



Permission Granted:

Texas Oil and Gas Regulators on Track
to Allow More Flaring Waste Than Ever

By Andrew Wheat, Texans for Public Justice

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This report was produced as part of a joint project between Commission Shift, Texans for Public Justice, and Rio Grande International Study Center (RGISC). The analysis included feedback and review from Martin Castro (RGISC), Benjamin Lyke (independent consultant), Virginia Palacios (Commission Shift), and Benek Robertson (Environmental Defense Fund).

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.

RGISC's mission is to preserve and protect the Rio Grande-Rio Bravo, its watershed and environment, through awareness, advocacy, research, education, stewardship and bi-national collaboration for the benefit of present and future generations.

Texans for Public Justice is a nonprofit that analyzes money in Texas politics and addresses political corruption and corporate abuses.



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Key Findings

- The oil and gas industry vents and flares massive volumes of methane and carbon dioxide that harm human health, drive climate change, and incinerate private and state wealth.
- The misnamed Texas Railroad Commissioners, who regulate the oil and gas industry, have done a poor job of limiting these wasteful releases of huge volumes of greenhouse gases.
- The *average* agency flaring permit today authorizes lower release volumes than it used to. By doling out these pollution permits in unprecedented numbers, however, Texas regulators are approving releases of record total volumes of flared gas.
- The commission is on track to authorize a record 3.5 billion cubic feet of greenhouse-gas releases by decade's end. This wholesale regulatory failure would authorize wasting enough gas to fuel every Texas residential gas customer for more than 15 years.
- Rather than using flaring permits to slash release volumes, the commission authorizes far greater flaring release volumes than the industry uses—or needs. In recent years the volume of gas that oil and gas operators *reported* flaring was about one-fourth of what the agency authorized them to spew. Satellite measurements of this pollution in Texas' biggest oil basins suggest that actual releases fall somewhere between these authorized and reported volumes.
- Just 4% of Texas oil producers obtained flaring permits in recent years. Most of the state's harmful, wasteful release volumes come from relatively few bad actors.
- The two main types of mega-releasers are: 1. Large oil producers, who obtain numerous flaring permits authorizing below-average release volumes per permit; and 2. Small producers with few permits that authorize staggering *per-permit* release volumes.
- The Railroad Commissioners weakly enforce weak flaring rules. The agency took serious action in just 5% of the 798 flaring violations that it tracked since 2015. It levied just 11 fines for unpermitted flaring since 2010, settling most of the cases for half of what it was authorized to charge—with no admission of wrongdoing.
- This study analyzes 43 years of muddled state flaring data. While both oil wells and gas wells produce natural gas, oil wells are the kings of flaring. In recent years they accounted for 89% of flaring permits and more than 73% of authorized flaring release volumes.
- In a positive trend, the lifespan of the average flaring permit has plummeted over time (longer permits generally enable greater release volumes). The agency undercuts this progress, however, by frequently amending permits to extend their lifespans.
- Since methane traps 83 times more atmospheric heat than carbon dioxide in the near term, it's encouraging that permits to *vent* methane have largely been replaced by permits to *flare* off methane as carbon dioxide. Unfortunately, many faulty flares continue to spew methane.
- There's been an explosion in producers who use a single lease to “commingle” oil and gas production from multiple energy properties into the same holding tank or facility. With the right operators or regulators, commingling can advance conservation. This is because flaring-prevention technologies become more cost effective as you increase the volumes of oil and gas processed at one location.
- As Texas Railroad Commissioners have failed to take flaring releases seriously, the federal government finalized rules in 2023 that could help clear Texas skies. Those rules limit—and eventually phase out—routine flaring at new industry facilities.
- This report's conclusion explores ways to sharply curtail Texas' runaway releases of greenhouse gases, which harm the health of Texans, alter the climate, and incinerate private and public wealth.

Introduction and Background

This report analyzes more than 40 years of Texas flaring permits to understand how regulation of this pollution has evolved at the Railroad Commission of Texas. Before delving into flaring-permit trends, we briefly discuss how greenhouse gases cause problems and how they're regulated by Texas, New Mexico, and the U.S. government.

The primary component in natural gas is the greenhouse gas methane. The oil and gas industry releases large volumes of both methane and carbon dioxide as waste. Operators waste natural gas through inadvertent leaks and the purposeful venting of the gas. They also burn it off in flares that produce a variety of pollutants, including carbon dioxide and uncombusted methane. These two greenhouse gases have different profiles. Burning fossil fuels generates carbon dioxide, which accounts for 57% of U.S. greenhouse release volumes. By contrast, methane¹ accounts for 33% of U.S. greenhouse release volumes.² In a key difference, carbon dioxide persists in the atmosphere for hundreds of years, while methane's potency wanes significantly over a decade. However, methane has more than **83 times**³ the warming power of carbon dioxide during the first 20 years after it is released into the atmosphere.⁴

Methane accounts for about one third of today's global-warming effects, according to the U.S. EPA.⁵ Its short-lived potency means that cutting methane emissions **counters** planetary warming trends quickly.⁶ Moreover, the EPA **estimates** that relatively few huge leaks may account for half of all oil and gas methane emissions volumes.⁷ The Paris-based International Energy Agency **estimated** that more than 70% of global oil and gas methane emissions volumes could be prevented. More than half of these emissions cuts would impose no net costs due to the value of the gas that they would recover.⁸

Gas	U.S. Greenhouse Emissions	Atmospheric Lifetime	20-Year Global Warming Potential Index
Carbon Dioxide	57%	100s of years	1
Methane	33%	10 years	83

Sources: "Methane," NASA.

"IPCC Sixth Assessment Report Global Warming Potentials," ERCE Group, August 2021.

adapted from "Overview of Greenhouse Gases," U.S. Environmental Protection Agency.

In Texas' official division of labor, the Railroad Commission of Texas regulates the use of natural resources while the Texas Commission on Environmental Quality regulates pollution emissions. To prevent waste, the Railroad Commission ostensibly requires the oil and gas industry to either sell the natural gas it produces or to use it to power its own operations ([Statewide Rule 32](#)). In reality, the agency issues thousands of "exceptions" to this rule that authorize the industry to flare off huge volumes of gas into the atmosphere. For simplicity, instead of repeatedly saying the agency "approved exceptions to Rule 32," this report will say that the agency "approved flaring permits." While air pollution emissions officially are the purview of the Texas Commission on Environmental Quality, it is indisputable that the flaring permits that the Railroad Commission of Texas grants authorize oil and gas operators to release vast volumes of air pollution.

The Railroad Commission of Texas has issued thousands of permits for oil and gas facilities to flare huge volumes of these greenhouse gases in recent years. Flaring pollutants that harm human health include black carbon (soot), carbon monoxide, nitrogen oxides, sulfur dioxide, and volatile organic compounds.⁹ Flared gases **exacerbate**¹⁰ **asthma**¹¹ and other respiratory diseases, heart diseases, and strokes, **imposing**¹² \$7.4 billion in annual U.S. health damages. Seven of the 10 U.S. counties with the **worst child-asthma rates**¹³ sit on Texas' side of the Permian Basin. Each year flaring **results**¹⁴ in more than 700 U.S. premature deaths.¹⁵ Almost

500,000 people [live](#)¹⁶ within 3 miles of one or more flares in the Texas-centric Permian Basin or Eagle Ford Shale.¹⁷ A [disproportionate](#)¹⁸ share of them are people of color.

Flaring also incinerates private and state revenues. Texas exempts flared gas from its 7.5% natural gas production tax and the owners of mineral rights typically are not [paid](#)¹⁹ royalties for flared gas. Chapter 85 of the [Texas Natural Resources Code](#)²⁰ ostensibly makes wasting oil and gas resources “illegal and prohibited.” The elected Railroad Commissioners nonetheless approve these harmful and wasteful flaring releases despite their [mission](#)²¹ “to serve Texas by our stewardship of natural resources and the environment.”²²

Gas releases occur during normal oil and gas operations. They can happen during the drilling of new oil and gas wells, during shut-downs and start-ups, and at multiple points downstream as natural gas is processed and transported to market. Planned and unplanned facility shut downs throughout the infrastructure system create gas-flow bottlenecks that can trigger upstream vents and flares. The Railroad Commission of Texas long [prohibited](#)²³ routine flaring and venting of gas from gas wells, while it authorized routine flaring of the so-called “associated” or “casinghead” gas produced by *oil wells*.²⁴ An “oil well” [technically](#)²⁵ becomes a “gas well” when it produces at least 100,000 cubic feet of gas for every barrel of oil.

The oil and gas industry commercialized fracking—hydraulic fracturing with horizontal drilling—in the 2000s. Fracked wells produce large volumes of both crude oil and natural gas,²⁶ with fracked oil wells [producing](#)²⁷ more gas than traditional oil wells. Crude oil often fetches a higher premium and is easier to ship without pipelines. Some frackers in areas with insufficient pipeline capacity flare off gas in order to sell the more-valuable oil. Methane also leaks from multiple sources in upstream and midstream oil and gas operations. Although flaring and venting date to Texas’ pioneer oil days,²⁸ a federal [report](#) says “flaring has increased significantly in Texas since 2010,” primarily due to fracking “tight oil plays in the Permian Basin and the Eagle Ford” areas.²⁹ In 2020 Texas [flared](#)³⁰ off 263 billion cubic feet of gas—almost eight times what it flared just nine years earlier. Meanwhile, the amount of gas flared per barrel of Texas oil produced [leapt](#)³¹ from 80 cubic feet per barrel in the 1990s to 145 cubic feet in 2018 and 2019. The U.S. oil and gas industry vented and flared more than 1.1 billion cubic feet of natural gas per day in 2020, with Texas accounting for 63% of those climate-changing emissions volumes.³²

An ambitious [study](#)³³ published in 2024 used aerial measurements of methane releases to assess methane loss rates for seven U.S. oil and gas producing regions from 2016 through 2021. It found that these losses were much larger than thought. New Mexico’s side of the giant Permian Basin had the worst record, [leaking](#)³⁴ almost 10% of the methane gas it produced. The runners up were Utah and Colorado’s Uinta Basin (5.7% loss rate) and the Texas Permian (5.3%).³⁵ The study found that intermittent releases from a few sites drive large shares of overall release volumes and that such midstream facilities as pipelines, compressor stations, and gas-processing plants accounted for an elevated 42%-57% of Permian methane gas losses. In another factor, an Environmental Defense Fund survey of more than 1,000 flares in the prolific Permian Basin straddling the Texas-New Mexico border [found](#)³⁶ that 10% malfunctioned, spewing far more methane into the atmosphere than previously known. Indeed, 5% of the flares were not even lit.

State and Federal Flaring Rules

Key Section Findings

- Texas' contradictory flaring rules ostensibly prohibit waste and mandate conservation, even as they permit huge volumes of gas to be flared—sometimes with no regulation whatsoever.
- The Railroad Commissioners often congratulate themselves on their alleged flaring-reduction prowess, even as they authorize the flaring of record volumes of gas.
- Recent flaring baby steps by the commission amounts to too little too late. The agency recently summoned the courage to reject its first few flaring permits—out of many thousands approved. By contrast, the EPA and our New Mexico neighbor have plans to significantly slash flaring emissions volumes.

The Railroad Commission adopted Texas Statewide [Rule 32](#)³⁷ in 1978 to prevent³⁸ waste, foster conservation, promote orderly field development, and protect the correlative rights³⁹ of multiple owners of a pool of oil and gas (16 Texas Administrative Code §3.32).⁴⁰ The Railroad Commission generally requires gas to be used for one of two “legal purposes.” They are to be: 1. Used onsite, to fuel lease operation, for example; or 2. Sold to natural gas markets.⁴¹ But the rule carves out⁴² three broad classes of “exceptions” that allow operators to wastefully release massive volumes of greenhouse gases. Eschewing the agency’s awkward names for these “exceptions,”⁴³ we’ll use these descriptive terms: Unreported Releases, Reported Releases, and Releases Authorized by Permits. As these names suggest, Texas allows some flaring to legally occur with no permit and without reporting release volumes.

“Unreported Releases” need not be metered or reported and do not count toward a well’s allowable production. This exception covers all gas released during well drilling through 10 days after well completion or recompletion.⁴⁴ Other examples include certain equipment releases (from amine treaters, flash tank dehydrators, and storage tanks), as well as blowdowns,⁴⁵ purged, and fugitive gases. “Reported Releases” are metered, reported on monthly Production Reports and count towards a well’s allowable production. Examples include well-cleaning releases (up to 10 days), well unloading and shut down releases (up to 24 hours),⁴⁶ and limited releases of low-pressure separator gas.⁴⁷ Finally, “Releases Authorized by Permits” require agency-issued “exception” permits that set maximum volumes of gas releases per day for specified time periods. Exception permits are required to flare gas from clean ups, unloadings, shut downs, and low-pressure separators (exceeding the no-permit levels cited above). Other examples include: insufficient pipeline capacity, high line pressure, maintenance, a system upset, or bad chemistry (e.g. excess oxygen, nitrogen, or hydrogen sulfide).

The agency [says](#)⁴⁸ that most exception permits cover flaring “casinghead gas” from oil wells since gas wells specifically seek to market natural gas—not waste it. The agency [says](#)⁴⁹ that the leading rationales to flare casinghead gas are for:

- Drilling wells in new areas that lack existing pipelines;
- Production that exceeds existing pipeline capacity; or
- Flow disruptions caused by innumerable maintenance problems starting at the well and extending downstream (including compressors, plants and pipelines).

Commission staff [issue](#)⁵⁰ some Rule 32 exception permits to vent or flare “administratively.” Administrative exceptions do not involve formal hearings by an administrative law judge nor a final order by the Railroad Commission. Administrative exceptions can be made permanently for releases of less than 50,000 cubic feet (MCF) a day. Otherwise, administrative exceptions generally last up to:

- 90 days when no pipeline is available; or
- 60 days for system upsets and pipeline capacity issues.

Operators seeking administrative extensions are supposed to demonstrate progress toward marketing the gas.⁵¹ Releases of more than 50 MCF a day cannot extend beyond 180 days without a final order [signed](#) by at least two commissioners.⁵²

Texas Operators Can Vent or Flare Gas Without an 'Exception' Permit In Many Cases

Largely Unreported to Agency

- Gas produced during well drillings through 10 days after completion or recompletion;
- Fugitive, purged or blowdown gases; and
- Gas from storage tanks, amine treaters, flash tank dehydrators, reboilers, low pressure separators, molecular sieves or membrane treatment units.

Reported to Agency

- First 10 days of a well cleaning;
- First 24 hours of a well unloading or shut down;
- Gas from equipment during start-ups;
- Gas produced for up to 10 days after a workover;
- For at least 24 hours following a plant or pipeline upset (sometimes longer); and
- Low-pressure separator gas (<15 MCFD per gas well or <50 MCFD per oil lease or commingled).

Notes: The agency limits the amount of gas that can be flared in a few of these cases. Releases made without permits are not accounted for in agency permit data.

Source: "Statewide Rule 32: Exception to Flaring/Venting," Railroad Commission of Texas Power Point, Atia Rahman, August 2023.

The Railroad Commission's regulatory position on flaring is contradictory. On the conservation side, the agency's official mission is to prevent the waste of natural resources. Consistent with this mandate, the commissioners repeatedly applaud their flaring-reduction prowess in hearings and they [announced](#) a 2020 plan to reduce the durations of administrative flaring "exception" permits (though they can be extended).⁵³ Meanwhile, the agency approves enormous amounts of flaring waste and, in the World Bank's [words](#),⁵⁴ "has used a light-touch approach to regulating flaring." In 1990 the commissioners expanded this waste by [tweaking](#)⁵⁵ Rule 32 to expressly authorize flaring when "a pipeline or other marketing facility" is unavailable. In 2019 the commissioners voted in a controversial case to let [EXCO Operating Co.](#)⁵⁶ flare *all* the casinghead gas from 138 oil wells already served by a functioning pipeline. Two of the three commissioners [approved](#)⁵⁷ that mass flare on the grounds that the rates charged by the pipeline company were discriminatory and prohibitively expensive.⁵⁸

Compared to some neighboring oil states, Texas has been lax and slow to regulate flaring. As recently as 2018, Commissioner Christi Craddick [told](#)⁵⁹ the Texas Tribune that flaring is a shame but, "There's really no conversation to change those rules." To get in front of the mounting problem, the oil and gas industry itself formed the Texas Methane Flaring Coalition one year later and the Railroad Commission appointed a flaring Blue Ribbon Task Force in 2020.⁶⁰ In August 2020 the commission endorsed industry-backed plans to require operators to provide at least some rationale for flaring and to reduce the shelf lives of its flaring permits (which can be renewed).⁶¹ The agency even [acknowledged](#)⁶² in operator-training materials that it "is no longer back-dating exceptions."

Since the agency's overhaul of its application form for flaring exceptions in late 2020, operators seeking permanent flaring permits [submit](#)⁶³ maps showing the nearest viable pipeline, a cost-benefit analysis, and an estimate of the applicable reserves. Those seeking temporary exceptions are asked to explain why they cannot shut-in their operations and why they're unable to market the gas. The agency now says that it is insufficient to base flaring rationales on "economics" or claims that a "Mineral Owner might be damaged." It also says that it finally will start policing illegal flaring by ensuring that any flaring reported on production reports is authorized by a flaring permit. The World Bank estimated that "in most cases" these changes would [reduce](#)⁶⁴ the duration of most administrative exception permits by 50% to 80%.

In 2023, however, the agency continued to grant flaring requests based on operator [assertions](#)⁶⁵ that flaring is needed to maintain production.⁶⁶ Commissioner Jim Wright groused about Callon Petroleum's 2023 request to more than double its flaring of marketable gas at two West Texas sites for 18 months, saying it should "find a better solution." But Wright complained about it only *after* he and his colleagues approved Callon's request. The agency drives home the unexceptional nature of its flaring "exceptions" with a rubber stamp. Reviewing 20,000 permit requests over five years, the *Wall Street Journal* found in 2018 that the agency had not denied a single *one*.⁶⁷ As discussed below, the agency recently mustered the courage to deny a few dozen of the more than 5,500 flaring applications that it received in 2021 and 2022. Yet the three commissioners who wield the power to throttle flaring release volumes follow the industry instead of leading it.

The prolific oil and gas fields of the Permian Basin straddle the Texas-New Mexico border, making New Mexico the nation's No. 2 oil producer in 2021.⁶⁸ Previously, New Mexico's flaring rules arguably were worse than those of Texas. Its operators could flare casinghead gas without a permit until 60 days after well completion (compared to 10 days in Texas). Thereafter they could [obtain flaring permits](#)⁶⁹ for mechanical difficulties or because marketing the was uneconomical.

In March 2021, New Mexico's Oil Conservation Commission [mandated](#)⁷⁰ that its oil and gas industry report natural gas releases throughout the supply chain. Those rules require 98% of all natural gas to be captured by 2026 and prohibit flaring except during equipment failures or other emergencies. New Mexico's Oil Conservation Division began enforcing these rules with fines and penalties in 2023. [Analyzing](#)⁷¹ satellite data, the environmental analyst group [Kayrros](#)⁷² identified 134 methane "super emitting" events in the Permian Basin from 2019 to 2023—with 79% occurring in Texas. While Texas is a much larger oil producer, New Mexico methane leaks *per unit of production* were half those found in Texas. Kayrros CEO Antoine Rostand attributed this difference to New Mexico's [reforms](#).⁷³

Texas is coming under mounting pressure to curb greenhouse gases. The 2022 Inflation Reduction Act contained [methane-control policies](#).⁷⁴ They included the first U.S. greenhouse emissions fee,⁷⁵ slated to rise from \$900 to \$1,500 per metric ton of methane releases over two years. The 2022 law also provided \$1.6 billion to increase emissions monitoring and reporting, as well as to fund methane-reduction technologies.

President Joe Biden [announced](#)⁷⁶ at a UN climate summit in late 2022 that he would toughen EPA methane-control rules. The government [estimates](#)⁷⁷ that those rules, unveiled at the end of 2023, will prevent 58 million tons of methane that otherwise would have been emitted from 2024 to 2038. That's 80 percent less than projected without the rule. The government estimates that the program will yield \$97 billion in climate and ozone health benefits by 2038. The new federal rules [will](#).⁷⁸

- Eliminate routine flaring of gas from most new oil wells in two years;
- Require gas capture in the interim unless capture is certified to be technically infeasible;
- Impose zero-emissions standards for process controllers (pneumatic controllers and pumps), with a one-year phase in for new sources;
- Require routine monitoring of all well sites and compressor stations for leaks;
- Mandate flares inspections to ensure they burn properly;
- Allow qualified third-parties to monitor and report methane "super emitters," (which [produce](#)⁷⁹ half of the industry's methane emissions volumes); and

- Give states two years to submit plans to reduce methane emissions volumes from existing sources and then give industry three years to comply with those state rules.

A key difference between Texas' existing flaring rules and the EPA's new source standards that took effect on May 7, 2024 is in how they treat the so-called routine flaring of the natural gas that oil wells produce. Texas Statewide Rule 32 allows operators to flare this gas simply because no pipeline or other marketing facility is available. By contrast, the EPA bars such routine flaring for new wells that break ground after May 7, 2026.⁸⁰ This generally will require operators of new wells to route this gas to a sales line, use it on site, or reinject it into a well. For older, existing wells, the EPA rules only allow routine flaring if:

- Use of the gas is certified as technically infeasible; or
- The well produces a maximum of 40 tons of methane per year.

The new EPA rules allow *temporary* flaring for limited times during emergencies, maintenance, service interruptions, and when the gas does not meet pipeline specifications.⁸¹ The EPA rule also mandates higher standards for flaring devices to ensure that they eliminate most of the methane and volatile organic compounds in the flared natural gas.

The EPA established "Emissions Guidelines" for states to follow as they implement and enforce performance standards for older, existing industry sources of greenhouse gases. Generally, these standards must be at least as stringent as the federal "Emissions Guidelines."⁸² States have 24 months—until March 2026—to submit their plans to the EPA.⁸³ The Texas Commission on Environmental Quality is the lead agency developing these methane rules for existing sources in Texas. If a state fails to submit a satisfactory plan, the EPA will impose one of its own.

In January 2024 the Railroad Commissioners formally urged the Texas Attorney General to file a lawsuit [challenging](#)⁸⁴ the EPA's methane rules, which they characterized as an "overreach" that would "eviscerate" states' rights. The agency's general counsel specifically denounced the proposal to let third parties monitor and report methane leaks to the EPA. "This vote is the first step for the Railroad Commission of Texas in fighting back against unreasonable and unjust attempts to harm this state," Commission Chair Christi Craddick [said](#)⁸⁵ in a media release. Texas Attorney General Ken Paxton [filed](#)⁸⁶ just such a lawsuit in March 2024.

In early 2024 the Biden administration unveiled funding to reduce oil and gas methane emissions. It [announced](#)⁸⁷ the first \$80 million of an expected [\\$344 million](#) to plug and reclaim orphaned Texas wells.⁸⁸ It also touted a \$189 million [loan](#)⁸⁹ to LongPath Technologies, Inc. to develop lasers to monitor oil and methane leaks across six states—including in the powerhouse Permian Basin.

Texas Flaring Trends

Key Section Findings

- The Railroad Commission’s flaring permit data are riddled with problems, despite modest recent reforms.
- The *average* agency flaring permit today authorizes smaller release volumes than it used to. Yet because Texas regulators are doling out unprecedented numbers of these permits, they collectively are authorizing larger total release volumes than ever before.
- The commission is on track to authorize a record 3.5 trillion cubic feet of greenhouse gas releases by decade’s end. This wholesale oversight failure authorizes the waste of enough gas to fuel every Texas residential customer for more than 15 years.
- Rather than using flaring permits to slash release volumes, the Railroad Commission authorizes far more release volumes than the industry uses or needs. In recent years the volume of gas that operators reported flaring was about one-fourth of what the agency authorized them to spew. Satellite measurements of this pollution suggest that the actual release volumes fall somewhere between the authorized and reported volumes.
- After long approving every flaring permit application that it received, the agency recently rejected 32 of them. Yet in 20 of those rejected cases, the operator quickly obtained one or more flaring permits for the *same* property in the *very year* that it initially had been spurned.

Flaring permits issued by the Railroad Commission are a major focus of this report. This is because the agency’s three commissioners have the authority to slash industry flaring volumes in Texas—as New Mexico regulators recently did. Yet authorized volumes are just part of the overall flaring picture. In monthly “Production Reports” filed with the agency, operators must report the amounts of certain categories of gas that they *actually flare or vent*. Finally, academics, environmentalists, and federal officials increasingly use satellites and other technologies that independently track estimated oil and gas flaring volumes.

The Railroad Commission’s historical venting and flaring data are riddled with problems. Accusations that the data understate flaring volumes date back almost to the inception of such data in 1936.⁹⁰ The fact that agency data record just one flaring permit in 1980, for example, says more about regulatory inattention to this matter than it does about the absence of flaring in that year of elevated oil prices (since most recent permits authorize flaring rather than venting gas, this report often uses “flaring” to generically refer to the practice of flaring *or* venting gas—except when specifically discussing flaring versus venting). While agency flaring data have improved, the data still do a poor job tracking how often a flaring permit is renewed or amended.

In May 2021 the agency introduced reforms to [track](#)⁹¹ how often permits are amended.⁹² It also ended the agency’s invalid practice of assigning permits approval dates that preceded the actual ones.⁹³ In other recent [reporting improvements](#),⁹⁴ agency forms now direct operators to report flared and vented amounts *separately* for the first time on Monthly Production Reports ([Form PR](#))⁹⁵ (effective January 1, 2022). It also revised flaring permit applications ([Form R-32](#))⁹⁶ to:

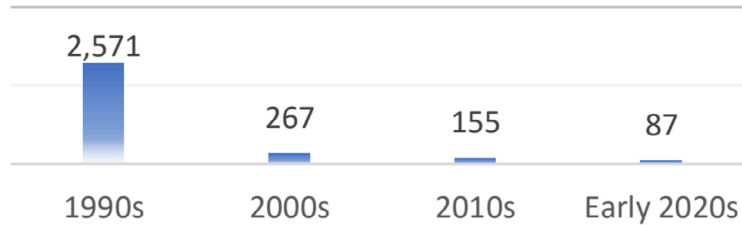
- Gather more data on flaring circumstances; and
- Require operators to modestly improve their justifications for flaring requests ([effective](#)⁹⁷ April 2021).

Despite problems with the agency’s historical data, its numbers do suggest that the Railroad Commission has been granting an unprecedented number of flaring permits since fracking exploded in the 2010s. The data also suggest that those permits authorized the industry to release unprecedented volumes of gas into Texas skies. These negative trends continued into the first few years of this decade.

In a welcome trend, the average number of flaring days that each permit authorized dropped sharply over time. The agency’s spotty 1980s data suggest that the average permit that decade authorized flaring for 9,977 days—or 27 years! Those 1980s data are not shown on the accompanying chart because they make the later data virtually imperceptible. The average 1990s permit authorized 2,571 days—or 7.5 years. Thereafter aver-

age flaring durations fell below one year’s time: hitting 267 days in the 2000s, 155 days in the 2010s and 87 days in the first three years of this decade.

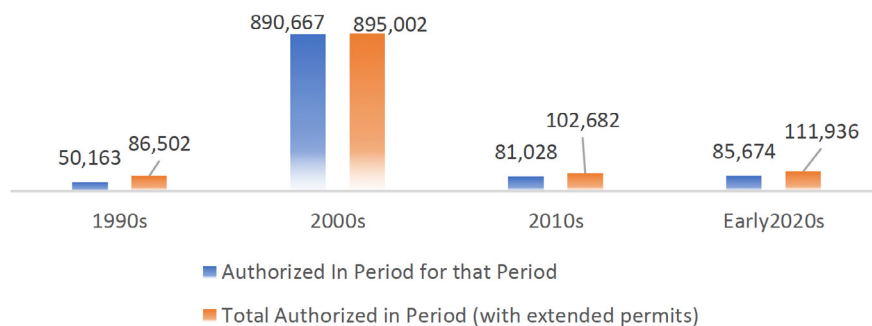
AVERAGE FLARING DAYS PER PERMIT, 1990 THROUGH 2022



Half of the flaring permits that the agency issued in the 1980s had “permanent” durations—ostensibly granting the right to an eternal flame (counterintuitively, many of these “permanent” permits list “expiration dates”). As discussed later, permanent permits dropped to 14% of the total in the 1990s and considerably lower thereafter.

In a related trend, average release volumes per permit plummeted over time. Regulators hit an indulgent peak amidst skyrocketing oil prices in the 2000s, when the average permit authorized an obscene release of 895 million cubic feet of gas. The largest average authorized release volume since then was the almost 112 million cubic feet authorized in the early 2020s, as shown in the accompanying chart. The chart lists two release-volume numbers for each time period. This is because some permits authorize releases that start in one decade and spillover into another. The smaller number for the 2010s, then, shows how much the average permit in that decade allowed an operator to flare *that decade* (81 million cubic feet). Yet many long-term permits, as well as permits issued late in a decade, authorize operators to continue spewing into the next decade. The larger 2010s number shows the total volume of *authorized* releases that decade—including releases authorized to spill over into subsequent periods (103 million cubic feet).

AVERAGE AUTHORIZED EMISSIONS VOLUMES PER PERMIT (MCF), 1990S THROUGH 2022

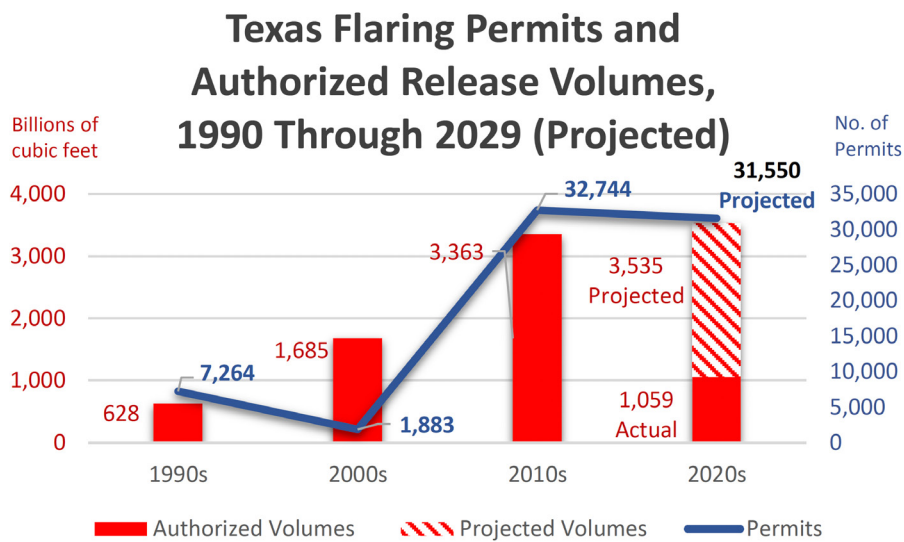


Whichever figure you use, average release volumes *per permit* are way down from their peaks in the 2000s. Nonetheless, the commission allowed per-permit average release volumes to creep back up again in the early 2020s. For simplicity and accuracy, unless otherwise noted, this report hereafter will show the total amount of release volumes authorized—including releases that spillover into another time period.

Unfortunately, the benefits of reducing average permit durations and release volumes over time have been wiped out by sharp increases in the total *number* of flaring permits issued. The number of flaring permits issued skyrocketed as fracking took off in the 2010s. The agency issued 32,744 permits that decade (permit numbers are shown in blue in the accompanying chart). That almost quintupled the number of permits approved in the 1990s—and was *17 times* more permits than regulators issued in the 2000s.⁹⁸ Projecting from the 9,465 exception permits that the agency issued in the first three years of the 2020s, this decade’s permits could rival the 2010s.⁹⁹

Despite sharp overall reductions in *per-permit* flaring durations and release volumes, the escalating numbers of flaring permits issued in recent years inflated total authorized releases from 628 billion cubic feet in the 1990s, to 1.7 trillion in the 2000s and 3.4 trillion in the 2010s. In the first three years of the 2020s, the agency authorized flaring just over 1 trillion cubic feet of gas. If the agency maintains this pace, it will authorize a record 3.5 trillion cubic feet of flaring releases by decade’s end.¹⁰⁰ That’s enough to fuel the state’s current 5.1 million household residential customers for 15.2 years.¹⁰¹

After Russia’s Ukraine invasion in early 2022 spiked world oil prices, Texas hit a [record](#)¹⁰² production of 5.6 million barrels of crude a day in October 2023. As the climate crisis has become more acute, the Railroad Commission negligently permits more flaring release volumes than ever. This regulatory failure invites federal oversight.



Period	Permits	1980s MCF	1990s MCF	2000s MCF	2010s MCF	'20 Thru '22	'23Thru'29	2030s MCF	MCF Totals
1980s	171	3,623,054	9,055,964	7,629,162	5,820,785	1,382,778	0	0	27,511,743
1990s	7,264	0	364,385,697	125,257,129	109,065,108	29,640,055	0	0	628,347,989
2000s	1,883	0	0	1,677,125,125	6,559,846	1,603,710	0	0	1,685,288,681
2010s	32,744	0	0	0	2,653,188,557	704,306,711	3,108,590	1,613,300	3,362,217,158
'20Thru'22	9,465	0	0	0	0	810,903,278	241,276,529	7,293,275	1,059,473,082
Totals	51,527	3,623,054	373,441,661	1,810,011,416	2,774,634,296	1,547,836,532	244,385,119	8,906,575	6,762,838,653

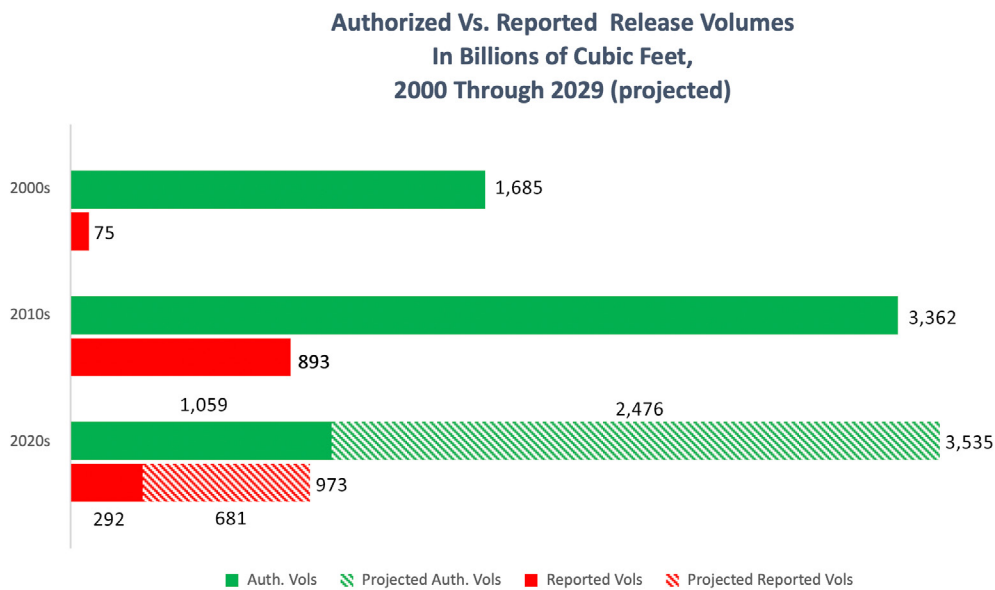
Note: Data exclude 671,071 MCF authorized in 2010s to rollover into the 2040s (bringing 2010s total to 3,362,888,229 MCF and grand total to 6,763,509,724 MCF).¹⁰³

Source: Railroad Commission of Texas.

The Railroad Commission allows operators to flare gas without a permit under some circumstances and it doesn't require operators to [report](#)¹⁰⁴ all of their releases. Meanwhile, academic, environmental, and federal officials increasingly deploy satellites that independently estimate oil and gas release volumes with increasing granularity and precision, irrespective of their regulatory permitting and reporting requirements. As such, the release volumes that are permitted, reported and detected by satellite are not identical.

The accompanying chart compares the volumes of gas that the Railroad Commission *authorized* to flare to what operators *reported* flaring. From 2000 through 2022, the agency authorized 6.1 trillion cubic feet of releases—five times what operators reported releasing in the same period. This discrepancy peaked in the 2000s, when authorized release volumes were 22 times larger than reported releases. This may suggest that flaring exceptions have been so easy to obtain that operators inflate requested flaring volumes to have room to flare even more if needed.

That same chart uses authorized and reported flaring release volumes from 2020 through 2022 to *project estimated* release volumes through 2029. Those projections show that if recent trends continue the agency will authorize—and operators will report—record amounts of release volumes in this decade.



Source: Railroad Commission of Texas.

Discrepancies between authorized, reported and detected flaring release volumes are common. Using fly-over data, the Environmental Defense Fund [estimated](#)¹⁰⁵ that industry release volumes are 60% larger than what the U.S. government acknowledged. A 2019 study in the journal *Science of the Total Environment* [compared](#)¹⁰⁶ flaring release volumes in Texas' Permian Basin and Eagle Ford regions from 2012 to 2015. It found that operators self-reported about half the volume of flaring volumes that federal satellites detected.¹⁰⁷ That study suggests that actual Texas flaring volumes probably fall somewhere between the self-reported volumes and the agency-authorized ones. Recall, too, that calculations of authorized, reported, and actual flaring volumes measure somewhat different things. As discussed earlier, Railroad Commission rules allow flaring and venting volumes that are: 1. Metered, reported, *and* permitted;¹⁰⁸ 2. Metered and reported but *not* permitted; and 3. Not metered, reported, *nor* permitted.

In other discrepancies, operators often do not flare off the full amounts of gas that their permits authorize. And some operators illegally flare without a required permit. Meanwhile, satellites detect flares regardless of their regulation status or source, including releases unknown to regulators.¹⁰⁹ The Environmental Defense

Fund and SpaceX [launched](#)¹¹⁰ a satellite in March 2024 designed to track the global oil and gas industry's flaring in unprecedented detail. As independent monitoring ramps up, those data may provide a clearer picture of the scale of release volumes that operators do not report. This could reduce—but not eliminate—the gaps separating authorized, self-reported and independently observed flaring volumes. This convergence would be even tighter if Texas regulators give these releases the scrutiny and oversight that they deserve.

Wielding vast powers to reverse dangerous state flaring trends, the Railroad Commission has ducked responsibility. The agency has [emphasized](#) that the amount of gas flared to the amount of oil produced has declined in recent years. But these *rates* paint a much rosier picture than *total volumes released* do. Unfortunately, climate impacts and wasted natural resources are more determined by total released volumes.

Yet the Railroad Commission is retrenching instead of leading. In late 2023 Commissioner Wayne Christian [urged](#)¹¹¹ the State Board of Education to reject “woke” textbooks that play into the “radical environmentalist agenda” by presenting climate change as a “settled” science. “Catastrophists are using the CO2 boogeyman and the threat of apocalypse to frighten people into submission,” Christian wrote.

Since [May 2021](#)¹¹² the Railroad Commission has made new flaring permit applications searchable on its [web-site](#).¹¹³ That data includes 6,149 records that fall within this study's period—May 2021 through December 2022.¹¹⁴ The agency denied just 32 of those flaring applications. The agency's denial letters to those applicants do not specify why they were rejected. The only bright line that the agency has drawn that *could be* used to deny a flaring permit appeared in a March 2020 COVID emergency [notice](#).¹¹⁵ It requires operators to:

- Notify the agency “no later than” seven calendar days after beginning a release; and
- Request a flaring permit within 15 calendar days of a release.

Because agency flaring data generally record when an operator applies for a permit and when the permit takes effect, it's possible to assess the Railroad Commission's enforcement of its requirement that operators request a permit within 15 days of an initial release. Between the time that this COVID rule was announced and the end of 2022, 8,831 qualifying flaring permits took effect.¹¹⁶ Of those permits, 522 (6%) recorded permit application dates falling at least 17 days after their flaring effective dates—in apparent violation of agency rules. Operators requested 61 of those permits more than 100 days after the effective date. In the biggest outlier, the agency approved a flaring application that Callon Permian, LLC submitted *530 days after* it began flaring in March 2021.¹¹⁷ These numbers suggest that the agency could do more to enforce compliance.

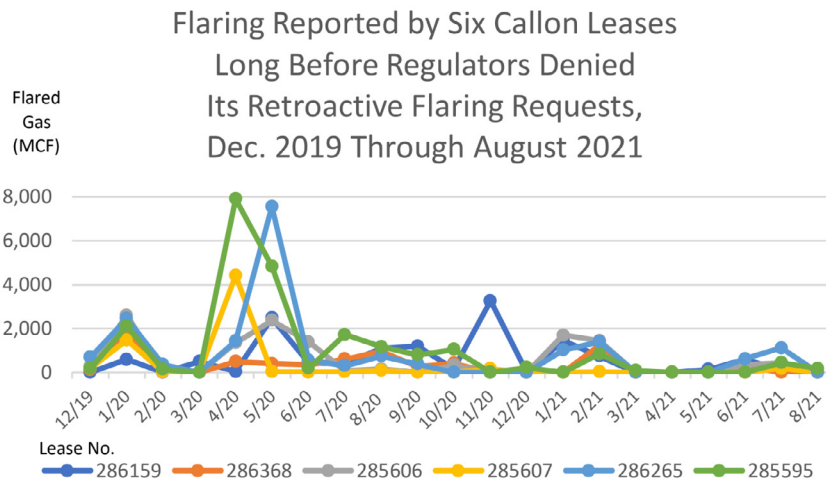
A closer look at the agency's rare flaring permit rejections reveals some commonalities—and outliers. Thirty of the 32 flare rejections applied retroactively, meaning that some or all of their requested flaring days preceded the application date. Retroactive flaring is common. Emergency flaring frequently occurs in response to equipment failures onsite or downstream. But emergencies don't trigger all retroactive flares. Regulators rejected three applications from Continental Resources, LLC and one from Percussion Petroleum that sought permission to retroactively flare for “*scheduled maintenance*.”¹¹⁸

The agency also spurned eight cheeky requests that Callon Permian, LLC filed in May 2022 asking the agency to approve flares that occurred *two years earlier* in west Texas' Reeves County.¹¹⁹ The eight belated flaring applications that Callon filed in May 2022 sought approval for flares beginning between January and August of 2020 and ending between April and September that same year. All of the flaring properties were gas leases except for one commingled permit.¹²⁰ Callon blamed a “system upset” for all the flares except for one, which it attributed to “*unscheduled maintenance*.”¹²¹ Callon's flaring applications—with durations ranging from 31 to 181 days apiece—sought retroactive permission to flare a total of 3 billion cubic feet of gas. What makes these flares significant is that Callon appeared to flare off the gas long before the Railroad Commission *denied* those flaring requests.¹²²

The accompanying graph shows that Callon's production reports¹²³ for six of the eight properties reported flaring spikes during the period in question, attributing them to a pipeline upset.¹²⁴ Callon's belated flaring *applications* for the six leases shown in the graph indicated that half of the flares were to start in January

2020 and the other half were to be staggered in by August of that year. Yet Callon's production reports say that all six leases ramped up flaring in January 2020, even though three of them never even *belatedly applied* for permits to do so that soon.

Moreover, Callon's rejected flaring applications sought permission to flare through September 2020 at the latest. Yet the accompanying graph shows many of those leases reported additional flares over the next 12 months—only one of which appeared to be authorized (lease No. 186265 had a permit for its November 2020 flaring shown in dark blue in the graph).¹²⁵ Although the record suggests that Callon may have flared without a permit, the Railroad Commission's enforcement and fine records (discussed later) never mention Callon. By contrast, the EPA [fined](#)¹²⁶ Callon Permian \$1.3 million in July 2023 for emissions of volatile organic compounds and methane that that agency discovered by doing helicopter flyovers with hydrocarbon-detection cameras. A resulting settlement requires the Callon Permian to monitor tank pressures and combustion control devices at all its facilities.



Lease/ Permit No.	Requested Flare Start	Requested Flare End	Requested MCFD	Requested Flare Days	Requested (MCF)	Reported Flaring In Req. Period (MCF)	Reported Flaring In Graphed Period
285606	1/1/20	6/30/20	1,927	181	348,787	7,709	23,460
285607	1/1/20	4/30/20	4,393	120	527,160	5,907	6,606
286265	1/1/20	5/31/20	5,089	151	768,439	17,721	18,638
285595	4/1/20	5/31/20	15,202	61	927,322	12,739	21,863
286159	5/1/20	9/30/20	1,593	153	243,729	5,603	13,169
286368	8/1/20	8/31/20	153	31	4,743	950	7,002
291890	4/1/20	6/30/20	2,683	91	244,153	No reports found	No reports found
8909	5/1/20	5/31/20	862	31	26,722	No reports found	No reports found
					3,091,055	50,629	130,367

Source: Railroad Commission of Texas.

The agency's rarified flaring rejections also suggest that flaring suitors who are spurned today likely will find their regulator more receptive tomorrow. For 20 of the 32 denied permits, the Railroad Commission granted the same operator another flaring permit for the very same property *before the end of the year in which the denial occurred*. What's more, those 20 properties received an average of four more flaring permits apiece within the same calendar year of rejection. The new permits typically authorized different flaring volumes on different days than the rejected request—but not always. On May 27, 2021, the agency granted Apache Corporation's request to retroactively flare 205 thousand cubic feet of a day for eight days some three months earlier. The only thing remarkable about this *Ground-Hog's-Day* flaring permit was that just one week earlier the agency had *rejected* Apache's request to flare that same amount of gas, on that same site, on those same days.¹²⁷

Top Flaring Companies

Key Section Findings

- Most major oil companies have phased out routine, mass flaring. The bulk of harmful, wasteful flaring release volumes come from relatively few bad actors. Just 4% of Texas oil producers obtained flaring permits in recent years. Fifty companies accounted for 91% of all authorized flaring release volumes.
- There are two main types of mega-releasers: 1. Large oil producers who obtain numerous flaring permits authorizing below-average release volumes *per permit*; and 2. Small producers with few permits that authorize staggering per-permit release volumes.
- With political will at the state or federal level, these huge releases from limited sources could be throttled quickly.

This section focuses on the companies that flared the most in the most-recent period studied: from 2020 through 2022. It identifies the companies that obtained the most flaring permits and those authorized to flare the largest volumes of gas. The lists of top flarers below notably do not include such publicly held giants as BP, Chevron, Shell or ExxonMobil (though Exxon subsidiary XTO Energy is a flaring superpower). Over time, the supermajors—along with many smaller producers—have distanced themselves from flaring. Instead, they have connected their wells to pipelines, invested in better technologies, and sold dirty operations to lower-profile operators. “Major producers in the Permian Basin treat takeaway capacity as a manageable constraint that involves ensuring that adequate takeaway infrastructure is in place before bringing a well online and being willing to shut in a well until takeaway capacity is secure,” a 2021 World Bank report [noted](#).¹²⁸ “Ongoing consolidation among operators is reinforcing this trend.”

That was not always true. The top 10 operators authorized to flare the most release volumes back in the 1990s included units of Exxon, Texaco, and Mobil.¹²⁹ In the 1990s, the Railroad Commission issued 7,264 flaring permits to 991 operators. By contrast, in just the first three years of the 2020s the agency issued even more flaring permits (9,465 of them)—to just 255 polluting companies. They constituted just 4% of the 5,898 oil producers that Texas had in 2021.¹³⁰ Their permits authorized these 255 operators to flare more than one trillion cubic feet of gas (averaging 4.2 million cubic feet per permit).¹³¹ A tiny share of the state's producers produce the vast majority of the state's flaring release volumes, which challenges claims that federal flaring restrictions will significantly impact the industry.

The companies authorized to flare the vast majority of Texas' gas are an eclectic bunch. They include some of the state's top oil producers—though generally not the world's biggest oil giants. The big companies that do flare a lot *tend* to obtain lots of flaring permits—with *per-permit* release volumes generally falling below the state average of 112 million cubic feet of gas. Pioneer Natural Resources and top permits-holder Endeavor Energy Resources are good examples.¹³²

The top flaring companies also include second-tier producers. They tend to obtain relatively few flaring permits that, nonetheless, are off the charts in average authorized release volumes *per permit*. For example, RRP Operating, LLC had just 12 flaring permits in the early 2020s yet ranked No. 6 in total authorized flaring release volumes. RRP had the state's highest per-permit release rate: an average of 3.7 billion cubic feet per permit. RRP's permit No. 51787 authorized more flared gas than any other permit in the early 2020s: 26.6 billion cubic feet.¹³³ That amount of flared gas could fuel 11% of Texas' residential gas consumers for a year.¹³⁴

Operators Authorized to Flare the Most Texas Gas, 2020 Through 2022

Rank	Operator	Auth. MCF 2020 Thru 2022	No. of Permits	Permits Rank	Avg MCF Per Permit	MCF Per Permit Rank	TX 2021 Oil Prod. Rank
1	Capitan Energy Inc	132,515,465	52	36	2,548,374	4	84
2	XTO Energy Inc	57,173,156	122	22	468,632	18	4
3	WPX Energy Permian LLC	54,549,089	423	5	128,958	73	9
4	Ovintiv USA Inc	49,352,326	540	3	91,393	88	14
5	Birch Operations	44,904,270	15	73	2,993,618	3	28
6	RRP Operating LLC	44,498,655	12	82	3,708,221	1	103
7	Callon (Permian) LLC	43,948,922	99	28	443,929	20	57
8	QEP Energy Co	39,709,876	76	30	522,498	15	29
9	BPX Operating Co	38,515,904	235	11	163,897	55	18
10	Callon Petroleum Operating Co	37,572,038	304	7	123,592	76	23
11	Marathon Oil EF LLC	32,112,778	138	18	232,701	42	13
12	Hunt Oil Co	23,884,050	40	42	597,101	14	52
13	Rosehill Operating Co LLC	21,439,438	13	79	1,649,188	5	78
14	PDC Permian Inc	20,972,667	100	27	209,727	44	56
15	Endeavor Energy Resources LP	20,953,964	1,087	1	19,277	168	8
16	Parsley Energy Operations LLC	20,792,850	127	20	163,723	56	68
17	Tall City Operations III LLC	17,624,593	58	33	303,872	31	115
18	Validus NRG Aquilas Asset Co LLC	17,551,510	35	46	501,472	16	65
19	Rio Oil and (Permian) II, LLC	16,005,345	21	63	762,159	10	96
20	DE3 Operating LLC	14,062,560	42	40	334,823	26	36
21	LRR Pecos Valley LLC	13,941,128	35	47	398,318	21	136
22	Trinity Operating (USG) LLC	13,423,853	286	8	46,937	110	60
23	Pioneer Natural Res. USA Inc	12,064,509	526	4	22,936	150	1
24	BPX Midstream	11,113,090	3	144	3,704,363	2	3,484
25	Apache Corp	9,991,659	636	2	15,710	182	17
26	Sable Permian Resources LLC	9,621,950	28	52	343,641	24	222
27	Highpeak Energy Holdings LLC	9,097,706	57	34	159,609	59	67
28	Blackbeard Operating	9,069,998	39	43	232,564	43	59
29	Laredo Petroleum Inc	8,713,010	242	10	36,004	122	22
30	BTA Oil Producers	8,598,014	28	53	307,072	30	89
31	Ring Energy, Inc.	7,809,889	25	56	312,396	28	74
32	Magnolia Oil & Operating LLC	7,794,628	48	39	162,388	57	34
33	Callon (Eagle Ford) LLC	7,752,080	11	84	704,735	11	33
34	Riley Permian Operating Co LLC	6,721,625	57	35	117,923	78	79
35	Matador Production Co	6,416,200	13	80	493,554	17	72
36	Surge Operating LLC	6,181,927	182	13	33,967	128	24
37	Luxe Operating LLC	5,715,594	9	95	635,066	13	124
38	Citation Oil & Corp	5,659,985	167	14	33,892	129	97
39	Treadstone Energy Partners	5,165,160	17	70	303,833	32	85

40	Centennial Resource Prod, LLC	4,978,609	249	9	19,994	162	37
41	Occidental Permian Ltd	4,972,463	232	12	21,433	156	16
42	Cog Operating LLC	4,778,559	123	21	38,850	118	5
43	Jetta Permian LP	4,662,150	20	65	233,108	41	328
44	Three Span Oil & Inc	4,650,284	15	74	310,019	29	151
45	Diamondback E&P LLC	4,647,086	321	6	14,477	188	3
46	Halcon Operating Co, Inc	4,528,805	10	90	452,881	19	62
47	Oasis Petroleum Permian LLC	4,446,820	31	48	143,446	65	196
48	Valence Operating Co	4,079,353	6	111	679,892	12	128
49	U.S. Energy Development Corp	3,794,571	28	54	135,520	68	111
50	Vencer Energy LLC	3,574,050	18	69	198,558	46	86

Note: These 50 operators were authorized to flare 962 billion cubic feet of gas—or 91% of the period's total.
Source: Railroad Commission of Texas.

A 2022 federally funded [study](#)¹³⁵ [found](#)¹³⁶ that marginal oil and gas wells—often run by smaller producers—produce 6% of the nation's oil and gas while generating half of the industry's methane emissions volumes.¹³⁷ A 2022 [study](#)¹³⁸ of U.S. oil and gas found an inverse relationship between well productivity and methane leaks.

The Railroad Commission of Texas authorized such low-profile flarers as RRP Operating and Capitan Energy to spew the largest total volume of releases. These companies may be more resistant to public pressure than the likes of major oil companies. Yet the average permit of ExxonMobil subsidiary XTO authorized flaring 469 million cubic feet of gas, more than four times more than the state average. XTO was the state's fourth-largest oil producer in 2021 and XTO ranked No. 2 in authorized flaring release volumes (Exxon [announced](#) in 2023 that it stopped routine flaring in the Permian Basin).¹³⁹ Units of Marathon Oil and Occidental Petroleum also rank among Texas' top flarers.

Our accompanying table lists the 50 companies authorized to flare the most from 2020 through 2022 (measured in thousands of cubic feet—or MCF). Those 50 operators were authorized to flare 962 billion cubic feet of gas—or 91% of what the Railroad Commission authorized in that period. For each operator, the table lists its total authorized release volumes, as well as its total flaring permits, average release volumes per permit, and its state [oil-production ranking](#).¹⁴⁰

One way to grasp the identities of the 50 companies authorized to flare the most Texas gas is to compare the top third of them *in terms of* [2021 oil production](#)¹⁴¹ with the bottom third. The top third was authorized to flare 13% more gas and received 6 times more flaring permits than the bottom third. Meanwhile, the bottom third's average authorized release volumes per permit were 5 times larger than the top third's. At a time when the average permit authorized 112 million cubic feet of releases, the top-third producers averaged 64 million cubic feet per permit, compared to 335 million cubic feet for the bottom third.

**Among the 50 Companies Authorized to Flare
the Most Texas Gas from 2020 Through 2022,
Big producers Obtained Six Times More Flaring Permits
While Small Producers Could Flare Five Times More Per Permit**

Oil-Production Cohort	Auth. Flaring (in MCF)	Auth. Flaring (%)	No. of Permits	Permits %	MCF Per Permit
Top Third	348,360,724	33%	5,434	57%	64,108
Bottom Third	307,918,745	29%	920	<1%	334,694

Source: Railroad Commission of Texas.

A 2017 Environmental Defense Fund study [found](#)¹⁴² enormous variation in flaring rates among the Texas Permian’s top 15 producers in 2014 and 2015. At a time when those big producers collectively flared an average of 3.5% of the casinghead gas that they produced, outliers COG Operating, Energen Resources, and Exxon’s XTO Energy wasted an average of 8% of their gas.

The vast majority of Texas’ authorized flaring release volumes come from a relatively small group of operators. By exerting leadership, the Railroad Commissioners could mandate reasonable best practices that would slash the state’s huge flaring release volumes. With state or federal political will, huge release volumes from limited sources could be throttled quickly.

Operators with the Most Flaring Permits, 2020 Through 2022

Rank	Operator	No. of Permits	Auth. MCF	MCF Rank	MCF Per Permit	MCF Per Permit Rank	TX 2021 Oil Prod. Rank
1	Endeavor Energy Resources LP	1,087	20,953,964	15	19,277	168	8
2	Apache Corp	636	9,991,659	25	15,710	182	17
3	Ovintiv USA Inc	540	49,352,326	4	91,393	88	14
4	Pioneer Natural Res. USA Inc	526	12,064,509	23	22,936	150	1
5	WPX Energy Permian LLC	423	54,549,089	3	128,958	73	9
6	Diamondback E&P LLC	321	4,647,086	45	14,477	188	3
7	Callon Petroleum Operating Co	304	37,572,038	10	123,592	76	23
8	Trinity Operating (USG) LLC	286	13,423,853	22	46,937	110	60
9	Centennial Resource Prod, LLC	249	4,978,609	40	19,994	162	37
10	Laredo Petroleum Inc	242	8,713,010	29	36,004	122	22
11	BPX Operating Co	235	38,515,904	9	163,897	55	18
12	Occidental Permian Ltd	232	4,972,463	41	21,433	156	16
13	Surge Operating LLC	182	6,181,927	36	33,967	128	24
14	Citation Oil & Corp	167	5,659,985	38	33,892	129	97
15	Murphy Expl. & Prod. Co. – USA	154	2,988,888	55	19,408	167	32
16	Continental Resources, Inc	152	711,951	96	4,684	221	148
17	Oxy USA WTP LP	139	2,130,333	61	15,326	183	26
18	Marathon Oil EF LLC	138	32,112,778	11	232,701	42	13
19	Oxy USA Inc	134	1,946,642	66	14,527	187	30
20	Parsley Energy Operations LLC	127	20,792,850	16	163,723	56	68
21	Cog Operating LLC	123	4,778,559	42	38,850	118	5
22	XTO Energy Inc	122	57,173,156	2	468,632	18	4
23	Cimarex Energy Co	122	2,761,466	58	22,635	153	19
24	Fasken Oil and Ranch, Ltd	116	1,285,847	77	11,085	199	44

Operators Authorized to Flare the Most Gas Per Permit, 2020 Through 2022

Rank	Operator	MCF Per Permit	Auth. MCF	MCF Rank	No. of Permits	Permits Rank	2021 Oil Prod. Rank
1	RRP Operating LLC	3,708,221	44,498,655	6	12	82	103
2	BPX Midstream	3,704,363	11,113,090	24	3	144	3,481
3	Birch Operations	2,993,618	44,904,270	5	15	73	28
4	Capitan Energy Inc	2,548,374	132,515,465	1	52	36	84
5	Rosehill Operating Co LLC	1,649,188	21,439,438	13	13	79	78
6	Major Midstream OP Partners LLC	1,080,000	1,080,000	83	1	191	3,331
7	Guidon Energy Mgmt Services LLC	1,046,250	2,092,500	63	2	161	NA
8	Encore Permian Operating LLC	945,000	1,890,000	68	2	162	178
9	Hat Creek Energy LLC	810,600	810,600	88	1	192	NA
10	Rio Oil and (Permian) II, LLC	762,159	16,005,345	19	21	63	96
11	Callon (Eagle Ford) LLC	704,735	7,752,080	33	11	84	33
12	Valence Operating Co	679,892	4,079,353	48	6	111	128
13	Luxe Operating LLC	635,066	5,715,594	37	9	95	124
14	Hunt Oil Co	597,101	23,884,050	12	40	42	52
15	QEP Energy Co	522,498	39,709,876	8	76	30	29
16	Validus NRG Aquilas Asset Co LLC	501,472	17,551,510	18	35	46	65
17	Matador Production Co	493,554	6,416,200	35	13	80	72
18	XTO Energy Inc	468,632	57,173,156	2	122	22	4
19	Halcon Operating Co, Inc	452,881	4,528,805	46	10	90	62
20	Callon (Permian) LLC	443,929	43,948,922	7	99	28	57
21	LRR Pecos Valley LLC	398,318	13,941,128	21	35	47	136
22	Joint Resources Co	365,000	730,000	95	2	163	294
23	E R Operating Co	365,000	365,000	112	1	193	334
24	Sable Permian Resources LLC	343,641	9,621,950	26	28	52	222
25	Teal Operating LLC	342,982	3,086,838	53	9	96	141

Source: Railroad Commission of Texas (operators who produced no oil in 2021 are all ranked No. 3,331).

Flaring Enforcement

Key Section Findings

- The Railroad Commission weakly enforces weak flaring rules. The agency took serious action in just 5% of the 798 flaring violations that it tracked since 2015.
- The agency levied just 11 fines for unpermitted flaring from 2010 through 2022. Operators settled most of the cases for half of what the agency was authorized to charge—without admitting wrongdoing.
- Since 10 of the 11 fines occurred before 2015, Commissioner Wayne Christian had a hand in just one of them. None of these fines occurred on the watch of the newest commissioner: Jim Wright.

The Railroad Commission of Texas could show oil and gas operators that it takes flaring releases seriously if it adopted tougher flaring rules—or even if it strictly enforced existing rules. Agency [data](#)¹⁴³ record 798 flaring violations from August 2015 through December 2022. Two-thirds of these violations involved flaring without an agency exception permit. The remaining violations were for venting without the appropriate separation and flaring equipment. The latter venting violators typically emitted gas containing hydrogen sulfide, which [irritates](#)¹⁴⁴ eyes and respiration and can cause convulsions, comas or death. The agency did not categorize a single one of its 798 flaring abuses as “major violations.”¹⁴⁵ Agency [examples](#) of “major violations” do not mention “flaring.”¹⁴⁶

Agency data record the latest enforcement action for each violation. The latest enforcement action for 95% of these cases was simply to send a “notice of violation” to the operator. The agency responded to 23 violations (3%) by issuing a [severance or seal order](#),¹⁴⁷ prohibiting the wells from producing oil and gas until they have complied with rules. Regulators referred 17 violations (2%) to their legal department for “possible legal enforcement.”

Railroad Commission’s “Last Enforcement Action” For Flaring or Venting Violations, August 2015 Through December 2022

Last Enforcement Action	No. of Violations	% of Violations
Notice of Violation	757	95%
Severance/Seal Order Issued	23	3%
Referred for Possible Legal Enforcement	17	2%
“Violation Corrected”	1	<1%
TOTAL	798	100%

Researchers made a formal legal request to the agency to provide records of “any fines, penalties, or other enforcement actions” that it imposed “for any violations, infractions or omissions related to Rule 32 flaring or venting requirements” from January 2010 through 2022. The Commission responded that during those 12 years of record flaring it levied just 11 *flaring fines* on eight operators. In each case the agency alleged that an operator illegally released gas without a permit (several operators also reportedly failed to notify the agency of releases or exceeded their permit limits). Responding to a formal request for any guidance that the agency relies on in assessing flaring compliance, the agency responded in April 2024, “We do not have any written internal guidance documents, procedures, or standards that RRC staff uses to assess compliance with Rule 32 other than the rule itself and the Form R-32 and instructions.”¹⁴⁸

Ten of the 11 fines that the commission levied involved unpermitted flaring ranging from 122 to 664 days—

all but one in the Eagle Ford Shale region of South Texas (women living near Eagle Ford flares experience [higher rates](#) of pre-term labor).¹⁴⁹ Nine of those 10 cases (accessible [here](#)),¹⁵⁰ involved smoking-gun violations. The operators had reported their unpermitted releases to the agency in their monthly “Production Reports.” Operators nonetheless settled those cases by paying half of what the agency was authorized to assess. They did so without admitting any wrongdoing.¹⁵¹

Railroad Commission Enforcements for Flaring or Venting Without a Permit, Jan. 2010 Through November 2023

Penalty	Company	Case No.	Other Violations	Violation Days	County	Case Settled
\$52,100	Matador Production Co.	01-0292368		365	La Salle	1/27/15
\$36,875	Cinco Nat'l Resources Corp.	02-0287764	Not notifying RRC	664	Live Oak	8/12/14
\$25,850	EP Energy E&P Co.	01-0287740		267	La Salle	7/8/14
\$23,750	Matador Production Co.	02-0292073		325	Karnes	1/27/15
\$17,850	Carrizo (Eagle Ford) LLC	01-0292785		271	La Salle	4/8/15
\$12,500	Riley Exploration LLC	01-0287160		332	Gonzales	4/28/15
\$12,500	Riley Exploration LLC	01-0287161		279	Dimmit	4/28/15
\$12,500	Riley Exploration LLC	01-0287162		279	La Salle	4/28/15
\$11,100	Zaza Energy, LLC	01-0292379	Exceeding permit	122	La Salle	8/25/15
\$9,850	Hess Corporation	01-0292380	Exceeding permit	406	La Salle	8/25/15
\$4,250	Viceroy Petroleum, LP	00001294	Venting H2S near homes	NA	Ft. Bend	5/5/20

Another striking aspect of these 10 cases is that all of them settled in 2014 or 2015—before two of the three current commissioners were elected.¹⁵² As of late 2023, the agency had issued just one flaring fine on Commissioner Wayne Christian’s watch. None of these fines occurred since Commissioner Jim Wright took office in early 2021. Moreover, the only one of these flaring fines issued under Commissioner Christian was for just \$4,250. That is less than half the amount of any of the other 10 flaring fines levied in the past 13 years—even though this 2020 case endangered public health.

Viceroy Petroleum agreed to pay \$4,250 in 2020 [to settle](#)¹⁵³ allegations that it had illegally vented without installing the proper gas-separation and flaring equipment at its well in Fort Bend County. Viceroy was *venting* gas containing “low concentrations” of harmful hydrogen sulfide, which is supposed to be flared off to protect people. The well was “less than 400 feet from the Fort Bend Parkway Toll Road” and less than a half mile from a residential neighborhood. Fumes venting from Viceroy’s open frac tank prompted at least 103 complaints in September 2019, many citing a “strong rotten egg odor.” The agency notified Viceroy that if the matter went to an enforcement hearing regulators “would be required to seek a penalty of not less than \$7,000.” Viceroy settled for \$4,250.

Flaring Rationales

Key Section Findings

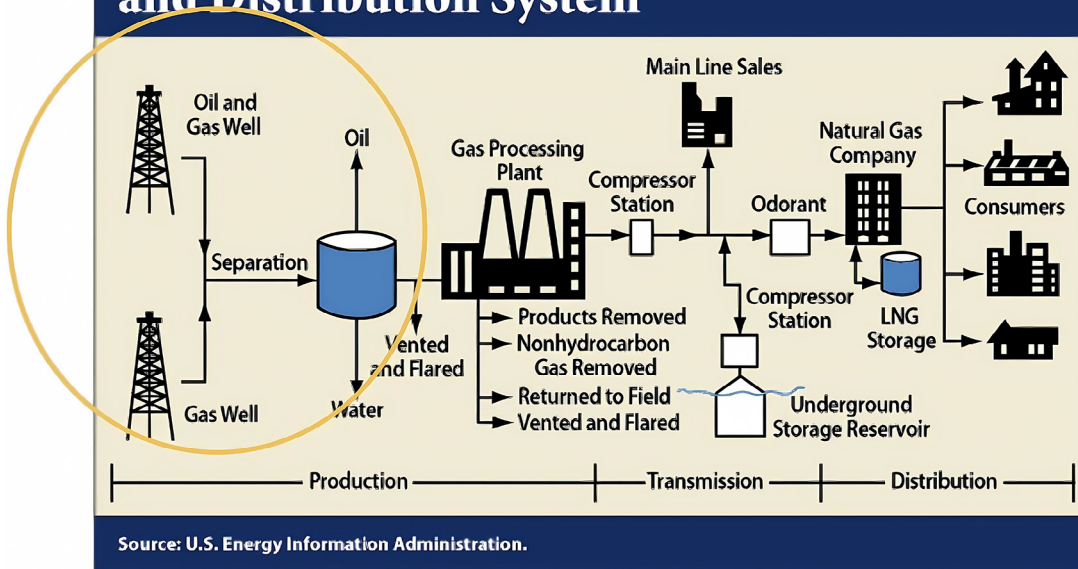
- To wastefully flare off gas, operators long reported one or more rationales. Wielding a rubber stamp, the Railroad Commission granted operator permits even when their stated rationales were vaguely broad to the point of meaninglessness.
- When the agency overhauled flaring reporting in 2021 it stopped listing flaring rationales in its flaring-permit macro data. This undermines efforts to reduce releases, since regulators and the public should devise flaring-prevention policies that address the root causes of this waste.
- In the 2010s, the leading flaring rationales were pipeline capacity or curtailment problems. In many of these cases no pipeline existed to market the gas or all the pipelines were full or incapacitated.
- At the very start of the 2020s, pipeline capacity/curtailment fell to the No. 4 flaring excuse. This could be because new pipelines were delivering more gas to market (though there was no drop in released flaring volumes). More operators also may have succumbed to pressure to cite flaring rationales that sound less wasteful.
- Operators in the early 2020s increasingly attributed flaring to maintenance or emergencies. Those rationales are more compelling than simply flaring for want of pipeline capacity.

Why do oil and gas operators wastefully flare off valuable gas? Flaring applications cite many reasons for doing so—often citing multiple rationales in a single flaring request. Flaring rationales long appeared in the “Remarks” field of the agency’s flaring data. Analyzing flaring permits from the 2010s, researchers could not immediately determine a rationale for 7% of them because they: listed no rationale; provided ludicrously vague rationales;¹⁵⁴ or cited a catch-all, laundry list of possible rationales.¹⁵⁵ The agency’s routine approval of such exceptions suggests an “anything-goes” approach to flaring. If the Railroad Commission required operators to demonstrate compelling flaring rationales, such permits likely would plummet.

As the agency overhauled flaring data in early 2021, it phased out reporting rationales in the flaring-permit data that it provides to the public. Researchers who could not determine a clear rationale for 7% of flaring permits in the 2010s now could not do so for more than half of the permits approved from 2020 through 2022.¹⁵⁶ Due to this data problem, this report just analyzes rationales for the more than 36,000 flaring permits issued from January 2010 through March 2021.¹⁵⁷ Excluding flaring rationales from summary permit data undermines the goal of reducing greenhouse-gas flaring since regulators, the industry, and the public should advocate for flaring-prevention policies that address the root causes of this waste.

Many of the flaring-rationale categories analyzed below are overlapping and interdependent. Operators often blame flaring on extreme pipeline pressures, which can be caused by bringing new wells online or by a compressor failure—both of which are common flaring rationales in and of themselves. Any number of disasters or maintenance issues can trigger an “upset,” “shut in,” “shut down,” or “turnaround.” Researchers coded rationales based on the plain language that operators used in flaring applications—often having to pick one of several cited causes. In those instances, researchers used a hierarchal approach. If operators attributed flaring to the need to test new wells that were not yet connected to a pipeline, for example, then that permit was attributed to a “Capacity Curtailment” bottleneck (given that there was no market pipeline for the well once tested).

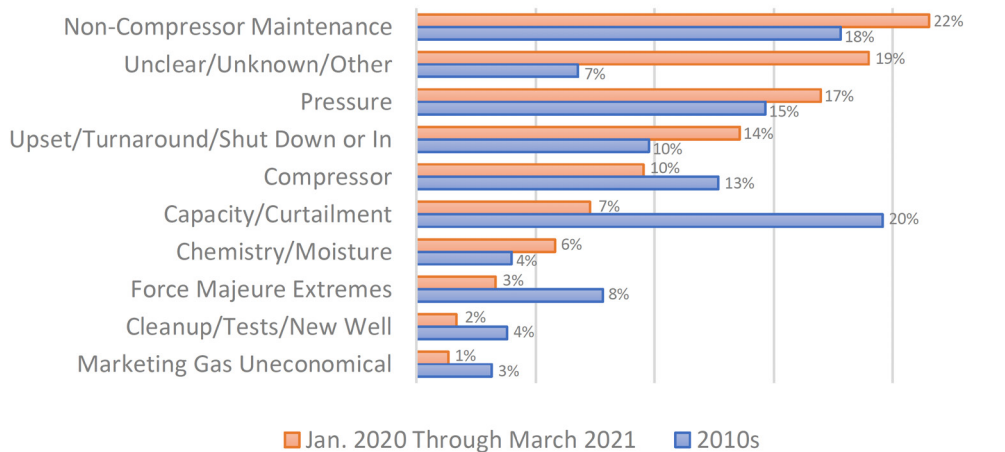
The Natural Gas Production, Transmission and Distribution System



Source: U.S. EIA cited in URS and Aerodyne Research. (n.d.) Measurements of Methane Emissions at Natural Gas Production Sites in the United States. University of Texas Center for Energy and Environmental Resources.

The accompanying chart highlights how stated flaring rationales changed in the first 15 months of the 2020s compared with the preceding decade. As discussed, a big change is that the share of permits for which no clear rationale could be established leapt from 7% in the 2010s to 19% in the first 13 months of the 2020s, as the agency phased out rationale reporting in the summary flaring data that it makes public.

STATED FLARING RATIONALES, JAN. 2010 THROUGH MARCH 2021



An even bigger change involves permits blamed on pipeline “Capacity/Curtailment” problems. Most capacity/curtailment problems involved facilities that were not yet connected to a functioning pipeline network (others involved problems at facilities that feed pipeline networks). During the 2010s, pipeline capacity/curtailment problems were the leading cause of flaring, accounting for 20% of all flares. In the early 2020s,

however, this rationale plummeted to just 7% of all flares—now ranking as the No. 4 flaring excuse.¹⁵⁸ Explanations for this sudden change could include:

- New pipelines relieved “Capacity/Curtailment” problems and delivered more gas to market;¹⁵⁹ or
- Operators came under mounting regulatory or social pressures to cite flaring rationales that sound less wasteful than a lack of a market pipeline.

If new pipelines did drive the drop in “Capacity/Curtailment” rationales, however, one might expect a big drop in overall volume of flaring releases authorized. As we have seen, that didn’t happen.

In the early 2020s, “Non-Compressor Maintenance” was the most-cited rationale, rising from 18% to 22% of the total. The No. 3 and No. 4 rationales in the early 2020s—accounting a total of 31% of all flares—were pipeline “Pressure” extremes and “Upsets/Turnarounds/Shut Downs/Shut Ins.”¹⁶⁰ These rationale categories that have been on the rise all have the ring of outright flaring emergencies. Did these sudden shifts in flaring rationales reflect actual changes on the ground? Or were they shaped by PR spin as the industry and its regulators have come under mounting pressure to throttle gratuitous flaring?

Compressor problems were such a common flaring rationale that they merited their own category separate from other maintenance problems. Still, “Compressor” rationales dropped from 13% of the total in the 2010s to 10% in the early 2020s. Flaring attributed to “Chemistry/Moisture” problems involving hydrogen sulfide, nitrogen, oxygen, carbon dioxide, water or vapor in the lines rose from 4% to 6% of all flaring rationales. Meanwhile, “Force Majeure Extremes” dropped from 8% to 3% of all permit rationales. While some permit applications referred to downstream plant closures as a “force majeure,” researchers just applied this category to such extreme events as fires, explosions, hurricanes, floods, freezes, and power losses.

Flares blamed on various well or equipment clean ups and tests—including many associated with bringing new wells online—decreased from 4% to 2% of all rationales. Finally, flaring applications claiming that it was “uneconomical” to market the gas shrank from 3% to 1% of the total. These applicants based their economic claims on the low amount of gas produced, its high contaminant content, or to the absence of a nearby pipeline.

Some experts [criticized](#)¹⁶¹ a flaring report that then-Railroad Commissioner Ryan Sitton published in 2020, saying that it ignored technological best practices that can slash—if not eliminate—the need for flaring. Common flaring rationales such as compressor problems lend themselves to proactive regulatory interventions. If the Railroad Commission maintained detailed data on compressor incidents triggering flares, for example, it could identify the types and brands of compressors that fail most and under what circumstances. That knowledge could be used to promote best practices. While the agency has taken some small steps to improve flaring-data collection,¹⁶² the maxim “garbage in equals garbage out” accurately describes too much of the agency’s flaring-rationale data.

Flaring Permit Durations and Amendments

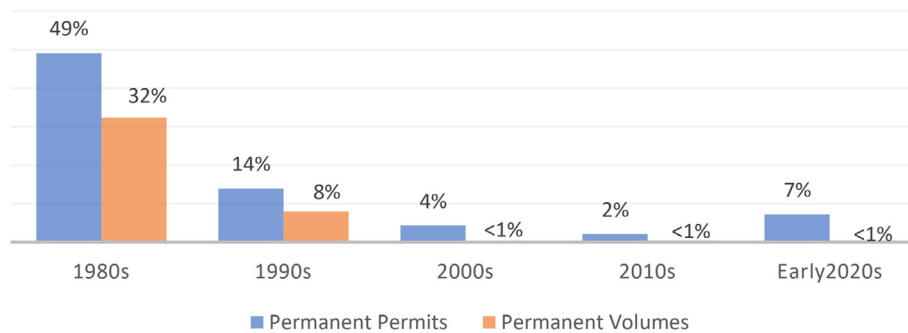
Key Section Findings

- Flaring-permit durations may be the most crucial—and most slippery—aspect of Railroad Commission flaring data. These durations are vital because the volume of releases that a flaring permit authorizes is equal to the amount of gas that it authorizes *per day* times the *number* of authorized flaring days. With key caveats, shorter permit lifespans generally authorize smaller release volumes.
- In a healthy trend, so-called “permanent” permits dropped from half of the total in the 1980s to 2% in the 2010s. Unfortunately, they then rebounded to 7% of the total in the early 2020s.
- Nonsensically, however, many flaring permits flagged as “permanent” also list expiration dates.
- Moreover, the agency often amends flaring permit expiration dates to extend their lifespans into the future. These amended permits account for a disproportionately large share of authorized flaring release volumes. In the early 2020s, 10% of all permits were amended yet they accounted for more than half of all authorized release volumes.
- Permits lasting fewer than 90 days leapt from half of all permits in the 1990s to 82% in the early 2020s. Meanwhile, permits exceeding one year dropped from 34% of the total in the 1990s to just 4% in the 2000s. Unfortunately, these longer permits have since rebounded to around 7% of the total.
- The Railroad Commission has done a poor job of tracking flaring-permit durations in the summary flaring-permit data that it makes public. This is akin to selling used cars without odometers. It’s time to install an “odometer” on every Texas flaring permit to record the permit’s inception date and all amendment dates. This flaring permit odometer also should record a permit’s total number of flaring days and the total volume of releases that it has authorized.
- Railroad Commission computers should automatically compare authorized flaring data to the volumes that operators report flaring from the same site in the same period. Discrepancies should be automatically flagged for prompt enforcement actions.

Permanent Permits

Despite problems with how the Railroad Commission of Texas tracks flaring permits that it flags as having “permanent” durations, permanent flaring permits clearly have become much rarer over time. Almost half of the Railroad Commission’s fragmentary flaring records from the 1980s boast “permanent” durations.¹⁶³ Permanency also was difficult to assess in the 1990s, when a fifth of all permits left the “permanent” field blank.¹⁶⁴ Those problems aside, permanent permits dropped to just 2% of the total in 2010s. Indeed, permanent permits appeared to be going extinct before they rebounded to 7% of the total in the early 2020s.

Permanent Permits' Share of All Permits
& Authorized Release Volumes,
1980 Through 2022



Because permanent permits typically authorize smaller flaring volumes, they are responsible for a smaller share of all authorized *release volumes*. Indeed, the agency said in August 2023 that it now restricts¹⁶⁵ its *staff* to authorizing permanent permits of no more than 50,000 cubic feet of gas per day (permanent releases of larger volumes require a hearing and approval by the commissioners).

After accounting for a third of authorized release volumes in the 1980s, permanent permits dropped to less than 1% of total in recent decades. The agency then issued 685 permanent permits that took effect in the first three years of the 2020s, including 18 that exceeded this 50,000 cubic-foot limit. Diamondback E&P, LLC received 10 of the large permanent permits, including the four largest. Its biggest permanent permit allowed it to spew 208,590,000 cubic feet a day.¹⁶⁶

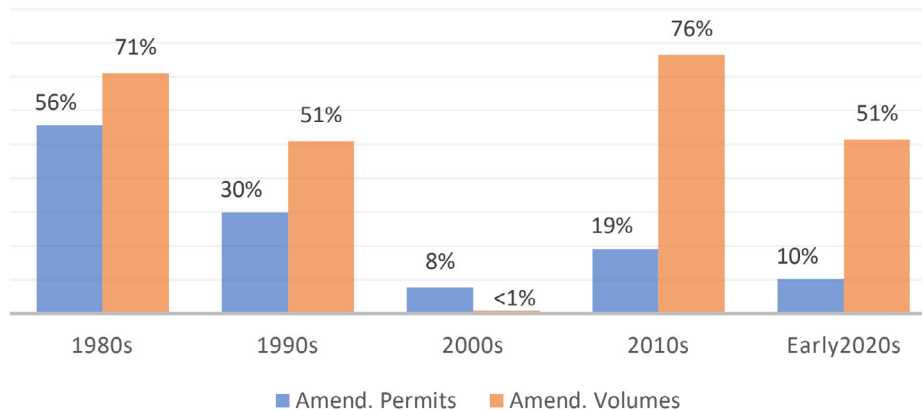
Renewed/Amended Permits

The Railroad Commission often grants flaring-permit “amendments” that extend a permit’s lifespan or alter¹⁶⁷ such things as the authorized volume of that gas that can be flared. These updates generally do not require a new exception permit application unless they involve¹⁶⁸ a change in operator or, in recent years, flaring for more than 180 days.¹⁶⁹ The aggregate data that the agency makes public do a poor job of tracking the impacts of renewals and amendments—greatly complicating assessments of permit durations.

Those data contain a couple amendment fields.¹⁷⁰ There is a simple yes-no “Amendment” field¹⁷¹ and a separate one that records the date of an amendment. Over 43 years, however, 7,527 records list amendment dates, while just 3,982 records checked off the “Amendment” field. Many permits flagged as amended do not contain an amendment date (and vice versa). Finally, although many permits are repeatedly amended, the agency just recently started tracking how many times permits get amended.¹⁷²

The accompanying graph shows the percentage of flaring permits that were flagged as amended and/or contained amendment dates. The overall amendment rate plummeted from a high of 56% of permits in the 1980s to a low of 8% in the 2000s. The amendment rate rebounded to 19% in the go-go 2010s before receding to 10% early this decade.¹⁷³

Amended Permits & Authorized Release Volumes, 1980 Through 2022



The Railroad Commission of Texas emphasizes how it has limited the durations of flaring permits. Yet most of the release volumes that it has authorized appear to involve permits that it has extended. Authorized release volumes for amended permits plummeted from 71% of the total in the 1980s to less than 1% in the 2000s. They then skyrocketed to 76% of the total in the 2010s and receded to just over half in the early 2020s. In every period except the 2000s, amended permits accounted for a disproportionately large share of release volumes—greatly exceeding their share of all permits. Just 10 percent of permits were flagged as amended in the early 2020s. Yet those amended permits accounted for just over half of all authorized release volumes in that period. While the agency’s summary flaring data do not do a good job of tracking the cumulative effects of these amendments, they do suggest that many amended permits authorize huge release volumes.¹⁷⁴ This indicates that the agency’s rules to limit venting and flaring have fallen short.

Permit Durations

For reasons discussed above, the true durations of many agency flaring permits are elusive. In October 1990, the Railroad Commission sporadically started using a “Time Period” field that ostensibly reports the number of days that a flaring permit is in effect. Yet this promising innovation failed to solve the duration problem. This field often is blank—or fails to account for the cumulative effects of duration-extending amendments. And the number of days reported in the “Time-Period” field often diverges from the number of days separating the same permit’s reported effective and expiration dates.¹⁷⁵ Nonetheless, permit durations are key to understanding how much gas the agency authorizes to be flared. The total volume of pollution that a flaring permit authorizes is equal to the number of authorized flaring days *times* the amount that an operator is allowed to flare each day.

Researchers devised a hierarchical method to estimate permit durations. Despite the limitations of the “Time Period” field, which accounts for the vast majority of permits, researchers deferred to this official duration field wherever possible. When no “Time Period” was given, researchers based durations on the number of days separating a permit’s effective date from its expiration date. Durations for permits with no expiration date were based on the days separating the permit’s effective date from its amendment date. Finally, permits containing no useful duration data were assigned the average number of duration days for other permits from that period (an 87-day average in the early 2020s, for example). Because agency data do a poor job of tracking the cumulative effects of permit amendments, these duration estimates probably are conservative.

To assess the accuracy of these estimates, researchers calculated authorized flaring release volumes in the early 2020s two different ways. From 2020 through 2022, the agency issued 9,465 flaring permits—including 8,756 relatively clean records (93%). The cleaner records report permit days in the “Time Period” field. They also report a *rational* permit effective date that *precedes* its expiration date.¹⁷⁶ Researchers then compared the reported “Time Period” duration to the number of days between a permit’s effective date to its expiration date. Even for these relatively clean data, these two calculations were more than a day apart 14% of the time—and often were wildly divergent. The craziest permit clocked a duration difference of 6,295 days between the two methods.¹⁷⁷

Using a permit’s reported start and stop dates to calculate release volumes for these relatively clean data, the agency authorized 893 billion cubic feet of flaring releases in the first three years of the 2020s. Using the “Time-Period” field instead, the agency authorized more than 1 trillion cubic feet of releases —18% more.

Authorized Flare Release Volumes, 1,000s of Cubic Feet, 2020 Through 2022



What follows are permit-duration data based on the hierarchal method described at the start of this section. The accompanying permit-duration chart excludes incomplete agency data from the 1980s (when every permit lasted at least one year).

Short permits of fewer than 90 days steadily gained share over time, rising from half of all permits in the 1990s to 82% in the early 2020s. Meanwhile, permits with lifespans exceeding a year dropped from 34% of the total in the 1990s to just 4% in the 2000s. Unfortunately, long permits then rebounded to around 7% in the 2010s and early 2020s. As late as the 2010s, the shelf life of 4% of these long-term permits exceeded three years, while 2% surpassed five years. In their longest-lasting gift, the Railroad Commission of Texas gave Treadstone Energy Partners a permit to flare for almost 27 years.¹⁷⁸

Flaring Permits & Authorized Release Volumes by No. of Permitted Days, 1990 Thru 2022

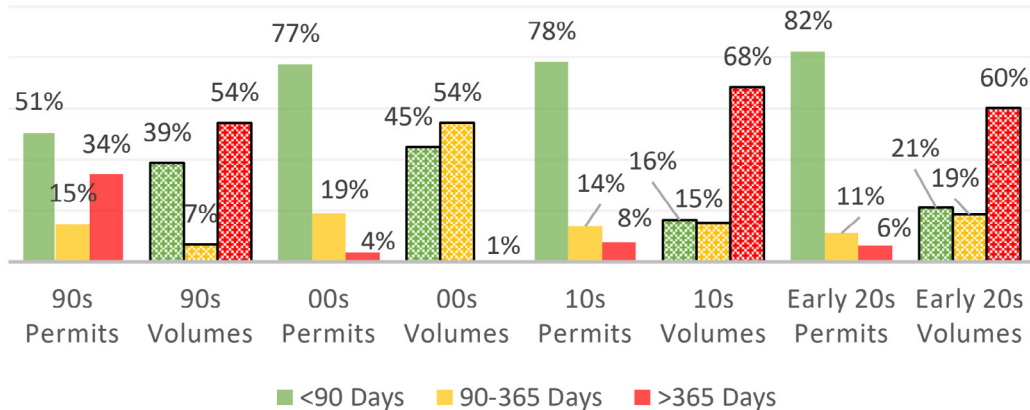


Chart shows permit durations lasting: More than 365 days (solid red); Fewer than 90 days (solid green); Or fell in between (solid yellow). Shaded bars show authorized release volumes (discussed next).

Predictably, long-term permits account for a disproportionately large share of authorized release volumes (shaded bars in the accompanying chart). In the 1990s, for example, permits exceeding one year accounted for 34% of all permits but 54% of authorized release volumes. In an outlier, long-haul permits during the drilling-frenzied 2000s accounted for 4% of permits but just 1% of authorized release volumes. In the 2010s and early 2020s, approximately 7% of permits ran over a year. Yet those long permits authorized 60% to 68% of all release volumes. By contrast, permits lasting fewer than 90 days accounted for a disproportionately small share of all authorized release volumes.

Wrestling in 2019 with EXCO Operating's controversial—but nonetheless approved—request to flare all the gas from 138 wells *already tied to pipelines*, the commissioners asked staff how many pipeline-connected wells then had flaring permits exceeding 180 days. The staff [identified](#)¹⁷⁹ 234 permits authorizing such long flares at 3,073 pipeline-connected wells (averaging 13 wells per permit and accounting for about 1% of the state's then-producing wells). The commission reported that these wells—concentrated in the Permian and Eagle Ford regions—flared 5.4% of the gas that they produced, or four times the then-state average.

Flaring Permit Types

Key Section Findings

- While venting and flaring both harm humans and the planet, flaring is the lesser evil. Happily, venting *permits* plunged from 44% of the total in the 1990s to 4% in the early 2020s. Even more progress could be made if regulators required inspections to ensure that flares burn properly. Faulty flares emit clouds of unburned methane.
- Five main types of oil and gas “producing properties” obtain flaring permits: Oil Wells; Gas Wells; Commingled Wells; Drilling Permits; and Gas Plants.
- Long the king of flaring, the Oil Well property category accounted for 66% of all permits and 52% of all authorized release volumes in the 1990s.
- Recently, Oil Well permits have been largely supplanted by Commingled Wells, which [combine](#)¹⁸⁰ production from two or more energy properties into a common surface tank or gathering system (many commingled properties include oil and/or gas wells that combine production from multiple leases). By the early 2020s, commingled properties accounted for 39% of all permits and 57% of authorized release volumes.
- Some commingling properties combine dozens of oil and gas leases under the umbrella of a single flaring permit. Commingling, therefore, reduces the number of flaring permits issued without a commensurate cut in authorized release volumes. Recently, the average Commingled permit authorized flaring 3.6 times more gas than the average oil well permit.
- Commingling oil and production from multiple properties also can create flare-reduction opportunities. Many technologies to reduce flaring become more cost effective as the processed volumes of oil and gas increase. With the right operator—or oversight agency—commingling can reduce flaring.
- Gas well permits accounted for about 7% of all flaring permits in recent years but were authorized to spew 16% of all authorized release volumes in the early 2020s.
- Oil and gas well drilling increases when economic stability combines with high energy prices. Flaring permits tied to drilling permits hit a peak in the 2010s, accounting for 16% of all flaring permits and 12% of authorized release volumes. Amidst COVID chaos in the early 2020s, drilling permits dropped to 8% of all flaring permits and authorized release volumes.
-

This section of the report analyzes trends in different types of flaring permits that the Railroad Commission has issued since 1980. Fundamental type differences separate permits that authorize:

- Flaring versus venting; and
- Releases of gas originating in oil wells versus gas wells.
- Regulators also grant flaring permits to five main types of producing properties—including some that overlap the flaring categories just mentioned. These producing-property types are: oil wells; gas wells; commingled wells; drilling permits; and gas plants. This section of the report capitalizes these titles when referring to a type: a “Gas Well” producing property type, for example.

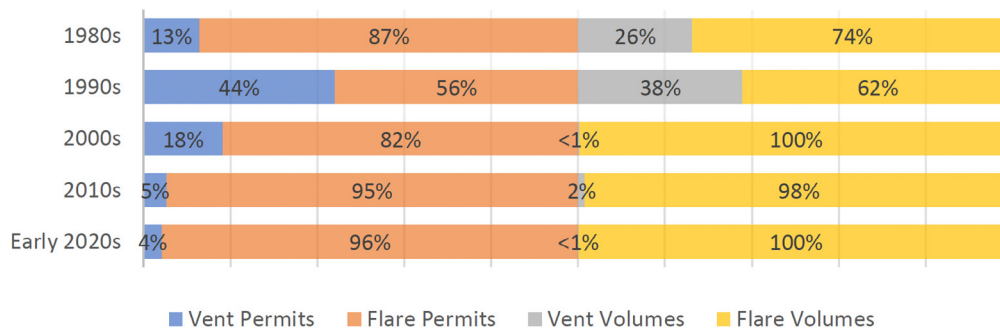
Flaring v. Venting Permits

The oil and gas Industry fuels global warming when it vents off methane directly into the atmosphere, as well as when it flares it off as carbon dioxide. Given that methane warms the atmosphere [83 times](#) more than carbon over the first 20 years, flaring methane off as carbon dioxide is preferable to venting despite the fact that the methane-burning efficiency of flares [varies wildly](#).¹⁸¹

Venting or leaking methane also can [release](#) smog-forming volatile organic compounds, [along with](#) such toxins and carcinogens as benzene, hydrogen sulfide, toluene, and xylene.^{182 183} Functioning flares burn off most of these chemicals, even as they release particulate matter, sulfur dioxide, carbon monoxide and nitrogen oxides, which also harm human health. While venting and flaring both harm the planet and humans, flaring is preferable. With some exceptions, the Railroad Commission no longer allows venting for more than 24 hours.^{184 185}

In a promising trend, the share of *permits* authorizing venting—as opposed to flaring—plunged from 44% in the 1990s to 4% in the early 2020s. The *volume* of gas authorized to be vented, meanwhile, plummeted from 38% of the total in the 1990s, to less than 1% in the early 2020s. That’s undeniable progress. This progress would be much greater, however, if state or federal regulators required flares to burn more efficiently—without emitting clouds of unburned methane.

FLARED v. VENTED PERMITS & AUTHORIZED RELEASE VOLUMES, 1980 THROUGH 2022



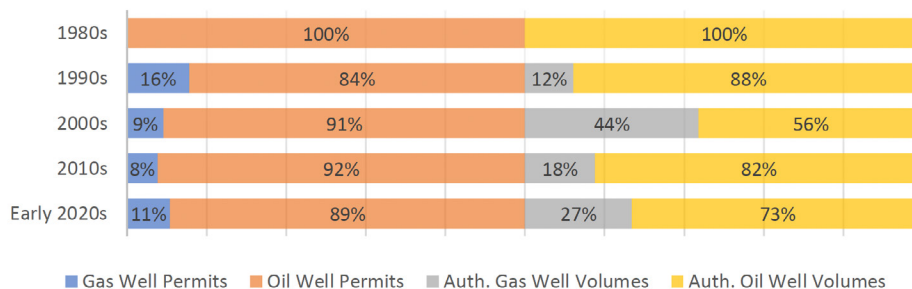
Oil Well v. Gas Well Flares

Flared gas originates either in gas wells or oil wells (oil-well gas is called “associated” or “casinghead” gas). The many wells that produce both oil and gas are formally [defined](#)¹⁸⁶ as “gas wells” when they produce at least 100,000 cubic feet of gas for every barrel of oil. The Railroad Commission of Texas [says](#) that it “does not issue long-term permits for flaring from natural gas wells as natural gas is the main product of a gas well.” In other words, it doesn’t make economic or regulatory sense to drill gas wells just to flare the gas off as waste. However, the agency lets both oil and gas wells flare from the start of drilling until 10 days after well completion. It also allows gas-well flaring during maintenance operations and emergencies.¹⁸⁷

The accompanying chart shows that oil wells are the kings of flaring, accounting for the vast bulk of flaring permits and authorized release volumes. Given this reality, the Railroad Commission uses a deceptive smokescreen when it [boasts](#) about falling flaring intensity rates based on “the percentage of natural gas flared compared to the natural gas produced from oil *and* gas wells” (emphasis added). The percentages of casinghead oil-well gas that Texas flares is a more [meaningful](#)¹⁸⁸ statistic when considering the percentage of gas releases that can be reduced. More fundamentally, what determines the speed at which we roast the planet is the total volumes of gas released into the atmosphere.

The Railroad Commission’s sketchy 1980s data attribute every single flaring permit to casinghead oil-wells. During the 1990s, gas wells claimed 16% of all permits and 12% of authorized release volumes. These shares swung wildly in the 2000s to just 9% of permits but a remarkable 44% of authorized release volumes. Driving this fluke was one monster flaring permit for a well that Encana Oil & Gas drilled in the Barnett Shale in Denton County. Over just 60 days in early 2009 that permit authorized Encana to flare a stunning 720 billion cubic feet of gas—or 43% of all the gas that the agency authorized that decade.¹⁸⁹ In Production Reports that it then filed with the agency for that lease and field, Encana said that it actually flared almost 10.6 million cubic feet of gas—a fraction of its authorized release volumes.¹⁹⁰ Putting that permit aside, gas wells accounted for just 1% of all flaring release volumes in the 2000s. Since the 2000s, gas-well flaring permits have accounted for roughly 10% of all permits, while increasing from 18% of all release volumes in the 2010s to 27% in the early 2020s.

GAS WELL v. OIL WELL FLARING PERMITS & AUTHORIZED RELEASE VOLUMES, 1980 THROUGH 2022



One monster operator drove a spike in authorized gas-well release volumes in the early 2020s. The era’s biggest gas well permit authorized BPX Midstream, LLC to spew 10.5 billion cubic feet of gas in Reeves County, or 1% of that period’s total release volume.¹⁹¹ Meanwhile, 36 of the 50 permits that authorized the most gas-well release volumes went to Capitan Energy, Inc. Capitan’s 52 Gas-Well permits—concentrated in Culberson County—authorized 132.5 billion cubic feet of releases in the early 2020s.¹⁹² That’s almost half of the period’s authorized gas well release volumes and 13% of all authorized release volumes. The Railroad Commission authorized Capitan to flare enough gas to fuel 57% of Texas residential households for a year.¹⁹³

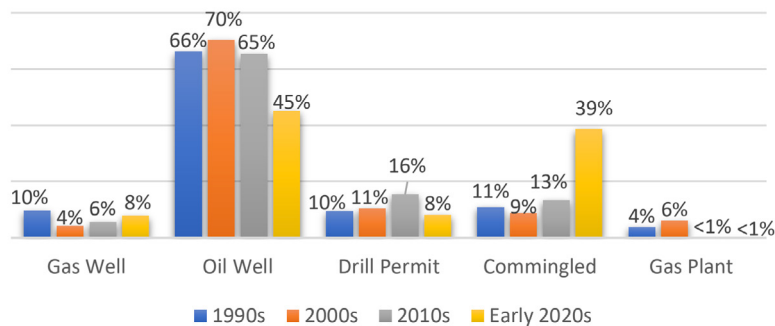
The next section on “Producing-Property Types” will discuss how the majority of all recent oil well flaring release volumes come from commingled leases, which [combine](#)¹⁹⁴ production from two or more energy properties into a common surface tank or gathering system.

Producing-Property Types

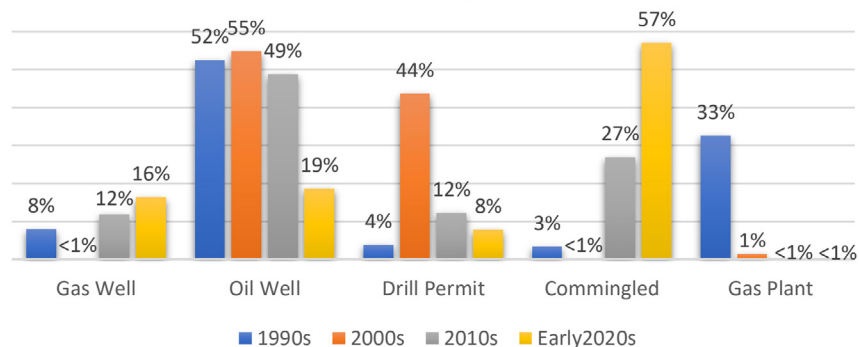
Flaring permit applicants identify the type of “producing property” from which they seek to flare. The six types are: Oil Well Leases, Gas Well Leases, Gas Plants, Drilling Permits, Commingled Leases, and American Petroleum Institute (API) Number. API numbers are unique numbers assigned to every oil and lease. API types are omitted below because they accounted for less than 1% of flaring permits or release volumes. These properties seemingly should be reclassified as Oil Wells, Gas Wells or Commingled properties. Also excluded here are the agency data from the 1980s, when oil wells accounted for all but two of the decade’s 171 reported flaring permits.¹⁹⁵

To varying degrees, four producing-property types mirror other agency flaring data fields. For example, Commingled and Drilling-Permit producing properties correspond almost perfectly with flaring permits that include either a commingle-permit number or a drilling-permit number, respectively.¹⁹⁶

**Permits by
Producing-Property Type,
1990 Through 2022**



**Authorized Release Volumes
by Producing-Property Type,
1990 Through 2022**



As discussed, most flaring permits and release volumes involve gas extracted from oil wells—not gas wells. Flaring and venting from Oil Well producing property types dominates the two accompanying charts. Yet these data also highlight the recent explosion of “Commingled” properties, which mostly grew at the expense of the “Oil Well” properties. Put another way, Texas kept right on flaring oil-well gas like there’s no tomorrow—but a skyrocketing share of this gas now is aggregated in properties that commingle multiple leases under a single umbrella flaring permit.

We previously discussed how flaring applicants use separate fields to report whether they seek to flare gas extracted from either gas wells or oil wells. Producing-property data break down this dichotomy further, reporting if the property flaring that gas is a Gas Well property, an Oil Well, a Drilling Permit, a Commingled property or a Gas Plant. A permit to flare gas extracted from an oil well, then, could report that the producing-property flaring that oil-well gas is an “Oil Well,” a “Commingled Lease,” or a “Gas Plant,” for example. In this way, producing-property data shift the focus from the *source* of the gas being flared to *where* that flaring occurs.

As we discuss the five main kinds of producing-property types below, it’s helpful to refer to the two charts above that break down flaring permits and authorized release volumes by producing-property type.

Oil Well v. Gas Well Types

Accounting for 65% to 70% of all flaring permits from 1990 through 2019, Oil Well properties dropped to 45% of the total in the early 2020s. Oil Well properties, which generated about half of all release volumes from 1990 through 2019, then fell to 19% in the early 2020s (see the above charts). Driving these drop-offs was the rapid expansion of Commingled property permits (discussed next).

Meanwhile, Gas Well properties fell from 10% of all permits in the 1990s to about half that in the first 20 years of this century. They then crept back up to 8% of the total in the early 2020s. Gas Well properties accounted for smaller shares of authorized release volumes than permits in the 1990s and 2000s. This promising trend reversed itself thereafter. By the early 2020s, 8% of all flaring permits went to Gas Well properties, which were entitled to spew 16% of all authorized release volumes. This unacceptable gas-well waste should be investigated and severely reined in.

Commingled Lease Types

The Railroad Commission allows operators to “[commingle](#)”¹⁹⁷ oil and gas production from more than one well or lease into the same holding tank or facility. During the 1990s and 2000s Commingled properties accounted for about a tenth of all flaring permits and a negligible share of authorized release volumes. Starting in the 2010s, Commingled flaring began to eat the lunch of traditional Oil Well properties. The percentage of Commingled flaring permits tripled from 13% of the total in the 2010s to 39% in the early 2020s. Commingled properties claimed a much larger share of authorized release volumes, more than doubling from 27% of the total in the 2010s to 57% in the early 2020s (see the charts above).

The numbers of energy properties consolidated into one commingled permit can boggle the mind. In May 2021 the Railroad Commission granted SEM Operating, LLC a commingled permit that [authorized](#)¹⁹⁸ flaring from 33 different oil leases in one fell swoop. Through the magic of commingling, what would have been 33 flaring applications was reduced a single permit. While commingling dramatically slashes the number of flaring permits that the agency otherwise would issue, it does not reduce associated release volumes commensurately. The average commingled permit in the early 2020s authorized flaring 3.6 times more gas than did the average permit for a regular casinghead oil lease.

Flaring Permits and Release Volumes Authorized for Oil Well and Commingled Properties, 2020 Through 2022

Property Type	No. of Permits	Authorized Releases (MCF)	Avg Release Per Permit (MCF)
Oil Well	4,277	197,305,567	46,132
Commingled	3,658	604,719,646	165,314

As third parties increasingly use satellites and other technologies to independently monitor flaring, commingled properties complicate the task of geographically pinpointing who’s flaring what. The single SEM Operating commingled permit mentioned above cites 33 different oil leases at 33 different GPS coordinates.¹⁹⁹

On the brighter side, [commingling](#)²⁰⁰ oil and gas production from multiple energy properties into a common holding tank or facility increases opportunities to reduce or eliminate flaring. As discussed in the conclusion, many stated rationales for flaring can be redressed with best-practice technologies. Many of these technologies involve economies of scale that make them more cost effective as the processed volumes of oil and gas increase. Commingling facilitates the adoption of best-practice flaring technologies, provided that the operators implement — or regulators require — best practices. As discussed above, however, in the early 2020s Commingled properties accounted for 39% of all permits and 57% of all authorized releases. These data suggest that Texas’ Commingled properties have yet to fully take advantage of their economies of scale to prevent the waste of natural gas.

Drilling Permit Types

The Railroad Commission does not require drillers to obtain a permit to flare from the start of drilling through the first 10 days of a new well's production. "Drilling-Permit" producing properties nonetheless account for a considerable number of flaring permits. A 2017 Environmental Defense Fund study [found](#) that flaring volumes peak in the months following the completions of new wells.

High energy prices motivate operators to drill new wells—especially when favorable prices coincide with stable economic conditions and new technologies. The accompanying chart shows how Texas oil prices cratered in the 1980s and didn't hit a sustained recovery until the 2000s. A couple ups and downs followed. These included the COVID-era freefall of oil prices in early 2020—and their subsequent recovery in a period of extreme economic uncertainty.

West Texas Intermediate Crude Oil Prices Per Barrel, Nov. 1979 to Sept. 2023



Source: <https://www.macrotrends.net/1369/crude-oil-price-history-chart>

As oil prices in the new millennium clawed their way out of a late Twentieth Century trough, Drilling Permits' share of flaring permits rose from about 10% in the 1990s and 2000s to 16% during the 2010s fracking boom. Hammered by COVID's 2020 price plunge and subsequent economic uncertainty, they then retreated to 8% in the first three years of this decade (see related producing-property charts above).

Drilling Permit flaring permits have not always been proportional to their authorized release volumes. As oil prices slumped through much of the 1990s, Drilling Permits accounted for 10% of all flaring permits but just 4% of authorized release volumes. With oil mounting a strong recovery in the 2000s, Drilling Permits claimed 11% of flaring permits—which were authorized to produce 44% all authorized release volumes. Causing this mismatch was Encana Oil's previously mentioned Denton County well. It was authorized to spew 720 billion cubic feet of gas, or 98% of all Drilling Permit release volumes approved in the 2000s. Thereafter, Drilling Permit flares receded—and became more proportional. They accounted for 16% of permits and 12% of release volumes in the 2010s and 8% of all permits and release volumes in the COVID-heavy early 2020s.

Gas Plant Types

When a gas plant, gathering system or compressor facility shuts down, the Railroad Commission requires just one flaring permit to cover²⁰¹ the multiple, ripple-effect releases that it can trigger.²⁰² Gas-Plant flaring all but vanished in recent years. During the outlier decade of the 1990s, Gas Plant properties accounted for just 4% of flaring permits while claiming 33% of all authorized release volumes (see the above producing-property charts). A single permit accounted for most of these authorized release volumes. For a scheduled week-long inspection shutdown of the Seminole CO₂ Recovery Plant in Gaines County in July 1994, Amerada Hess Corp. obtained a permit to flare 161 billion cubic feet of gas (the plant injected carbon dioxide to enhance oil recovery in that part of the Permian Basin).²⁰³ That flaring permit accounted for 79% of all of Gas-Plant release volumes authorized that decade.

Gas Plants claimed 6% of all permits and just 1% of all release volumes in the 2000s. Flaring by Gas Plants then all but vanished from the mix. Gas Plants accounted for less than 1% of permits and authorized release volumes from 2010 through 2022.

Flaring Recommendations

Copycat Rules

A quick, smart way to contain flaring releases is to steal good ideas from others—or even oneself. The Railroad Commission already has required operators in the densely populated Barnett Shale surrounding Fort Worth to use flares that burn with 98% efficiency. It's time to impose that standard statewide. Emulating New Mexico, the Railroad Commission should mandate—and enforce—a 98% reduction in venting and flaring over five years. Toward that end, the Railroad Commission should stop trying to obstruct federal rules and instead should collaborate with the Texas Commission on Environmental Quality on plans to apply these common-sense standards in Texas. The state agencies can adopt measures to: monitor all wells for methane leaks; mandate leak-prevention best practices; and recruit credible third parties to independently monitor flaring release volumes. Texas regulators should get out in front of coming federal flaring-regulation mandates.

Best-Practice Technologies

Mandating efficient, effective technologies can have enormous impacts. ICF International consultants and the Environmental Defense Fund [proposed](#)²⁰⁴ several technologies in 2017 to affordably prevent release volumes—especially at higher production levels. They include booster compressors (to maintain proper line pressure), compressed natural gas and tube truck transport where pipelines are unavailable, and [Joule-Thomson skids](#)²⁰⁵ to redress poor gas quality.

A 2021 national [report](#)²⁰⁶ by the Clean Air Task Force and Ceres pinpointed several ways to reduce greenhouse-gas release volumes from the oil and gas industry. It traced 54% of all oil and gas *methane* releases to pneumatic controllers and 49% of the industry's carbon release volumes to fuel-burning equipment such as engines. Increasing efficiency standards for this equipment could slash releases of both methane and carbon dioxide.

The agency also should improve flaring-rationale reporting and analyze those data to identify ways to reduce flaring (by updating compressors with high failure rates, for example). The Railroad Commission should mandate optimal technologies for operators working at sufficient scale (including operators of the many commingled permits that now account for 57% of all authorized release volumes).

Permit Approvals and Denials

There have been sharp overall reductions in *per-permit* flaring durations and released volumes over time. By approving soaring numbers of permits, however, the commission has authorized record volumes of *overall* release volumes in the early 2020s. This is a wholesale failure, given that the total volume of releases drives climate change. Consistent with its mission to prevent waste of natural resources, the agency should:

- Reduce the number of flaring permits that it authorizes for currently permitted releases;
- Require the permitting of more sources of industry greenhouse-gas releases; and
- Slash per-permit rates of authorized release volumes.

Because the vast majority of authorized Texas flaring release volumes come from a relatively small group of dirtier operators, the agency has the power to prioritize them and slash flaring release volumes quickly.

The agency should prohibit flaring wherever pipeline capacity is available to use natural gas productively. It should abolish “permanent” permits, set a reasonable lifetime cap on the total allowable release volumes for a given permit, and further reduce permit durations without exceptions. The agency's indulgent approach to flaring is reflected in the fact that it authorizes far more volumes than most operators need or use. The agency also approves way too many retroactive flaring permits that reach too far back in the past. It should strictly limit retroactive permits and hold retroactive flaring applicants to short application deadlines. The agency recently said that it would begin requiring applicants to provide more data on the circumstances and ratio-

nales that justify flaring but many of these data are still thin. Forcing operators to provide clear and convincing evidence of a short-list of acceptable flaring rationales would greatly reduce wasteful release volumes.

Recently, the agency began to gingerly reject some flaring applications without publicly explaining those denials. It should provide this reasoning—and flesh out the precise circumstances in which flaring is not permitted. It should prohibit, for example, the operation of gas-producing wells in areas not serviced by a pipeline. The agency says it doesn't issue long-term permits for gas-well flaring. Yet recent agency data suggest that gas originating in gas wells accounts for 27% of authorized release volumes. This unacceptable gas-well waste should be investigated and reined in.

The Railroad Commission should mandate and enforce the measuring, monitoring and reporting of all flaring and venting releases. The goal of this accounting should be a modern, common-sense release system that better aligns the separate streams of flaring-releases data: authorized release volumes, operator-reported release volumes, and satellite-measured release volumes.

Permit Amendments/Renewals

Just 10% of recent permits are flagged as amended yet those permits account for more than half of all authorized release volumes. Too many permits are serially renewed and authorize releases of too much gas. Renewals should be strictly limited to rare circumstances—approved by the commissioners themselves. Flaring-rule limitations lose meaning when they are serially renewed. Further, the agency's flawed tracking system make permits virtually unenforceable.

Flaring Records and Data

The Railroad Commission has long kept junk flaring data. Records on every flaring permit should contain the equivalent of an odometer. The odometer would straightforwardly record the permit's inception date, all amendment dates, as well as the total number of flaring days and the total volume of releases authorized so far. The Railroad Commission should program its computers to automatically compare the volumes of flaring releases that it has authorized to the release volumes that operators report flaring from the same site in the same period. Discrepancies should be automatically flagged for enforcement actions.

Given the agency's history of poor recordkeeping and weak enforcement, third parties should independently verify that the agency delivers on this enforcement pledge. They also should independently monitor flaring and venting release volumes and compare them to the permitted and reported volumes. The Railroad Commission should make this data triangulation tighter by tying each flaring permit issued to its associated, operator-filed production reports. Finally, the agency should mandate accurate GPS data for flaring permits and production reports so those data can be checked against independent release volumes measurements collected by satellites and other technologies. These reforms could reduce—but not eliminate—the gaps separating authorized, self-reported and independently observed flaring volumes.

Enforcement

Tracking close to 800 flaring violations in a recent seven-year period, the Railroad Commission held back its enforcement arm. In the rare cases when it imposed fines it settled solid cases for half of what it was authorized to charge and violators did not admit wrongdoing. By failing to vigorously enforce its weak flaring rules, the agency telegraphs the message that it is not concerned about flaring release volumes. The commission should recognize that this wasteful pollution is harming people and the planet. Abuses should not be tolerated.

Greenhouse gases released by the oil and gas industry are altering the climate radically and rapidly. This has endangered a staggering list of Earth's inhabitants and is imposing astronomical costs on Texans in the form of drought, storms, property insurance, disaster relief, and an overtaxed power grid. Gases released by the industry contain toxins that undermine human health, exacerbating incidences of cancers, asthma, pre-term births, and early deaths. The Railroad Commission of Texas is legally obligated to prevent the waste of oil and gas resources. The incremental steps it has taken so far have not been proportional to the huge damage that is occurring on its watch.

Data Appendix

Permanent Permits' Share of All Permits & Authorized Release Volumes, 1980 Through 2022

Period	Perm. Permit Count	All Permits	Auth. Perm. Vol. (MCF)	All Auth. Vol. (MCF)	Perm. Permits (%)	Auth. Perm. Vol. (%)
1980s	84	171	8,895,323	27,511,743	49%	32%
1990s	1,015	7,264	50,327,699	628,347,989	14%	8%
2000s	82	1,883	3,417,107	1,685,288,681	4%	0.2%
2010s	687	32,744	16,134,069	3,362,888,230	2%	0.5%
Early '20s	685	9,465	4,665,636	1,059,473,083	7%	0.4%
TOTALS	2,553	51,527	83,439,833	6,763,509,726	5%	1%

Amended Permits & Authorized Emissions Volumes, 1980 Through 2022

Period	All Permits	Amended Permits	%	All Emissions	Amended Emissions	%
1980s	171	95	56%	27,511,743	19,526,886	71%
1990s	7,264	2,162	30%	628,347,989	320,392,394	51%
2000s	1,883	146	8%	1,685,288,681	13,933,627	1%
2010s	32,744	6,232	19%	3,362,217,158	2,570,429,662	76%
Early2020s	9,465	957	10%	1,059,473,082	544,368,501	51%
Totals	51,527	9,592	19%	6,762,838,653	3,468,651,069	51%

Flaring Permits and Authorized Emissions Volumes by Number of Permitted Days, 1980 Thru 2022

Period	Permits <90 Days	Permits 90-365 Days	Permits >365 Days	All Permits	<90 Days Vol. (MCF)	90-365 Days Vol. (MCF)	>365 Days Vol. (MCF)	All Emissions Vol. (MCF)
1980s	0	1	170	171	0	18,250	27,493,493	27,511,743
1990s	3,692	1,083	2,489	7,264	243,838,613	42,940,979	341,568,397	628,347,989
2000s	1,459	354	70	1,883	757,713,279	917,343,342	10,232,060	1,685,288,681
2010s	25,679	4,534	2,531	32,744	548,846,928	513,940,922	2,300,100,380	3,362,888,230
Early '20s	7,805	1,063	597	9,465	225,619,308	196,106,991	637,746,784	1,059,473,083
TOTAL	38,635	7,035	5,857	51,527	1,776,018,128	1,670,350,484	3,317,141,114	6,763,509,726

Note: 2010s releases include 671,071 MCF authorized to spill over into the 2040s.

Flared Vs. Vented Permits & Authorized Release Volumes, 1980 Through 2022

	Vent Permits	Flare Permits	All Permits	Vent Vol. (MCF)	Flare Vol. (MCF)	All Vol. (MCF)
1980s	22	149	171	7,198,695	20,313,048	27,511,743
1990s	3,201	4,063	7,264	237,720,333	390,627,656	628,347,989
2000s	344	1,539	1,883	4,808,469	1,680,480,213	1,685,288,681
2010s	1,712	31,032	32,744	51,564,889	3,311,323,340	3,362,888,230
Early '20s	399	9,066	9,465	1,521,903	1,057,951,179	1,059,473,083
Total	5,678	45,849	51,527	302,814,289	6,460,695,437	6,763,509,726

Gas Well Vs. Oil Well Flaring Permits & Authorized Release Volumes, 1980 Through 2022

(Showing Split Between Gas Originating in Oil Wells V. Gas Wells)

Period	Oil Well Permits	Gas Well Permits	All Permits	Oil Well Vol. (MCF)	Gas Well Vol. (MCF)	All Vol. (MCF)
1980s	171	0	171	27,511,743	0	27,511,743
1990s	6,128	1,136	7,264	551,977,539	76,370,450	628,347,989
2000s	1,709	174	1,883	951,423,010	733,865,672	1,685,288,681
2010s	30,231	2,513	32,744	2,773,628,923	589,259,306	3,362,888,230
Early '20s	8,438	1,027	9,465	774,885,335	284,587,748	1,059,473,083
Totals	46,677	4,851	51,527	5,079,426,550	1,684,083,176	6,763,509,726

Gas Well Versus Oil Well Flaring Permits & Authorized Release Volumes, 1980 Through 2022

(Showing Gas Released Onsite at Oil Wells or Gas Wells—
Not at Producing-Property Types Shown Below)

Period	Oil Well Permits	Gas Well Permits	Oil Well Vol. (MCF)	Gas Well Vol. (MCF)
1980s	169	0	26,996,307	0
1990s	4,810	694	329,598,248	49,563,106
2000s	1,323	79	923,357,281	1,288,457
2010s	21,438	1,815	1,639,390,268	396,759,772
Early '20s	4,277	739	197,305,567	173,483,640
Totals	32,017	3,327	3,116,647,671	621,094,975

Commingled Flaring Permits & Authorized Release Volumes, 1980 Through 2022

	1980s	1990s	2000s	2010s	Early 2020s	Totals
Permits	2	789	165	4,362	3,658	8,976
Vol. (MCF)	515,436	20,427,608	2,105,370	905,423,355	604,719,646	1,533,191,414

Drilling Flaring Permits & Authorized Release Volumes, 1980 Through 2022

	1980s	1990s	2000s	2010s	Early 2020s	Totals
Permits	0	692	198	5,083	776	6,749
Emits (MCF)	0	24,144,261	735,327,668	411,682,218	82,418,162	1,253,572,309

Gas-Plant Flaring Permits & Release Volumes, 1980 Through 2022

	1980s	1990s	2000s	2010s	Early 2020s	Totals
Permits	0	276	114	36	7	433
Emits (MCF)	0	204,609,095	23,180,506	9,408,603	1,261,068	238,459,272

Notes

- ¹ "Overview of Greenhouse Gases," Environmental Protection Agency, 11 Apr. 2024, www.epa.gov/ghgemissions/overview-greenhouse-gases#CO2-references.
- ² The oil and gas industry is the nation's leading industrial source of methane.
- ³ "IPCC Sixth Assessment Report Global Warming Potentials," ERCE Group, August 2021. <https://erce.energy/erceipccsixthassessment/>
- ⁴ "Methane: A Crucial Opportunity in the Climate Fight," Environmental Defense Fund, 2024, www.edf.org/climate/methane-crucial-opportunity-climate-fight.
- ⁵ "Biden-Harris Administration Strengthens Proposal to Cut Methane Pollution to Protect Communities," Environmental Protection Agency, 11 Nov. 2022, <https://www.epa.gov/newsreleases/biden-harris-administration-strengthens-proposal-cut-methane-pollution-protect>.
- ⁶ "Importance of Methane," Environmental Protection Agency, 1 Nov. 2023, <https://www.epa.gov/gmi/importance-methane>.
- ⁷ "Biden-Harris Administration Strengthens Proposal to Cut Methane Pollution to Protect Communities," Environmental Protection Agency, 11 Nov. 2022, <https://www.epa.gov/newsreleases/biden-harris-administration-strengthens-proposal-cut-methane-pollution-protect>.
- ⁸ IEA (2022), *Global Methane Tracker 2022*, IEA, Paris <https://www.iea.org/reports/global-methane-tracker-2022>.
- ⁹ See, for example, Anejionu et al. ; Fawole et al., and Umukoro & Ismail.
- ¹⁰ Chen, Chen et al. "Black Carbon Emissions and Associated Health Impacts of Gas Flaring in the United States," *Atmosphere*, 25 February 2022, <https://www.mdpi.com/2073-4433/13/3/385>
- ¹¹ Fleischman, Lesley. "Gasping for Breath: An analysis of the health effects from ozone pollution from the oil and gas industry," Clean Air Task Force, Aug 2016, https://cdn.catf.us/wp-content/uploads/2018/10/21094452/CATF_Pub_GaspingForBreath.pdf
- ¹² Tran, Huy et al. "Air Quality and Health Impacts of Onshore Oil and Gas Flaring and Venting Activities Estimated Using Refined Satellite-Based Emissions," *GeoHealth*, 06 March 2024, <https://doi.org/10.1029/2023GH000938>
- ¹³ Fleischman, Lesley. "Gasping for Breath: An analysis of the health effects from ozone pollution from the oil and gas industry," Clean Air Task Force, Aug 2016, https://cdn.catf.us/wp-content/uploads/2018/10/21094452/CATF_Pub_GaspingForBreath.pdf
- ¹⁴ Tran, Huy et al. "Air Quality and Health Impacts of Onshore Oil and Gas Flaring and Venting Activities Estimated Using Refined Satellite-Based Emissions," *GeoHealth*, 06 March 2024, <https://doi.org/10.1029/2023GH000938>
- ¹⁵ This No. 1 cause of infant deaths (36%) exceeds birth defects (21%), as well as both Sudden Infant Death Syndrome and Accidents (6% apiece). See "A Profile of Prematurity in United States," March of Dimes, for data covering 2017-2019.
- ¹⁶ Cushing, Lara J. "Up in smoke: Characterizing the population exposed to flaring from unconventional oil and gas development in the contiguous US," *Environmental Research Letters*, March 2021, https://www.researchgate.net/publication/349543440_Up_in_smoke_Characterizing_the_population_exposed_to_flaring_from_unconventional_oil_and_gas_development_in_the_contiguous_US
- ¹⁷ The study identified 358,167 people within 3 miles of at least one Permian flare and 113,253 more that are that close to one or more Eagle Ford Shale (Western Gulf) flares (Table 2 of the study).
- ¹⁸ Johnston, Jill E. et al. "Environmental Justice Dimensions of Oil and Gas Flaring in South Texas: Disproportionate Exposure among Hispanic communities," *Environ. Sci. Technol.* 26 Apr 2020, <https://pubs.acs.org/doi/10.1021/acs.est.0c00410>
- ¹⁹ "Global flaring and venting regulations," World Bank, Dec. 2023, <https://flaringventingregulations.worldbank.org/united-states-texas>
- ²⁰ "Natural Resources Code," State of Texas, Sept. 1, 1983, <https://statutes.capitol.texas.gov/Docs/NR/htm/NR.85.htm>
- ²¹ Railroad Commission of Texas, 2024, <https://www.rrc.state.tx.us/>
- ²² "Natural Flaring and Venting: State and Federal Regulatory Overview, Trends and Impacts," U.S. Department of Energy, June 2019, p. 22.
- ²³ Fielder, Caleb A. "Those who favor fire: An odyssey of flaring in Texas," *Texas Tech Law Review*, June 2022, https://works.bepress.com/caleb_fielder/6/
- ²⁴ An 1899 Texas law banning such waste from wells was gradually hobbled by legislative lobbying and court decisions. In 1935 the Railroad Commission resurrected the ban. Under conservationist Chair Bill Murray, Jr. in the late 1940s the agency even shut in numerous oil wells to halt flaring—an authority upheld by the Texas Supreme Court.
- ²⁵ Fielder, Caleb A. "Those who favor fire: An odyssey of flaring in Texas," *Texas Tech Law Review*, June 2022, https://works.bepress.com/caleb_fielder/6/
- ²⁶ "Natural gas constitutes up to 20% of production on a barrel of oil equivalent basis from a typical horizontal tight oil well in the Permian Basin. After four years, this percentage increases to about 50%, but by then, the overall output volume declines about 70% compared to the first year." "Natural Flaring and Venting: State and Federal Regulatory Overview, Trends and Impacts," U.S. Department of Energy, June 2019, p. 22.
- ²⁷ Willyard, Katherine et al. "Flaring in two Texas shale areas: Comparison of bottom-up with top-down volume estimates for 2012 to 2015," *Science of The Total Environment*, 15 Nov. 2019, <https://doi.org/10.1016/j.scitotenv.2019.06.465>.

- ²⁸ Fielder, Caleb A. "Those who favor fire: An odyssey of flaring in Texas," *Texas Tech Law Review*, June 2022, https://works.bepress.com/caleb_fielder/6/
- ²⁹ "Natural Flaring and Venting: State and Federal Regulatory Overview, Trends and Impacts," U.S. Department of Energy, June 2019, p. 21.
- ³⁰ "Global flaring and venting regulations," World Bank, Dec. 2023, <https://flaringventingregulations.worldbank.org/united-states-texas>
- ³¹ "Global flaring and venting regulations," World Bank, Dec. 2023, <https://flaringventingregulations.worldbank.org/united-states-texas>
- ³² "Texas Natural Flaring and Venting Regulations," U.S. Department of Energy.
- ³³ Sherwin, E.D., Rutherford *et al.* "US oil and gas system emissions from nearly one million aerial site measurements," *Nature* 627, 2024, <https://doi.org/10.1038/s41586-024-07117-5>.
- ³⁴ Sherwin, E.D., Rutherford *et al.* "US oil and gas system emissions from nearly one million aerial site measurements, Supplemental Information," *Nature* 627, 2024, <https://doi.org/10.1038/s41586-024-07117-5/>
- ³⁵ These data appear in supplemental Table S10. Texas' Fort Worth Basin fared better, with methane losses of 3.3%.
- ³⁶ "Permian Methane Analysis Project," Environmental Defense Fund, 2024, <https://www.permianmap.org/flaring-emissions/>
- ³⁷ State of Texas, Texas Administrative Code, Title 16, Part 1, Chapter 3, RULE 53.32, 1 Sept 2023, [https://texreg.sos.state.tx.us/public/readtac\\$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=16&pt=1&ch=3&rl=32](https://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=16&pt=1&ch=3&rl=32)
- ³⁸ Rahman, Atia. "Statewide Rule 32: Exception to Flaring/Venting," Railroad Commission of Texas, Aug 2023, <https://docs.google.com/presentation/d/1Jp0Z4adqwA7f62SxqQ7ZbCBv68xCvucO/edit#slide=id.p1>
- ³⁹ "Correlative rights means the opportunity of each owner in a pool to produce his just and equitable share of the oil and gas in the pool without waste."
- ⁴⁰ "Statewide Rule 32: Exception to Flaring/Venting," Railroad Commission of Texas Power Point, Atia Rahman, August 2023.
- ⁴¹ See slide 3, "Statewide Rule 32: Exception to Flaring/Venting," Railroad Commission of Texas Power Point, Atia Rahman, August 2023.
- ⁴² Rahman, Atia. "Statewide Rule 32: Exception to Flaring/Venting," Railroad Commission of Texas, Aug 2023, <https://docs.google.com/presentation/d/1Jp0Z4adqwA7f62SxqQ7ZbCBv68xCvucO/edit#slide=id.p4>
- ⁴³ In the agency's clumsy nomenclature, they are: 1. Exempt Releases (ER); 2; Authorized Releases (AR); and Authorized by Securing an Exception (AE) through an application.
- ⁴⁴ Including "perforating, stimulating, deepening, cleanout, well maintenance or repair operations." See section 3.32(f)(1)(A).
- ⁴⁵ "A blowdown is the purposeful venting of natural gas to the atmosphere during well operations and/or during pipeline operations or maintenance to relieve pressure in the pipe."
- ⁴⁶ Or up to 72 hours a month for well unloading.
- ⁴⁷ Up to 15,000 cubic feet a day of for gas wells or up to 50,000 for oil or commingled wells.
- ⁴⁸ "Flaring Regulation," Railroad Commission of Texas, 2024, <https://www.rrc.texas.gov/about-us/faqs/oil-gas-faq/flaring-regulation/>
- ⁴⁹ "Flaring Regulation," Railroad Commission of Texas, 2024, <https://www.rrc.texas.gov/about-us/faqs/oil-gas-faq/flaring-regulation/>
- ⁵⁰ Nattin, Nathan. "Statewide Rule 32 – Venting & Flaring," Railroad Commission of Texas, 5 Aug 2021, <https://stage2.rrc.texas.gov/media/i14nezuo/statewide-rule-32-venting-and-flaring.pdf>
- ⁵¹ The agency says that operators most often claim that they are awaiting pipeline completion. Others request more time for well cleanups or to negotiate with landowners over pipeline right of ways.
- ⁵² 16 TAC 3.32(h)(4).
- ⁵³ "Texas Railroad Commission Revamps Application for Flaring Exemptions," *Journal of Petroleum Technology*, 9 Nov 2020.
- ⁵⁴ "Global flaring and venting regulations," World Bank, Dec. 2023, <https://flaringventingregulations.worldbank.org/united-states-texas>
- ⁵⁵ Fielder, Caleb A. "Those who favor fire: An odyssey of flaring in Texas," *Texas Tech Law Review*, June 2022, https://works.bepress.com/caleb_fielder/6/
- ⁵⁶ Palacios, Virginia et al. "Captive Agency: Conflict of interest policies at the Railroad Commission of Texas need reform," Commission Shift, Sept 2021, <https://commissionshift.org/wp-content/uploads/2023/02/Commission-Shift-Captive-Agency-Part-I.pdf>
- ⁵⁷ Collier, Kiah. "Pipeline giant sues Railroad Commission, alleging lax oversight of natural gas flaring," *Texas Tribune*, 3 Dec 2019, <https://www.texastribune.org/2019/12/03/railroad-commission-sued-lax-oversight-natural-gas-flaring/>
- ⁵⁸ The case, decided on August 6, 2019, appeared to be the first formal challenge to a long-term flaring request. Dissenting Commissioner Wayne Christian objected to EXCO skewing its economic rationale for flaring by just considering the costs-versus-benefits of the gas it produced—thereby ignoring the *oil* profits it extracted from the same wells. Pipeline giant Williams Companies filed a lawsuit in state district court to challenge the agency's approval of these mass flaring requests but withdrew the suit before a judgment was issued.
- ⁵⁹ Collier, Kiah. "As oil and gas exports surge, West Texas becomes the world's 'extraction colony,'" *Texas Tribune*, 11 Oct 2018, <https://www.texastribune.org/2018/10/11/west-texas-becomes-worlds-extraction-colony-oil-gas-exports-surge/>
- ⁶⁰ "Texas continues to issue thousands of flaring permits," *Inside Climate News*, October 18, 2023.

- ⁶¹ "Railroad Commission moves toward adopting industry recommendations to reduce flaring," *Houston Chronicle*, August 4, 2020.
- ⁶² Nattin, Nathan. "Statewide Rule 32 – Venting & Flaring," Railroad Commission of Texas, 5 Aug 2021, <https://stage2.rrc.texas.gov/media/i14ne-zuo/statewide-rule-32-venting-and-flaring.pdf>
- ⁶³ Nattin, Nathan. "Statewide Rule 32 – Venting & Flaring," Railroad Commission of Texas, 5 Aug 2021, <https://stage2.rrc.texas.gov/media/i14ne-zuo/statewide-rule-32-venting-and-flaring.pdf>
- ⁶⁴ Global flaring and venting regulations," World Bank, Dec. 2023, <https://flaringventingregulations.worldbank.org/united-states-texas>
- ⁶⁵ Pskowski, Martha. "Texas Continues to Issue Thousands of Flaring Permits," *Inside Climate News*, 18 Oct 2023. <https://insideclimatenews.org/news/18102023/texas-railroad-commission-approval-flaring/>
- ⁶⁶ "Texas continues to issue thousands of flaring permits," *Inside Climate News*, October 18, 2023.
- ⁶⁷ "In America's Hottest Drilling Spot, Is Going up in Smoke," *Wall Street Journal*, August 29, 2018.
- ⁶⁸ New Mexico also was the nation's No. 7 gas producer.
- ⁶⁹ "New Mexico Natural Gas Flaring and Venting Regulations," U.S. Department of Energy, June 2022, <https://www.energy.gov/sites/default/files/2022-06/NewMexico-state-profile.pdf>
- ⁷⁰ Montoya Bryan, Susan. "New Mexico adopts rules to curb emissions from oil industry," Associated Press, 25 Mar 2021, <https://apnews.com/general-news-dfceac403517adcad9532e379c854f12>
- ⁷¹ "Texas produces twice as much methane as better regulated neighbor, study finds," *The Guardian*, 08 Nov 2023, <https://www.theguardian.com/us-news/2023/nov/08/texas-methane-oil-and-gas-study-climate>
- ⁷² 2023, <https://www.kayrros.com/>
- ⁷³ "New Mexico's nationally leading oil and gas emissions rule becomes law," Gov. Michelle Lujan Grisham, 28 Jul 2022, <https://www.governor.state.nm.us/2022/07/28/new-mexicos-nationally-leading-oil-and-gas-emissions-rule-becomes-law/>
- ⁷⁴ "The Inflation Reduction Act is a game-changer on methane," Environmental Defense Fund, 25 Jan 2023, <https://blogs.edf.org/energyexchange/2023/01/25/the-inflation-reduction-act-is-a-game-changer-on-methane-heres-why-2/>
- ⁷⁵ "Inflation Reduction Act Methane Emissions Charge," Congressional Research Service, 29 Aug 2022, <https://crsreports.congress.gov/product/pdf/R/R47206>. The fee generally applies to larger polluting facilities that emit at least 25,000 metric tons of CO₂-equivalent. Osborne, James. "Despite assurances, small oil companies face methane fees from EPA," *Houston Chronicle*, 17 Jan 2024, <https://www.houstonchronicle.com/business/energy/article/methane-fees-epa-regulation-18611036.php>
- ⁷⁶ Biden-Harris Administration Strengthens Proposal to Cut Methane Pollution to Protect Communities," Environmental Protection Agency, 11 Nov. 2022, <https://www.epa.gov/newsreleases/biden-harris-administration-strengthens-proposal-cut-methane-pollution-protect>.
- ⁷⁷ "Key Things to Know About EPA's Final Rule to Reduce Methane," U.S. Environmental Protection Agency, 2 Dec 2023, <https://www.epa.gov/system/files/documents/2023-12/key-things-to-know-about-epas-final-rule-for-oil-and-natural-gas-operations.fact-sheet.pdf>
- ⁷⁸ "Key Things to Know About EPA's Final Rule to Reduce Methane," U.S. Environmental Protection Agency, 2 Dec 2023, <https://www.epa.gov/system/files/documents/2023-12/key-things-to-know-about-epas-final-rule-for-oil-and-natural-gas-operations.fact-sheet.pdf>
- ⁷⁹ "EPA Issues Final Rule to Reduce Methane and Other Pollution from Oil and Natural Gas Operations," U.S. Environmental Protection Agency, Dec. 2023, <https://www.epa.gov/system/files/documents/2023-12/epas-final-rule-for-oil-and-natural-gas-operations.-overview-fact-sheet.pdf>
- ⁸⁰ "Rules and Regulations," *Federal Register*, Vol. 89, No. 47, 8 Mar 2024, p. 16,887. The EPA began phasing out routine flaring for new wells started before May 2026 by requiring those operators to file certifications of the technical infeasibility of any possible use of the gas. For new wells breaking ground between May 2022 and May 2024 these permits are renewable but subject to annual recertification. For new wells breaking ground between May 2024 and May 2026 these nonrenewable permits were capped at a maximum duration of 790 days. Moreover, that gas must be flared with devices that reduce methane and volatile organic compounds by at least 95%.
- ⁸¹ Operators can flare a maximum of 24 hours for safety, malfunctions, and numerous maintenance and repair activities. The can flare up to 72 hours when the gas composition does not meet pipeline specifications. And they can flare up to 30 days for service interruptions in the gathering or pipeline system.
- ⁸² Less-stringent standards can be established based on a source's "remaining useful life and other factors."
- ⁸³ Publication of the EPA rules in the *Federal Register* on March 8, 2024 started the 24-month stop watch.
- ⁸⁴ Ward, Rebekah F. "Texas oil and gas regulator votes to sue the federal government over new methane rule," *Houston Chronicle*, Jan 31, 2024, https://www.houstonchronicle.com/news/houston-texas/environment/article/texas-oil-gas-methane-epa-lawsuit-18637641.php?sid=5b0231612ddf9c12eaea41cd&ss=A&st_rid=0cc30de8-b99d-43db-ab6f-b44db2e41900&utm_source=newsletter&utm_medium=email&utm_term=news&utm_campaign=HC_TomlinsonsTake
- ⁸⁵ "RRC Commissioners Vote to Challenge the Validity of EPA Air Emissions Actions," Railroad Commission of Texas, 1 Mar 2023, <https://www.rrc>

¹⁰⁷ National Oceanic and Atmospheric Administration (NOAA) Visible Infrared Imaging Radiometer Suite (VIIRS) satellite-based radiance sensors. EDF's PermianMap report found that company-reported upstream flare volumes in the Permian Basin often fell short of what satellites detected. An EDF report focused on large producers globally, however, found the opposite: their self-reported flaring volumes often were greater than what satellites detected.

¹⁰⁸ In another wrinkle, the agency allows operators to flare while an original or amended permit application is pending. Such releases are reportable but may not show up in agency data covering authorized releases.

¹⁰⁹ For a decade NASA's satellite-based Visible Infrared Imaging Radiometer Suite of detectors (VIIRS) have measured flares worldwide once nightly at a spatial resolution of 1 km², a 2021 EDF report notes. The Earth Observation Group uses this data to provide annual estimates of flared gas volumes at individual flaring sites globally, including upstream production sites, midstream (e.g., compressor stations, processing plants, LNG) and downstream sites (e.g., crude oil refineries). "The Burning Question: How to Fix Flaring," Environmental Defense Fund, 21 Oct 2021.

¹¹⁰ Carrington, Damian. "Satellite to 'name and shame' worst oil and gas methane polluters," The Guardian, 4 Mar 2024, <https://www.theguardian.com/environment/2024/mar/04/satellite-to-name-and-shame-worst-oil-and-gas-methane-polluters>

¹¹¹ McKinley, Edward. "Top Texas energy regulator pans proposed science textbooks as 'woke environmental agenda,'" 7 Nov 2023, https://www.houstonchronicle.com/politics/article/wayne-christian-climate-change-textbooks-18473180.php?utm_content=hed&sid=599db56324c17c50398bcb10&ss=P&st_rid=null&utm_source=newsletter&utm_medium=email&utm_term=politics&utm_campaign=HC_TexasTake

¹¹² "Flare/Vent Exceptions (SWR 32) Query User Guide," Railroad Commission of Texas Information Technology Services Division, Feb 2022, https://www.rrc.texas.gov/media/u4hc253p/swr-32-public-query-user_guide_1-0.pdf

¹¹³ "Application for Exception to Statewide Rule 32," Railroad Commission of Texas, <https://webapps.rrc.state.tx.us/swr32/publicquery.xhtml>

¹¹⁴ For a news report discussing a different time-period slice of this data, see: "Texas continues to issue thousands of flaring permits," Inside Climate News, October 18, 2023.

¹¹⁵ "Notice to Oil and Operators, Extension of Notification Requirements Under Statewide Rule 32," Railroad Commission of Texas Oil and Gas Division, March 19, 2020. The agency provided this document in November 2023 as part of its response to a formal legal request for any "criteria, guidelines, guidance, or instructions that your agency currently relies upon in determining whether or not to deny applications for Rule 32 flaring or venting exceptions."

¹¹⁶ This excludes two permits that did not include the application and effective dates required to assess compliance.

¹¹⁷ Permit number 54250 shows an application date of August 24, 2022 and an effective date of March 12, 2021.

¹¹⁸ Exception filings 14428, 14676, 14677 and 16584.

¹¹⁹ Exception filing numbers 14266, 14268, 14270, 14273, 14274, 14275, 14276, and 14277. The agency also denied a retroactive Callon request to flare one year after the fact (filing number 14269).

¹²⁰ Commingle permit No. 8909 corresponding to flare filing No. 14273.

¹²¹ Flare filing No. 14266 for Gas Lease 285606 cited "unscheduled maintenance."

¹²² The flares all started between January and August of 2020 and ended between April and September of 2020. The flaring applications all were filed in May 2022, seeking to retroactively flare for periods ranging from 31 to 181 days.

¹²³ <https://webapps.rrc.texas.gov/PDQ/quickLeaseReportBuilderAction.do>

¹²⁴ No production report was found for Commingle permit 8909. Callon's 2020 production reports for Gas Lease 291890 are blank, apart from entering "Not On Schedule" in the field reserved for reporting the barrels of oil/condensate on hand at the beginning of each month.

¹²⁵ See flaring permit No. 46278. Approved in January 2021, it retroactively authorized up to 15,400 cubic feet of flaring over the last three weeks of November 2020.

¹²⁶ "EPA Announces \$1.3 Million Settlement for Permian Basin Company," Environmental Protection Agency, 13 July 2023. <https://www.epa.gov/newsreleases/epa-announces-13-million-settlement-permian-basin-company>

¹²⁷ See flaring permit No. 50174 and denied flaring filing 10160 for Apache lease No. 43190.

¹²⁸ "Global flaring and venting regulations," World Bank, Dec. 2023, <https://flaringventingregulations.worldbank.org/united-states-texas>

¹²⁹ Both Exxon Corp. and Texaco E&P, Inc. were authorized to release more than 19 billion cubic feet of apiece, with 500 and 260 flaring permits, respectively. Mobil Producing TX & NM, Inc. had 194 permits authorizing almost 9 billion cubic feet of releases.

¹³⁰ There were 5,898 Texas oil producers in 2021, according to the Railroad Commission. This report previously discussed how oil wells account for most Texas flaring, with gas wells or points farther downstream accounting for much smaller flaring volumes. This section of the report reiterates the fact that oil-producing companies are responsible for the vast majority of Texas' authorized flaring.

¹³¹ Some permits issued in that period authorized ongoing, additional flaring extending beyond December 31, 2022. Predictably, this was especially true of permits issued in late 2022.

¹³² XTO Energy, Inc. and WPX Energy Permian, on the other hand, rank among Texas' top 10 oil producers but obtained permits that authorized above-average releases.

¹³³ That permit authorized releases of 45 million cubic feet of a day for a time period of 592 days.

¹³⁴ In 2022, Texas' 5,097,533 residential customers consumed 232,684,000,000 cubic feet of (averaging 45,646 cubic feet per household), according to the U.S. Energy Information Administration.

¹³⁵ "Quantification of Methane Emissions from Marginal (Small Producing) Oil and Gas Wells," National Energy Technology Laboratory, 12 Sep 2022, <https://netl.doe.gov/node/9373>

¹³⁶ Osborne, James. "Anxiety grows among small Texas oil producers ahead of federal methane rule," *Houston Chronicle*, 11 Dec 2023, <https://www.houstonchronicle.com/business/energy/article/methane-rule-texas-small-wells-18534264.php>

¹³⁷ A 2021 report by the Clean Air Task Force and Ceres had similar findings based on their analysis of national oil and production and emissions in 2019.

¹³⁸ Omara, M., *et al.* "Methane emissions from US low production oil and natural gas well sites." *Nat Commun*, 2022, <https://doi.org/10.1038/s41467-022-29709-3>

¹³⁹ Valle, Sabrina, "Exxon halts routine gas flaring in the Permian," 25 Jan 2023, Reuters.

¹⁴⁰ "Texas Oil & Gas Producers by Rank Calendar year 2021," Railroad Commission of Texas, <https://www.rrc.texas.gov/oil-and-gas/research-and-statistics/operator-information/texas-oil-and-gas-producers-by-rank-2021/>

¹⁴¹ "Texas Oil & Gas Producers by Rank Calendar year 2021," Railroad Commission of Texas, <https://www.rrc.texas.gov/oil-and-gas/research-and-statistics/operator-information/texas-oil-and-gas-producers-by-rank-2021/>

¹⁴² Palacios, Virginia *et al.* "Vast energy resources wasting away in the Texas Permian Basin," Environmental Defense Fund, 2017, <https://blogs.edf.org/energyexchange/wp-content/blogs.dir/38/files/2018/06/Permian-Flaring-Report-2017-3.pdf>

¹⁴³ "Oil & Gas Inspections and Violations," Railroad Commission of Texas, <https://www.rrc.state.tx.us/resource-center/inspections-and-violations/>

¹⁴⁴ "Hydrogen Sulfide," National Institute for Occupational Health & Safety, 21 Jun 2019, <https://www.cdc.gov/niosh/topics/hydrogensulfide/default.html>

¹⁴⁵ The agency's vague definition of a "major violation," is in Appendix B of its annual "Monitoring and Enforcement Plan."

¹⁴⁶ "Railroad Commission Enhances Oil & Gas Enforcement Data, Updates Definition of Major Violation," Railroad Commission of Texas, 16 Feb 2017, <https://www.rrc.texas.gov/news/021617a-commission-enhances-oil-gas-enforcement-data/>

¹⁴⁷ "Severance Reconnect Process," Railroad Commission of Texas, <https://www.rrc.texas.gov/oil-and-gas/compliance-enforcement/severance-reconnect-process/>

¹⁴⁸ Email from Railroad Commission of Texas Office of General Counsel Legal Assistant Karen Sanchez to Virginia Palacios, April 23, 2024, responding to a Texas Public Information Act request.

¹⁴⁹ Cushing, Lara *et al.*, "Flaring from Unconventional Oil and Gas Development and Birth Outcomes in the Eagle Ford Shale in South Texas," *Environ Health Perspect.* 2020 Jul; 128(7).

¹⁵⁰ "Oil & Gas Hearings Key Search," Railroad Commission of Texas, https://rrcsearch3.neubus.com/esd3-rrc/index.php?_module_=esd&_action_=keysearch&profile=11

¹⁵¹ The agency's 2014 settlement with Cinco Natural Resources Corp. is typical. "Should this case go to hearing, Enforcement would be required to seek a penalty of not less than \$97,150," said the agency's settlement offer in April 2014. If "Cinco pays a \$48,575 penalty," however, "Enforcement would be willing to accept a 50% reduction of the penalty." The resulting settlement of August 2017 says, "Respondent makes no admission of any alleged violation." Eight of these 10 agency cases cited production reports submitted by the operators and mention settlements of about half of what the agency was authorized to charge. The Carrizo case settled for 38 cents on the dollar. No records were found in the Matador case 0292368 file regarding settlement negotiations or production reports.

¹⁵² The current commissioners are Christi Craddick (assumed office in late 2012), Wayne Christian (Jan. 2017), and Jim Wright (Jan. 2021).

¹⁵³ "Case documents search," Railroad Commission of Texas, <https://rrctx.my.site.com/s/case/500t000000N8hWRAAZ/detail>

¹⁵⁴ Common examples allude to "equipment," "plant," or "third-party" "issues," "problems," or "difficulties."

¹⁵⁵ One such example cites "system upsets including high line pressure, improper fuel pressure, compressor issues, pipeline quality issues, hydrates form due to weather issue."

¹⁵⁶ Most flaring permits in the early 2020s say nothing in the "Remarks" field except variants of this: "Filing No 10002. Excp/Seq No 50000-01. SWR 32(h)(8)=N." This says nothing about the permit's rationale other than it was not a "Multiple Property" exception (covering releases from multiple upstream properties).

¹⁵⁷ Of the 162 flaring permits that took effect in April 2021, the agency repurposed the "Remarks" field to eliminate the stated rationale for 120 of

them (74%). In the previous month this problem afflicted just 30% of the new permits.

¹⁵⁸ Many of these rationales specifically use variants of the words “curtail” or “capacity.”

¹⁵⁹ Another explanation is that for some reason a disproportional share of “Capacity/Curtailment” permits joined the ranks of all the “Unknown” rationales as the agency phased out rationale reporting.

¹⁶⁰ Researchers coded permits attributed to a “plant shut down for maintenance” as a “Maintenance” rather than a “Shut Down” rationale.

¹⁶¹ “It’s a joke’: Flaring expert finds big problems in report from Texas oil and gas regulator,” KUT News, 25 Feb 2020, <https://www.texastribune.org/2020/02/25/expert-finds-problems-report-texas-oil-and-gas-regulator/>

¹⁶² These modest improvements are discussed in the section “State and Federal Flaring Rules.”

¹⁶³ Of 171 permits that decade, 58 were flagged in the “Permanent” field; 26 others indicated that they were “permanent” in the “Remarks” field.

¹⁶⁴ Because researchers had to assess those permits solely based on the “Remarks” field, the 1990s data almost certainly grossly undercount permanency. Most of “Remarks” fields did not address permanency.

¹⁶⁵ “Flaring Venting Presentation,” Railroad Commission of Texas, Aug 2023, <https://docs.google.com/presentation/d/1jp0Z4adqwA7f62SxqQ7ZbC-Bv68xCvucO/edit#slide=id.p10>

¹⁶⁶ See Diamondback permit No. 55535. All 18 of the larger permanent permits took effect in December 2022 (the tail end of the period studied in this report). The agency approved all of them in January 2023.

¹⁶⁷ “Flaring Venting Presentation,” Railroad Commission of Texas, Aug 2023, <https://docs.google.com/presentation/d/1jp0Z4adqwA7f62SxqQ7ZbC-Bv68xCvucO/edit#slide=id.p10>

¹⁶⁸ “Flaring Venting Presentation,” Railroad Commission of Texas, Aug 2023, <https://docs.google.com/presentation/d/1jp0Z4adqwA7f62SxqQ7ZbC-Bv68xCvucO/edit#slide=id.p10>

¹⁶⁹ These conditions meet the agency’s narrow definition of a “material change.” Flaring significant volumes of gas more than 180 days also requires the approval of the commissioners themselves.

¹⁷⁰ The data do not mention “renewals.”

¹⁷¹ The amendment field mirrors the yes/no “New” field in the same dataset almost perfectly. For the 43 years of data studied, almost every record flagged as “Yes” in the “Amendment” field also was flagged “No” in the “New” field.

¹⁷² Operators are supposed to file for an amendment at least 21 days prior to a permit’s expiration. They can flare while that application is pending.

¹⁷³ The number of permits flagged as amended greatly exceeded the share of permits that included amendment dates late in the previous century. Subsequent decades reversed this trend, with more permits containing amendment dates than were marked as amended.

¹⁷⁴ There is forensic evidence of some flaring permits being amended over large swaths of time. New permits in 2022, for example, received permit numbers exceeding the number 51,000. Yet one old permit amended that year dated back to 2014. Capitan Energy, Inc.’s amended permit No. 19,760 authorized it to flare for eight years ending in early 2023. In the 1990s, 714 permits listed amendment dates, including 140 that were amended as late as in the 2000s or 2010s.

¹⁷⁵ In recent online agency flaring forms, the computer automatically inserts the number of days for an exception based on the number of days between the requested Effective Date and Expiration date. This appears to use those dates as entered in the most recent amendment application. See page 19 of this Form 32 user’s guide.

¹⁷⁶ For this limited-comparison purpose, researchers set aside records that: Did not have both effective and expiration dates; had expiration dates that *preceded* their effective dates; and records where the “Time Period” field was blank.

¹⁷⁷ Endeavor Energy Resources, LP permit No. 52933 lists a “Time Period” of 6,295 days, while also reporting an expiration date just five days after its effective date of April 28, 2022.

¹⁷⁸ See Treadstone permit No. 41445, with a listed “Time Period” of 9,715 days. It was approved in 2019 and amended in 2021. Two permits issued to Anadarko that decade were listed at 8,911 days apiece—or 24 years (see permit Nos. 33763 and 34463).

¹⁷⁹ Collier, Kiah. “Pipeline giant sues Railroad Commission, alleging lax oversight of natural gas flaring,” *Texas Tribune*, 3 Dec 2019, <https://www.texastribune.org/2019/12/03/railroad-commission-sued-lax-oversight-natural-gas-flaring/>

¹⁸⁰ “Commingleing,” Texas General Land Office, <https://www.glo.texas.gov/energy-business/oil-gas/mineral-leasing/commingleing/index.html>

¹⁸¹ “Permian Methane Analysis Project,” Environmental Defense Fund, 2024, <https://www.permianmap.org/flaring-emissions/>

¹⁸² Palacios, Virginia et al. “Vast energy resources wasting away in the Texas Permian Basin,” Environmental Defense Fund, 2017, <https://blogs.edf.org/energyexchange/wp-content/blogs.dir/38/files/2018/06/Permian-Flaring-Report-2017-3.pdf>

¹⁸³ Willyard, Katherine et al. “Flaring in two Texas shale areas: Comparison of bottom-up with top-down volume estimates for 2012 to 2015,” *Science of The Total Environment*,

15 Nov. 2019, <https://doi.org/10.1016/j.scitotenv.2019.06.465>.

¹⁸⁴ “Flaring Venting Presentation,” Railroad Commission of Texas, Aug 2023, <https://docs.google.com/presentation/d/1Jp0Z4adqwA7f62SxqQ7ZbC-Bv68xCvucO/edit#slide=id.p10>

¹⁸⁵ It also has banned venting that contains dangerous hydrogen sulfide levels.

¹⁸⁶ Fielder, Caleb A. “Those who favor fire: An odyssey of flaring in Texas,” *Texas Tech Law Review*, June 2022, https://works.bepress.com/caleb_fielder/6/

¹⁸⁷ See “Does the RRC allow long-term flaring?” <https://www.rrc.texas.gov/about-us/faqs/oil-gas-faq/flaring-regulation/>

¹⁸⁸ “‘It’s a joke’: Flaring expert finds big problems in report from Texas oil and gas regulator,” KUT News, 25 Feb 2020, <https://www.texastribune.org/2020/02/25/expert-finds-problems-report-texas-oil-and-gas-regulator/>

¹⁸⁹ See permit 9546 (the well was not connected to a pipeline). While this was the biggest authorized *gas-well* emission that decade, regulators authorized an oil well at that time to flare even more gas. Permit 9543 authorized XTO Energy, Inc. to release of 900 billion cubic feet of over 90 days in Yoakum County in 2009 (53% of that decade’s authorized releases). Together, these two leviathan flares accounted for 96% of authorized releases in the 2000s.

¹⁹⁰ See Encana’s January 2009 Production Report for the Robson Ranch Lease No. 253784 in the Barnett Shale’s East Newark Field.

¹⁹¹ See permit 46070 authorizing the commingled facility to flare 17,900 a day for 589 days.

¹⁹² 42 of Capitan’s permits were for gas wells and 10 were for drilling permits.

¹⁹³ In 2022, Texas’ 5,097,533 residential customers consumed 232,684,000,000 cubic feet of gas, according to the U.S. Energy Information Administration. Capitan’s authorized releases were equal to 57 percent of what all Texas residential gas customers consumed.

¹⁹⁴ “Commingling,” Texas General Land Office, <https://www.glo.texas.gov/energy-business/oil-gas/mineral-leasing/commingling/index.html>

¹⁹⁵ The exceptions were two commingled properties.

¹⁹⁶ All but one of the commingled-permit types contain commingled-permit numbers. And all but one of the drilling-permit types have drilling-permit numbers.

¹⁹⁷ “About Searching for P-17 Commingling Reports,” Railroad Commission of Texas, <https://www.rrc.texas.gov/resource-center/research/research-queries/imaged-records/searching-for-commingling-reports/>

¹⁹⁸ “Exception to Statewide Rule 32 Filing No. 10095,” Railroad Commission of Texas, 16 Apr 2021, https://webapps.rrc.state.tx.us/dpimages/img/5400000-5499999/PR0005427769_0001.pdf

¹⁹⁹ This problem comes on top of the fact that a single flaring permit even for non-commingled leases can authorize flares at more than one location on a property. See “Exception to Statewide Rule 32 Online Filing...External User Guide,” Railroad Commission of Texas, September 2021, page 21.

²⁰⁰ “About Searching for P-17 Commingling Reports,” Railroad Commission of Texas, <https://www.rrc.texas.gov/resource-center/research/research-queries/imaged-records/searching-for-commingling-reports/>

²⁰¹ “Flaring Venting Presentation,” Railroad Commission of Texas, Aug 2023, <https://docs.google.com/presentation/d/1Jp0Z4adqwA7f62SxqQ7ZbC-Bv68xCvucO/edit#slide=id.p10>

202 Statewide Rule 32 (h)(8).

²⁰³ Occidental Petroleum became the operator of those operations in 2017.

²⁰⁴ Palacios, Virginia et al. “Vast energy resources wasting away in the Texas Permian Basin,” Environmental Defense Fund, 2017, <https://blogs.edf.org/energyexchange/wp-content/blogs.dir/38/files/2018/06/Permian-Flaring-Report-2017-3.pdf>

²⁰⁵ “Joule Thomson (JT) Skid Package,” Rushton Gas and Oil Equipment Ltd., 2020, <http://www.rushton.ca/jtskid.html>

²⁰⁶ “Benchmarking methane and other GHG emissions of oil and natural gas production in the United States 2021,” Clean Air Task Force and Ceres, 1 Jun 2021, <https://www.ceres.org/resources/reports/benchmarking-methane-and-other-ghg-emissions>