Flaring Away

DAMAGING OUR HEALTH AND CLIMATE, AND SCHOOL FUNDS

How the Texas General Land Office is mismanaging oil and gas leases on state lands

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EARTHWORKS

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ON THE COVER: Diamondback Longfellow 3-13 well photographed with a lit flare. Photos: Well site by Earthworks, pump jack by Charlene Anderson

TITLE PAGE: Optical Gas Imaging shows extensive emissions from an unlit flare at Diamondback Desperado well.

Photos by Earthworks unless noted

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Dedicated to protecting communities and the environment from the adverse impacts of mineral and energy development while promoting sustainable solutions.

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Introduction

The prevalence and perils of flaring and venting

Flaring is on a rapid rise. The Texas Railroad Commission (RRC) permits flaring beyond well completion and initial start-up through the Rule 32 exception. Over the past 11 years the RRC has steadily issued more and more exceptions, from 107 in 2008 to 6,900 by 2019 — a 65X increase.[1] According to Environmental Defense Fund (EDF), Texas now flares more gas than the entire state consumes each year.[2]

As flaring has increased, so has pollution associated with the practice, and the prevalence of mismanaged flares. EDF estimates that 1 in 10 flares in the Permian Basin are malfunctioning, or unlit and venting.[3] Because they aren't fully combusting, unlit and malfunctioning flares release comparatively high levels of methane — a greenhouse gas 86 times worse for climate than carbon dioxide — as well as health-harming volatile organic compounds (VOCs) including benzene, a carcinogen.

The Texas Commission on Environmental Quality (TCEQ) is responsible for maintaining clean air in Texas, so flares that are malfunctioning, or unlit and venting are its responsibility. Unfortunately, as years of Earthworks' research and fieldwork has demonstrated,[4] TCEQ's oversight is inadequate, sometimes taking months to investigate complaints. Even after TCEQ inspects and issues violations, it doesn't necessarily force the operator to change its flaring violations — Earthworks documented this at MDC Texas Operator's Pickpocket 21,[5] Primexx Meeker Canadian, and Primexx Red Unit.[6]

Using documentation acquired from the RRC on the number of Rule 32 exceptions active and data captured by EDF during a series of flyovers throughout the Permian Basin, Earthworks was able to determine the number of flares in the EDF sample that were unpermitted. 75% of the operating flares documented by EDF on state lands were unpermitted. While there is no record of the exact number of flare stacks on state lands there are 36,830 wells. Given that EDF's sample of state lands was a random sample of active flares, this indicates that the actual number of unreported flares on state lands could be in the thousands.

Texas flares more gas than the entire state consumes each year.

How flaring impacts state budgets

While the RRC and TCEQ acknowledge that excessive flaring is a problem and are taking some limited steps to address it,[7] the responsibility of another state agency has largely avoided scrutiny, despite having significant impact on oil and gas policy.

The Texas General Land Office (GLO) is charged with managing Texas' state lands and the minerals associated with those lands. The agency leases mineral-bearing lands to operators who extract the oil and gas and bring it to market. A large portion of the land leased by the GLO is located in the oil and gas rich Permian Basin in West Texas. These leases require operators to pay a royalty to the state of Texas through the GLO. The royalty is based on the revenue generated by the oil and gas plus the market value of the gas flared (non-sales gas). Therefore, a stronger market results in a larger royalty. That revenue helps fund Texas public school education through the Permanent School Fund (PSF).

GLO's mission statement reads:

> ***The Texas General Land Office primarily serves the schoolchildren, veterans, and the environment of Texas. The agency does so by preserving our history, maximizing state revenue through innovative administration, and through the prudent stewardship of state lands and natural resources.[8]***

The day-to-day oil and gas operations on land leased by the GLO are regulated similarly to non-GLO lands. Operators must receive Rule 32 exceptions from the RRC to flare beyond the time of well completion and initial start up. They need air permits from the TCEQ, and the TCEQ is responsible for the enforcement of those permits. However, the GLO is responsible for protecting the environment and maximizing state revenue on the lands it manages. By definition this includes the authority to govern flaring practices that waste the state's natural resources on which education funding relies or that harm the environment.

Environmental Defense Fund's helicopter flyover of a BPX Operating Company well documented a unlit flare releasing significant hydrocarbons.

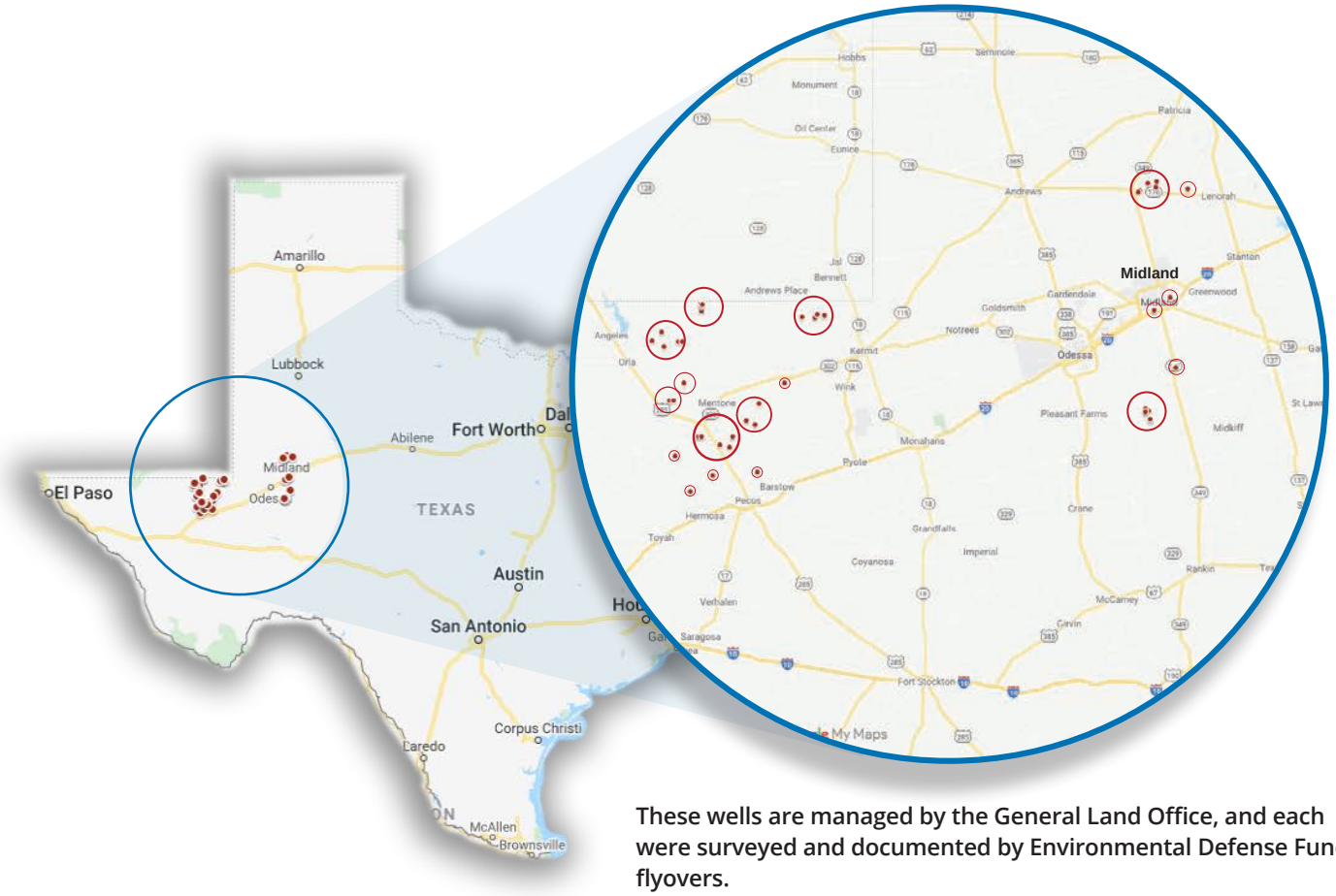
Texas operators flare routinely despite regulations

Texas regulations are designed to prevent flaring as a regular occurrence during most stages of oil and gas production. However, throughout the Permian Basin the request and granting of Rule 32 exceptions has become increasingly common. The Institute of Energy Economics and Financial Analysis (IEEFA) argues that the reason for this practice's prevalence is a weak oil and gas market. Numerous factors have forced prices down including the COVID pandemic — making it even cheaper for operators to flare rather than transport and sell gas — but as IEEFA puts it, "The underlying cause of the flaring is an oversupply of gas and oil — a condition that preceded the pandemic and the price war between Saudi Arabia and Russia."[9]

In theory, operators should flare infrequently, in response to gas pressure build-up and the associated risk of explosions and other unsafe conditions. The RRC allows operators to flare for ten days after a well is drilled to gauge the capacity of the well. Rule 32 exceptions were originally intended to allow operators to flare outside of that window only for unusual circumstances. However, over time flaring has become routine, in large part because Rule 32 exceptions can be granted if the operator demonstrates a financial need.

"The underlying cause of the flaring is an oversupply of gas and oil — a condition that preceded the pandemic and the price war between Saudi Arabia and Russia."

— Institute of Energy Economics and Financial Analysis



These wells are managed by the General Land Office, and each were surveyed and documented by Environmental Defense Fund flyovers.

The RRC rarely, if ever, rejects Rule 32 exception requests and exceptions are on a rapid rise[10]. Efforts to decrease flaring through the RRC are aimed at making Rule 32 exceptions less common. Twice, concerned legislators have signed letters asking that the RRC decrease routine flaring.[11] Their efforts ultimately led the RRC to form the Blue Ribbon Task Force to address flaring[12]. Even with most members representing oil and gas operators, the Task Force concluded that the RRC "should strive to end routine flaring".[13] Shell and BP also have pushed for an end to routine flaring in Texas.[14]

With consensus building around the need to end routine flaring, how and when to do so remain undetermined. Moving forward, resolving the problem will require involvement and action by the GLO with regard to its leases.

By allowing gas on GLO lands to be flared, state agencies are supporting the release of significant pollution and the loss of a resource that could potentially appreciate in value in the future if left in the ground. Continued expansion of oil and gas is unsustainable and we must rapidly transition to renewable energy in order to keep warming of our climate below 2°. While we make that transition, GLO should maximize the revenue earned

The GLO is allowing massive amounts of a state resource to be jettisoned into the atmosphere, harming the climate and communities — all the while garnering a low financial return for the state.

Flaring in the Permian Basin occurs at double the rate that is reported.

— From EDF, Environmental Defense Fund

Below, the Diamondback Misbehaving well is on General Land Office land and within sight of a cemetery. Inset Optical Gas Images from on site: Upper shows a tank venting significant hydrocarbon emissions. Lower shows hydrocarbons released by an unlit flare.

for the Permanent School Fund. The GLO earns a 20-25% royalty based on the value of oil and gas brought to market as well as what is flared.[15] Operators claim they need to flare because of low prices for gas — indicating that it would be in the GLO's interest to minimize flaring now and achieve higher royalty payments for the PSF when gas prices rise. The GLO is allowing massive amounts of a state resource to be jettisoned into the atmosphere, harming the climate and communities — all the while garnering a low financial return for the state. Operators — who are short-term actors — may make the decision to flare away the gas to get the oil before their lease expires, but the GLO should be far more conservative about wasting a natural resource given its mandate to maximize revenue for the PSF.

Texas' lack of flaring oversight

While the RRC is responsible for granting Rule 32 exceptions and TCEQ is responsible for ensuring operators stay within the parameters of those exceptions, it is clear they lack political will to minimize flaring. The TCEQ should regularly inspect all sites and respond to public pollution complaints on a timely basis. Unfortunately, it doesn't.[16] Adding insult to injury, TCEQ provides limited public data on flaring frequency and violations, making it difficult to gauge the scope of flaring and venting. Even if such data did exist it would be difficult to quantify specifically for GLO land, since neither the TCEQ nor the RRC incorporate whether a site is on GLO land into their respective permitting databases.

In addition, the RRC and TCEQ rely on self-reported data for flaring. If operators fail to report or under report activities — as polluters have incentive to do — the TCEQ and RRC emissions data could be inaccurate.

Unreported flaring is a chronic problem with flaring in the Permian Basin occurring at double the rate that is reported.[17]

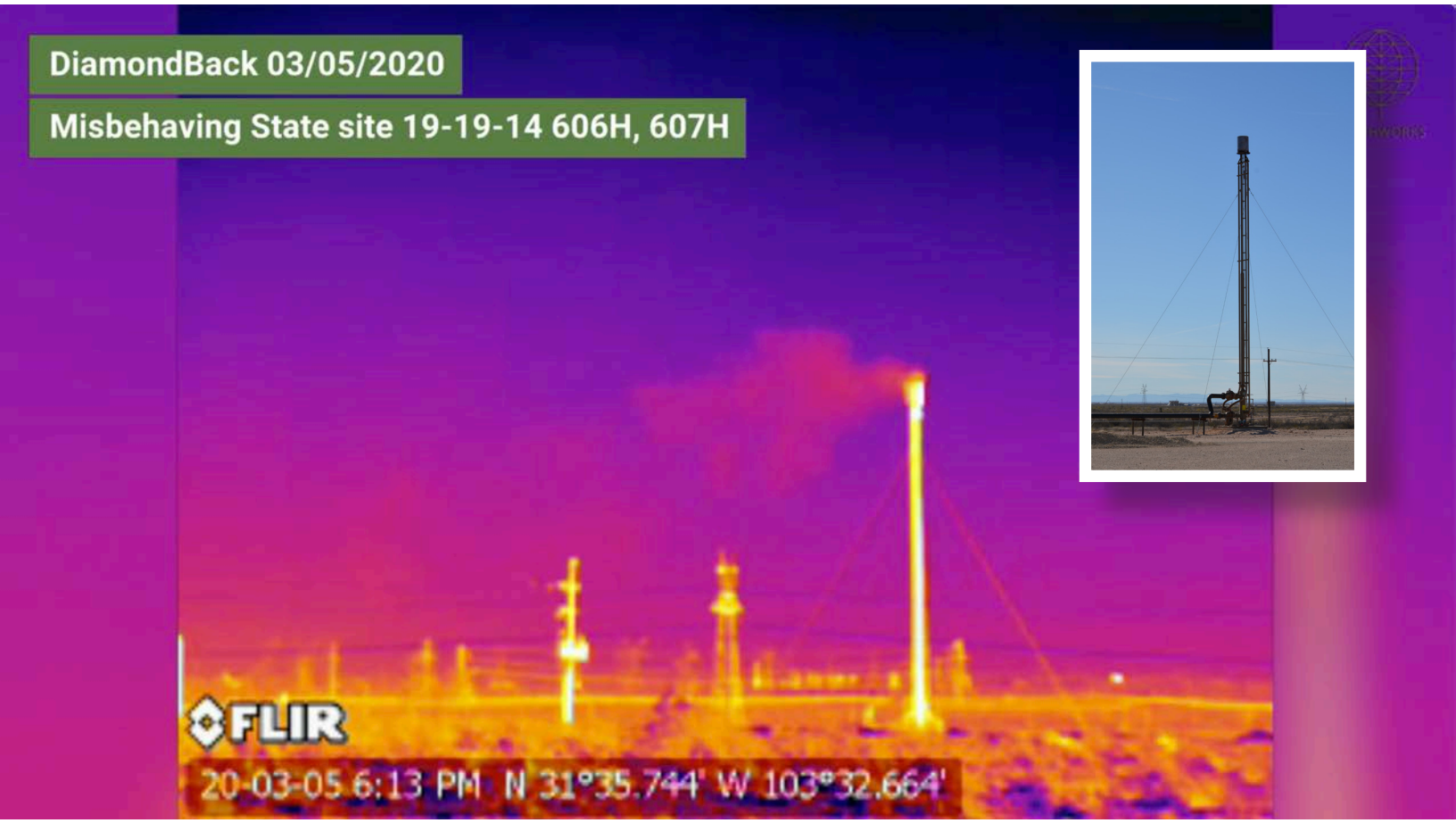
GLO continues to rely on inadequate oversight and enforcement by other state agencies for a practice that directly prevents GLO from achieving its mission of maximization of state educational revenue and protecting the environment.

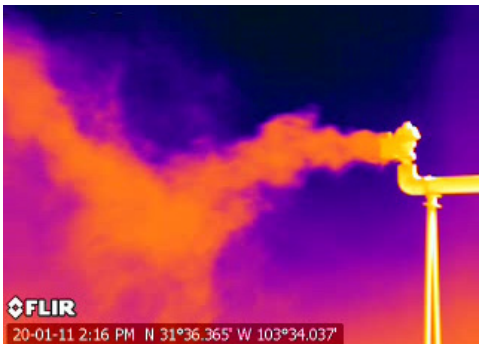
Documenting the evidence

In order to fully understand the scope of the problem on GLO lands, the public must rely on third-party data. The best snapshot available of flaring practices throughout the Permian Basin is EDF's flyover surveys, which collect data using a helicopter equipped with an infrared camera to conduct a random survey of hundreds of flares across the entire Permian Basin. EDF has conducted three flyovers, demonstrating that 1 in 10 flares in the Permian Basin are either unlit and venting, or malfunctioning. This study included flares at nearly a dozen GLO sites that were either malfunctioning, or unlit and venting.

Earthworks has also visited GLO sites identified as problematic in the EDF flyovers and used Optical Gas Imaging to document similar problems. In some cases the malfunctioning and unlit flares occurred at much later dates, indicating the possibility that polluting flaring practices are chronic on GLO land. Yet GLO continues to rely on inadequate oversight and enforcement by other state agencies for a practice that directly prevents GLO from achieving its mission of maximization of state educational revenue and protecting the environment.

OGI footage documenting emissions from an unlit flare at Diamondback Misbehaving site in Reeves County, Texas, 2019. Inset photo shows how flare appears to the naked eye.

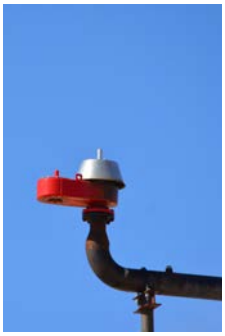





Diamondback Desperado site in Reeves County, Texas. 2019.



Diamondback Longfellow site in Reeves County, Texas. 2019.



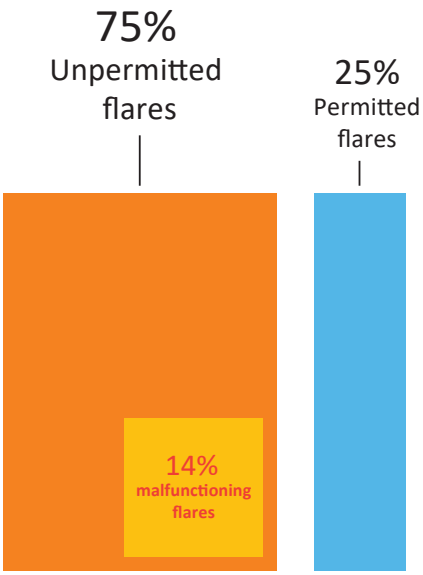
Diamondback Misbehaving site in Reeves County, Texas. 2019.

Luxe Operating California Chrome Unit site in Reeves County, Texas. 2019.

Estimating unreported flaring

EDF's flaring flyover surveys[18] visited 45 GLO sites, most of which were visited three times over the course of six months. The RRC keeps track of every Rule 32 exception that has been granted as well as when it is in effect. This information is collected in the RRC's Flaring and Venting Master Document.[19]

Using both the EDF's flyover data and the RRC's Flaring and Venting Master Document, Earthworks was able to estimate the number of unreported (unpermitted) flares on GLO land among those that EDF documented. If a site where EDF recorded a flare did not appear in the Flaring and Venting Master Document, there is a high probability the flare was unreported—contributing to an underestimation of the occurrence of flaring.[20]



Based on analyzing 45 GLO sites there is a high probability flares are not being reported, and therefore a severe underestimation of the occurence of flaring.

From these 45 sites, Earthworks identified 34 GLO sites that were flaring at least once during the EDF flyover over the course of 2020 that failed to report to the RRC. Of those 34 sites, eight appeared to also be flaring improperly (i.e., were either unlit and venting or malfunctioning). 32 of the sites appear to have lacked flaring permits during multiple flyovers, suggesting that operators didn't report flaring activity for several months. Given that we sampled only 45 GLO sites out of 36,830[21], it is likely that the actual number of sites that regularly fail to get Rule 32 exception permits or report flares is much higher.

- Earthworks detected VOC pollution at several of these GLO sites using an OGI camera in September 2020. For example at the Diamondback Longfellow 3-13, we documented a malfunctioning flare. Despite this and documentation of flaring during all three EDF flyovers, RRC's Flaring and Venting Master Document indicates that the site operator had not reported flaring activities in nearly two years.
- Earthworks also visited Permian Deep Oil Co.'s Waffle Iron facility. Based on the RRC's Flaring and Venting Master Document, the site operator has not reported a flare in nearly three years. Yet EDF documented flaring at the site during two flyovers, as did Earthworks during a site visit in September 2020. Even worse, Earthworks documented the flare malfunctioning and thus failing to fully combust methane emissions.

The GLO ignores many concerns around flaring based on the fact that the GLO earns a royalty on flared gas, as if that were its only obligation. However, according to its mission, the "GLO primarily serves the schoolchildren, veterans, and the environment of Texas," and "we will accomplish our goals using the highest standards of ethics, professionalism, transparency, fairness, and responsiveness towards those we serve." If those are not empty words, GLO should be concerned that its oil and gas leaseholders are operating unpermitted flares.

Flaring's impact on climate and health

Ideally, Texas agencies like the GLO would be motivated to reduce and oversee flaring activities beyond the promise of additional monetary benefits. Flaring has a significant impact on climate and health, particularly when not done properly. Flares operating exactly as intended release CO2 into the atmosphere. In fact, according to the Global Carbon Project, properly combusted flaring is responsible for .6% of all human-driven fossil CO2 emissions[22].

Unfortunately, unlit and malfunctioning flares present even more of a threat. When flares are unlit but continue venting, or the flare is not fully combusting, they release methane and other gases directly into the atmosphere. According to EDF, the Permian Basin oil and gas operations release methane into the atmosphere at three times the nation-wide rates by mass reported by the EPA[23].

At least 300,000 metric tons of methane are being released into the atmosphere from oil and gas operations across the Permian Basin.[24] Methane pollution has increased the climate impact of the Permian basin by a factor of three.[25] Methane has a relatively short life span in the atmosphere, so cutting emissions of methane can have a significant impact in slowing the speed of warming, buying the world valuable time to determine solutions for other longer-lived greenhouse gases like carbon dioxide.[26]

Flaring emits black carbon and is responsible for 15% to 30% of global climate change.

Flaring has also been found to emit black carbon into the atmosphere. [27] Black carbon is responsible for 15% to 30% of global climate change.[28] A major reason black carbon has such a significant climate impact is that it lowers the albedo of the Earth's surface increasing heat absorption.[29] Just like

Below: Tanks at the Diamondback Desperado site. OGI footage shows these tanks venting extensively.

LIVING IN THE PROXIMITY TO FLARING AND PREMATURE BIRTHS:

A study by the University of Southern California found that the risk can increase by as much as 50%.

methane, black carbon has a short lifespan so reducing black carbon can have rapid effects on slowing warming. Clearingstone Energy went so far as to say, "Flaring mitigation is an excellent means of reducing the amount of black carbon emissions, which has a positive impact on climate change and a direct positive impact for people".[30] Black Carbon is also a pollutant that the World Health Organization (WHO) has tied to increased occurrences of cardiopulmonary events.[31]

In addition to its significant impact on the climate, flaring can result in health problems for people living in proximity. The link between flaring and premature births has been studied extensively and indicates that those who live near flares have a significantly greater chance of premature birth according to the National Institutes of Health (NIH).[32] A study by the University of Southern California found that the risk can increase by as much as 50%.[33]

"NOx emissions contribute to acid rain, ozone and smog formation, and can irritate the eyes, nose, throat and lungs."

— Professor Gunnar W. Schade of Texas A&M

Flares also emit VOCs, which contribute to smog. VOCs have also been linked to eye, nose, and throat irritation, respiratory problems, nausea, headaches, and dizziness. Texas A&M has linked flaring to NOx emissions. Their data reveals that flaring may be the single greatest contributor to NOx emissions in rural Texas. According to Professor Gunnar W. Schade of Texas A&M, "NOx emissions contribute to acid rain, ozone and smog formation, and can irritate the eyes, nose, throat and lungs."[34]

Outside of air pollution, there is also the risk associated with light pollution. In many cases flares operate throughout the night. Many flares have strong enough flames that nearby residents complain that they "turn night into day." Extensive light pollution like this has been linked by the National Institutes of Health to a disrupted circadian rhythm which can result in trouble sleeping and even cancer.[35]

These health impacts are particularly concerning in relation to GLO lands because, especially in the Midland area, there are several wells under GLO leases that are in close proximity to communities.

The GLO is obligated to take steps to protect the environment for Texans, and that obligation includes steps to minimize climate change and health impacts. By leaving flaring concerns on its land to the TCEQ and RRC, the GLO is abdicating its responsibilities to Texans.

Footage captured by Environmental Defense Fund during its helicopter flyover of various sites on GLO managed land. Each photo shows flares emitting smoke, an indicator of incomplete combustion.

The way forward

1. **We recommend that GLO enact measures to raise the standard for operating practices on the leased land that the agency oversees on behalf of all Texans.** The GLO and/or the state legislature should stipulate that Rule 32 exceptions cannot be granted to operators on state lands. This is an important step to curtail routine flaring and would dramatically reduce the likelihood of flares malfunctioning or being allowed to vent. This would ensure that a valuable state resource with potential to appreciate in value is not squandered through flaring because operators find it financially expedient to burn it off at times of oversupply and low prices in the market.

   In fact, many operators have already committed to ending routine flaring on their land including Shell and BP — others should be required to follow suit.

2. **The GLO should rework the online leasing database to make information about activities on public land more accurate and accessible to the public — which will foster greater accountability by the agency and operators.** Currently the GLO doesn't list precisely how many sites are under their jurisdiction. The database can be sorted by region and specific lease information, but not by industrial sector, making it difficult to search and use. The database needs to be searchable by industrial sector type so the public can see the number of GLO leases in a given area as well as locate specific leases without first knowing the leasing information about the site in question. This is critically important information to determine which sites in the TCEQ and RRC databases are on GLO land.

3. **Action is also needed to limit the prevalence of unreported flaring. While change will first and foremost be needed by TCEQ and RRC, the GLO is not powerless.** The GLO should begin calculating the royalty earned based on the capacity of the well rather than the sum of gas flared and brought to market. There is precedent for handling royalties in this manner. The New Mexico State Land Office has considered formatting their royalties in this manner. This practice would limit the incentive to not report flares as the royalty would be paid either way. It would also ensure that even if a flare is unreported, the GLO does not lose any money.

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