the Gasoline Tax, Diesel Fuel Tax, and Liquefied and Compressed Natural Gas Tax

**Exemptions and incentives reflect amounts claimed through July 14, 2021.*

EXEMPTIONS AND INCENTIVES

There are a variety of crude oil and natural gas production tax exemptions, direct incentives, and sales tax exemptions that exclusively benefit Texas oil and gas producers.¹⁷⁵ These include:

1. The enhanced oil recovery severance tax rate reduction, which reduces the operator's production tax rate to 2.3%.¹⁷⁶ Oil producers claimed \$48.6 million for this incentive in 2019 and \$39.7 million in 2020. The incentive is forecasted to cost the state \$36.7 million so far in 2021.¹⁷⁷
2. The enhanced oil recovery projects using anthropogenic carbon dioxide incentive is a reduction of the severance tax rate of 1.15% of market value for up to 30 years for companies that inject human-caused greenhouse gas emissions,¹⁷⁸ specifically carbon dioxide, to produce more oil from an existing well. Oil and gas producers claimed \$3.3 million for this incentive in 2019 and \$966,315 in 2020. The incentive is projected to cost the state an additional \$513,168 in expenditures in 2021, but greater market interest in this technique suggests lost revenues will increase in the coming years.

3. The previously inactive well exemption, also known as the Two-Year Inactive Well Incentive,¹⁷⁹ provides a five-year severance tax exemption for certain wells that were previously inactive for two years as certified by the commission. Oil and gas producers claimed \$1.7 million for this incentive in 2019 and \$151,855 in 2020.
4. The oil and gas from reactivated orphaned wells exemption provides a tax exemption for oil produced from certified orphaned wells, as defined in Sec. 89.047(a)(3), Natural Resources Code.¹⁸⁰ The exemption is not transferable from the original certified operator of the well to the well's new operator.
5. The high-cost gas incentive is a tax credit for tight formation and deep wells where operators receive a reduced tax rate for 10 years or until the well accumulates tax savings of 50 percent of the actual drilling and completion costs for the well, whichever occurs first.¹⁸¹ Gas producers claimed \$210.2 million in 2020 and the incentive is forecasted to cost the state \$153.1 million so far in 2021.¹⁸²
6. The previously flared or vented casinghead gas severance tax exemption is a complete elimination of severance tax on casinghead gas that had previously been released into the air (vented or flared) but brought to market.¹⁸³ Notably, the gas production severance tax does not tax gas "produced from oil wells with oil and lawfully vented or flared."¹⁸⁴
7. The low-producing oil lease tax incentive is a crude oil tax credit for low-producing oil leases for qualifying report periods.¹⁸⁵ A qualifying low-producing oil lease is a well classified as an oil well whose production during a 90-day period is less than an average of 15 BOPD of production. Oil and gas producers claimed \$7.2 million for this incentive in 2020 and is projected to cost the state \$5 million in 2021.
8. The low-producing gas well tax incentive provides a natural gas tax credit for low-producing gas wells for qualifying report periods.¹⁸⁶ The incentive provides three levels of tax credits on gas production from qualified, low-producing gas wells for any given month, depending on the Comptroller's average taxable oil and gas prices, adjusted to 2005 dollars, based on applicable price indices of the previous three months. Gas producers claimed \$34.7 million in 2020 and the incentive is forecasted to cost the state \$20.1 million so far in 2021.¹⁸⁷
9. The tax credit for enhanced efficiency equipment provides an incentive to operators of marginal wells (an oil well that produces 10 barrels of oil or less per day on average during a month) for using equipment that reduces the energy required to produce a barrel of fluid by 10% as compared to alternative equipment.¹⁸⁸ The credit is in an amount equal to the lesser of either (1) 10% of the cost of the equipment or (2) \$1,000 per well.
10. Equipment Used Elsewhere for Mineral Exploration or Production exempts from sales tax tangible personal property (e.g., drill pipe, casing or tubing) used for the exploration for or production of oil, natural gas, sulfur or other minerals offshore not in this state.¹⁸⁹ Oil and gas producers claimed \$70.7 million for this incentive in 2019 and \$71.4 million in 2020. The incentive is projected to cost the state an additional \$72.3 million in expenditures in 2021.
11. Components of Tangible Personal Property Used in Connection with Sequestration of Carbon Dioxide exempts from sales tax components of tangible personal property used in connection with an advanced clean energy project that are installed to capture, transport, inject or prepare for transportation or injection of carbon dioxide from an anthropogenic emission source if the

carbon dioxide is sequestered in Texas as part of an enhanced oil recovery project under conditions that create a reasonable expectation that at least 99% of the carbon dioxide will remain sequestered from the atmosphere for at least 1,000 years.¹⁹⁰

12. Reuse/recycle of fracking water exempts a variety of water conservation activities including tangible personal property specifically used to process, reuse, or recycle wastewater that will be used in fracturing work performed at an oil or gas well.¹⁹¹ Producers claimed \$8.1 million in 2020 and projected to cost the state an additional \$8.3 million in expenditures in 2021.

The commission is unequivocal regarding the purpose and function of these exemptions, writing:

“By providing exemptions from or reductions of the severance tax on oil and gas production, these incentive programs in effect lower the cost of production. For marginal operations, in particular, these incentives might mean the difference between shutting in a well, keeping a well in production, or bringing a well back into production.”¹⁹²

In other words, the state explicitly subsidizes privately owned companies by lowering their marginal costs, under the pretense of economic development. In total, the state paid out \$372.8 million in incentives to oil and gas producers in 2020 and is forecasted to spend an additional \$296 million in incentives in 2021 (Appendix D).¹⁹³ A recent study found that “implicit” subsidies (i.e. tax exemptions and credits) in the United States to fossil-fuel producers averaged \$62 billion a year between 2010 and 2018.¹⁹⁴ The study stated that for the median oil and gas producer, the implicit subsidy accounted for a whopping 18% of the net income from its U.S. operations. Nonetheless, these exemptions and incentives do not result in shared prosperity and develop the state’s economy, but instead ignore risks posed to the state by prolonged uneconomic production.

Between 2014 and 2018, Texas crude oil production increased by 60%.¹⁹⁵ Texas produced more crude oil than any other state or region of the United States, accounting for 41% of the national total in 2019. In total, Texas produced 1.8 billion barrels of oil in 2019 alone. The average WTI crude oil price in 2019 was \$57. Just a quick back of the envelope calculation shows that under these market conditions, Texas crude oil producers brought in \$105 billion in gross revenues. Yet between 2014 and 2018 Texas jobs in extraction crashed by 30%.¹⁹⁶ So while shareholders and companies lowered their obligatory contribution to Texas roads and schools, they fired Texas oil and gas workers in order to increase profit margins.

Recommended Policy

Increase the crude oil and natural gas severance taxes for all existing and future production.

These tax rates have remained flat for decades, leaving consumers to pay a larger share of related taxes. The commission’s operations should be primarily funded through fees, taxes, and surcharges it collects to the OGRC Fund and General Revenue Fund. Ideally, these fees, taxes, and surcharges can be consolidated to an OGRC trust fund, under the control of the commission and not to be used for balancing the state budget, as discussed in the [State Funding](#) section. Should the commission require additional funding appropriated from severance taxes, the legislature should clearly indicate the source of those appropriations to ensure that the oil and gas industry is paying for its own oversight expenses.

That said, we warn against the temptation to make the program “revenue neutral” and solely rely upon industry generated revenues or a trust fund exclusively. First, postponing decommissioning can be dangerous and costly. The longer a structure is present in Texas waters for instance, the greater the likelihood it will be damaged by a storm and decommissioning a storm-damaged structure may cost 15 times or more the cost of decommissioning an undamaged structure.¹⁹⁷ Storm-damaged or toppled structures present a greater risk to safety and require difficult and time-consuming salvage work.¹⁹⁸ Sec-

ond, it creates a perverse incentive to expand production for revenue's sake. The Railroad Commission is a regulatory program responsible for implementing a broad mix of federally delegated and state laws, and ultimately, protecting Texan communities. These are statutorily mandated roles and responsibilities whose obligations do not disappear because of a commodity downturn or new drilling techniques. The commission's ability to function must be independent and separate from the industry's shifting winds.

Repeal all crude oil and natural gas severance tax exemptions and tax incentives. Appropriately established tax rates will force the oil and gas industry to internalize its true costs and fund the necessary commission staff and resources to safely regulate, monitor and enforce the industry's activities. These investments will create real jobs and improved protection of the state's freshwater and air quality are investments in the health and prosperity of Texans for generations to come. Repealing these tax exemptions and incentives can help to achieve the last part of the Railroad Commission's mission to support "enhanced development and economic vitality for the benefit of Texans."

At the end of fiscal year 2021, there were over 177,000 wells in the state of Texas with daily oil production of less than 10 barrels of oil or 250 Mcf of natural gas.^{199, 200} As explained earlier, operators indefinitely produce from these wells to forestall plugging and abandonment, while these wells could be emitting significant methane or contaminating nearby water aquifers. The low-producing oil lease tax incentive, the low-producing gas well tax incentive, and the tax credit for enhanced efficiency equipment pay operators to delay and undermine the Railroad Commission's efforts to contain the frequency of orphaning. Not only are operators permitted to indefinitely delay safe plugging and abandonment, but the state of Texas also pays them to delay. It's time to end these subsidies and force the oil and gas industry to pay for their own operations.

Similarly, while some of these tax incentives appear to be beneficial to the environment on their face, we have to question the reason why the incentives are needed in the first place. For example, the gas production severance tax does not tax casinghead gas that is vented or flared; meanwhile, the state offers a severance tax exemption for the value of previously released gas that is brought to market. This is a perverse and inefficient incentive structure. The state should first tax gas that is vented and flared before implementing a tax incentive for operators who are able to bring the gas to market. Next, the tax exemption for reuse and recycling of fracking water would not be necessary if the commission simply required the water to be reused or recycled in the first place. Finally, the tax exemption for oil produced from certified orphan wells cannot be used by new operators of the wells, indicating that the exemption rewards operators that previously failed to abide by the commission's well plugging requirements.

Statutory Revisions and Supporting Resources

Increasing severance taxes would require changes to Texas Tax Code sections 201.052 and 202.052. Repealing the tax exemptions and incentives would require several changes throughout the Texas Tax Code. The Railroad Commission will need to update or eliminate Form H-12A Application for Certification for Additional Tax Rate Reduction for Enhanced Recovery Projects Using Anthropogenic Carbon Dioxide, Form H-14 Enhanced Oil Recovery Reduced Tax Annual Report, and Form ST-1 Application for Texas Severance Tax Incentive Certification. The Comptroller of Texas will need to promulgate supporting rules and documentation while the Railroad Commission will need to amend any rules that reference these taxes, exemptions, and incentives and issue a "Notice to Industry" explaining the new rates and any implementation changes.

A Note on Federal Tax Policy

In a U.S. House Natural Resources Committee Hearing on *Modernizing Energy Development Laws for the Benefit of Taxpayers, Communities, and the Environment*,²⁰¹ California Representative Katie Porter questioned an owner of a New Mexico-based oil and gas exploration company regarding the federal tax treatment of oil and gas operators. Specifically, Rep. Porter focused on intangible drilling costs (IDC),²⁰² explaining that operators get to “deduct 70% of [their] costs immediately, and other businesses have to amortize their expenses over their entire profit stream.” These costs can include expenditures on wages, fuel, supplies, repairs, survey work, and site clearing and constitute up to 80% of a company’s drilling costs. The deduction has existed since the creation of the federal tax code.²⁰³ In addition to IDC deduction, there are several federal tax deductions and incentives specific to the oil and gas industry that outsource the industry’s marginal costs onto the American public and increase the risks of orphaning. Percentage Depletion allows firms to deduct a set percentage from their taxable income and because percentage depletion is not based on capital costs,²⁰⁴ total deductions can exceed capital costs. Because the deductions are based on revenues, not costs, the subsidy actually increases at times when prices are high.

The Stockholm Environment Institute found that during the last shale boom, the intangible drilling costs tax credit and percentage depletion provision saved companies billions of dollars most years, and over \$20 billion in some high-price years.²⁰⁵ This translated to a median increase in expected value of \$4 per barrel of oil equivalent. In other words, the federal government directly subsidized the profit margins of oil and gas projects, without evaluating backend risks like ability to decommission or the need for perpetual monitoring of wells.

And when prices are low, the marginal well production tax credit is particularly beneficial to small well producers, who produce limited barrels a day - a category of producers who are most likely to be both high methane emitters and orphan their inventories of wells.²⁰⁶ The marginal well credit can be carried back for five years and carried forward for 20 years.²⁰⁷ The marginal gas tax credit allows producers to claim a \$0.66 credit per qualified MCF and can provide as much as \$4,336.20 in tax savings per qualified stripper well.²⁰⁸ There is no limitation on the number of wells to claim the credit. Marginal production tax credits subsidize companies at the riskiest phase of production and when regulators should be determining solvency and whether the companies can pay for decommissioning obligations.

As it stands, federal tax law will undermine and counter any state efforts to contain the conditions that lead to well orphaning. The Federal government cannot with one hand incentivize orphan wells with tax credits and subsidies, while assuming those liabilities with the other hand. While the Railroad Commission does not determine federal tax policy, it must nevertheless contend with its cascading consequences.

III. State management of abandoned wells

A. Environmental Compliance and Inspections

Existing Policy

Environmental compliance is a key predictor of whether an operator is likely to orphan wells.²⁰⁹ There is considerable federal and state law regulating oil and gas development's impact on the environment. Most of these laws operate under a "cooperative federalism" framework where the federal government sets national pollutant standards, and then authorizes states to implement the program locally.²¹⁰ The Railroad Commission is the federally delegated state partner for many of these federal laws which include: the Safe Drinking Water Act,²¹¹ Resource Conservation and Recovery Act,²¹² Clean Air Act,²¹³ Clean Water Act,²¹⁴ Comprehensive Environmental Response, Compensation, and Liability Act,²¹⁵ and the Oil Pollution Act.²¹⁶ The delegating federal agency retains the right to revoke local authorities if the appointed state regulator fails to uphold statutory obligations.

There are also plenty of environmental and health risks that the commission does not monitor. Produced water, which can contain benzene, naturally occurring radioactive materials (NORM) and heavy salt, is a well-known political exemption from Clean Water Act requirements and disclosures.

The commission does not track a host of environmental hazards including wastewater spills, with the rules being such that operators maintain that they don't need to notify state officials when they have a spill.²¹⁷ For geographically isolated ranches like Ashley Williams Watt's Antina Cattle Company, groundwater contaminated with salt could put the ranch out of business and worse.

While the two wells on the ranch unleashed the lurking danger in the sub-surface, Watt's team researched and found that in December 2020, Chevron's "Estes 101" well leaked produced water and flooded a pasture. Because Chevron claimed the spill was "only" 31.69 barrels of produced water, the commission did not require the company to report the spill to the commission. In March 2021, a grove of mesquite trees adjacent to the spill were all dead. Ashley Williams Watt explained that there is not "a potable water pipeline within 20 miles of our ranch. That's not feasible. We only have the surface water on our ranch...If we lose our water at the ranch, it's less than worthless, it's a liability at that point. It's absolutely useless for habitation, cattle raising, or



8:36 PM · Jun 18, 2021 · Twitter for Android

A cow stands on the roadway near one of the leaking well sites with cranes, excavators, and trucks in the background. Photo and tweet: Watt, Ashley Williams. @sand_frac. [Twitter](#). June 18, 2021. Accessed on Dec. 7, 2021.

for anything else. It's a piece of dirt that's worthless. Our shallow water wells aren't huge gushers - they are just scraping by and giving you enough to work with. If you pollute anything, it won't dilute."²¹⁸ With persistent drought conditions, the commission's refusal to implement salt and brine regulations are even harder to explain, and once again, reveals the commission's bias toward the oil and gas industry instead of Texas residents.

Texas statute authorizes the commission to conduct oil and gas monitoring and inspection activities,²¹⁹ and requires that the commission formulate an annual plan or program for monitoring and enforcement.²²⁰ Monitoring activities include: field inspections; witnessing tests; reviewing monitoring reports; processing applications; and issuing enforcement actions (inspectors are authorized to inspect operator's books, files, records, reports, supplemental data, other documents and information, plant, property, and facilities). Inspectors follow a uniform handbook, the *Standard Operating Guidelines: Job Priorities for Field Inspectors*, a risk-factor based prioritization schedule to prioritize time and resources.²²¹ Inspectors use the Inspection, Compliance, and Enforcement (ICE) system to document inspections of oil and gas facilities electronically. ICE grants inspectors the ability to track inspections at the well level, and map wells and identify those wells that the commission had not inspected in the previous five years. Field inspectors can file their reports remotely using ICE without the need for an internet connection.

Each inspection requires a trained inspector, earning median salaries between \$48,000 and \$65,000 per year, to travel 50% of the year, conduct physical investigations, and report back to an office where they document the investigation and potentially initiate enforcement activities.^{222, 223} Investigators are expected to undertake routine safety and inspection training and compose and update technical and inspection reports within prescribed time periods.

In 2018, the Railroad Commission committed to inspecting every producing oil and gas well in the state at least once every five years.²²⁴ For bay and offshore wells, the commission has a target of inspecting each well at least once every two years.²²⁵ This well population does not include previously plugged and abandoned wells or legacy wells which can also require emergency response activities. The Railroad Commission of Texas is made up of just 873 employees and oversees 250,000 miles of pipelines, and monitors upwards of 1,650,000 oil and gas wells of various types and status.²²⁶ There are just 173 inspectors in the oil and gas safety inspection team and 65 inspectors on the pipeline safety team.^{227, 228} That's just one site inspector per 3,856 miles of pipeline and one inspector per an estimated 10,580 wells across the state of Texas.

Because of this unachievable mission, efforts are prioritized, or put another way - rationed. Responses to emergencies and complaints are triaged. The Oil and Gas Division receives between 500 and 600 complaints each year.²²⁹ The commission claims that complaints involving an imminent threat to public health and safety or the environment will be investigated immediately, however people who have made such complaints have noted that the commission took a day and a half to respond.²³⁰ Other pollution-related complaints are allegedly investigated within 24 hours, and complaints not involving pollution are supposed to be investigated within 72 hours. The first step to this process is to determine whether any part of the complaint is within the commission's scope of authority. One commenter to the commission's FY 2022 monitoring and enforcement plan noted that if a complaint included the term "odor" then inspectors tended to kick jurisdiction the Texas Commission on Environmental Quality (TCEQ) even if the cause of the odor was clearly under the RRC's oversight.²³¹

How the RRC categorizes and tracks these complaints requires scrutiny. Ashley Williams Watt explained that unless she explicitly said, "This is a formal complaint" - the RRC would tag and file the incident as a "routine inspection." The monitoring and enforcement plan explains that "A complaint may be a formal complaint requiring a certain process or an informal complaint that requires action but does not follow the prescribed process of formal complaints."²³²

Inspections for the 442,000 remaining active and inactive wells are prioritized based on factors including performance goals, proximity to public or sensitive areas, compliance history of an operator, and knowledge or concerns specific to an area. Field inspectors schedule their time to cover as many high priority inspections as possible and incorporate lower priority inspections as time allows.

The Commission's oversight and penalty program is a sequence of second chances:

1. When a violation is uncovered, the commission issues a 'Notice of Violation' (NOV), and the operator is given between 15-30 days to correct the violation.
2. If the operator has not resolved the violation in 30 days, it goes to "Unresolved Notices" status.
3. P-4 Cancellation (Severance Notice) - After the NOV deadline has passed without remedy, a severance order (for oil leases) or seal order (for gas wells) is issued. That order prohibits the operator from producing, selling hydrocarbons or otherwise using any of the wells until the order has been corrected and a statutory fee has been paid.
 - a. Cancellation or Suspension of Permits: If a NOV is not responded to, the Railroad Commission may cancel or suspend drilling permits or other operating permits
 - b. P-5 Cancellation: An operator's Organization Report (P-5) must be active and maintained to perform any activities under the jurisdiction of the Railroad Commission. This permit may be cancelled if operators do not respond appropriately to violations.
 - c. Bond Collection: An operator's financial assurances may be collected by the commission if they do not maintain a valid P-5 or if they are unresponsive to remitting penalties.
 - d. Administrative Penalties: After notice is provided, if operators are unresponsive in a 30-day time period, the Railroad Commission can assess administrative penalties based on the type and severity of the violation. Penalties may be as high as \$10,000 per day per violation.
 - e. S.B. 639 Flag: After an operator's P-5 becomes 30 days delinquent, a notice to sever the operator's highest producing lease is issued. Failing to cure the P-5 delinquency after this time results in a S.B. 639 non-compliant operator flag (7-year-ban). When a S.B. 639 flag is placed on an operator's P-5, it prohibits P-5 renewal, and the order is no longer subject to appeal.
 - f. Referral to Attorney General: may refer orders to the AG for enforcement of the order and collection of administrative penalties or reimbursement for collection of plugging and/or site remediation expenses.²³³

While this seems like an escalation on paper, the Sunset Commission has previously found that "the Commission takes relatively few enforcement actions, resulting in a lack of deterrence for future non-compliance. While there is no standard for how many violations should result in a monetary sanction, action should be frequent enough to deter future violations." The organization Earthworks noted that "one enforcement action per 160 violations is highly unlikely to motivate oil and gas companies to comply with the Texas oil and gas rules."²³⁴ As a landowner with considerable oil and gas infrastructure on her property, Ashley Williams Watt has interacted with RRC inspectors repeatedly over the years. In a recent Digital Wildcatters interview she remarked that the "RRC inspectors on the ground [are] great [and] hardworking. They want to do what's best. They intend to make things better. But this is what surprised me. They really don't have any power...The RRC is toothless."²³⁵

The Sunset Commission previously noted that "After issuing the initial citation, inspectors follow up on each violation an average of three more times to bring the violation into compliance. Such a cumbersome follow-up process comes at the expense of additional inspections and broader field work."²³⁶ What information is available suggests that the commission's actions have little deterrent effect and that its main enforcement tool — severing a lease to stop production — may well be weakened because of inadequate cross checks to ensure compliance with the severance.²³⁷

Even with scarce resources and too few staff, the commission still does uncover a number of regulatory infractions. In 2020, the commission performed 203,697 oil and gas well and facility inspections (1,117

sites per inspector) and uncovered 32,361 statewide rule violations, or 14% of all inspected sites.²³⁸ Statewide Rule 8 is the commission's primary regulation for protecting the environment and prohibits unauthorized discharge or disposal of produced fluids or waste into Texas surface and subsurface waters. In 2020, there were 8,365 water protection violations.²³⁹ In 2020, the RRC discovered 5,741 plugging violations.²⁴⁰ There were 364 violations of a requirement to erect a firewall to protect nearby residences or highways.²⁴¹

If 14% of inspections of a barebones inspection program revealed significant violations, then how many thousands of violations go undetected each year?

Recommended Policy

Federal agencies should audit the Railroad Commission's regulations to ensure that they conform to federal environmental law and that standards prioritize the health and safety of Texans. We recommend that the U.S. Congress order the Governmental Accountability Office (GAO) to perform this study. Because the commission carries out federally delegated law, the federal assessment of these activities is appropriate and long overdue. Water is Texas' most precious resource, and Texas law must reflect that priority.

Create and implement a layered monitoring and inspection program. We recommend the creation and implementation of an oversight system with multiple redundancies. The following recommendations are not substitutes for each other, but vital complements of a regulatory program that prioritizes human safety and health.

- Establish a baseline ratio of staff to infrastructure and increase the frequency of physical inspections to at least once per year, with a goal of one scheduled inspection and one unannounced inspection per year. Based on the time commitments of that monitoring and inspection goal as well as the additional complaints/requests for inspections routinely received, the commission can back calculate the number of sites and establish a realistic ratio of inspectors to wells. Current staffing levels do not allow staff to inspect sites thoroughly and consistently, leaving unaddressed risks and potentially contributing to inspector burnout.²⁴²
- Equip inspectors with the appropriate tools and supporting staff do their jobs. All RRC inspectors should be trained and equipped with an optical gas imaging (OGI) camera, which makes otherwise invisible emissions visible, to identify methane venting, extinguished flares, and other chemical leaks at oil and gas industry sites. There are new generation, cost-effective models that are compact for routine inspections and can live-stream to a central data repository. As it stands, RRC inspectors rely on paper audits to verify venting and flaring compliance, which is insufficient.²⁴³ Adoption of new technologies like OGI cameras will create certainty and objective standards. There is also the added benefit of a video and photographic record for each inspection.
- Amend rules and regulations to grant RRC inspectors the power to issue "red light" enforcement actions and penalties at the time of inspection.
- RRC inspectors perform inspections in pairs, both for the safety of the inspectors and improved accountability and credibility of inspections.
- Increase the inspector pay scale and pursue all options to increase benefits. Several reports suggest that RRC has a challenge with inspector recruitment and retention. RRC inspector duties are physically demanding and critically important to the residents of Texas. Their compensation should reflect those priorities.

- Expand the drone program as a complement to physical on-site surveillance.²⁴⁴ Currently, the commission inspection team has “16 licensed drone pilots—field inspectors that completed 100 training hours to acquire the Federal Aviation Administration’s Small Unmanned Aircraft Systems Rule (Part 107) license.”²⁴⁵ But the commission’s “statutory authority is limited to using drones to respond to spills/leaks and emergency situations, and the commission does not have legal authority to otherwise use drones.” We recommend statutory approval of a pilot program that includes a state/federal agreement with NASA JPL Methane Source Lab to incorporate the map tool into the commission’s inspection and enforcement program.²⁴⁶
- Initiate a program to install real-time leak detection sensors on all categories of wellheads from producing to plugged and abandoned. The 2022 Oil and Gas Division Monitoring and Enforcement plan noted the addition of two new data fields in the ICE database which include, “an H2S indicator and GPS location.” These are useful additions that could be augmented with real-time data acquisition. We recommend that the commission work with the Department of Energy Office of Fossil Energy to pilot and test various sensors. Texas is home to one of the most advanced oil and gas provinces on the planet and its regulatory regime should be equally as advanced.

A robust surveillance and inspection program will inform the commission’s assessment of operator performance, and with financial solvency tests, determine whether these operators should be permitted the privilege to profit from Texas resources. An operator’s observance of statewide rules and federal law are strong predictors of whether the company will also observe decommissioning obligations.²⁴⁷

Statutory Revisions and Supporting Resources

A comprehensive federal audit would require careful review of Railroad Commission rules. If the audit were to reveal that the commission has not properly implemented federal rules, then federal agencies may need to revoke authorities delegated to the commission.

Creating and implementing a layered monitoring and inspection program would require some of the rule changes addressed throughout this report but would primarily entail more thorough and imaginative planning on the part of commission staff and leadership. Ideally, the commission could implement these changes through internal processes and policies, in some cases without a change in rules. The annual Monitoring and Enforcement Strategic Plan would be a good venue for developing and communicating new approaches.²⁴⁸

The commission will need to recruit and train an entire new workforce, procure new equipment and vehicles, and enter partnerships with federal agencies. The above recommendations are not comprehensive, but like many reports before it, echo the need to fundamentally reorient the commission from one of industry accommodator to actual regulator. If implemented, these changes would endow Texas’ oil and gas regulator with monitoring and enforcement authority such that the companies it oversees cannot ignore the agency. Without inspection, monitoring, and enforcement reforms, the commission will remain complicit in orphaning new wells, spending scarce resources on expenditures that individual oil and gas companies should have made directly.

Alternatively, if the commission refuses to reform its standards and practices, the legislature may be able to shift some of the commission’s responsibilities to more capable state agencies. And without legislative action, federal agencies have full legal right to revoke delegated authorities and increase federal presence in Texas.

B. The Oil Field Cleanup Program

Existing Policy

The commission's Site Remediation Section utilizes the OGRC Fund in coordination with the Railroad Commission of Texas District Offices to clean up pollution of abandoned oil and gas sites. This program is called the Oil Field Cleanup Program or the State Managed Well Plugging and Cleanup Program. The Texas Natural Resources Code authorizes activities associated with oil and gas well plugging and site remediation, which include identifying, assessing, and prioritizing the wells and sites.²⁴⁹ An abandoned site becomes a candidate for state cleanup when the responsible party fails or refuses to take action or is unknown, deceased or bankrupt. There are more than 2,000 sites across Texas that are eligible for cleanup using OGRC funds. In 2020, the commission conducted 258 "cleanup activities" on those sites, including not only remediation, but also investigations and emergency activities.²⁵⁰

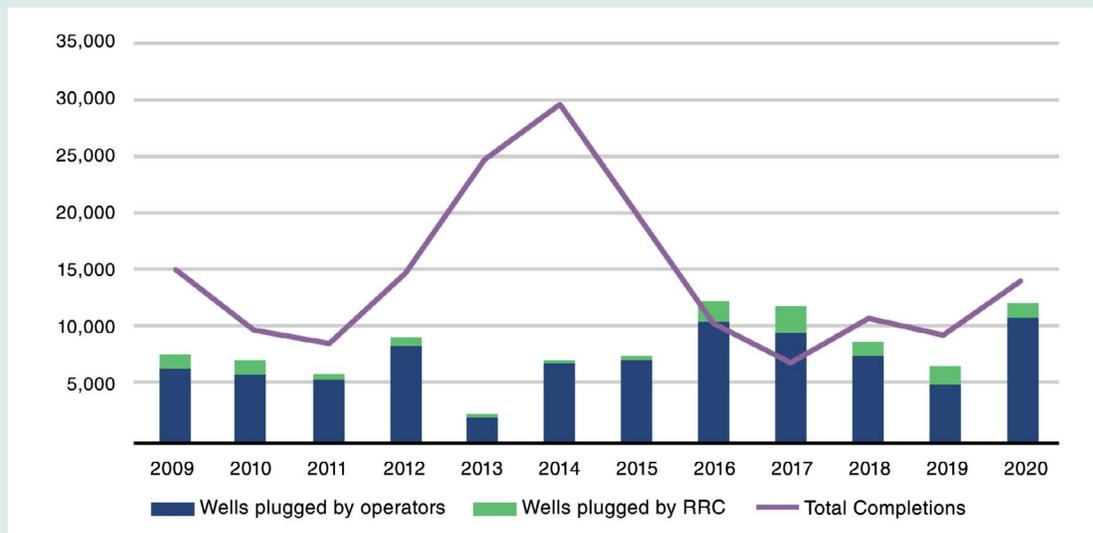
The Oil Field Cleanup Program also intersects with the RRC's routine monitoring and emergency response programs. In the case of a jurisdictional emergency, the District Director determines if well plugging or pollution abatement funds should be expended. When it becomes apparent that a complaint will become an Oil Field Cleanup Site candidate and will require further investigation/action by the Site Remediation Group, the District Oilfield Clean-up Coordinator (DOCC) will become part of the complaint process. If no active pollution is occurring at a site, the complaint can be closed and referred to the Site Remediation Group. When active pollution is occurring at a site, the complaint remains open. Complaints can be closed or referred to State-Managed Plugging (SMP) when there is no current active operator available. It is then referred to State-Managed Plugging for evaluation and prioritization. Then the well(s) will be eligible for plugging consideration in accordance with the established priority system and budgetary constraints.

In other words, if an individual reports an unplugged well in the state of Texas, and the last operator is no longer in business, and if the well meets current triage requirements, then it might be safely plugged and abandoned. However, it is unclear how soon the commission will conduct plugging and abandonment activities on the site.

The program consists of six staff members in Austin and 18 District Office Cleanup Coordinators.²⁵¹ The commission contracts out to private firms for state-funded well plugging and site remediation while RRC staff oversee decommissioning activities on site.²⁵² It is estimated the entire annual program provides employment for just 90 to 100 oil field services workers. It requires between 45-50 days to plug an orphaned well with state-managed funds and between 90-105 days to complete a state-managed cleanup. The State Managed Well Plugging and Cleanup Program plugged 1,477 wells in 2020 and projects to plug 1,400 wells in 2021 and 1,000 wells in 2022.

Generally, operators have deferred well plugging during the most active periods of oil and gas development (Figure 13). From 2009 to 2020, nearly 175,000 wells were completed -this includes 14,000 wells that were recompleted and approximately 1,500 plugged wells that were re-entered.²⁵³ Nonetheless, in 2020 there were only 15,000 more active wells in Texas than there were in 2009.²⁵⁴ During these 12 years, the commission plugged an average of 13% of the total 99,000 plugged wells, and in some years up to 25%.

Figure 13: Completions and well plugging activities from 2009 – 2020.



Data sources: Railroad Commission of Texas. Monthly Drilling, Completion and Plugging Summaries and Oil Field Cleanup Program Annual Reports.

Considering that the majority of plugged wells are plugged by operators, it follows that more stringent financial assurance requirements or policies that ensure operators will plug their wells and cleanup sites will not endanger the industry as some lawmakers have suggested.²⁵⁵ Rather, the commission’s lax rules and enforcement for the 15% of operators who fail to pay for their own asset retirement obligations misuses funds that could otherwise be spent on monitoring and enforcement.

For 2022-2023, the commission was appropriated more than \$112 million for well plugging and remediation, which includes the cost of administering the program, such as staff salaries and supply costs and storage.²⁵⁶ This constitutes almost half of the commission’s entire budget. As explained in the [State Funding](#) section, over 80% of Oilfield Cleanup Program funds are spent on contractors who carry out well plugging and site remediation activities. The Sunset Commission has repeatedly identified deficiencies in the commission’s contracting procedures, specifically the lack of uniform contracting procedures and the risks of commission staff unwilling to pursue adverse action when necessary.²⁵⁷

Worse, the funds collected from operators to pay for state managed plugging and cleanup are insufficient, such that thousands of wells and sites are left in the commission’s queue year after year, posing risks to land, water, air, and climate. Although statute requires the commission to develop a Monitoring and Enforcement Strategic Plan each year,²⁵⁸ the commission has merely reported legislatively mandated goals related to the State Managed Well Plugging Program,²⁵⁹ rather than taking on a forward-looking assessment of what it will take to reduce operators’ reliance on the program and finally plug and remediate the long list of wells and sites in its queue.

Plug and abandonment costs are increasing. In 2015, the commission paid less than \$16,000 each to plug each well, and in 2020 it paid an average of almost \$21,000 per well.²⁶⁰ Commission data shows most wells it plugged were less than 3,000 feet deep, far shallower than most wells being drilled today.²⁶¹ As a result, the current cost of plugging wells may be a poor indicator of future expense. Contractor availability, however, also increases costs. Competition for site assessment and remediation services increase the cost for such services during periods of strong industry activity. When oil prices increase,

oilfield service contractor rates increase, and then the number of sites the commission can remediate decrease. Throughout 2020-2021, the commission deferred site remediation cleanup activities for larger cleanup projects, focusing instead on smaller projects. The longer projects are deferred, the more the cost to remediate sites increases.

There are a variety of factors that influence the costs of plugging and abandonment and reclamation of a wellsite: depth of the well, conventional versus fracturing, whether the well was previously plugged, whether that plug job was sufficient, whether there is fracking activity nearby, proximity to water aquifers, presence of Naturally Occurring Radioactive Materials (NORM), whether its onshore or offshore (Texas waters extend nine nautical miles from the coastline) and contractor availability. For state or federally managed plugging programs, regulators are often required to outsource and use only private contractors. Contractor management and built-in profit margins for private contractors add an additional layer to total program costs. A recent report from the Northwest Landowners Association on the use of federal CARES Act funding to plug and reclaim wells sites across North Dakota revealed exploding costs.²⁶² Figures provided by the Oil and Gas Division show that the program's average cost for plugging and reclaiming a well is \$283,000. Plugging ranged from \$51,000 to \$523,000 per well. Reclamation ranged from \$8,000 to \$1.9 million per well.²⁶³

Contractor availability is a limiting factor for the Texas program. When the commission issues more and more drilling permits with little scrutiny, it both increases the risks of orphaning, and increases the costs for state managed plugging of orphaned wells. Indeed, a recent proposal outlining a federal to states grant program admitted that “the marginal cost of plugging each well may increase if demand for well plugging services leads to higher...costs.”²⁶⁴ The authors also speculated that higher oil and gas prices could place demand pressure on both oilfield workers and service providers leading to increased plugging and restoration costs. In other words, the state will be competing with drillers for resources to plug wells, and the more it costs to safely plug each well, the fewer wells will be plugged.

A note on the RRC’s May 5, 2020 waiver of plugging rules

In April 2020, West Texas Intermediate oil prices crashed to negative values for the first time in history.²⁶⁵ A combination of factors including a Russia–Saudi Arabia oil price war and low demand caused by lockdowns during the COVID-19 pandemic contributed to the event.²⁶⁶ Only a few weeks later, at its May 5th Open Meeting, the Railroad Commissioners issued an order waiving plugging rules,²⁶⁷ pit cleanup requirements, and certain fees and surcharges in order to provide relief to the industry.²⁶⁸ The commission chose to ignore requests from industry and environmental proponents alike to resume the commission’s role in managing oil production within the state under a prorating structure, as the commission has done in the past.²⁶⁹

Public Citizen and ranchers Molly Rooke and Hugh Fitzsimons sued the commission for failure to give proper notice of the rule waivers.²⁷⁰ The ranchers had been waiting for dozens of wells to be plugged on their respective ranches. Rooke had experienced a blowout of a legacy well on her property. Wells on Fitzsimons’ property had already failed and were threatening groundwater on his ranch. Fitzsimons remarked “it is a simple and irrefutable fact that once your water is contaminated you have no ranch.”

By the end of 2020, the commission had waived over \$400,000 in fees and surcharges, an amount that is likely insufficient to keep the industry afloat and save jobs.²⁷¹ At an average cost of \$21,000 to plug a well, the commission could have plugged 19 wells on the orphan wells list or employed several full-time staff in its monitoring and enforcement division. From the end of FY 2019 to the end of FY 2021, the number of orphan wells in the commission’s queue grew by 1,278 wells,²⁷² despite the commission plugging 2,962 wells in FY 2020 and FY 2021.²⁷³

UNITED STATES DISTRICT & BANKRUPTCY COURT SOUTHERN DISTRICT OF TEXAS

Since 2015, 124 Texas-based oil and gas companies have filed bankruptcy, more than all other states combined, and their combined debt is more than \$117 billion.²⁷⁴ Judge Marvin Isgur and Judge David Jones preside over the United States District & Bankruptcy Court for the Southern District of Texas and have adjudicated over many of these oil and gas reorganizations. The two judges process more business bankruptcies of \$300 million or more than any other bankruptcy court in the country.²⁷⁵ Judge Jones has explained that his recent reforms were to persuade large Texas companies to consider restructuring through courts in Houston instead of filing for bankruptcy in Delaware or New York, thereby bringing in hundreds of millions of dollars in annual revenue for lawyers, bankers and financial consultants in Houston.

It has been previously noted that bankruptcy law can run afoul and even contradict with administrative law.²⁷⁶ Nowhere is this more explicit than the Southern District of Texas' Bankruptcy Court, whose cases involve federal and state regulatory programs. Bankruptcy should not supersede nor replace state law and their obligations. Indeed, Rasmussen wrote that the "administrative arena should resolve [its] dispute[s] unimpeded by the bankruptcy process." As the asset retirement obligations of the oil and gas industry come due, both state and federal regulators will have to confront and establish processes for how administrative and bankruptcy law intersect.

DECOMMISSIONING NON-PROFITS & START-UPS

The Biden Administration's American Jobs Plan called on Congress to spend \$16 billion over 10 years to reclaim orphaned wells and mines. Several pieces of proposed legislation respond to this call.²⁷⁷ U.S. Senators Ben Ray Lujan (D-N.M.) and Kevin Cramer (R-N.D.) introduced the REGROW Act,²⁷⁸ which called for nearly \$5 billion in federal funds to be given to state regulatory agencies to clean up orphan well sites on public, private, and tribal lands. New Mexico Congresswoman Tessa Leger Fernández (D-N.M.) introduced a similar bill, which authorized \$4.7 billion to states to state oil and gas regulators to plug orphan wells.²⁷⁹

The funding includes several types of grant programs:

- Initial grants of up to \$25 million per state;
- Formula grants based on job losses, number of documented orphan wells and estimated costs to plug wells and reclaim lands;
- Performance grants, including:
 - o Regulatory improvement grants of up to \$20 million per state;
 - o Matching grants of up to \$30 million per state for the amount the state spends on its orphan well program over the previous ten-year average.

Environmental Defense Fund estimated the Railroad Commission of Texas could be eligible to receive potentially more than \$340 million to disperse to private contractors.²⁸⁰ In its Notice of Intent to apply for Formula Grant funding, the Railroad Commission of Texas reported 7,396 orphan wells at a projected cost of nearly \$482 million to plug the wells and reclaim the sites.²⁸¹

With the prospect of federal dollars trickling down to state managed well plugging programs, there are several non-profit organizations which could potentially make use of those funds. Most of these organizations are managed by veterans of the oil and gas industry or active oil and gas operators.²⁸² With little to no precedent for these kinds of organizations, the Railroad Commission needs to consider its

capacity to oversee these new entities and financial assurance structures, while ensuring transparency and accountability.

Section 89.048 of the Natural Resources Code authorizes the state to reimburse surface estate owners up to 50% of the cost of plugging orphan wells on their property.²⁸³ Some of these new non-profit well-plugging organizations in Texas have crafted business models to work with landowners to take advantage of these state funds. However, the statute requiring the approved well pluggers to “assume responsibility for the physical operation and control of the well,” has proved to deter pluggers from entering into the program.²⁸⁴ In addition to using state funds, the organizations are also seeking donations from firms that are interested in claiming ESG credits, potentially for the value of carbon emission reductions. They are also taking on research studies to assess methane emissions from abandoned wells and recommend well-plugging prioritization schemes that take methane emissions into account.

While innovative solutions to address the problem of orphaned wells and the massive number of inactive wells is needed, a few points should be considered and resolved in these for-profit and non-profit business models:

- If ESG credits are available to firms that pay to plug orphan wells, but a strong regulatory regime that prevents operators from orphaning wells is not established, then the ESG credits could simply create a market that encourages well orphaning so that another company can claim credits for well plugging.
- Without the presence of ESG credits, the nonprofit models will not attract donors sufficient to plug meaningful numbers of wells.
- Without decommissioning cost reporting reviewed by the commission and transparent application procedures, non-profit firms -if they become approved well pluggers- could take on millions of dollars in well plugging contracts at inflated rates without being subject to taxation.
- Regardless of the number of wells these nonprofit firms are able to plug under an ESG model, the Railroad Commission must still pursue an oversight function that prevents orphaning by holding operators accountable on the front end and is capable of monitoring plugged wells in perpetuity.

The global carbon offset and the nascent ESG accreditation industries have both identified orphaned wells as business opportunities. These are evolving dynamics and federal legislation and state recognition will shape how these emerging players evolve and add regulatory complexity to an already populated field.

The transnational oilfield services firm Halliburton met with Railroad Commissioner Jim Wright in May 2021 regarding well plugging.²⁸⁵ In May, Halliburton was not yet on the commission’s Approved Cementers List. As of November 2021, Halliburton was on the list.²⁸⁶ With that said, it is unclear how these new and smaller non-profits will fit with such a dominant and capitalized firm entering the fray.

Recommended Policy

Develop a strategy to swiftly eliminate orphaned wells and sites. Landowners, groundwater conservation districts, and neighbors of orphaned wells and sites are bewildered by the Railroad Commission’s slow response to the thousands of locations that need plugging and site cleanup. Many legacy sites are not even on the commission’s list. Rather than simply reporting its performance metrics each year, the commission should take advantage of the prompt offered by statute that requires the agency to develop a Monitoring and Enforcement Strategic Plan each year.²⁸⁷ A true strategic plan for the Oilfield Cleanup Program would forecast growth in orphan wells, estimate total costs to address the problem, evaluate all the regulatory tools available (including those suggested in this report), calculate potential revenue

increases through amended fees and surcharges, and make proposals to the legislature for statutory changes if necessary. Moreover, a strategic plan should assess ways to ensure that the state properly funds the execution of its monitoring and enforcement program.

Study feasibility of bringing the State Managed Well Plugging and Cleanup Program in house. Almost half of the entire commission budget is allocated to the State Managed Well Plugging and Cleanup Program. Nearly half of the commission's current mission is the public management of orphaned oil and gas wells. This is a routine public program. We recommend that the Railroad Commission of Texas study bringing its State Managed Well Plugging and Cleanup Program in house. Under this scenario, the commission will purchase plug and abandonment equipment, directly employ oilfield service workers as commission staff, and directly perform site remediation and plug and abandonment work. The commission can either continue to rely upon the whims of private contractors and increasing rates, or it can create in-house competency and capacity.

When the commission responds to an emergency, both the commission and landowners must often wait on approved contractor availability. This creates unnecessary operational inefficiencies and imposes real costs onto stakeholders near these sites. It's as if the fire department rented its trucks and had to wait to respond to an emergency. If instead, the commission maintained its own trained workforce and equipment to perform this work directly, it could more efficiently plan yearly budgets and schedules, as well as respond to emergencies more nimbly. Instead of costly management and oversight of contractors, the commission could create uniform procedures and processes that it perfects inhouse. While initial capital costs for rigs and equipment will be costly, the commission will retain exclusive use of that equipment and not be forced to respond to ever changing industry rates.

As discussed in the [Qualification and Permitting](#) section, we recommend increasing the legal threshold to exploit hydrocarbon resources in the state of Texas. The commission cannot safely monitor and control its current inventory of oil and gas wells while continuing to allow unfettered access to Texas resources will only compound this crisis. An important precondition to improving public management of orphan wells is to better screen those private firms responsible for orphaning.

Seek clarity from federal courts on the application of priority liabilities in bankruptcy proceedings. Although environmental liabilities are supposed to have priority in bankruptcy proceedings, the number of orphaned wells and sites that have been offloaded onto the Railroad Commission suggest that this policy is going unenforced in many cases. The commission should explore avenues for resolving this inconsistency.

Consider what new oversight mechanisms are appropriate for non-profit organizations and financial assurance providers that are seeking to resolve the orphan wells problem. The commission should ensure that financial transactions with these organizations remain transparent and ethical, and that the firms taking on liabilities for decommissioning have a strong compliance track record. The use of ESG credits should be structured to ensure that larger firms are not allowed or encouraged to offload marginal wells to smaller operators who are likely to orphan the wells, thereby setting up the larger firm to benefit or profit from the ESG credits by funding decommissioning of the wells.

Statutory Revisions and Supporting Resources

These recommendations primarily involve planning and thought leadership from the Railroad Commission before any statutory or rule changes are needed. These work products may result in new reports from the commission, work plan proposals, and potentially recommended statutory changes to the legislature.

If the commission chooses to take on a study of the feasibility of bringing the State Managed Well Plugging and Cleanup Program in-house, there will be an interim period where the commission continues to contract out to private service contractors while it ramps up capacity. The commission will need to recruit and train an entire new workforce and procure new rig equipment and vehicles. This will require revisions to the commission's revenue sources, as explained earlier, and higher legislative appropriations requests.

C. Oversight of Private Plugging and Abandonment

Existing Policy

Commission rules define well plugging requirements and establish criteria for plugging wells including cement efficacy, plug placement, verification, and requirements for a person to become an “approved cementer” for plugging wells in Texas.²⁸⁸ The commission specifies methods for plugging wells back to the base of usable quality water for the landowner. According to these rules, plugging operations on each dry or inactive well should be commenced within a period of one year after drilling or operations have ceased and must proceed with due diligence until completed.²⁸⁹ But as discussed in [Plugging Extensions & Inactive Wells](#), current RRC rules and policies incentivize delay indefinitely.

Texas statute requires the RRC Oil and Gas Division employ a Chief Supervisor who, among other duties, is responsible for supervising “the plugging of all abandoned wells.”²⁹⁰ Prior to commencing plug and abandonment operations, an operator submits a W-3A Notice of Intention to Plug and Abandon form at least five days prior to plugging operations.²⁹¹ Completed W-3A forms are then sent to the relevant Commission District Office of the well's surface location. The District Office then has five days to process and approve, modify, or reject the operator's plugging proposal. Operators are required to provide at least four-hour notice to the district office prior to plugging the well.²⁹² While Railroad Commission guidance suggests operators should call in all plugs, “they are not required to give [the commission] 4 hours necessarily on every plug.”²⁹³ It is unclear what metrics would allow the commission to except an operator from the 4-hour rule.

The commission asserts that its inspectors currently witness 74% of all operator pluggings.²⁹⁴ It is unclear how the commission achieves this metric given the four-hour notice and current staff to well ratios. For example, landowners who have called in emergencies to the Railroad Commission have noted that the commission took over 12 hours to respond.²⁹⁵

Operators must have a letter from the Commission's Groundwater Advisory Unit (GAU), dated within the last five years, stating the depth to which usable quality water strata occur in the area of the well. When approved, the plugging proposals are valid for six months. Within 30 days after the plugging operations are completed, the operator must file in the appropriate District Office a Form W-3 Plugging Record.²⁹⁶ The cement contractor must complete and sign the cementing report on Form W-3 or file a separate Form W-15 Cementing Report with the Form W-3 Plugging Record.

Form W-15 states that operators must, “set and cement sufficient surface casing to protect all usable-quality water strata, as defined by the Groundwater Advisory Unit in Austin” and “sufficient cement shall be used to fill the annular space outside the casing from the shoe to the ground surface or to the bottom of the cellar.”²⁹⁷ Cementing requirements are explained in Statewide Rule 14. Geologic and physical conditions of the wellbore site should dictate the cement material and plugging technique to ensure durability, but availability and costs win the day. In 2020, private operators plugged almost 8,900 wells, and have sealed another 5,700 so far in 2021. In 2020, 5,137 operators failed to thoroughly complete plugging, abandonment, and site clearance operations.²⁹⁸

The commission also oversees pollution cleanups performed by the oil and gas industry — ensuring cleanups do not become state-managed projects — and provides incentives to landowners to remediate production-related pollution by granting landowners a release of liability in exchange for successful remediation.²⁹⁹

Recommended Policy

Extend notice requirements to allow staff more time to plan for monitoring a plugging operation.

The Oil and Gas Division should plan to monitor a plugging operation from the moment it receives the W-3A Notice of Intention to Plug and Abandon. The 5-day notice required for filing the form may not be sufficient notice for staff to plan to arrive at the site on the day of plugging. Similarly, the idea that commission staff would wait for a phone call four hours before the plugging event seems disorganized and impractical.

Statutory Revisions and Supporting Resources

No statutory changes would be needed to extend notice requirements for operator plugging and abandonment. Statewide Rule 14 would need to be amended. No changes would be needed on Form W-3A Notice of Intention to Plug and Abandon.

D. Abandoned Well Surveillance: Monitoring in Perpetuity

Let's return to the Antina Cattle Company. As a refresher, the family only owned the surface rights. Chevron, and previously Gulf Oil, owned the subsurface rights. For decades Gulf Oil, and then Chevron, produced oil and made profits from hundreds of oil and gas wells on the *North Estes Lease* and the *North Wristen Lease*. Over that period some wells were plugged while new wells were drilled. Then in the mid-1990s, Chevron plugged and abandoned dozens of those wells after failing Mechanical Integrity Testing (MIT), while the rest were either in “temporarily abandoned” status or marginally producing.³⁰⁰

We will highlight two of those wells here: the Wristen 68 and the Estes 24. Ashley Williams Watt and her team discovered a puddle of crude pooling at the Wristen 68 well in late May 2021. When a service company re-entered the well, they discovered a fraudulent plug that included a foot of cardboard stuffed into the well casing with several feet of cement atop. This demonstrates that the commission failed to witness and verify that the cement was placed and set correctly when the well was first “plugged.” In 2021, it required two separate cement jobs to plug the 8-5/8” casing shoe. The first attempt completely “fell out” and never set. Chevron found poor cement quality behind the 8-5/8” annulus from the original setting in 1959. There were pockets of void cement which required punching holes into the casing to squeeze cement into those spaces. The



The Estes 24 well, with a red bucket and rock placed atop the well to control the spraying fluids. Photo: Watt, Ashley. @sand_frac. [Twitter](#). June 13, 2021. Accessed on Dec. 7, 2021.

combined efficacy of the original subpar plugging and improvised patchwork “fix” is unknown.

The Estes 24 has been referred to on Twitter as the “red bucket” well (see image on page 47).³⁰¹ The Estes 24 plug job was just 25 years old when subsurface pressure and salt water conspired to create a subsurface blowout and effectively unplugged the well. After Watt’s team alerted Chevron of the well’s failure, a Chevron contractor jauntily balanced a plastic red bucket atop the blowing out well with a rock on top to try to contain the flow from spraying outwards. Like a band aid on a gunshot wound, the Twitter-famous red bucket would come to symbolize how ill-equipped both oil and gas operators and the Railroad Commission are to deal with the massive inventory of previously abandoned oil and gas wells. Schlumberger performed a downhole diagnostic log in July and found that the surface casing of the Estes 24 was corroded and full of holes. Repeated attempts to replug the well have failed.³⁰² There’s mounting evidence that subsurface pressure is impacting the entire Estes field.³⁰³

The Estes 24 is the canary in a coal mine of dead canaries, with dozens of corroding wellbores succumbing to shallow but high pressure. And because all of this is happening subsurface post plug and abandonment, no one is monitoring it. As a consequence, toxic and radioactive brine is threatening three separate water aquifers. Watt noted the City of Crane, Texas gets its water from a field just four miles northwest of her ranch.

There are a few implications from the Wristen 68 and Estes 24 wells. First, as the cardboard in the Wristen 68 demonstrates, the commission does not physically inspect nor confirm the quality of all plug jobs. Indeed, as the regulator of oil and gas activities in the state of Texas, it has taken an unusual hands-off approach to dealing with the failing Chevron wells. A RRC Oil & Gas Division staff member wrote in an email, “We will not be able to have an [Railroad Commission of Texas] inspector go out [and] watch Chevron take samples. This is a civil matter, and we will not be acting as a mediator between the two parties.”³⁰⁴ On June 17th, Watt publicly tweeted “I requested my water wells tested, and was told they could get to it in 4-6 weeks.”³⁰⁵ Despite their unwillingness to test Watt’s water, the Railroad Commission reported that it inspected Estes Lease wells in Crane County on June 14th, 16th, 18th, and 19th.³⁰⁶ As of December 2021, the RRC had issued no violations to Chevron or other nearby operators for pollution of surface or subsurface water.³⁰⁷ Out of the violations that were issued, none were listed in commission databases as “major violations.”

The commission’s response to these incidents is concerning. If the commission is treating a failed abandoned oil well on a private landowner’s property as a “civil matter”, this is an ominous portent for the future. According to a recent analysis of wells drilled between 1871-1973, Texas has nearly 805,000 known legacy abandoned oil and gas wells.³⁰⁸ In the earliest days of oil and gas drilling, oil hunters improvised plugging, “They’d take rocks and debris and toss it down the hole. But pressure can build up and water can seep beneath the oil and push it up and methane gas can leach out of the ground.”³⁰⁹ When America mobilized to fight World War II on multiple fronts, it required rationing, price controls and creativity. Steel was in short supply, and oil and gas operators used creosote-soaked telephone poles as plugging materials, or worse yet, “puddle jobs”: pouring cement in the bottom of the well then shoving casing into it. This technique proved very common from the 1940s through the 1950s.³¹⁰

Between 1975-2018, approximately 655,000 oil and gas wells were drilled in the state of Texas, and during that same period over just over 405,000 oil and gas wells were plugged and abandoned.³¹¹ Even if a small percentage of these wells were plugged with subpar practices or fraudulently plugged like the Wristen 68, below Texas lurks an inevitable threat to its people, land and freshwater resources. The commission does retain authority to order an operator to replug a well if it has failed to plug it according to commission rules, but without a robust buildout of post-abandonment verification and monitoring, this

authority is confined to paper.³¹² The condition and status of these 1,210,000 “plugged” and abandoned wells is not known, and nothing about the Texas oil and gas regulatory regime is designed or funded to confront that reality. If these plugs do fail and threaten Texans, the regulator on record has already declared itself a neutral party on a potential 1,210,000 “civil matters.”

Second, is the commission monitoring the interaction between new wells and abandoned wells? Many areas undergoing shale development have had prior exploration or development activity. Existing wells, either producing, idle, or plugged, may pose a risk of pressure communication. A “frac hit” is defined as “the invasion of fracturing fluids into an existing producer (parent well) while a neighboring well (child well) is being fractured.” A 2016 study of Eagle Ford Shale plays in South Texas, with specific attention paid to abandoned oil and gas wells converted into water wells (converted wells) showed that, “abandoned wells have the potential to be intersected by multiple stimulated reservoirs, and risks for intersection would increase if currently permitted horizontal wells in the Eagle Ford Shale are actually completed.”³¹³ We have yet to solve the Antina Cattle Company mystery, and we do not yet know the precise origins of those particular wells’ failures. But the Antina Cattle Company wells do establish a new urgency to ask these questions. In 2020 alone, the commission processed 12,950 horizontal drilling permit applications in a state with well over 1.2 million previously abandoned wells.³¹⁴ The lack of study, oversight, and monitoring amounts to nothing short of a complete dereliction of duty to the safety and wellbeing of Texas residents and resources.

Finally, the commission treats plugged and abandoned wells as “case closed” and does not monitor the conditions of those wells. Watt explained that the Wristen 68 well was a better representative sample of a normal old oil well in normal condition. It was initially plugged in 1968, with 50 years of sulfates eating away at the cement. There’s no reason to expect this cement to last especially long. Yet that appears to be a main expectation of the Railroad Commission’s oil and gas regulatory program – plug it and forget about it. But cement fails. The commission needs to take into consideration the lifespan of cement and understand that it is not the forever plugging material. There are new materials being developed that need to be validated and allowed for in state plugging regulations. Materials such as epoxy resins have been used as secondary abandonment barriers when the cement fails and provide a much longer lasting plugging option.³¹⁵

A 1976 report on plugging and abandonment methods remarked that, “the technical literature contains very little information on long-term testing of cementing materials to determine durability with time and under various temperatures.”³¹⁶ A recent textbook on plugging techniques pointed out that there is “no international standard describing testing of plugging materials to qualify them for an eternal perspective.”³¹⁷ The Texas oil and gas monitoring program does not confront this inevitability. Indeed, without comprehensive monitoring and linking liabilities to operators in perpetuity, all oil and gas wells are destined to become wards of the state of Texas. Each permitted well today is at risk of becoming a failed plug, a legacy well lost to poor records, and an extra cost to the state of Texas.

A New Year Blowout for an Old Problem

On January 3, 2022 a plugged and abandoned well on a neighbor’s property in Crane County had erupted into a geyser of saltwater brine.³¹⁸ Watt estimated the blowout’s height at 150 feet.³¹⁹ The salty mix coated the Permian sagebrush with white crystals, while temperatures were well above freezing.³²⁰

The well could not be located in Railroad Commission databases, but researchers found county files for a well that seemed to be a likely match. Gulf Oil Corporation (now Chevron) Core Hole Well No. 112 was a core test well drilled in 1947 to 1,390 feet.³²¹ Watt and her neighbor conducted a records search and found that the casing had been pulled and was plugged back to surface, then the well was reentered in

1957.³²² She said there was no record the well had been re-plugged after the 1957 reentry.³²³

Ms. Watt piloted a drone to better assess the blowout and provide real time information to the public. On January 6th, the Railroad Commission of Texas petitioned the Federal Aviation Administration enact a Temporary Flight Restriction (TFR),³²⁴ or “no fly zone” of a one-mile radius up to approximately 1,000 feet above ground level.³²⁵ Despite the well’s connection to Gulf Oil and Chevron, as of January 10th, the well was still blowing out and the Railroad Commission had deployed personnel and a plugging contractor to plug the well.³²⁶ Texas Monthly reported that Chevron took control of the well the next day, and a spokesperson commented “we are committed to assuming full responsibility for onsite operations, remediation and costs.”³²⁷

In the months preceding the blowout, the RRC had suspended “all disposal well permits to inject oil and gas waste into deep strata within the boundaries of the Gardendale SRA [Seismic Response Area]” in nearby Andrews, Midland, Ector, and Martin Counties.³²⁸ The RRC took this action in response to four earthquakes greater than a 3.0 magnitude occurring in a two-day period in northwest Midland.

But the subsurface problems the RRC is finally responding to are not so new. In Pecos County, just south of Midland, dozens of legacy oil and gas wells were once converted to water wells and are potentially no longer under the jurisdiction of the Railroad Commission.³²⁹ The wells began producing so much water in 2003 that they formed what is now referred to as “Boehmer Lake,” a massive salt-water body near Imperial, Texas.

Despite efforts from the Pecos County Groundwater Conservation District to get aid from the Oil and Gas Regulation and Cleanup Program to plug the Boehmer Lake wells, the RRC has refused in most cases, because the wells are classified as water wells. The RRC’s initial response to plug the Crane County blowout for a well assumed to belong to Chevron could indicate a change of policy from the commission.

In addition to the federal programs discussed in the [Decommissioning Non-Profits & Start-Ups](#) section the federal Infrastructure Investment and Jobs Act made \$30 million available to the Department of Energy for research and development to assist states with “identifying and characterizing undocumented orphaned wells” and “mitigating the environmental risks of undocumented orphaned wells.” The Railroad Commission would be wise to take advantage of this opportunity for federal assistance to cleanup oil and gas wells that were long ago reclassified as water wells and are now presenting pollution problems.³³⁰ It is unreasonable to expect individual landowners or counties to pay to address a costly problem that was created by state policy.



A well in Crane County, Texas blows out on January 3, 2022. Photo: Watt, Ashley Williams. @sand_frac. Twitter. Accessed on Jan. 11, 2021.

The RRC's action in response to the recent seismicity in the Gardendale SRA is evidence that the agency can make decisions to reduce permitting based on environmental and safety threats. Moreover, the January 3rd blowout underscores the need for the RRC to (1) spend federal dollars locating, plugging, and monitoring legacy wells, and (2) hold operators accountable for their own costs while they are still in operation.

Recommended Policy

Develop a plan for perpetual monitoring of plugged wells and locating legacy wells. As we see in the case of Antina Ranch, even plugged wells can fail. Texas landowners and neighbors of oil and gas development need a state agency to monitor the millions of legacy and plugged wells in Texas that can create risks to water supplies, air quality, and the climate. Part of this task will require the commission to accurately locate legacy wells and modern wells. Some of the federal funding authorized in the infrastructure bill can be spent to “identify and characterize undocumented orphaned wells on State and private land.”³³¹ The commission should take advantage of this funding to complete tasks it has not ordinarily had funding for, including not only locating legacy wells but also identifying the most expensive to remediate sites throughout the state that can only be cleaned up with the help of governmental bodies. Aside from the opportunities this federal funding creates, addressing long term funding sources for the OGRC fund will be essential for developing a plan to perpetually monitor plugged wells. It is essential to ensure that the commission holds operators accountable now and collects revenue now, because these finite fossil fuel resources will not be around forever -but their risks will. Those risks and costs will be passed on to everyday Texans in greater proportions as the oil and gas industry declines.

Develop a study on long-term testing of cement and other materials. Using more effective materials for plugging could help to reduce long-term risks of plugs failing and the remediation expenses required of the commission when there is no company around to pay for it. Additionally, the commission should consider reviewing Statewide Rule 14 to allow operators to use plugging materials that are found to be more effective than traditional cementing materials.

Monitor the interaction between new drilling, hydraulic fracturing, injection and disposal wells, and abandoned wells. The amount of oil and gas activity taking place throughout Texas has presented new challenges for industry and landowners alike. Texans need the commission to take a serious, scientific, and methodological approach to determining what risks are posed by connections between different types of wells under different geological circumstances.

Statutory Revisions and Supporting Resources

While no statutory or rule revisions are needed to develop these recommended plans or studies, the commission will need additional funding to achieve these objectives. The changes to the OGRC Fund recommended in the [State Funding](#) section and repealing relevant [tax exemptions and incentives](#) can help the commission to secure the revenue it needs to take on these new tasks.

Conclusion

Viewed in isolation, each of the Railroad Commission's policies and practices that contribute to operators orphaning wells above could be dismissed as accidental or an unintended consequence. But taken together, current oil and gas regulation in the state of Texas is designed to favor producers at the expense of the public. The design and implementation of the commission's oversight of oil and gas production creates risk at every stage of its program. It is often said that the Railroad Commission is failing or missing the mark,³³² but it is functioning exactly as it is designed, staffed, and funded. The commission's function is a resounding success for industry, though it fails to deliver on the promises of its mission: *stewardship of natural resources and the environment, our concern for personal and community safety, and our support of enhanced development and economic vitality for the benefit of Texans.*

The good news is that there are clear, actionable ways to reform the Railroad Commission. The following list of reforms is not comprehensive, but should be considered as a toolkit of possible solutions that would prevent more orphaning and protect the people and natural resources of Texas.

- 1. Tighten eligibility and increase scrutiny of operating permits and drilling permits.** The Railroad Commission should review financial solvency and environmental compliance before approving organization reports and drilling permits. Calculating a well's economic limit and planning in advance for asset retirement can help the commission to reduce the number of inactive and marginal wells that operators are likely to orphan. Collecting real-time production data can help the commission to calculate wells' economic limit and review a firm's financial solvency before operating permits are renewed and additional drilling permits are granted. Additionally, the commission should review applicants' full, undiscounted cleanup liabilities before new permits are approved.
- 2. Ensure operators pay for financial assurance that covers the full cost of asset retirement obligations.** Each well should have financial assurance that corresponds to its estimated level of risk without exception. The commission should issue a Decommissioning Costs Reporting Rule to more accurately inform financial assurance requirements and to control costs in the Oil Field Cleanup Program. Improved financial security tools include retroactive joint and several liability, sticky asset retirement obligations, and full cost bonding and trust funds for all Texas wells. Each tool has its place based on the risk a particular well represents. To support these reforms, operators must submit to the commission the bids and actual costs to plug and abandon wells and perform site restoration.
- 3. Hold operators accountable to their own decommissioning obligations.** Existing regulations allow operators to both sell a well and escape decommissioning liability all at once. There should be no exemptions to the legal obligation to safely plug and abandon oil and gas wells in Texas. Organization reports, drilling permits, and other activity permits should be turned into legal instruments and contracts that are not dischargeable by bankruptcy or contracts between private parties.
- 4. Repeal Inactive Well Plugging Extensions and Reduce the Marginal Well Population.** As it stands, Texas operators are able to indefinitely delay decommissioning through a variety of exemptions and "pay to delay" fees. The commission must instead require operators to report when they plan to cease production at least six months prior. Plugging and abandonment should commence and must proceed congruent with wind-down operations. In conjunction with new well solvency monitoring, the commission must also raise the production volume threshold that

defines “active” status and end the practice of marginal production. The commission should consider expedited timelines for decommissioning as an extension of its current proration authorities.³³³ When an operator chooses to decommission does not happen independent of regulation and law, but because of what is allowed by regulation and law.

- 5. Revise fees and surcharges deposited to the oil and gas regulation and cleanup fund (OGRC) and the General Revenue Fund.** Despite being the highest oil and gas producing state in the nation, the Railroad Commission’s monitoring and enforcement program continuously falls short, and the agency maintains a long backlog of orphaned wells and sites. Meanwhile, the state legislature routinely leaves unappropriated funds set aside in the OGRC Fund to certify the state budget. The commission was appropriated funding by the legislature in 2021 for a study to review sources of revenue to the OGRC Fund through 2025, including any caps on fees and fines. This represents a good opportunity to revise the commissions fees and surcharges to improve the commission’s capacity to administer the recommendations in this report. Furthermore, the OGRC Fund should be converted into a trust fund, separate from the General Revenue Fund, with the commission having access to the funds to spend on the OGRC Fund’s intended purpose.
- 6. Repeal tax exemptions and incentives for wells that operators are likely to orphan.** Texas cannot with one hand incentivize orphan wells with tax exemptions and incentives, while assuming those liabilities with the other hand. Texas paid out over \$370 million in incentives to oil and gas producers in 2020 and is forecasted to spend nearly \$300 million in incentives in 2021.³³⁴ Severance tax rates have remained flat for decades, and the people of Texas deserve a larger share from Texas resources. Increasing severance tax rates and repealing tax exemptions and incentives would also recoup the mounting costs from orphaned wells and monitoring previously abandoned wells. This additional funding could support a 21st century Railroad Commission of Texas, capable of achieving its mission. The agency has been chronically underfunded, understaffed and ill equipped to successfully monitor and inspect oil and gas infrastructure across the state.
- 7. Close gaps in the inspection program.** Implement a layered monitoring and inspection program with multiple redundancies to prevent hazards and protect human life. The Railroad Commission should be staffed, equipped and funded to meet its mission which includes a baseline ratio of staff to infrastructure and increased inspection frequency. Increase the inspector pay scale and pursue all options to increase benefits. The commission should train and equip all of its inspectors with the appropriate equipment and amend rules and regulations to grant RRC inspectors the power to issue “red light” enforcement actions and penalties at the time of inspection. If the commission cannot rise to the level of capacity needed to fulfill all parts of its mission, federal agencies like the U.S. Environmental Protection Agency and U.S. Department of Transportation can withdraw monitoring and enforcement authorities they have delegated to the RRC.
- 8. Develop a strategy to swiftly eliminate orphaned wells and sites.** Landowners, groundwater conservation districts, and neighbors of orphaned wells and sites are bewildered by the Railroad Commission’s slow response to the thousands of locations that need plugging and site cleanup. Many legacy sites are not even on the commission’s list. A true strategic plan for the Oilfield Cleanup Program would forecast growth in orphan wells, estimate total costs to address the problem, evaluate all the regulatory tools available (including those suggested in this report), calculate potential revenue increases through amended fees and surcharges, and make proposals to the legislature for statutory changes if necessary. Moreover, a strategic plan should assess ways to ensure that the state properly funds the execution of its monitoring and enforce-

ment program.

9. Bring the public State Managed Well Plugging and Cleanup Program “in-house.” Instead of competing for rigs and crews with drilling firms when prices are high and increasing costs because of profit markups, the commission could directly employ workers and buy its own equipment. More wells could be plugged, costs standardized, and efficiencies realized if the Railroad Commission carried out the plugging and abandonment and site restoration activities itself.

10. Create a program to oversee perpetual monitoring of plugged wells and locate legacy wells. The commission treats plugged and abandoned wells as a closed case and does not monitor the conditions of those wells. Yet, cement can degrade, and plugs can fail. There are at least 1,209,995 legacy and “recently” plugged and abandoned wells in the state of Texas that the commission does not monitor or oversee. Many wells are not properly located or recorded in commission databases. Only when these wells pollute a lake or threaten a landowner do they appear back on a commission spreadsheet. It is well past time for the Railroad Commission to create a monitoring program for previously abandoned and plugged wells.

If we want different results, then we require different approaches, different laws, and a different tax regime. Texas needs a resourced, funded and staffed oil and gas oversight agency with the mission to protect Texans above all else. Recently, Colorado’s Legislature passed SB 19-18, shifting the Colorado Oil and Gas Conservation Commission’s (COGCC) mission from “fostering” to “regulating” oil and gas development in a manner that protects public health, safety, welfare, the environment and wildlife resources.³³⁵ This is a subtle, but important, distinction. A regulator cannot simultaneously foster or promote or support an industry while credibly policing it. A change of the Railroad Commission of Texas mission is perhaps the precondition for the many, many recommendations we make in this report. The commission cannot “support enhanced development” of an industry that is in need of significant reforms. It is long past time for the Railroad Commission to protect public health and safety above all else.

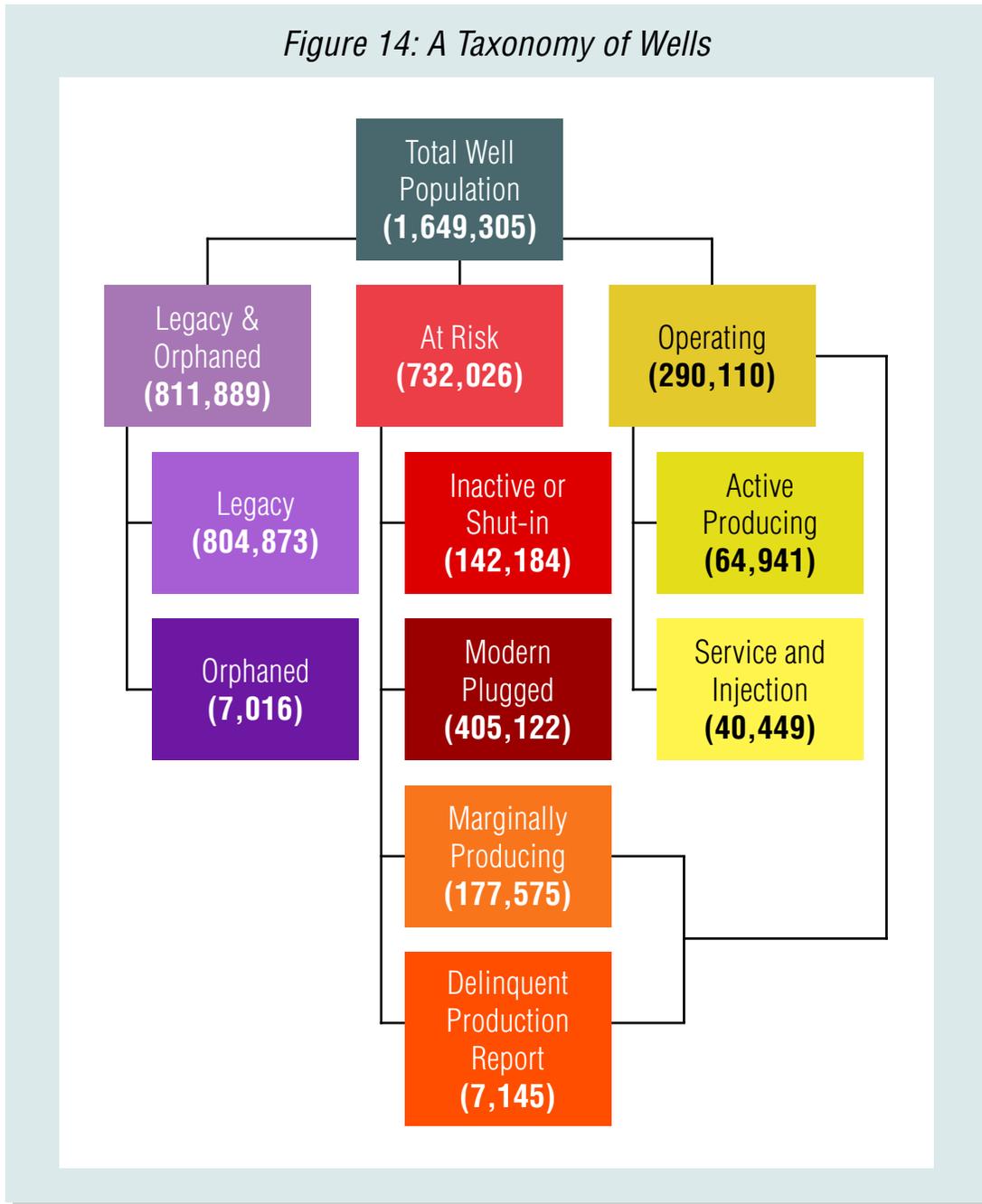
We acknowledge that a change to the mission statement is not a panacea -after all, the Railroad Commission does not currently follow its mission statement. State leaders can change words faster than they can truly shift mission and culture. Railroad Commission staff have inherited a century of norms and practices, but they can begin charting a new direction for the state and its people today. Texas ranchers have a fundamental right to clean water and pastures. Texas children have a right to breathe clean air, and the people of Texas have a fundamental right to an accountable and honest government that works for them.

As the regulator for the biggest oil-producing state, the Railroad Commission’s ability to enact reforms will have national implications. Colorado, Louisiana, New Mexico and all other oil and gas producing states are facing almost the exact same challenges. Indeed, many nations are facing how to manage the decline of a global industry while dealing with its wreckage, from Nigeria to New Zealand to Romania. Texas has an opportunity to lead, acting as the vanguard for an issue facing every oil and gas producing state in the United States, and indeed, the world.

Appendix A: Well Taxonomies and Populations

In total there are an approximate 1,650,000 wells of various ages and status in the state of Texas (Figure 14). Aside from legacy wells and modern plugged and abandoned wells, counts are based on data as of August 31, 2021.³³⁶

Figure 14: A Taxonomy of Wells



1. Legacy & Orphaned Well Inventories: These include all oil and gas well categories that are potentially “the government’s problem.” The government typically bears the responsibility and cost to monitor, abandon or re-abandon, and restore sites for these wells.

a. Legacy Wells: According to a recent analysis of wells drilled between 1871-1973, Texas has nearly 805,000 known abandoned oil and gas wells.^{337,338} Texas oil and gas production dates back to the 1860’s and there is a considerable inventory of wells both documented and lost to official records. A legacy well is any previously undiscovered, unreported, or un-permitted historic well. The status may be shut-in, abandoned or plugged (but with older technologies). Wells drilled before 1980 have a higher risk of well casing failures,³³⁹ and casings in wells drilled before 1953 are not considered effective, even by industry standards.³⁴⁰ Prior to 1950, wells were either orphaned or plugged and abandoned with very little cement. All oil and gas wells will become legacy wells unless monitored and maintained.³⁴¹

b. Orphan wells: At the end of FY 2021, there were 7,016 wells defined by the commission as orphaned wells.³⁴² According to the RRC definition,³⁴³ orphaned wells are inactive, non-compliant wells that have been inactive a minimum of 12 months and the responsible operator’s *Form P-5 Organization Report* has been delinquent for greater than 12 months.³⁴⁴ Operators desiring to take over these wells must have an active *Organization Report* and, upon request, provide a good faith claim to operate the wells. Private owners “orphan” wells and leave the costs and responsibility to decommission and plug the wells to Texans.

2. At Risk Wells: These wells are in danger of becoming orphaned in the near future. These wells may be producing, but there is inadequate financial security, or the operator may be close to or currently insolvent. The wells may be idled or inactive for a prolonged period of time.

a. Inactive or Shut-In Wells: At the end of FY 2021, there were 142,000 inactive or shut-in Texas oil and gas wells that account for roughly one-third of the total monitored well population, not counting legacy wells.³⁴⁵ Shut-in wells are wells that have been shut-in for less than 12 months. “Inactive” wells have been inactive more than 12 months and can regain active status by producing a minimum amount of oil or gas within a certain timeframe.³⁴⁶ These wells are not actively producing, injecting, disposing, or otherwise in service. This also includes unplugged wells that have been spudded or have been equipped with cemented casing and that have no reported production, disposal, injection or other permitted activity for a period of greater than 12 months. These wells can be further organized by age of last production.

b. Marginal and Stripper Wells: The Railroad Commission defines marginal wells as oil wells producing between less than 35 BOPD to less than 10 BOPD over the preceding 10 days, depending on depth of the well.³⁴⁷ The Texas Tax Code defines marginal wells as an “oil well that produces 10 barrels of oil or less per day on average during a month,” for the purposes of the Tax Credit for Enhanced Efficiency Equipment.³⁴⁸ Stripper wells are defined by the IRS as producing an average of 15 barrel-equivalents or less per day over the course of a calendar year.³⁴⁹ For gas wells, 6 Mcf is equal to 1 barrel-equivalent,³⁵⁰ so a stripper gas well produces 90 Mcf per day or less. The commission does not provide a summary of wells meeting these definitions. However, by the end of FY 2021, the commission reported about 109,000 oil wells producing less than 10 BOPD, and nearly 69,000

gas wells producing less than 250 Mcf per day, for a total of 178,000 low-producing wells.³⁵¹ These wells are nearing the end of their economically useful life. Owners of a well like this may artificially extend this phase, stalling plugging and abandonment requirements. Note, in Figure 14, Marginally Producing wells are considered both “At Risk” and “Operating.”

c. Insolvent Wells: These wells are under-bonded and producing beyond their Economic Limit (EL). The EL of an oil or gas well is the minimum average daily-oil-production rate needed to break even on a before- and/or after-income-tax basis. When a well has reached its economic limit, it cannot fund its own plugging and cleanup. When a well has reached its economic limit, it is deemed too mature and can't secure third-party bonding. The well is insolvent - more liability than asset. When you aggregate a company's whole inventory of wells and determine that collectively the wells are beyond their economic limit, the company is itself insolvent. Without appropriate bonding in place or additional secured collateral to pay for decommissioning, the company is a debtor to the state of Texas. Every drop of production beyond the EL increases the chances of orphaning.

d. Modern Plugged and Abandoned Wells: Between 1975-2018, 655,193 oil and gas wells were drilled in the state of Texas, and during that same period over 405,000 oil and gas wells were plugged and abandoned.³⁵² When a well stops producing commercial quantities of oil and gas, companies “abandon” it, usually by placing cement or bentonite clay plugs inside the wellbore, stopping the flow of gas and fluid. But cement and clay deteriorate, and plugs weaken. Abandoned wells may still have an operator on file with the commission.

e. Delinquent Production Report: The Railroad Commission reports gas wells that are delinquent in filing their monthly production report. While some of these operators will likely come into compliance, data suggests that operators with a history of noncompliance are more likely to orphan their wells. Moreover, a delinquent production report could be a sign that a well is simply not producing and should be classified as inactive. Note, in Figure 14, wells with a delinquent production report are considered both “At Risk” and “Operating.”

3. Operating Wells: A well that is currently producing, injecting, disposing or otherwise in service.

a. Active Wells: Active wells produce at least 5 barrels of oil or 50 Mcf of gas per month for three consecutive months or at least 1 barrel of oil or one Mcf of gas per month for 12 consecutive months.³⁵³ At the end of FY 2021, there were nearly 243,000 active oil and gas wells in the state of Texas with 163,000 oil wells and 79,000 gas wells, and of those, approximately 65,000 are producing above marginal levels.³⁵⁴ Here, we define non-marginal operating wells as unplugged wells with average daily oil and gas production equal to or greater than 10 barrels of oil or 250 Mcf of natural gas.

i. Service & Injection Wells: As of April 30, 2021, there were over 40,000 service and injection wells in the state of Texas. Unplugged injection wells and other unplugged wells with no reported oil and gas production, including wells classified as disposal, dry hole, monitor, observation, other, storage, and water.

4. Future Wells: These are wells not yet drilled or approved by the Railroad Commission of Texas but represent both future liabilities and future clean slate opportunities to regulate with the people in Texas at the forefront. As of 2019, the Energy Information Administration estimated that Texas has 18,622 million barrels of proven crude oil reserves and 113,736 billion cubic feet of natural gas.³⁵⁵

Appendix B: 2021 Oil and Gas Regulation and Clean Up Fund Revenues

Source: Texas Comptroller of Public Accounts Data Visualization Dashboard. Year: 2021. Appropriated Fund: 5155 GR Acct – Oil and Gas Regulation and Clean Up Fund. Revenue Category: All.

COMPTROLLER OBJECT	AMOUNT
3310 - Oil and Gas Regulation and Cleanup Fee Surcharge	\$19,382,778
3313 - Oil and Gas Well Drilling Permit	\$4,730,585
3314 - Oil and Gas Violations	\$7,181,508
3338 - Organization Report Fees	\$3,811,075
3339 - Railroad Commission Voluntary Cleanup Application Fees	\$33,900
3369 - Reimbursement for Well Plugging Costs	\$1,907,688
3373 - Injection Well Regulation	\$21,100
3381 - Oil-Field Cleanup Regulatory Fee on Oil	\$9,051,404
3382 - Railroad Commission Rule Exceptions	\$1,112,660
3383 - Oil-Field Cleanup Regulatory Fee on Gas	\$6,558,416
3384 - Oil and Gas Compliance Certification Reissue Fee	\$655,950
3393 - Abandoned Well Site Equipment Disposal	\$1,709,175
3553 - Pipeline Safety Inspection Fees	\$11,005,325
3592 - Waste Disposal Facilities, Generators, Transporters	\$188,510
3700 - Federal Receipts Matched – Other Programs	\$6,824,985
3701 - Federal Receipts Not Matched – Other Programs	\$119,242
3727 - Fees for Administrative Services	\$1,825,050
3791 - Deposit of Cash Bonds to Secure Liability	\$9,709,613
3879 - Credit Card and Electronic Services Related Fees	\$437,243
Total	\$86,266,207

Appendix C: 2021 RRC Revenue Deposited to the General Revenue Fund

Source: Texas Comptroller of Public Accounts Data Visualization Dashboard. Railroad Commission of Texas. 2021. Appropriated Fund: General Revenue Fund. Revenue Categories: All.

COMPTROLLER OBJECT	AMOUNT
3234 - Gas Utility Pipeline Tax	\$58,961,597
3329 - Surface Mining Permits	\$2,486,477
3702 - Federal Receipts – Earned Credits	\$2,482,623
3314 - Oil and Gas Violations	\$2,433,768
3035 - Commercial Transportation Fees	\$2,387,233
3722 - Conference, Seminars, And Training Registration Fees	\$914,856
3839 - Sale of Vehicles, Boats and Aircraft	\$146,346
3246 - Compressed Natural Gas Licenses	\$51,200
3719 - Fees for Copies or Filing of Records	\$48,333
3245 - Compressed Natural Gas Training and Examinations	\$41,969
3879 - Credit Card and Electronic Services Related Fees	\$33,215
3752 - Sale of Publications/Advertising	\$24,821
3802 - Reimbursements – Third Party	\$10,032
3717 - Civil Penalties	\$4,250
3754 - Other Surplus or Salvage Property/Materials Sales	\$2,929
3851 - Interest on State Deposits and Treasury Investments – General, Non-Program	\$1,905
3045 - Railroad Commission Service Fees	\$343
3105 - Discount for Sales Tax – State Agencies and Higher Education	\$10
Subtotal	\$70,031,906
3789 - Returned Checks – Default Fund	-\$100
3983 - Agency Unappropriated Receipts Swept by Comptroller	-\$66,326,442
Subtotal	-\$66,326,542
Net Revenue	\$3,705,364

Appendix D: Value of Texas oil and gas related tax exemptions or incentives claimed 2019 - 2021

Exemption or Incentive	FY 2019	FY 2020	As of 7/14/2021
Enhanced oil recovery severance tax rate reduction	\$48,600,000	\$39,700,000	\$36,700,000
Enhanced oil recovery projects using anthropogenic carbon dioxide incentive	\$3,300,000	\$966,315	\$513,168
Two-Year Inactive Well Incentive (also known as previously inactive well exemption)	\$1,700,000	\$151,855	Unknown
High-cost gas incentive	Unknown	\$210,000,000	\$153,100,000
Low-producing oil lease tax incentive	Unknown	\$7,200,000	\$5,000,000
Low-producing gas well tax incentive	Unknown	\$34,700,000	\$20,100,000
Equipment Used Elsewhere for Mineral Exploration or Production	\$70,700,000	\$71,400,000	\$72,300,000
Reuse/Recycling of Fracking Water	Unknown	\$8,100,000	\$8,300,000
Total	\$124,300,000	\$372,218,170	\$296,013,168

Appendix E: Relevant forms, rules, or statutes by recommendation

Recommendation	RRC Forms	RRC Rules	Statute
Tighten operators' eligibility by reviewing financial solvency and environmental compliance when operators file P-5 organization reports and drilling permit applications.	Form P-4 Certificate of Compliance and Transportation Authority Form P-5 Organization Report. Form W-1 Application for Permit to Drill, Recomplete, or Re-Enter.	16 TAC §3.1, 16 TAC §3.5, 16 TAC §1.201, 16 TAC §3.58 16 TAC §3.78	Texas Natural Resources Code 91.114, 91.142
Collect real-time production data	Form PR Monthly Production Report	16 TAC §3.27, 16 TAC §3.54, 16 TAC §3.58(b)	Texas Natural Resources Code Chapter 91, Subchapter C, Subchapter L
Apply joint liability retroactively to hold original operators responsible for well plugging and site cleanup along with new operators.		16 TAC §3.14(c)	Texas Natural Resources Code Sec. 89.011
Audit operator history for each proposed well transfer and deny the transfer of a well to known bad actors.	Form P-4 Certificate of Compliance and Transportation Authority	16 TAC §3.78(j)	Texas Natural Resources Code Sec. 91.107
Amend the Organization Report (Form P-5), the Application for Permit to Drill, Recomplete or Re-Enter (Form W-1), and all other activity permits into legal instruments and contracts with the state of Texas that state the basic rules and obligations accrued by the permit holder.	Form P-5 Organization Report Form W-1 Application for Permit to Drill, Recomplete, or Re-Enter Other relevant forms	16 TAC §3.1, 16 TAC §3.5, 16 TAC §1.201	Texas Natural Resources Code 89.011, 91.114, 91.142
Increase production thresholds that define "active" status for oil and gas wells.		16 TAC §3.15	Tex. Nat. Res. Code 89.023

Recommendation	RRC Forms	RRC Rules	Statute
Discontinue plugging extensions. Require plugging and abandonment as soon as production is officially ceased.	Form W-3X Application for an Extension of Deadline for Plugging an Inactive Well Form W-3C Certification of Surface Equipment Removal for an Inactive Well	16 TAC §3.14 16 TAC §3.15	Tex. Nat. Res. Code 89.023 to 89.030
Develop a Texas version of BSEE's "Idle Iron" program.	Not applicable		
Eliminate the use of blanket bonds.	Form P-5PB(2) Blanket Performance Bond Form P-5LC Irrevocable Documentary Blanket Letter of Credit	16 TAC §3.78 16 TAC §3.15(f)(2)(B)(iii)	Texas Natural Resources Code Sec. 89.023(a)(3)(G)(ii)(b), 91.104, 91.1042
Require individual, sinking trust funds (bankruptcy remote) with the commission as beneficiary for each permitted well. Require permit holders opting for an annual trust fund payment to purchase a full cost surety bond for each individual well.	Form P-5PB(1) Individual Performance Bond Form P-5PB(2) Blanket Performance Bond Form P-5LC Irrevocable Documentary Blanket Letter of Credit	16 TAC §3.78 16 TAC §3.15(f)(2)(B)(iii)	Texas Natural Resources Code Sec. 89.023(a)(3)(G)(ii)(b), 91.103, 91.104, 91.1041, 91.1042, 91.107
Issue a Decommissioning Costs Reporting Rule to inform bonding and trust requirements. Incorporate decommissioning data into a public database that includes the commission's own "cost calculation for plugging an inactive well" maintained for the commission's own orphan well program.	Form W-1 Application for Permit to Drill, Recomplete, or Re-Enter. Form P-5LC Irrevocable Documentary Blanket Letter of Credit	16 TAC §3.15 16 TAC §3.78	Texas Natural Resources Code Sec.89.002(9) Sec. 91.103 to 91.107

Recommendation	RRC Forms	RRC Rules	Statute
Revise fees and surcharges deposited to the oil and gas regulation and cleanup fund and the General Revenue Fund.	Any forms that specify the amount of fee that must be submitted with the form.	Various rules in 16 TAC Chapter 3 that include specific amounts for fees and surcharges. 16 TAC §7.351	Texas Natural Resources Code Sec. 81.067 Sec. 81.070 Sec. 81.071 Sec. 81.116 Sec. 81.117 Texas Utilities Code Chapter 122
Convert the OGRC Fund into a trust fund, separate from the General Revenue Fund.			Texas Natural Resources Code Sec. 81.067 Sec. 81.115
Increase the crude oil and natural gas severance taxes for all existing and future production.			Texas Tax Code Sec. 201.052 Sec. 202.052
Repeal all crude oil and natural gas severance tax exemptions and tax incentives.	Form H-12A Application for Certification for Additional Tax Rate Reduction for Enhanced Recovery Projects Using Anthropogenic Carbon Dioxide Form H-14 Enhanced Oil Recovery Reduced Tax Annual Report Form ST-1 Application for Texas Severance Tax Incentive Certification		Texas Tax Code Sec. 202.054 Sec. 202.0545 Sec. 202.056 Sec. 202.060 Sec. 201.057 Sec. 202.058 Sec. 201.058 Sec. 201.059 Sec. 202.061 Sec. 151.324 Sec. 151.334 Sec. 151.355(7)
Federal agencies should audit of the Railroad Commission's regulations to ensure that they conform to federal environmental law and that standards prioritize the health and safety of Texans.		Various rules potentially including 16 TAC §3.8, §3.9, §3.13, §3.14, §3.15, §3.32, §3.91, §3.93	Related statutes.

Recommendation	RRC Forms	RRC Rules	Statute
Create and implement a layered monitoring and inspection program.			Texas Natural Resources Code Sec. 81.066
Develop a strategy to improve the pace of orphaned well plugging and site cleanup.			Texas Natural Resources Code Sec. 81.066
Study feasibility of bringing the State Managed Well Plugging and Cleanup Program in house.		16 TAC §3.14	
Seek clarity from federal courts on the application of priority liabilities in bankruptcy proceedings.	Not applicable		
Consider what new oversight mechanisms are appropriate for non-profit organizations and financial assurance providers that are seeking to resolve the orphan wells problem.	Not applicable		
Extend notice requirements to allow staff more time to plan for monitoring a plugging operation.	Form W-3A Notice of Intention to Plug and Abandon	16 TAC §3.14(a)(3)	
Develop a plan for perpetual monitoring of plugged wells and locating legacy wells.	Not applicable		
Develop a study on long-term testing of cement and other materials.	Not applicable		
Monitor the interaction between new drilling, hydraulic fracturing, injection and disposal wells, and abandoned wells.	Not applicable		

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- ² Trey Cowan, & Tom Sanzillo. (2021). Deep in the Heart of Texas, Oil and Gas Losing Economic Luster. http://ieefa.org/wp-content/uploads/2021/07/Deep-in-the-Heart-of-Texas-Oil-and-Gas-Losing-Economic-Luster_July-2021.pdf
- ³ Text - H.R.3684 - 117th Congress (2021-2022): Infrastructure Investment and Jobs Act. (2021, November 15). <https://www.congress.gov/bill/117th-congress/house-bill/3684/text>
- ⁴ Specifically, Title VI--Methane Reduction Infrastructure
- ⁵ Environmental Defense Fund. (2021). Mapping Orphan Wells in Texas. <https://www.edf.org/sites/default/files/2021-10/Orphan-Well-FactSheet-TX.pdf>
- ⁶ The life cycle of an oil well is dependent upon several variables, but all oil and gas firms base decisions on EL. When the operating cost of a well equals the income from production, the well has reached its economic limit; and then firms decide whether to abandon the well and shut-in production or divest the well and sell to another firm.
- ⁷ Sunset Advisory Commission. (2017). Staff Report with Final Results - Railroad Commission. https://www.sunset.texas.gov/public/uploads/files/reports/Railroad-Commission-of-Texas-Staff-Report-with-Final-Results_6-21-17.pdf
- ⁸ Blanket bonds, the practice that allows a company to bundle hundreds of wells into one lump policy, lowers the per well coverage and has exacerbated this shortfall. It is as if a commercial real estate owner is only required to take out one single insurance policy for all of its properties.
- ⁹ Form W-1 Application for Permit to Drill, Recomplete or Re-Enter <https://www.rrc.state.tx.us/media/4hphrgp4/form-w-1.pdf>
- ¹⁰ Weber, Jeremy G. (December 2021). "Identifying the end: Minimum production thresholds for natural gas wells" Resources Policy Volume 74, December 2021, 102404 <https://www.sciencedirect.com/science/article/abs/pii/S030142072100413X>
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- ¹⁸ Shortly thereafter, Congress created the quasi-governmental entity, the Interstate Oil and Gas Compact Commission, to serve that role nationally helping member states craft regulatory programs that maximize oil and gas recovery.
- ¹⁹ The Interstate Compact to Conserve Oil and Gas: A Summary of its Organization, Purposes and Functions. 1942. Interstate Oil Compact Commission. Accessed on: December 20, 2021. Retrieved from: [https://hdl.handle.net/2027/uc1.\\$b103637](https://hdl.handle.net/2027/uc1.$b103637)
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- ²¹ Prindle, David F. 1981. Petroleum Politics and the Texas Railroad Commission. University of Texas Press.
- ²² Railroad Commission of Texas (2020). Operating Budget for Fiscal Year 2020. <https://www.rrc.texas.gov/media/huydkffv/opbudget2020.pdf>
- ²³ A temporarily abandoned well is an active well incapable of production or injection without the addition of one or more pieces of wellhead or other equipment, including valves, tubing, rods, pumps, heater-treaters, separators, dehydrators, compressors, piping or tanks. Temporarily abandoned wells are not "permanently" plugged because the operator has indicated there is future use from the well. According to the Railroad Commission of Texas records for the wells on the Antina Cattle Ranch, those wells' official status for some of the wells was "Temporarily Abandoned."
- ²⁴ The Railroad Commission defines orphan wells as "inactive, non-compliant wells that have been inactive a minimum of 12 months and the responsible operator's Organizational Report (Form P-5) has been delinquent for greater than 12 months." See Railroad Commission of Texas. (2021). Orphan Wells with Delinquent P-5 Greater Than 12 Months. Accessed

on December 20, 2021. Retrieved from: <https://www.rrc.texas.gov/oil-and-gas/research-and-statistics/well-information/orphan-wells-12-months/>

²⁵ Railroad Commission of Texas. Oil Field Cleanup Program Annual Reports. Accessed on November 13, 2021. Retrieved from: <https://www.rrc.texas.gov/oil-and-gas/environmental-cleanup-programs/oil-gas-regulation-and-cleanup-fund/>

²⁶ Railroad Commission of Texas. “2020 Oil Field Cleanup Program Annual Report.” See Figure 1: Wells Monitored by the Railroad Commission as of August 31, 2020. Retrieved from: <https://www.rrc.state.tx.us/media/jjhlaywd/2020-oilfield-cleanup-program-annual-report-fiscal-year-2020.pdf>

²⁷ General Appropriations Act. 85th Leg. R.S. Railroad Commission.VI-45.

²⁸ RRC Site Remediation Candidate List where OFCU = Active, obtained through an open records request on Oct. 25, 2021.

²⁹ Railroad Commission of Texas (2020). Operating Budget for Fiscal Year 2020. <https://www.rrc.texas.gov/media/huydkffv/opbudget2020.pdf>

³⁰ Railroad Commission of Texas. (August 31, 2021). Wells Monitored by the Railroad Commission. <https://rrc.texas.gov/oil-and-gas/research-and-statistics/well-information/well-distribution-tables/>

³¹ Railroad Commission of Texas. (2021). Oil and Gas Division Monitoring and Enforcement Plan Fiscal Year 2022. https://www.rrc.texas.gov/media/uhffe2db/og-s-plan-fy-2022_final_june-22.pdf

³² Chuck Lesniak. Public Comments submitted to the Railroad Commission of Texas regarding the Draft Oil and Gas Monitoring and Enforcement Plan for FY 2022, July 26, 2021. https://commissionshift.org/wp-content/uploads/2021/07/2021.07.06_Public-Comments-on-RRC-OGME-Plan-Commission-Shift.pdf

³³ Email Correspondence with Railroad Commission of Texas, May 14, 2021.

³⁴ Railroad Commission of Texas. (August 31, 2021). Wells Monitored by the Railroad Commission. <https://rrc.texas.gov/oil-and-gas/research-and-statistics/well-information/well-distribution-tables/>

³⁵ For example, Enverus has located wells that are not in the Railroad Commission’s databases. Also see Carbon Tracker Plugging Liability Estimator Tool, Carbon Tracker. 2021. <https://carbontracker.org/aro-portal-plugging-liability-estimator-tool/>

³⁶ See Appendix A, Figure 14 for exact numbers in each well category.

³⁷ While it is vital for a regulator to classify wells, there is no absolute and definitive flow from one category to the next. Indeed, it is possible for a well to meet all three criteria simultaneously. The world rarely deals in absolutes, and oil and gas wells and the risks they pose are no exception.

³⁸ 16 Tex. Admin. Code §3.1. Also see Form P-5: <https://www.rrc.state.tx.us/media/02nddiqq/form-p5.pdf>

³⁹ 16 Tex. Admin. Code §3.78 (d)

⁴⁰ Railroad Commission of Texas. (2021). Summary of Requirements and Responsibilities. <https://www.rrc.texas.gov/oil-and-gas/requirements-and-responsibilities/summary-of-requirements/>

⁴¹ Railroad Commission of Texas. (2018, October 10). @TxRRC: How to Complete Your Form P-5. YouTube. <https://www.youtube.com/watch?v=HoulQa4Tuco>

⁴² Railroad Commission of Texas. (2021). HB2259-Inactive Well Compliance Summary. Compliance and Enforcement. <https://www.rrc.texas.gov/oil-and-gas/compliance-enforcement/hb-2259-hb-3134-inactive-well-requirements/inactive-well-compliance-summary/>

⁴³ McFarland, John B. (2012). Report Card on HB 2259 – Inactive Wells. Oil and Gas Lawyer Blog. Retrieved from: <https://www.oilandgaslawyerblog.com/report-card-on-hb-2259-inact/>

⁴⁴ Railroad Commission of Texas. (2015, September 3). HB 2259/HB 3134 Enforcement Status. Compliance and Enforcement. <https://www.rrc.texas.gov/oil-and-gas/compliance-enforcement/hb-2259-hb-3134-inactive-well-requirements/hb-2259-hb-3134-enforcement-status/>

⁴⁵ Railroad Commission of Texas. (2020). Operating Budget for Fiscal Year 2020. <https://www.rrc.texas.gov/media/huydkffv/opbudget2020.pdf>

⁴⁶ Railroad Commission of Texas. (2019). Oil and Gas Division Permitting Efficiencies Report. Accessed on Dec. 20, 2021. Retrieved from: <https://www.rrc.texas.gov/media/yxyj53lx/rider-9-permitting-efficiencies-report.pdf>

⁴⁷ Railroad Commission of Texas (2020). Operating Budget for Fiscal Year 2020. <https://www.rrc.texas.gov/media/huydkffv/opbudget2020.pdf>

⁴⁸ Durrett et al. (2018) explains “The Commission defines a good faith claim as a factually supported claim based on a recognized legal theory to a continuing possessory right in a mineral estate, such as evidence of a currently valid oil and gas

lease or a recorded deed conveying a fee interest in the mineral estate. 16 Tex. Admin. Code §3.15(a)(5).” Source: Durrett, B., Skinner Fernandez, R., & Smith, D. C. (2018, April 20). Plugging Liability: A Framework for Risk and Financial Security. 44th Annual Ernest E. Smith Oil, Gas and Mineral Law Institute. https://www.dykema.com/media/site_files/167_Durrett - Plugging Liability Paper.pdf

⁴⁹ 16 Tex. Admin. Code §1.201

⁵⁰ Railroad Commission of Texas. (2021). 2020 Annual Summary of Drilling Permits, Completions and Plugging Reports Processed. <https://www.rrc.texas.gov/media/xm4ixbs1/annual-2020.pdf>

⁵¹ Tex. Nat. Res. Code. § 89.002(a)(2) (2020).

⁵² Resnick-Ault, Jessica. David French. Bankruptcy looms over the U.S. energy industry, from oil fields to pipelines. (April 23, 2020). Reuters. <https://www.reuters.com/article/us-global-oil-usa-restructuring-focus/bankruptcy-looms-over-u-s-energy-industry-from-oil-fields-to-pipelines-idUSKCN2250FQ>

⁵³ Mark J. Kaiser. (2019). Decommissioning Forecasting and Operating Cost Estimation. Gulf Professional Publishing.

⁵⁴ Kaiser, M.J., B. Snyder, and A.G. Pulsipher. 2011. Assessment of opportunities for alternative uses of hydrocarbon infrastructure in the Gulf of Mexico. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Regulation and Enforcement, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study BOEMRE 2011-028. 278 pp.

⁵⁵ The Boston Consulting Group. 2015. Asset Abandonment in Upstream Oil: A Growing Threat to the Sector. Retrieved from: <https://www.bcg.com/publications/2015/upstream-oil-gas-energy-environment-asset-abandonment-in-upstream-oil-a-growing-threat-to-the-sector>

⁵⁶ Tabuchi, Hiroko. (June 2, 2021). “Here Are America’s Top Methane Emitters. Some Will Surprise You.” The New York Times. Retrieved from: <https://www.nytimes.com/2021/06/02/climate/biggest-methane-emitters.html>

⁵⁷ Cowan, Trey and Tom Sanzillo. July 2021. Deep in the Heart of Texas, Oil and Gas Losing Economic Luster. Institute for Energy Economics and Financial Analysis. http://ieefa.org/wp-content/uploads/2021/07/Deep-in-the-Heart-of-Texas-Oil-and-Gas-Losing-Economic-Luster_July-2021.pdf

⁵⁸ U.S. Code § 548 - Fraudulent transfers and obligations

⁵⁹ U.S. Environmental Protection Agency. 2021. Case Summary: Court Decision in Tronox Bankruptcy Fraudulent Conveyance Case Results in Largest Environmental Bankruptcy Award Ever. Accessed on: December 20, 2021. Retrieved from: <https://www.epa.gov/enforcement/case-summary-court-decision-tronox-bankruptcy-fraudulent-conveyance-case-results-largest>

⁶⁰ “Most majors do not operate properties once they reach a certain minimum level and regularly divest or decommission assets low on their decline curves.” Excerpt from Mark Kaiser’s “Decommissioning Forecasting and Operating Cost Estimation.” (2019). Gulf Professional Publishing.

⁶¹ Tex. Tax Code. Sec. 202.054 (10)

⁶² Language adopted from “The Abandoned Well Act of 2021” written by Megan Milliken Biven and with consultation on economic limit from Regan Boychuck. <https://www.truestransition.org/>

⁶³ Note: A larger discussion on the legal end date for the production of oil and gas resources and carbon budgets are beyond the scope of this report, but relevant, nevertheless.

⁶⁴ Correspondence between the North Dakota Oil and Gas Division and operator, Argo (October 2021) Obtained through the Freedom of Information Act.

⁶⁵ Railroad Commission of Texas. (2021). Production Reporting Form PR. Oil and Gas FAQs. <https://www.rrc.texas.gov/about-us/faqs/oil-gas-faqs/production-reporting-form-pr-faqs>

⁶⁶ The 2017 Sunset Commission Final Report noted “The Railroad Commission’s system only catches operators producing on a severed lease if the operators effectively turn themselves in.” (p. 38)

⁶⁷ Clayton Aldern, Christopher Collins, & Naveena Sadasivam. (2021, March/April). Waves of Abandonment. Grist and The Texas Observer. <https://grist.org/abandoned-oil-gas-wells-permian-texas-new-mexico/>

⁶⁸ See General Appropriations Act. 87th Leg. R.S. Railroad Commission. VI-48; Railroad Commission of Texas. Oil and Gas. Drilling Permit Processing Times. Accessed on Dec. 9, 2021. Retrieved from: <https://www.rrc.texas.gov/oil-and-gas/> and Railroad Commission of Texas. Oct. 10, 2018. @TxRRC: How to Complete Your Form P-5. Accessed on Dec. 9, 2021. Retrieved from: <https://www.youtube.com/watch?v=HouIQa4Tuco>

⁶⁹ Railroad Commission of Texas (2020). Operating Budget for Fiscal Year 2020. <https://www.rrc.texas.gov/media/huydkffv/opbudget2020.pdf>

⁷⁰ Chuck Lesniak. Public Comments submitted to the Railroad Commission of Texas regarding the Draft Oil and Gas Monitoring and Enforcement Plan for FY 2022, July 26, 2021. https://commissionshift.org/wp-content/uploads/2021/07/2021.07.06_Public-Comments-on-RRC-OGME-Plan-Commission-Shift.pdf

⁷¹ Texas Natural Resources Code. Section 89.011. Retrieved from: <https://statutes.capitol.texas.gov/Docs/NR/htm/NR.89.htm>

⁷² Section 548 of U.S. Chapter 11 Bankruptcy Code provides a bankruptcy trustee (or the debtor-in-possession) the power to set aside or “avoid” certain transfers of the debtor’s assets out of the bankruptcy estate that may otherwise place assets

beyond creditors' reach. Such a transfer of the debtor's assets to a third party, with the intent to prevent creditors from reaching the assets to satisfy their claims, is known as a "fraudulent conveyance" or a "fraudulent transfer." Oil and gas companies intentionally pass on properties to less capitalized firms to avoid environmental liabilities and in doing so defraud the government and landowners of those obligations.

⁷³ Note: There is legal precedent for retroactive joint and several liability for environmental debts under the Environmental Response, Compensation, and Liability Act (Superfund) 42 U.S.C. §9601 et seq. (1980). EPA cleans up orphan sites when it cannot identify or locate potentially responsible parties, or when they fail to act. Through various enforcement tools, EPA obtains private party cleanup through orders, consent decrees, and other small party settlements. EPA also recovers costs from financially viable individuals and companies once they complete a response action. EPA is authorized to implement the Act in all 50 states and U.S. territories.

⁷⁴ State of California (2018, January) Publication No. PRC10: California Statutes and Regulations for the Division of Oil, Gas, & Geothermal Resources. Retrieved from: <https://www.conservation.ca.gov/index/Documents/DOGGR%20Statutes%202018%20%20updated%204-4.pdf>

⁷⁵ U.S. CFR §250.1701-§250.1702 "Who must meet the decommissioning obligations in this subpart?" <https://www.govinfo.gov/app/details/CFR-2013-title30-vol2/CFR-2013-title30-vol2-sec250-1701>

⁷⁶ As shown in the recent Fieldwood Bankruptcy, the United States government will pursue prior lessees equally. Chutchian, Maria. "In Brief: Fieldwood Energy approved to solicit credit votes on reorg plan" (April 14, 2021). Westlaw News via Reuters. <https://www.reuters.com/article/bankruptcy-fieldwood-idUSL1N2M7384>

⁷⁷ The decommissioning of the Holly Platform is the best example of this policy. See California State Lands Commission (2021, December 9) Platform Holly/ Piers 421/ Venoco Bankruptcy. <https://www.slc.ca.gov/oil-and-gas/southellwood/>

⁷⁸ Paul, Sonali. (2021, May 11). Australia hits oil producers with levy to decommission abandoned Timor Sea field. Reuters.

⁷⁹ New Zealand Parliament. (2021 November) Crown Minerals (Decommissioning and Other Matters) Amendment Bill. <https://www.legislation.govt.nz/bill/government/2021/0047/latest/LMS508724.html#LMS508596>

⁸⁰ Alberta Liabilities Disclosure Project <https://www.aldpcoalition.com/>

⁸¹ Exxon recently stopped a sale of Australian assets when the government informed the operator that it would retain its decommissioning obligations. See Williams, Perry. (2021, May 21). Oil giant faces \$2bn Bass Strait clean-up bill. Retrieved from: <https://www.couriermail.com.au/business/exxonmobil-faces-2bn-bass-strait-cleanup-bill/news-story/f86989d45fc51df6fb26991a95094f1a>

⁸² For example, see The U.S. Department of the Interior Bureau of Ocean Energy Management Lease Agreement. <https://www.boem.gov/sites/default/files/about-boem/Procurement-Business-Opportunities/BOEM-OCS-Operation-Forms/BOEM-2005.pdf>

⁸³ Railroad Commission of Texas. Oil and Gas Circular No. 13. March 1, 1923. <https://hdl.handle.net/2027/mdp.35112102913763>

⁸⁴ Tex. Nat. Res. Code Sec. 89.011.

⁸⁵ 16 Tex. Admin. Code §3.14 (b)(2)

⁸⁶ 16 Tex. Admin. Code §3.15(a)(6).

⁸⁷ "Total well population" includes all active wells and inactive wells that are neither plugged nor orphaned but does not include legacy wells that have not been located.

⁸⁸ 16 Tex. Admin. Code §3.15(a)(1), adopted in 41 Tex. Reg. 9465 (Dec. 2, 2016).

⁸⁹ Railroad Commission of Texas. (Form last revised on 8./2019), Form W-3X Application for an Extension of Deadline for Plugging an Inactive Well. <https://www.rrc.state.tx.us/media/2vymqxgz/w-3x-fill.pdf>

⁹⁰ 16 Tex. Admin. Code §3.15(a)(5).

⁹¹ Railroad Commission of Texas. Rev. 08/2019. Form W-3C Certification of Surface Equipment Removal for an Inactive Well. Accessed on Dec. 9, 2021. Retrieved from: <https://rrc.texas.gov/media/a5fmfsyf/w-3c.pdf>

⁹² 16 Tex. Admin. Code §3.15(f)

⁹³ Texas statute stipulates that filing a \$2 million blanket bond is only an option for publicly traded companies, although Railroad Commission rules do not include this stipulation. See Tex. Nat. Res. Code Sec. 89.023(a)(3)(G) and 16 Tex. Admin. Code. §3.15(f)(2)(B)(iii).

⁹⁴ 16 Tex. Admin. Code §3.15(j)

⁹⁵ Here we define "reactivated" wells as wells that operators re-completed or re-entered; or orphan wells that were taken off the orphan wells list for the following reasons: returned to active status, operator change, P-5 renewal, other reasons, or originally delinquent P-5 >12 months changed to < 12 months.

⁹⁶ Railroad Commission of Texas. Oil Field Cleanup Program Annual Reports. Retrieved from: <https://www.rrc.texas.gov/oil-and-gas/environmental-cleanup-programs/oil-gas-regulation-and-cleanup-fund/>

⁹⁷ Schlumberger. (2021). Oilfield Glossary: completion. Accessed on November 24, 2021. Retrieved from: <https://glossary.oilfield.slb.com/en/terms/c/completion>

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- ¹⁰¹ Carbon Tracker. Billion Dollar Orphans. (2020) <https://carbontracker.org/reports/billion-dollar-orphans/>
- ¹⁰² Railroad Commission of Texas (Form last revised on 6/ 2002) Form P-5PB(2), Blanket Performance Bond, Form P-5LC, Irrevocable Documentary Blanket Letter of Credit. <https://www.rrc.texas.gov/media/kr3npwry/p-5pb2p.pdf>
- ¹⁰³ Clayton Aldern, Christopher Collins, & Naveena Sadasivam. (2021, March). Waves of Abandonment. *Grist and The Texas Observer*. <https://grist.org/abandoned-oil-gas-wells-permian-texas-new-mexico/>
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- ¹⁰⁵ Railroad Commission of Texas. Oil Field Cleanup Program Annual Reports. And Monthly Drilling, Completion and Plugging Summaries. Retrieved from: <https://www.rrc.texas.gov/oil-and-gas/research-and-statistics/drilling-information/monthly-drilling-completion-and-plugging-summaries/>
- ¹⁰⁶ 16 Tex. Admin. Code §3.15(e)
- ¹⁰⁷ 16 Tex. Admin. Code §3.15(g) and Railroad Commission of Texas. (2021). HB2259-Inactive Well Compliance Summary. Compliance and Enforcement. <https://www.rrc.texas.gov/oil-and-gas/compliance-enforcement/hb-2259-hb-3134-inactive-well-requirements/inactive-well-compliance-summary/>
- ¹⁰⁸ 16 Tex. Admin. Code §3.15(f)(2)(A)
- ¹⁰⁹ 16 Tex. Admin. Code §3.15(k).
- ¹¹⁰ 16 Tex. Admin. Code §3.15(f)(2)(A)
- ¹¹¹ Weber, Jeremy G. "Identifying the end: Minimum production thresholds for natural gas wells" *Resources Policy* Volume 74, December 2021, 102404 <https://www.sciencedirect.com/science/article/abs/pii/S030142072100413X>
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- ¹¹⁴ Conversation with Dr. Amy Townsend-Small, University of Cincinnati, December 2020
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- ¹²⁰ See U.S. Department of the Interior. Bureau of Safety and Environmental Enforcement. Gulf of Mexico OCS Region. NTL No. 2018-G03. <https://www.bsee.gov/sites/bsee.gov/files/notices-to-lessees-ntl//ntl-2018-g03.pdf>
- ¹²¹ Sunset Advisory Commission. (2017). Sunset Advisory Commission Staff Report with Final Results: Railroad Commission of Texas. p. 4. Retrieved from: Railroad Commission of Texas Staff Report with Final Results
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- ¹²⁵ Railroad Commission of Texas, Staff Report, Sunset Advisory Commission of the 85th Texas Legislature, 2016-2017, 4, https://www.sunset.texas.gov/public/uploads/files/reports/Railroad%20Commissio%20of%20Texas%20Staff%20Report%20with%20Final%20Results_6-21-17.pdf
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- ¹²⁷ These wells are depleted, low value wells that constitute more debt than asset, but in repackaging them into these to new financial products they may appear to be a new, low-risk investment.
- ¹²⁸ Hunton Andrews Kurth. (April 2020). Securitizations by Independent Oil and Gas Companies. <https://www.huntonak.com/images/content/6/5/v2/65462/securitizations-independent-oil-gas-companies.pdf>
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- ²⁷⁵ Mark Curriden. (2020, September 1). Meet the judge who saved the Texas bankruptcy practice. The Houston Chronicle. <https://www.houstonchronicle.com/business/article/Meet-the-judge-who-saved-the-Texas-bankruptcy-15528320.php>
- ²⁷⁶ Rasmissen, Robert K. Bankruptcy and the Administrative State. Hastings Law Journal. Volume 42. Issue 6. https://repository.uchastings.edu/cgi/viewcontent.cgi?article=3046&context=hastings_law_journal
- ²⁷⁷ One of the authors of this report has also written and proposed federal legislation that would create a new federal agency, the Abandoned Well Administration, to directly employ oil and gas workers and directly perform identification, plugging and abandonment, remediation, and monitoring work across the nation. TrueTransition.org
- ²⁷⁸ H.R.3585 - 117th Congress (2021-2022): REGROW Act of 2021. (2021, May 28). <https://www.congress.gov/bill/117th-congress/house-bill/3585>
- ²⁷⁹ H.R.3684 - 117th Congress (2021-2022): Infrastructure Investment and Jobs Act. (2021, November 8). <https://www.congress.gov/bill/117th-congress/house-bill/3684>
- ²⁸⁰ Environmental Defense Fund. (2021). Mapping Orphan Wells in Texas. <https://www.edf.org/sites/default/files/2021-10/>

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²⁸¹ Railroad Commission of Texas. (2021, Dec. 17). Orphaned Well Site Plugging, Remediation, and Restoration Section 40601 of the Infrastructure Investment and Jobs Act, Notice of Intent to Apply for Formula Grant Funding. In their cover letter to the Department of the Interior, commission staff noted “The count of documented orphaned wells includes 310 bay or offshore wells located in state waters of the Gulf of Mexico. The projected cost to plug the state’s documented orphaned wells includes the higher costs associated with plugging those 310 bay or offshore wells, along with costs associated with plugging inland wells across Texas.”

²⁸² Veazey, Matthew V. “A Better Way to Cut the Orphan Well Backlog?” Rigzone Magazine. (March 8, 2021). https://www.rigzone.com/news/a_better_way_to_cut_the_orphan_well_backlog-08-mar-2021-164819-article/ Texas-specific organizations include Texas Well Protected Energy Foundation, Native State Environmental, and OneNexus Environmental.

²⁸³ Railroad Commission of Texas. (2021). Reimbursement to Surface Owners. Orphan Wells > 12 Months. <https://www.rrc.texas.gov/oil-and-gas/research-and-statistics/well-information/orphan-wells-12-months/reimbursement-to-surface-owners/>

²⁸⁴ Texas Nat. Res. Code. Sec. 89.048(c)(2).

²⁸⁵ Railroad Commissioner Calendar. May 14, 2021. Public Records Request obtained by Documented.

²⁸⁶ Railroad Commission of Texas. (Nov 1, 2021). Approved Cementers List. <https://www.rrc.texas.gov/media/ka5hfqtc/cementers-list-november-21.pdf>

²⁸⁷ Tex. Nat. Res. Code. 81.066.

²⁸⁸ 16 Tex. Admin Code. §3.14(e) through (k)

²⁸⁹ 16 Tex. Admin Code. §3.14(b)(2)

²⁹⁰ Tex. Nat. Res. Code. Sec. 81.020

²⁹¹ Railroad Commission of Texas. (1983, January 1). Form W-3A Notice of Intention to Plug and Abandon. <https://www.rrc.texas.gov/media/1wbfo33t/w-3ap.pdf>

²⁹² 16 Tex. Admin. Code §3.14(a)(3) – “Operator shall notify the district office at least 4 hours prior to commencing plugging operations and proceed with the work as approved. Operations shall not be suspended prior to plugging the well unless the hole is cased, and casing is cemented in place in compliance with Commission rules.”

²⁹³ “Field Inspector Training Program” document, provided by the Railroad Commission through open records request.

²⁹⁴ Correspondence with the Railroad Commission of Texas Open Records office. Received on: November 17, 2021

²⁹⁵ Tara Jones’ comments in Commission Shift. (2021). Public Comments submitted to the Railroad Commission of Texas regarding the Draft Oil and Gas Monitoring and Enforcement Plan for FY 2022. Retrieved from: https://commissionshift.org/wp-content/uploads/2021/07/2021.07.06_Public-Comments-on-RRC-OGME-Plan-Commission-Shift.pdf

²⁹⁶ Railroad Commission of Texas. (2019, August). Form W-3 Plugging Record. <https://www.rrc.texas.gov/media/lw0bmny4/w-3p.pdf>

²⁹⁷ Railroad Commission of Texas. (2014). Form W-15 Cementing Report. <https://www.rrc.texas.gov/media/nfpf0etz/w-15-08-04-2014-final.pdf>

²⁹⁸ Railroad Commission of Texas Oil & Gas Monitoring & Enforcement Plan Fiscal Year 2022 https://www.rrc.texas.gov/media/uhfte2db/og-s-plan-fy-2022_final_june-22.pdf; Note: 16 Tex. Admin. Code § 3.14(d)(12) “The operator shall fill the rathole, mouse hole, and cellar, and shall empty all tanks, vessels, related piping and flowlines that will not be actively used in the continuing operation of the lease within 120 days after plugging work is completed. Within the same 120-day period, the operator shall remove all such tanks, vessels, and related piping, remove all loose junk and trash from the location, and contour the location to discourage pooling of surface water at or around the facility site. The operator shall close all pits in accordance with the provisions of §3.8 of this title (relating to Water Protection (Statewide Rule 8)). The district director or the director’s delegate may grant a reasonable extension of time of not more than an additional 120 days for the removal of tanks, vessels and related piping.”

²⁹⁹ Railroad Commission of Texas. (2021). Voluntary Cleanup Program. <https://www.rrc.texas.gov/oil-and-gas/environmental-cleanup-programs/site-remediation/voluntary-cleanup-program/>

³⁰⁰ The wellhead or Christmas-tree assembly may be inadequate to contain fluids, creating a pathway for methane to leak to the atmosphere (API 1993). A temporarily abandoned well is an active well that is incapable of production or injection without the addition of one or more pieces of wellhead or other equipment, including valves, tubing, rods, pumps, heater-treaters, separators, dehydrators, compressors, piping or tanks. It is not “permanently” plugged because the operator has indicated there is future use from the well. According to the Railroad Commission of Texas records for the wells on the Antina Cattle Ranch, the official status for some of the wells was “Temporarily Abandoned.”

³⁰¹ Watt, Ashley Williams. @sand_frac. (2021, Jun. 16). “There is currently a @chevron well uncontrollably blowing out on my land that I live and raise cattle on in West Texas. It is injecting super concentrated brine and benzene into my water supply. The casing (metal pipe) is so corroded that Chevron literally cannot re plug it.” Retrieved from: https://twitter.com/sand_frac/status/1405312779372924932

³⁰² Watt, Ashley Williams. @sand_frac. (2021, Jun. 20). “The well blew through/around it’s new cement plugs and is still

blowing out. Yes, I'm as tired of it as you are. Chevron literally cannot fix it. And they have to do this another one hundred times after this one on the others. \$CVX." Retrieved from: https://twitter.com/sand_frac/status/1417518351908319239

³⁰³ Watt, Ashley Williams. @sand_frac. (2021, Aug. 11). "There is no longer any doubt this is a field wide subsurface blowout. Records are missing on other wells, and Chevron refuses to provide them. We know that the Estes 16, 28, 87, 100, and 101 all have had mechanical integrity issues. What do we still not know?" Retrieved from: https://twitter.com/sand_frac/status/1425436628621922317

³⁰⁴ Email correspondence. June 16, 2021.

³⁰⁵ Watt, Ashley Williams. @sand_frac. (2021, Jun. 17). "No. They're "too busy". I wish I were kidding. I requested my water wells tested, and was told they could get to it in 4-6 weeks. @txrrc is failing the citizens of Texas. It's clear regulatory capture, and the whole organization needs to be cleaned out root and stem. #CVXblowout" Retrieved from: https://twitter.com/sand_frac/status/1405527952146665476?s=20

³⁰⁶ Railroad Commission of Texas. (2021, December 15). Oil & Gas Inspections and Violations Data Files. <https://www.rrc.texas.gov/resource-center/inspections-and-violations/>

³⁰⁷ On Estes leases in Ward and Crane Counties, the Railroad Commission issued notices of violation (NOV) to Chevron and Pitts Energy Company from May through Sep. 2021 for violation of statewide rules pertaining to bradenhead requirements, unpermitted disposal of oil and gas wastes, surface control of well, and emptying & removing tanks, vessels, flowlines, junk, and closing pits. Railroad Commission of Texas. On Wristen leases in Ward and Crane Counties, the commission issued NOVs to several operators for a variety of violations from May through Nov. 2021. None of those violations were for water contamination. Source: Railroad Commission of Texas. (2021, December 22). Oil & Gas Inspections and Violations Data Files. <https://www.rrc.texas.gov/resource-center/inspections-and-violations/>

³⁰⁸ U.S. Environmental Protection Agency. (2018). Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2016: Abandoned Oil and Gas Wells. https://www.epa.gov/sites/production/files/2018-04/documents/ghgemissions_abandoned_wells.pdf

³⁰⁹ Pool, Bob. Los Angeles Times. (2012) "Capping an era of L.A. oil exploration" <https://www.latimes.com/local/la-xpm-2012-jan-09-la-me-old-wells-20120109-story.html>

³¹⁰ Bahadori, Alireza. (2014). Dictionary of Oil, Gas, and Petrochemical Processing. CRC Press. Retrieved from: https://books.google.at/ks?id=iXDSBQAAQBAJ&pg=PA342&lpg=PA342&dq=%22puddle%22+oil+well+%22cemen%22+job&source=bl&ots=LSRMwZKl1x&sig=ACfU3U0Y7NkocBgi1pwepL61ZC7HcaGSSw&hl=en&sa=X&redir_esc=y#v=onepage&q=%22puddle%22%20oil%20well%20%22cement%22%20job&f=false

³¹¹ Railroad Commission of Texas. "Texas Drilling Statistics." https://www.rrc.state.tx.us/media/3yhlylo4/drill_graph_2018.pdf.

³¹² Tex. Nat. Res. Code. Sec. 89.042. (a)

³¹³ Brownlow, J.W., J.C. Yelderian, Jr, and S.C. James. 2016b. Spatial risk analysis of hydraulic fracturing near abandoned and converted oil and gas wells. Groundwater. 518 dx.doi.org/10.1111/gwat.12471

³¹⁴ Railroad Commission of Texas (2020). Operating Budget for Fiscal Year 2020. <https://www.rrc.texas.gov/media/huydkffv/opbudget2020.pdf>

³¹⁵ Sonnier, P. (2018). Resin Compared to Cement as a Sealant for OCS Wells. <https://www.bsee.gov/sites/bsee.gov/files/research-reports/787aa.pdf>

³¹⁶ Herndon, J., and Smith, D. K. Plugging wells for abandonment: a state-of-the-art study and recommended procedures. United States: N. p., 1976. Web. doi:10.2172/7132411.

³¹⁷ Khalifeh, Mahmoud. 2020. Introduction to Permanent Plug and Abandonment of Wells. https://link.springer.com/chapter/10.1007/978-3-030-39970-2_4

³¹⁸ Watt, Ashley Williams. Twitter: @sand_frac. (2022, Jan. 3). "There's been another blowout:" Accessed on Jan. 11, 2022. Retrieved from: https://twitter.com/sand_frac/status/1478115189983789056

³¹⁹ Watt, Ashley Williams. Twitter: @sand_frac. (2022, Jan. 3). "Petroleum engineers of #EFT, what's it take to push 10 lb brine 150 ft up in the air?" Accessed on Jan 11, 2022. Retrieved from: https://twitter.com/sand_frac/status/1478122634642612224

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³²² Railroad Commission of Texas. Oct. 1958. Form 4 Plugging Record.

- ³²³ Watt, Ashley Williams. @sand_frac. “The well is the Gulf (aka @Chevron) CT 112. It is a core test well drilled in 1948 to 1390’ TVD. Casing was pulled and it was plugged back to surface. It was re-entered in 1957, and there is no record it was ever replugged.” Accessed on Jan. 11, 2022. Retrieved from: https://twitter.com/sand_frac/status/1480633437270720516
- ³²⁴ Federal Aviation Administration. January 06, 2022 at 1633 UTC. NOTAM Number: FDC 2/1632. Retrieved from: https://tfr.faa.gov/save_pages/detail_2_1632.html#restrictions Accessed on: January 11, 2022.
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BSEE discovers a leak, it retains authority to order prior lessees to return and “re-abandon” wells. (See: CFR §250.1701- §250.1702; §556.900- §556.907)

³⁴² Railroad Commission of Texas. Orphan Wells with a Delinquent P-5 Greater than 12 months. Updated May, 18, 2021 <https://www.rrc.state.tx.us/oil-and-gas/research-and-statistics/well-information/orphan-wells-12-months/>

³⁴³ Railroad Commission of Texas. (2021). Procedure for Taking Over an Orphan Well. <https://www.rrc.state.tx.us/oil-and-gas/research-and-statistics/well-information/orphan-wells-12-months/procedure-for-taking-over-an-orphan-well/>

³⁴⁴ Railroad Commission of Texas. (2011, September). Form P-5 Organization Report. <https://www.rrc.state.tx.us/media/02nddiqq/form-p5.pdf>

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