

# Insights from the Methane Risk Map: Methane Emissions Events and Their Health Risks in New Mexico, 2016-2026

November 25, 2026

## Authors

Yanelli Nunez, PhD | PSE Healthy Energy
Jasmine Lee, MPH | PSE Healthy Energy
Pat McCornack, BS | PSE Healthy Energy
Sofia Bisogno, BSE | PSE Healthy Energy
Sebastian Rowland, PhD | PSE Healthy Energy
Ali Snell, BS | PSE Healthy Energy
Kelsey Bilsback, PhD | PSE Healthy Energy

## About PSE Healthy Energy

PSE Healthy Energy (PSE) is a scientific research institute generating energy and climate solutions that protect public health and the environment. PSE provides expertise in public health, environmental science, and engineering and brings science to energy policy through actionable research, communications, and advising. **Visit us at psehealthyenergy.org**.

## About the Methane + Health Initiative

PSE Healthy Energy's Methane+Health Initiative uses cutting-edge science to document the relationship between methane, air pollution, and human health and translate this information to support smart energy and health policy decisions. The Methane Risk Map is a cornerstone of this initiative.

PSE Healthy Energy
1440 Broadway, Suite 750
Oakland, CA 94612
510-330-5550
www.psehealthyenergy.org
mhi@psehealthyenergy.org

## Table of Contents


**Introduction** **4**

**Four Takeaways From the Methane Risk Map** **5**

- New Mexico Has Hundreds of Methane Emissions Events and Nearly All Have Benzene Risk Exceedances 5
- Tens of Thousands of New Mexicans Live in Benzene Risk Areas From Methane Emissions Events 7
- Some Eddy County Communities Fall Within Risk Areas Again and Again 8
- New Mexico's Setback Distances Fall Short of Protecting Health 9

**Policy Context and Opportunities** **10**

**About the Methane Risk Map and Our Analysis** **12**

**References** **13**



# Introduction

Methane emissions events are common across the oil and gas supply chain, and satellites and aircraft can now detect them routinely. Methane is the primary component of natural gas and a potent climate pollutant (U.S. EPA, 2016). However, the risks posed by these emissions events extend beyond climate impacts. Natural gas nearly always contains hazardous air pollutants (HAPs), including benzene, a known human carcinogen, and these pollutants are released along with methane during emissions events (Rowland et al., 2025; Marrero et al., 2016; Helmig et al., 2014). Furthermore, previous PSE analyses have shown that these co-emitted HAPs can reach levels of health concern in outdoor air surrounding the sources (Bisogno et al., 2025).

The New Mexico Environment Department (NMED) has proposed a state Methane Abatement Rule that includes a super-emitter program, with a public hearing before the Environmental Improvement Board beginning December 1, 2026 (NMED, n.d.). Methane super-emitter events are conventionally defined as releases of 100 kilograms of methane per hour (kg/hr) or more, the threshold used by the U.S. Environmental Protection Agency's (EPA) federal super-emitter program (on pause as of July 2025 and likely to be rescinded) (U.S. EPA, 2026a, 2026b). NMED's proposed super-emitter program would lower the threshold to 50 kg/hr, bringing events of 50–100 kg/hr under the same scrutiny as larger events for the first time (Vaziri, 2026).

PSE Healthy Energy's Methane Risk Map (MRM) combines PSE's gas composition database with remotely sensed methane emissions and regulatory-grade air dispersion modeling to assess the potential acute health risks of methane emissions events (Bisogno et al., 2025; PSE Healthy Energy, 2026). For each event, it maps a risk area where modeled hazardous air pollutants (HAPs) concentrations exceed an acute, health-based benchmark.

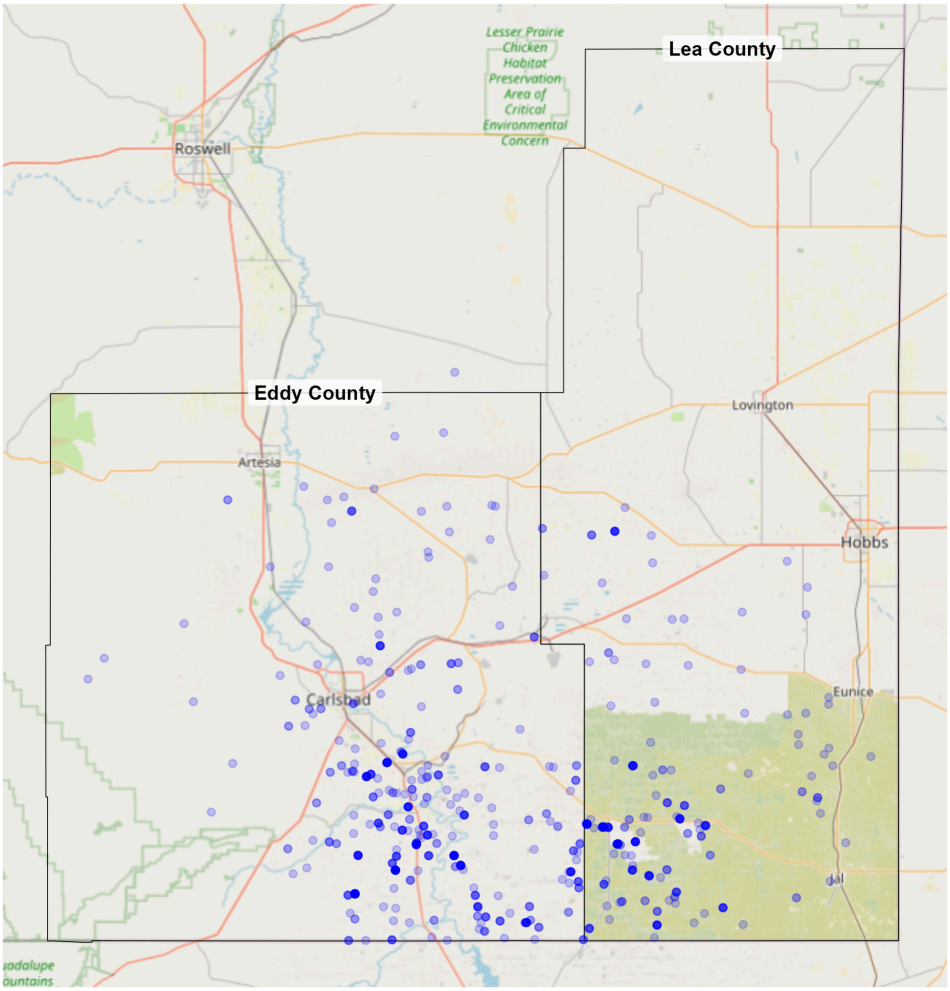
For this report, PSE analyzed all New Mexico methane emissions events currently included in the MRM. These are events detected by Carbon Mapper's satellite and aircraft surveys (Carbon Mapper, 2026) that could be attributed to an upstream oil and gas source and for which PSE has gas composition data. The results bring insights from 779 methane emissions events detected between 2016 and 2026, including methane releases <100 kg/hr. Across these events, we show how often and how far from the source co-emitted benzene exceeds health-based benchmarks and the potential scale of the population affected.

## Four Takeaways From the Methane Risk Map

### New Mexico Has Hundreds of Methane Emissions Events and Nearly All Have Benzene Risk Exceedances

The MRM modeled 779 methane emissions events that occurred in New Mexico between 2016 and 2026. Almost all of these events occurred in Eddy (491) and Lea (287) Counties (Figure 1).

**Figure 1: Methane emissions events in New Mexico, 2016–2026.** Locations of the 779 events modeled on the Methane Risk Map (MRM) and included in this report analysis. Darker blues indicate more events.

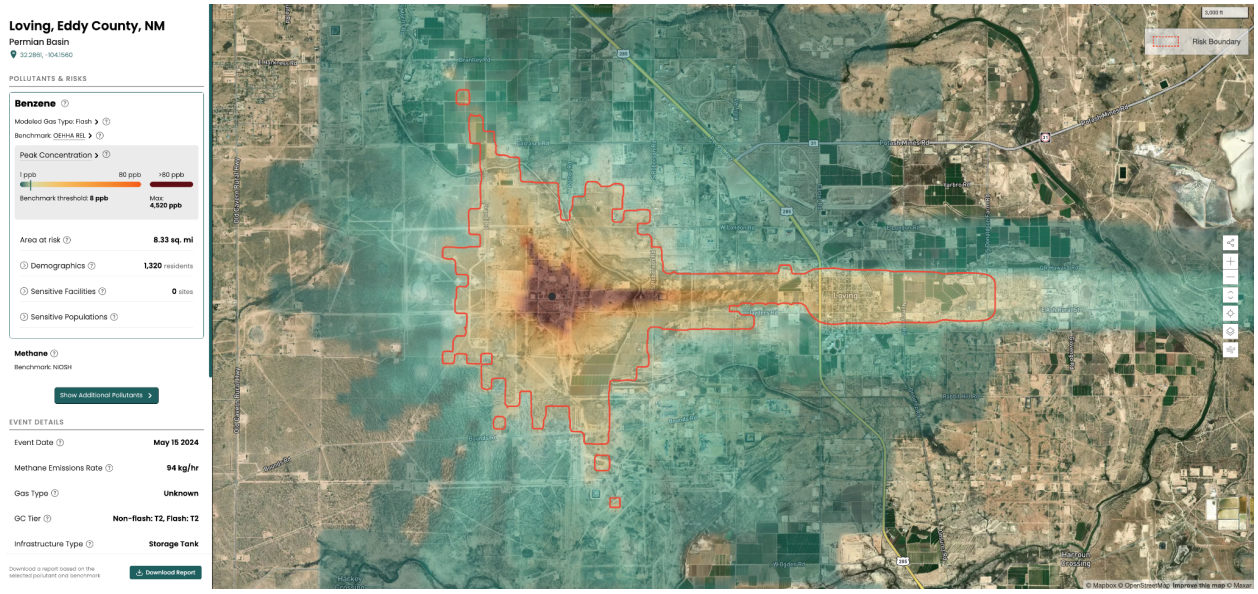



Of the 779 New Mexico events analyzed, 99.6% had modeled benzene concentrations above the California Office of Environmental Health Hazard Assessment (OEHHA) acute 1-hour

Reference Exposure Level (aREL) of 8 ppb (OEHHA, 2016). Therefore, nearly every methane emissions event modeled in the state may have produced short-term benzene levels that are unhealthy to breathe.

We refer to the area where benzene concentrations exceed the OEHHA health risk threshold of 8 ppb as the benzene risk area. We found that even relatively small methane releases can produce meaningful risk areas. For example, events of 50 to <100 kg/hr, below the federal 100 kg/hr methane super-emitter threshold, produced modeled benzene risk areas typically within about a third of a mile of the source (median = 0.3 miles). In New Mexico, 108 of the 779 modeled events fall in the 50 to <100 kg/hr range, and all of those events produced modeled benzene exceedances. Figure 2 shows one example from the MRM illustrating the risk area associated with a methane emissions event of <100 kg/hr.

**Figure 2: Modeled benzene risk area for a 94 kg/hr methane emissions event near Loving, Eddy County.** The red outline marks the risk area, where modeled benzene concentrations exceeded OEHHA's acute health benchmark (8 ppb). At 94 kg/hr, this event falls below EPA's 100 kg/hr super-emitter threshold but above NMED's proposed 50 kg/hr threshold. [Explore this event on the Methane Risk Map].




Overall, among the methane emissions events modeled in the MRM, events in New Mexico tend to have larger benzene risk areas that extend farther from the source relative to the nationwide median, likely because of events linked to storage tanks (Table 1). Our analysis attributed 143 of the emissions events to storage tanks, which can emit flash gas enriched in

hazardous air pollutants. Previous PSE research has found that flash gas contains average benzene concentrations 59 times higher than non-flash gas (Rowland et al., 2025). For this reason, methane emissions events attributed to storage tanks account for most of the larger benzene risk areas in this study. While most of the New Mexico methane emissions events analyzed (75% of events) produced modeled benzene risk areas of 1.4 square miles or smaller, a few, mostly from storage tanks, had benzene risk areas as large as 183 square miles.

**Table 1: Modeled benzene risk areas in New Mexico compared to all MRM events.** Median risk area and median farthest distance from the source at which modeled benzene concentrations exceed OEHHA's acute health benchmark (8 ppb).

| | All MRM Events | New Mexico MRM Events |
|---|---|---|
| **Number of Events** | 1,961[1] | 779 |
| **Median Risk Area (sq. mi)** | 0.16 | 0.28 |
| **Median Farthest Exceedance Distance (mi)** | 0.53 | 0.65 |

1. Total MRM numbers are as of October 2026. Numbers may differ from what is currently shown on the MRM tool as events are regularly being added to the tool.

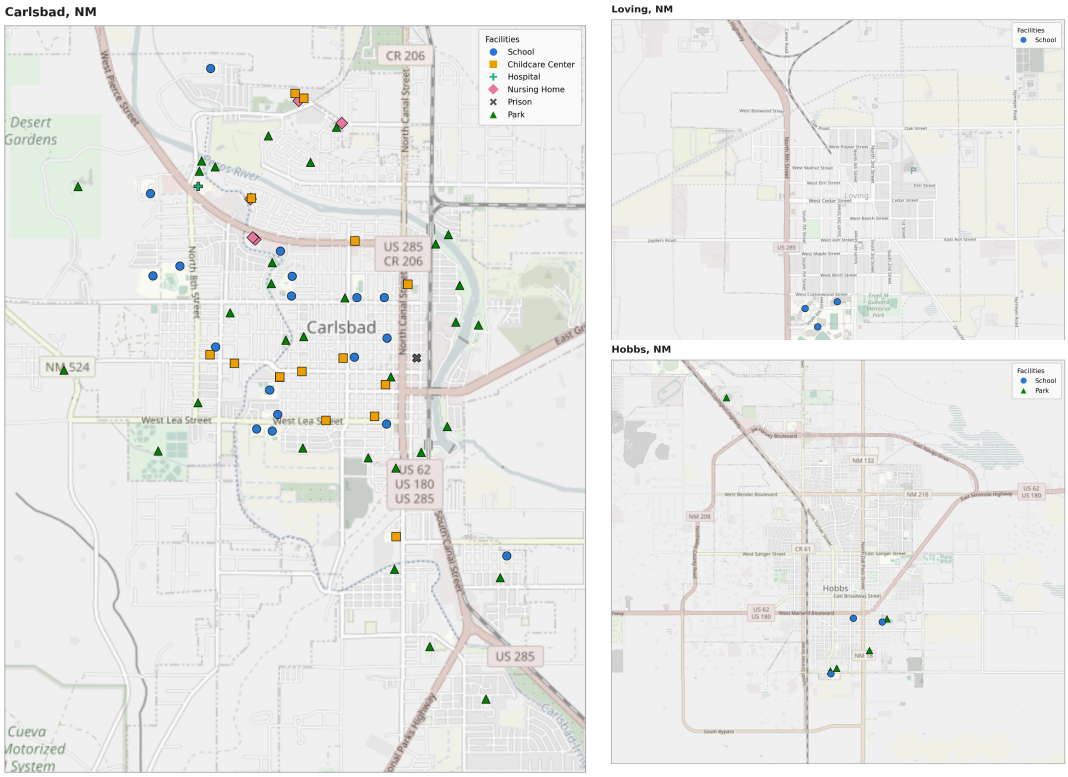
## Tens of Thousands of New Mexicans Live in Benzene Risk Areas From Methane Emissions Events

Approximately 19,800-46,500[1] New Mexicans, about 1-2% of the state's population, live within at least one modeled benzene risk area. While many of the state's methane emissions events have occurred in rural areas with populations of less than 100 people within the risk area, a few events near populous areas like Carlsbad, Hobbs, and Loving may have put many New Mexico residents at risk. About 2% (18) of the modeled events have more than 1,000 people living within the modeled benzene risk areas. The vast majority of such events occurred in Eddy County, where an estimated 23-65% of the population (14,200-40,900 people) may have experienced at least one short-term benzene exposure above health-based benchmarks.

[1]Events attributed to storage tanks are modeled as flash gas, since this equipment is commonly associated with flash gas emissions. One event near Carlsbad, NM has a disproportionate effect on our population estimates because of the large number of people (36,690) within its benzene risk area. Because of the influence of this particular event on the population estimates, we modeled it both as flash and non-flash to account for gas type uncertainty and report population and sensitive facility as ranges instead of single values. All other statistics in this report are the same under either gas type assumption.

Statewide, between 20 and 82 sensitive facilities fell within at least one modeled risk area, with schools and parks being the most common (see Figure 3 for the locations of some potentially impacted facilities). Sensitive facilities, such as schools, childcare centers, parks, hospitals, nursing homes, and correctional facilities, serve people who are especially sensitive to air pollution due to developmental age or health status.

**Figure 3: Sensitive facilities within at least one modeled benzene risk area in Carlsbad, Loving, and Hobbs, New Mexico.** Each symbol marks a school, childcare center, hospital, nursing home, prison or park located inside the benzene risk area of one or more modeled methane emissions events, where modeled concentrations exceed OEHHA's acute health benchmark (8 ppb)**.**

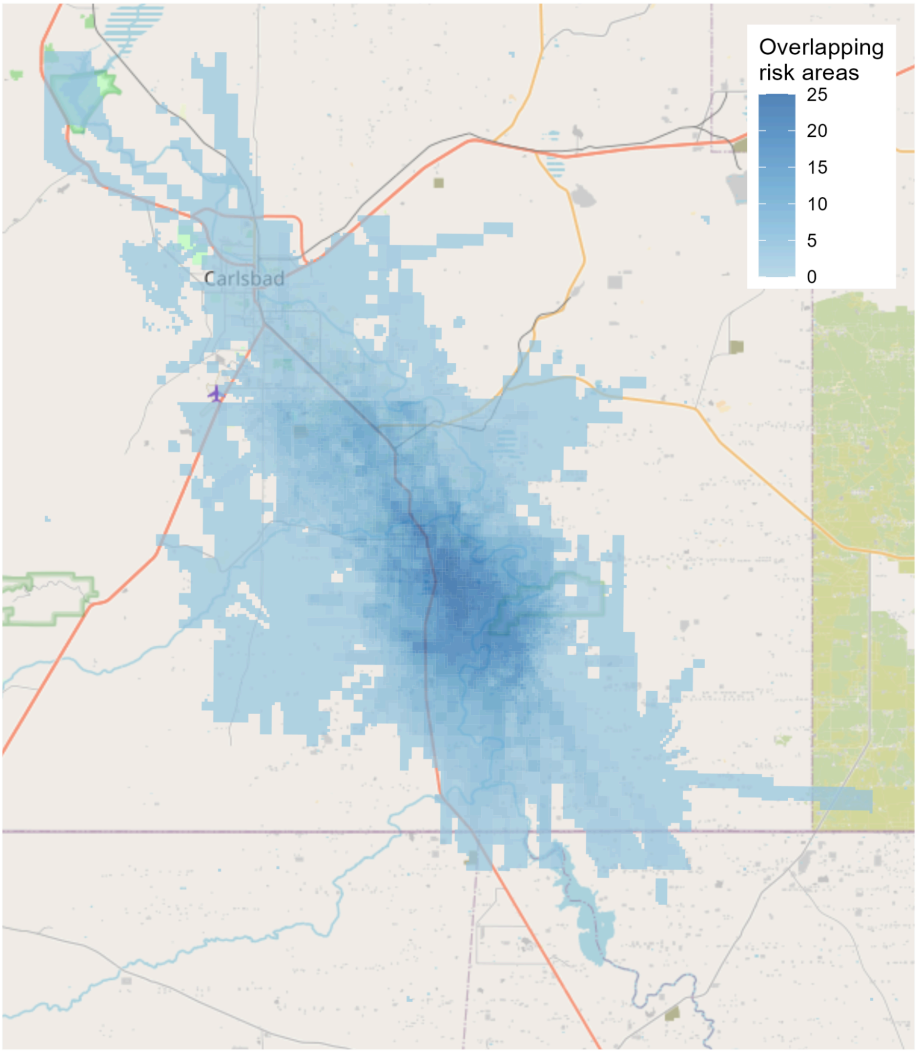



## Some Eddy County Communities Fall Within Risk Areas Again and Again

The MRM shows repeated methane emissions events around Carlsbad and Loving from 2016 through 2026, and their benzene risk areas overlap substantially (Figure 4). About 9-18% of Eddy County residents live where the risk areas of more than two separate events overlap. Although MRM does not model long-term risk, repeated methane emissions events in the

same geographic area raise the question of whether residents also could face elevated chronic benzene exposure from methane emissions events.

**Figure 4: Overlapping benzene risk areas in Eddy County.** The map shows the modeled risk areas of methane emissions events with at least 100 people living inside them. Darker blue tones indicate places where more events' risk areas overlap.




## New Mexico's Setback Distances Fall Short of Protecting Health

Modeled benzene exceedances routinely reach well beyond local setbacks, the minimum distance oil and gas infrastructure must be from homes, schools, or other sensitive facilities. The City of Carlsbad requires a setback distance of 500 feet, and Eddy County requires a setback of 300 feet (New Mexico Legislative Finance Committee, 2024), while there is no

statewide setback. Established local setbacks may not be sufficient to reduce health risks since almost every modeled upstream methane emission event in New Mexico produced modeled benzene concentrations that exceeded the health risk threshold of 8 ppb beyond 300 feet from the source (see Table 2). Of the 99.4% of emission events with modeled benzene exceedances, every event produced exceedance distances of at least 300 ft. The median farthest exceedance of all events in New Mexico was about 3400 feet from the source. Even for events with emissions rates of 50-100 kg/hour, the median farthest exceedance was around 1500 feet. These results suggest that current local setbacks do not adequately protect public health.

**Table 2: Modeled benzene exceedance distances far exceed local setbacks.** Farthest distance from the source at which modeled benzene concentrations exceed OEHHA's acute health benchmark (8 ppb), compared with the City of Carlsbad's 500-foot setback.

| | Distance (feet) | Multiple of Carlsbad's 500-ft Setback |
|---|---|---|
| **Median Farthest Exceedance:** Events of 50–<100 kg/hr | ~1,500 | 3x |
| **Median Farthest Exceedance:** All New Mexico Events | ~3,400 | 7x |
| **Minimum Farthest Exceedance:** All New Mexico Events | ~300 | |
| **Minimum Farthest Exceedance:** All New Mexico Storage Tank Events | ~3,000 | 6x |

## Policy Context and Opportunities

EPA has paused its federal super-emitter program until January 22, 2027 (Colclasure, 2026), and has announced its intention to rescind the program entirely (Plumer, 2026). Despite this federal methane policy potential rollback, states, counties, and cities can take several actions to reduce health risks associated with methane emissions.

In August 2026, NMED petitioned the state's Environmental Improvement Board to adopt a new Methane Abatement Rule, 20.2.51 NMAC (docket EIB 26-78(R)). The public hearing is scheduled to start December 1, 2026 (NMED, n.d., 2026). As proposed, the rule would:

- Define a super-emitter event as a release of 50 kg/hr or more detected by an approved remote sensing method, half of EPA's 100 kg/hr threshold.

- Require operators to investigate and repair within three calendar days of notification, with detections submitted by certified third parties (Vaziri, 2026).
- Set a zero methane emission standard for process controller-designated, natural gas-driven facilities, beginning in 2031.

The MRM results can inform the Board's decision, as well as measures beyond the rule:

1. **Emissions threshold:** Methane emissions events of 50 to < 100 kg/hr, below the federal threshold of 100 kg/hr, produced modeled benzene exceedances, typically within about a third of a mile of the source. A 50 kg/hr threshold captures releases with documented health relevance.
2. **Prioritizing storage tanks and flash gas:** Storage tanks make up about 20% of the modeled New Mexico events, but nearly all of the population risk. Policy and enforcement that prioritize flash gas sources would focus effort where the greatest health benefit is.
3. **Transparency on equipment type:** Many methane emissions events cannot be tied to a specific equipment type. Public reporting of infrastructure and oil and gas equipment databases would facilitate better risk assessment and help identify flash gas sources.
4. **Gas composition data:** Requiring operators to report gas composition, and making these data publicly available, would allow the public and regulators to quickly assess the health risks associated with an event as soon as an emissions event is detected.
5. **Accurate, timely reporting:** Methane-monitoring satellites are revealing that super-emitter events are more frequent and larger than reported, and Earthworks recently documented major under-reporting in New Mexico's Permian Basin (Earthworks, 2026). Unreported events delay mitigation and health risk assessment, prolonging emissions and exposures.
6. **Health-based setbacks:** Local setbacks of 300–500 feet fall far short of most modeled benzene exceedance distances, which have a median of about 3,400 feet in New Mexico. Modeled risk areas could inform setbacks that better protect health, especially around flash gas sources.

For a broader discussion of policy recommendations addressing methane super-emitters, including six recommendations that extend beyond New Mexico, see our policy brief How *Methane Emissions Events Impact Air Quality and Put Human Health at Risk* (2026) available through the Federation of American Scientists. (Bilsback et al., 2026)

## About the Methane Risk Map and Our Analysis

- **Events:** This analysis covers 779 methane emissions events modeled on the MRM in New Mexico, detected by satellite or aircraft between 2016 and 2026.
- **Risk area:** For each event, the MRM uses a regulatory-grade Gaussian air dispersion model to estimate the outdoor event-specific air concentrations of methane and hazardous air pollutants. The risk area is where modeled concentrations exceed California OEHHA's acute reference exposure level (REL) for benzene. The farthest exceedance distance is the greatest distance from the source at which that occurs.
- **Population and facilities:** Residents and sensitive facilities are estimated within each event's risk area. Statewide and county totals use the combined (unioned) risk area to avoid double counting the population in areas impacted by more than one event.
- **Limitations:** Our analysis includes only a subset of large methane emissions from oil and gas facilities in New Mexico. This analysis includes only methane emissions events detected remotely by Carbon Mapper, with available modeled gas composition, and attributed to the upstream sector. Results describe potential acute health risk, not measured exposures or health outcomes.

For a comprehensive description of the MRM methodology, please visit the MRM website and review the MRM Product Guide (PSE Healthy Energy, 2026a, 2026b).



# References


1. Bilsback, K. (2026). How Methane Emissions Events Impact Air Quality and Put Human Health at Risk. *Federation of American Scientists.* https://fas.org/publication/methane-emissions-air-quality-health-at-risk/
2. Bisogno, S., et al. (2025). Not just a climate problem: the safety and health risks of methane super-emitter events. *Environmental Research Letters*, 20(9), 094025. https://doi.org/10.1088/1748-9326/addedd
3. Plumer, B. (2026). Trump Loosens Rules for Oil Firms to Cut Methane, a Potent Warming Gas. *The New York Times.* https://www.nytimes.com/2026/10/27/climate/trump-methane-rules-epa-greenhouse-gas.html
4. Carbon Mapper Data. Retrieved on November 1, 2026. *Carbon Mapper*. https://data.carbonmapper.org
5. Coclasure C. (2026). New Mexico's Proposed Methane Super-Emitter and Process Controller Rules: What Operators Need to Know. *Beatty & Wozniak.* https://www.bwenergylaw.com/blog/2026/07/new-mexicos-proposed-methane-super-emitter-and-process-controller-rules-what-operators-need-to-know/
6. Earthworks. (2026). New data shows major under-reporting of methane super-emitter events in New Mexico's Permian Basin. https://earthworks.org/releases/new-data-shows-major-under-reporting-of-methane-super-emitter-events-in-new-mexicos-permian-basin/
7. Helmig, D., et al. (2014). Highly Elevated Atmospheric Levels of Volatile Organic Compounds in the Uintah Basin, Utah. *Environmental Science & Technology*, 48(9), 4707-15. https://doi.org/10.1021/es405046r
8. Marrero J.E., et al. (2016). Estimating Emissions of Toxic Hydrocarbons from Natural Gas Production Sites in the Barnett Shale Region of Northern Texas. *Environmental Science & Technology*, 50(19), 10756-64. https://doi.org/10.1021/acs.est.6b02827
9. New Mexico Environment Department. (n.d.). Proposed Air Quality Regulations and Plans (20.2.51 NMAC, Methane Abatement; EIB 26-78(R)). https://www.env.nm.gov/air-quality/proposed-regs/
10. New Mexico Environment Department. (2026). New Mexico Environment Department Petitions the Environmental Improvement Board to Adopt Methane Abatement Rule. https://content.govdelivery.com/accounts/NMED/bulletins/4255577
11. New Mexico Legislative Finance Committee. (2024). Oil and gas setbacks [Hearing brief].

https://www.nmlegis.gov/Handouts/ALFC%20061124%20Item%203%20Hearing%20Brief%20-%20Oil%20and%20Gas%20Setbacks.pdf

12. OEHHA. (2016). OEHHA Acute, 8-Hour and Chronic Reference Exposure Level (REL) Summary. https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary
13. PSE Healthy Energy. (2026a, Nov. 5). Methane Risk Map. (Version 1.2). Retrieved on November 20, 2026. https://mrm.psehealthyenergy.org/
14. PSE Healthy Energy. (2026b, Nov. 5). Methane Risk Map Product Guide. (Version 1.2). Retrieved on November 20, 2026. https://mrm.psehealthyenergy.org/
15. Rowland, S. T., et al. (2025). Scalable estimation of Speciated Volatile Organic Compound Content in the Upstream Natural Gas Sector. *Environmental Research Communications*, 7(5), 051011. https://doi.org/10.1088/2515-7620/adcd49
16. U.S. EPA. (2016). Importance of Methane. https://www.epa.gov/gmi/importance-methane
17. U.S. EPA. (2026a). Methane Super-Emitter Program. https://www.epa.gov/compliance/methane-super-emitter-program
18. U.S. EPA. (2026b). EPA Proposes Major New Revisions to Burdensome, Unworkable Biden-era Oil and Natural Gas Regulations. https://www.epa.gov/newsreleases/epa-proposes-major-new-revisions-burdensome-unworkable-biden-era-oil-and-natural-gas
19. Vaziri, M. (2026). New Mexico Methane Abatement Rule: Requirements for Super-Emitters and Pneumatic Controllers. *All4Inc.* https://www.all4inc.com/4-the-record-articles/new-mexico-methane-abatement-rule-requirements-for-super-emitters-and-pneumatic-controllers/