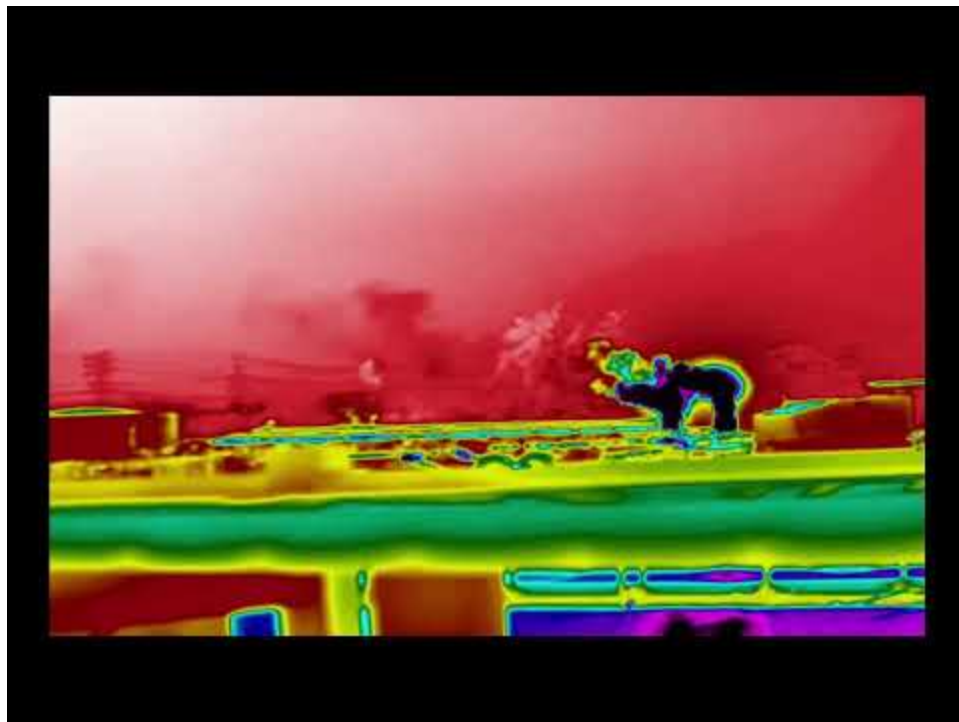


Pennsylvania 2025 Oil & Gas Production Report: Record Gas, Low-Producing Wells, and Long-Term Liabilities

 fractracker.org/2022/08/fractracker-finds-widespread-hydrocarbon-emissions-from-active-idle-oil-and-gas-wells-and-infrastructure-in-california

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FracTracker Finds Widespread Hydrocarbon Emissions from Active &

Idle Oil and Gas Wells and Infrastructure in California

/ 15 minute read

[VIEW STORY MAP: TOXIC EMISSIONS FILMED AT LEAKING OIL AND GAS INFRASTRUCTURE IN CALIFORNIA](#)

[VIEW DYNAMIC MAP: FRACTRACKER OIL AND GAS LEAKING INFRASTRUCTURE COMPLAINTS](#)

Overview

Using a FLIR-Teledyne GF320 optical gas imaging camera, FracTracker spent seven days (August 1-7, 2022) inspecting oil and gas infrastructure in Los Angeles County, Kern County, and Ventura County. The inspections of drilling sites and production facilities prioritized idle well-sites, following [the discovery of 49 leaking idle wells in Bakersfield](#). In addition to idle wells, the field trip focused on neighborhood and urban drilling sites, which present the highest risk of exposure to volatile organic compounds (VOCs) for frontline communities. VOCs are known to cause respiratory harm and certain chemicals such as benzene are known carcinogens. Benzene and other toxic VOCs are components of gaseous emissions from oil and gas production infrastructure, and [concentrations of these chemicals have been found to be elevated near oil and gas production facilities](#).

FracTracker inspected over 400 wells and other pieces of infrastructure at nearly 100 different drill sites. Leaks and sources of uncontrolled emissions were documented in each of the three counties. In total, FracTracker filed 68 air quality complaints with local air districts: 41 to the South Coast Air Quality Management District, 23 to the San Joaquin Valley air pollution control district, and four to the Ventura County air pollution control district. Inspectors from each district are actively investigating and several notices of violations have already been issued.

The complaints included leaks and uncontrolled emissions documented from the following pieces of oil production infrastructure:

- 23 well-heads, including 21 idle wells
- 35 tank facilities
- 9 VOC combustors
- 2 flares

The full FracTracker report includes discussions of these various sources of leaks and uncontrolled emissions, as well as the applicable state and local regulations. A digital map of

the 68 complaints with links to OGI and DSLR imagery of the facilities and emissions plumes is provided, as well as a guided story map presenting descriptive summaries of particularly serious leaks and other complaints generally representative of common leaks. These widespread leaks highlight the need for a statewide setback between existing oil and gas projects and homes, schools, and other sensitive receptors in order to reduce exposures for frontline communities. Governor Newsom has signaled support for this type of protection through legislation and regulations—the state should adopt and implement these long overdue protections as quickly as possible.

Toxic Emissions Filmed at Leaking Oil and Gas Infrastructure in California

This StoryMap explores a selection of wells and production facilities where emissions were documented. The map takes viewers on a tour of these production facilities and presents the OGI footage of the leaks and plumes of emissions.

Place your cursor over the image and scroll down to advance the StoryMap.

Click on the icon in the bottom left to view the legend.

Scroll to the end of the StoryMap to learn more and access the data sources.

[View Full Size Map](#) | [Updated 8/21/2022](#) | [Map Tutorial](#)

Introduction

FracTracker Alliance recently took to the field in collaboration with grassroots groups and community organizations in California including the Central California Environmental Justice Network (CCEJN) in Kern County, Climate First: Replacing Oil and Gas (CFROG) in Ventura County, and Sierra Club in Los Angeles County. From August 1-7, 2022, FracTracker's Western Program Coordinator (a certified thermographer) inspected over 400 individual oil and gas wells and pieces of infrastructure at nearly 100 different drill sites, in the counties of Los Angeles, Kern, and Ventura. [Using state-of-the-art technology called optical gas imaging \(OGI\)](#), we documented otherwise invisible toxic pollutants and greenhouse gas emissions (GHGs) being released from oil and gas wells and other infrastructure. These emissions represent an immediate environmental health threat to frontline communities and all individuals present near these oil production facilities.

Using a FLIR GF320 optical gas imaging camera, FracTracker visually observed and recorded leaks and uncontrolled releases of methane and volatile organic compound (VOC) emissions. These toxic, carcinogenic pollutants and greenhouse gasses are invisible to the naked eye, but visible in the infrared spectrum. This short report details the findings of this

field work and presents the footage of leaks and uncontrolled emissions discovered at the oil production well-sites and collection facilities. All leaks and emission sources have been reported as complaints to the local air districts as well as other appropriate agencies responsible for emergency response. The locations of these leaks and uncontrolled emissions can be viewed in the map in Figure 1 below.

FracTracker Oil and Gas Leaking Infrastructure Complaints

This interactive map looks at oil and gas drilling and production sites in California counties where leaks were detected using a FLIR-Teledyne optical gas imaging camera.

View the map “Details” tab below in the top right corner to learn more and access the data, or click on the map to explore the dynamic version of this data. Data sources are also listed at the end of this article.

In order to turn layers on and off in the map, use the Layers dropdown menu. This tool is only available in Full Screen view.

Items will activate in this map dependent on the level of zoom in or out.

[View Full Size Map](#) | Updated 8/21/2022 | [Map Tutorial](#)

Figure 1. Map of oil and gas drilling and production sites where leaks were detected using a FLIR-Teledyne optical gas imaging camera, model GF320. The icons on the map provide links to folders that house the recorded footage and DSLR imagery, as well as the complaint reports, for each site.

Health Considerations

It is most important to stress that the filmed emissions present an immediate risk to the frontline communities with homes and schools located near these drilling and production sites. [The composition of volatilized emissions from crude oil](#) and natural gas production [has been thoroughly studied](#), and the [presence of toxic and carcinogenic BTEX](#) (benzene, toluene, ethylbenzene, and xylenes) [chemicals is well established](#). Prolonged (chronic) exposure to BTEX compounds can affect the kidney, liver and blood systems. [Long-term exposure to high levels of the benzene compound](#) can lead to leukemia and cancers of the blood-forming organs. These chemicals are also neurotoxins and respiratory and skin irritants. While in the field at urban drilling sites, the thermographer and colleagues regularly experienced burning eyes, headaches, nausea, difficulty breathing, and fatigue. In addition to local health impacts, these chemicals also degrade regional air quality and are known [to be elevated near oil and gas production in California](#). They are also precursors to ground level ozone, the main component of smog, as well as being potent greenhouse gasses. In addition to respiratory irritation and cancer risk from BTEX compounds, ground level ozone can reduce

lung function causing a variety of health problems including chest pain, coughing, throat irritation, and congestion, and it can exacerbate bronchitis, emphysema, and asthma.

In response to pressure from grassroots organizations and frontline communities Governor Newsom ordered CalGEM to start a public health rule-making process. That was nearly three years ago. Since then [CalGEM has released a regulatory proposal](#) that includes a combination of engineering protections and a public health setback for new drilling permits. Setbacks are buffer zones that act as a type of zoning ordinance to prevent the development or expansion of industrial and extractive industries within sensitive use areas. California is the only major oil extraction state without a public health setback for oil and gas drilling. While the draft rulemaking is a good start, its one major shortcoming is that it applies only to the drilling of new wells – it does not apply to redrilling and reworking of wells on existing wellpads, which composes three quarters of all drilling activity since the beginning of 2021 (75.4%). As of this writing, Governor Newsom is proposing legislation that would enact the 3,200-foot setback into statute and apply it to redrilling and reworking in addition to new wells, as part of a larger end-of-session [climate package proposal](#).

Leaking Idle Wells

California's aging oil and gas infrastructure is in a state of disrepair. As oil and gas infrastructure and wellheads age, new leaks and emission sources appear. For example, [state regulators recently identified 49 leaking idle wells](#) in May (2022) following a complaint submitted by FracTracker on behalf of a community concerned over one possibly leaking well in their east Bakersfield neighborhood (see Appendix A for dataset from CalGEM). The discoveries of these leaks coincided with the news that [inspectors at the state regulatory office, the California Department of Geological Energy Management \(CalGEM\), were conducting thousands of inspections remotely](#)—from their offices rather than actually being present at the well-sites. Following the reporting of the 49 leaking wells in Bakersfield in May, FracTracker visited Bakersfield in June and inspected idle wells using a FLIR optical gas imaging sensor/camera. [The results of that field trip included the identification of additional leaking wells discovered by FracTracker](#).

While the August field investigation did not discriminate between active and idle drilling sites, particular attention remained focused on inspecting idle wells. As oil wells and production infrastructure at drill-sites age, pipe connections loosen, teflon tape degrades, flange connections fail, bushings harden, and rust corrodes and degrades equipment. These issues eventually occur at all drilling sites whether wells are actively producing oil and gas or sitting idle, resulting in leaks. In many cases human error also plays a role. Additionally, idle wells do not receive the same amount of attention or maintenance from operators as active operations,

and a lack of inspections from CalGEM and local air districts at these sites have resulted in high counts of leaking wells.

Building upon the 49 leaking idle wells identified by CalGEM in Bakersfield (See Appendix A), this field trip identified an additional 21 leaking idle wellheads previously unreported. This count includes the identification of eight leaking wells in Kern County and six near Bakersfield not previously identified by CalGEM. Two of the wells are operated in the Fruitvale field by Sunray petroleum, [the same operator as a portion of the leaking idle wells identified in east Bakersfield](#). FracTracker discovered two more leaking wellheads operated by Sequoia Exploration, Inc. in the City of Arvin, located downtown in the city park, next to a playground and an elementary school. In Los Angeles, 15 leaking wellheads at idled urban drilling sites were filmed leaking methane and VOCs in the neighborhoods West Carson (Torrance field) and Signal Hill (Long Beach field). A table summarizing the counts of leaking wells and infrastructure discovered in each district is presented below.

District	Leaking Idle* Wells	Uncontrolled Tank Emissions	Flares	Active Wellheads	Combustors
South Coast AQMD	15	19	1	1	8
San Joaquin Valley APCD	6	14	2		
Ventura County APCD		2		1	
Total	21	35	2	2	8
*Includes marginally producing					

Table 1. Summary of the counts of documented leaks and emission sources by facility type.

Contractor Activity

It is very likely that the actual count of leaking idle wells discovered by regulators since May is much higher than reported by the agency. As we previously reported in the coverage of [FracTracker's June field work](#), many of the idle wells inspected by FracTracker had recently received maintenance from oilfield contractors. This maintenance work was not limited to Bakersfield. Many of the wells visited throughout Kern County and Ventura County had clear indications of maintenance and repair efforts, including new pressure gauges, new stainless caps, new teflon tape, and replaced nuts and bolts.

As was reported by CalGEM, this work was paid for directly by the agency, with the possibility of recouping costs from operators in the future. FracTracker is supportive of CalGEM for taking these measures to shore up the highest risk sites, but it is troubling that it required an environmental health emergency to begin this work. While the immediate maintenance and remediation work by contractors hired by CalGEM was limited to just the leaking wells identified in east Bakersfield, it is clear that regulators at CalGEM understood the widespread and systemic nature of the risk of leaking idle wells. That is why CalGEM began hiring

contractors to complete this work at a handful of sites in Kern County, and possibly in other parts of the state as well.

Missing Spill and Leak Reports

Evidence from the field investigation indicates that there have been numerous leaks that were never reported as required under state law. FracTracker suspects that the count of idle wells determined by CalGEM contractors to be leaking (since the initial discovery of the leaking Bakersfield wells in May) has not been publicly disclosed. During this August field trip FracTracker inspected over 300 individual wellheads. While this number may sound high, it was actually very limited in scope to wells that were accessible and those located within communities and near homes as a matter of prioritization. The vast majority of the idle wells inspected had clear signs of very recent maintenance and remediation of varying pieces of infrastructure at each wellhead. This was consistent in both Kern and Ventura Counties, but not in Los Angeles. This type of maintenance service is not conducted blindly, as there are many small pieces of equipment on a wellhead that can leak (examples are shown in the story map below).

It is most likely that contractors had identified leaks and replaced the leaking equipment on these idle wells. These leaks, like the majority of the leaking wells initially identified in Bakersfield in May, were never reported to the California Office of Emergency Services (CalOES) as is protocol for all spills including vapor leaks, neither were they [reported on the CalGEM website for the public](#). The webpage still lists just 41 leaking wells, while their dataset provided to community advocacy groups identifies 49 (see Appendix A). When FracTracker reached out to CalGEM for a list of wells identified as leaking by contractors, or even the list of wells remediated by contractors who were paid by CalGEM, we were informed that records with that information are not maintained. Without releasing these records CalGEM is effectively suppressing crucial data on the incidence rate of leaking idle wells, which [other researchers have estimated is 65%](#), but may be much higher. In a state where the California Council on Science and Technology estimates the existence of nearly 70,000 idle and another 5,500 already orphaned wells, this information on leakage rates is vital.

Tanks

In addition to leaking idle wells, tanks continue to be a predominant source of VOC emissions in frontline communities. This remains true even though tank emissions are technically addressed by state regulations, and some districts such as the south coast even have their own additional regulations. Tanks were present at the majority of the nearly 100 drilling sites visited and inspected by FracTracker. Inspections with the OGI camera revealed uncontrolled

tank emissions at 35 drilling sites, including 19 in Los Angeles County, 14 in Kern County, and two facilities in Ventura County. Like wells, these tanks are a major hazard for communities as the emissions include BTEX chemicals and other toxic and carcinogenic VOCs. Additionally, tanks are an explosive hazard. Methane and other hydrocarbons are often emitted at flammable concentrations, making these emissions streams a major explosive hazard [similar to the risk documented at the leaking wellheads in Bakersfield in May](#).

Tanks on oil and gas drill sites typically include wash tanks and stock tanks. Wash tanks are a sort of separator, washing water and brine from the oil before it's sent to a stock tank, where crude oil is stored onsite. These tanks are engineered to operate at or near atmospheric pressure, but pressure regularly builds up in the headspace of the tanks. This is the result of the produced fluid or crude oil off-gassing VOCs and other hydrocarbons, possibly due to particularly gassy production in some cases or otherwise due to increasing temperatures as the tanks heat up in the afternoon sun. Tank emissions are therefore typically documented from pressure-vacuum vents or hatches, which open as a safety mechanism to prevent tanks from exploding. This can occur when tanks either do not have vapor recovery systems or the vapor recovery system is not operating properly. At many of the sites, however, the tanks were damaged from some physical trauma or badly corroded and no longer air-tight.



Regulations

California Air Resources Board Regulations

At the state level, the California Air Resources Board's (CARB) regulates greenhouse gas emissions, including methane, from oil and gas production facilities ([California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 10 Climate Change, Article 4, Subarticle 13: Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities](#)). These restrictions, however, are insufficient because of numerous loopholes, reliance on industry's self-reporting, and lack of enforcement.

One major loophole in the CARB rules exempts many of the leaking tanks observed in this field investigation from installing the necessary equipment that reduces community exposure by capturing and controlling the emissions. The equipment, known as vapor recovery devices and systems are required only for separator and tank facilities that receive an average of more than 50 barrels of crude oil or condensate per day.

While small production facilities are still regulated to prevent emissions, they are exempt from the requirement of installing vapor recovery systems. In addition, the regulations for small facilities suffer from twin flaws that create a major loophole for many oil fields and smaller leaks that can accumulate. The first flaw exempts oil wells and production facilities that produce crude oil with an absolute gravity value (API) of less than 20. As much of the oil produced in the central valley is low quality tar-like crude, many wells qualify for this exemption. This includes all of the wells CalGEM found to be leaking in Bakersfield.

The second flaw is that leaks below 1,000 ppm are not actionable, and the accumulation of numerous smaller leaks at production facilities presents a risk of chronic exposure for frontline communities. For those oil wells that can be regulated (producing crude with an API > 20), the small producer rules are based on the concentration of methane in the leak. While this does not take into account the actual mass or volume of methane escaping, it allows inspectors to levy violations based on methane concentration measured with a simple methane detection device. The extent of the violation is determined by the concentration of methane with several actionable requirements based on concentration thresholds. The lowest threshold begins at a concentration of over 1,000 ppm and requires operators to fix the leak or stop the emissions, up to a minimum of 50,000 ppm that results in immediate fines, violations, and a suspension of production until the issue is resolved. Leaks under 1,000 ppm receive no response from the districts and are allowed to accumulate.

As a result of these loopholes, the majority of the inspected well-sites could be exempt from this section of the CARB rule given the following conditions: if the tank receives less than 50 barrels per day and the leak is below the 1,000 ppm methane threshold, or if the oil produced is considered heavy crude.

Local Air District Regulations

In addition to state regulations, certain individual air districts have adopted their own regulations. The South Coast Air Quality Management District (SCAQMD), for example, regulates emissions from nearly 8,500 operational oil wells and has additional rules at the local level to close these loopholes for small producer sites. The SCAQMD requires vapor recovery systems for all oil and gas facilities in the district versus this requirement for just large producer sites statewide. These additional local emissions regulations cover all facilities with tanks larger than 471 barrels ([Rule 463](#)) and emissions from all small producer sites [\[1148.1\(D\)\(8\)\]](#) as well, whereas the state regulations only apply to larger tanks. In contrast, the San Joaquin Valley Air Pollution Control District has jurisdiction over more than 82,000 operational wells, but does not have additional rules to regulate these emissions sources.

CalGEM Regulations

While the air districts have limited jurisdiction over certain emissions scenarios, CalGEM maintains a more thorough jurisdiction that is up to the interpretation and implementation of the agency's Supervisor. According to the California public resources code, the agency is tasked with inspecting wells and tanks, issuing remediation orders, reporting leaks to OES, and ordering plugging where there's any unreasonable waste of gas. CalGEM also has the jurisdiction to require wells to be plugged and abandoned if they leak "natural gas", stating "The blowing, release, or escape of gas into the air shall be prima facie evidence of unreasonable waste." and "an order shall be made by the supervisor directing that the unreasonable waste of gas be discontinued or refrained from to the extent stated in the order." (Public Resources Code section 3300 and 3308.) CalGEM should require oil companies to plug these leaking idle and marginally producing wells, but has not yet leveraged this tactic. As a result new leaks will continue to occur as these facilities continue to age and decay.

VOC Combustors

Operators have several options to deal with the hydrocarbons collected by vapor recovery systems. They can be injected back into the ground, sold to market, or combusted. Since the market for natural gas is so poor, and it costs money to inject it, most operators choose to just burn it. While the state CARB rules allow for simple flares and low-NOX incinerators to just burn it, the SCAQMD requires that operators use the gas and vapors as a fuel source. Operators therefore use it to fuel Raypak heaters, boilers, and other combustion devices. These combustion devices do not require permits as long as they qualify for the [Rule 219\(n\)](#) low NOX exemption. The district requires the devices meet a minimum destruction threshold of 95% of the methane in the fuel source, but according to the SCAQMD, the efficiency of the devices have never been tested.

The exhaust streams of the various VOC combustors inspected during the field trip were often concentrated in non-combusted methane and VOCs. FracTracker identified eight facilities where methane and VOCs were documented in the exhaust streams from combustion devices, and the plumes of exhaust were traveling over the fencelines of the facilities and into frontline communities. These nine facilities were therefore included in the list of complaints submitted to air district regulators, for their inefficient combustion devices. Additionally, three flares were reported as complaints; two in Kern that were burning inefficiently and one in the Santa Fe Springs field of Los Angeles that was unlit but still releasing emissions. Examples of complaints submitted for combustor exhaust and flares are provided in the storymap below, along with other complaints representative of the various categories of leaks discussed above (See also Table 1).

The Take Away

Leaks and uncontrolled emissions are a common occurrence for oil and gas infrastructure in California. This includes both active production drill sites and aging idled wells. The lack of oversight of idle wells by operators and regulators has resulted in leaks from the wellheads of idle wells becoming a systemic issue throughout California that has been ignored for decades. FracTracker's field work shows that this is also the case for active tanks at drilling sites and collection facilities. While regulations exist to address tank emissions and leaking idle wells, inspections of these facilities have not been occurring. Additionally, active sites have not been required to meet the standards of the "new" emissions regulations, passed in 2017 and fully implemented in 2019. Furthermore, many of the tank facilities visited were repeat offenders, and uncontrolled emissions were documented at the same facilities and sometimes from the same exact sources as reported by FracTracker to the local air districts in previous years.

The systemic nature of these documented leaks is not an issue that can be addressed with engineering controls. When one leak is fixed, another often emerges shortly after, as the aging infrastructure has many fail points. New regulatory loopholes, such as venting through VOC combustors, also create new sources of emissions rather than actually reducing exposures. The only solution is to plug the wells and remediate the drilling sites. FracTracker urges the legislature and Governor Newsom's administration to plug all idle wells, and develop protective public health setbacks of at least 3,200' that include all existing wells and oil production infrastructure.

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References & Where to Learn More

This dataset was provided by CalGEM (see Appendix A). It identifies the 49 idle wells determined to be leaking and provides data on the status of the leaks at the time of the dataset distribution (July 2022). The initial well inspections conducted by CalGEM occurred in May 2022.

Appendix A. Dataset of leaking Bakersfield wells from CalGEM

Topics in This Article:

What You Should Read Next



Pennsylvania produced more than 7.8 trillion cubic feet of gas in 2025, with unconventional wells accounting for over 99% of the total. This analysis examines statewide production trends, declining well output, regional differences, and the large number of conventional wells reporting little or no production.



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