



## NEW MEXICO ENVIRONMENTAL PUBLIC HEALTH NETWORK

### **Environmental Public Health Impacts of Oil and Gas Development Emissions:**

#### **New Mexico Environmental Public Health Network**

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Methane emissions from oil and gas operations have been in the spotlight recently as the Trump administration seeks rollback of federal Obama-era rules limiting emissions and the State of New Mexico embarks on its own rule-making process. Methane is a potent greenhouse gas, and as oil drilling ramps up in New Mexico, emissions are increasing and thereby contributing to a warming climate, which will eventually have ramifications for human health in the state.

But these emissions also pose a far more immediate, though less talked about, consequence for public health. Even more concerning than methane are the associated volatile organic compounds (VOC) that also are emitted from oil and gas infrastructure. Exposure to these compounds, which include air toxics such as benzene, can have long and short-term health effects, according to an emerging body of peer-reviewed research on the environmental and public health implications of unconventional oil and natural gas development.

This research should help inform the New Mexico Environmental Department's methane ruling and provide an empirical underpinning for policy decisions.

New Mexico has been a major oil and natural gas producing state since the 1920s. Just over a decade ago, the "shale revolution" arrived in the state in the form of horizontal drilling and multistage hydraulic fracturing, also known as unconventional oil and natural gas development (UONGD) or "fracking," which unlocked previously un-extractable oil contained in tight shale formations and sparked the most recent drilling boom.

At any given time, at least 100 drilling rigs are operating around the state, mostly in the Permian Basin in southeastern New Mexico, but also around Chaco Culture National Historical Park<sup>1</sup>. New Mexico's oil production increased more than five-fold over the last decade<sup>2</sup>, making it the third largest oil producing state in the nation. Each month, New Mexico's wells put out some 27 million barrels of crude, while tens of thousands of older wells continue to produce natural gas.

The marketable commodities, however, are not all that emerges from a well. Natural gas and oil are accompanied by substantial volumes of water (this waste stream, known as "produced water," may be

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<sup>1</sup> Baker-Hughes North American Rig Count <https://rigcount.bhge.com/na-rig-count>

<sup>2</sup> U.S. Energy Information Administration  
<https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MCRFPNM1&f=M>

discussed in a future issue brief), as well as VOCs such as benzene, toluene, xylene, naphthalene, anthracene, n-hexane, and benzopyrene. Hydrogen sulfide often is also present. Fugitive emissions of these VOCs come from various points of the extensive network of oil and gas extraction, transportation, and processing infrastructure during the drilling, completion, and production phases.<sup>3</sup> At oil wells, VOCs and methane, or natural gas, are typically vented or flared — i.e. intentionally released into the air or combusted — because with today’s low prices, it is not profitable to build pipelines to ship it to market. The oil and gas industry is the nation’s largest industrial source of VOCs, according to the Environmental Protection Agency.<sup>4</sup>

Methane and VOCs can react with other chemicals to form ozone, or smog, which aggravates and may cause asthma and other respiratory ailments.<sup>5</sup> VOCs also directly affect human health. Short-term effects of inhalation of benzene, for example, include drowsiness, dizziness, headaches, confusion, and rapid or irregular heartbeat. Long-term exposure can harm bone marrow, cause a decrease in red blood cells, affect the immune system, and increase risk for various cancers.<sup>6</sup> Hydrogen sulfide can also seep from oil and gas wells, causing headaches, dizziness, and burning eyes at low concentrations. It can be fatal at higher concentrations.<sup>7</sup>

In New Mexico, oil and gas wells and other facilities are commonly found in or near populated areas. According to the Earthworks Oil & Gas Threat Map, nearly 140,000 New Mexicans live within a half-mile radius of oil and gas facilities.<sup>8</sup> Wells are commonly found near schools, parks, sports fields, in golf courses, and near homes.

The body of research tying specific public health outcomes to unconventional oil and gas operations is growing alongside concerns about the fracking boom’s effects on populations who live near oil and gas operations. A meta-analysis of this research conducted between 2009 and 2017 identified 685 research publications that are relevant to understanding the impacts of fracking and directly pertain to associations between risk factors and health outcomes in human populations.

The analysis found that 84% of these studies contain findings that indicate oil and gas development are associated with increased public health risks, or adverse health outcomes such as birth defects, hospitalization, or have a positive association with a known human health risk.<sup>9</sup> Meanwhile, 87% of air quality studies contain findings that indicate elevated air pollutant emissions and/or atmospheric concentrations near oil and gas operations.<sup>10</sup>

In 2016, the Obama administration’s Bureau of Land Management issued a methane waste-prevention rule that would have reduced VOC emissions nationwide by as much as 270,000 tons per year.<sup>11</sup> The

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<sup>3</sup> <https://fas.org/sgp/crs/misc/R42986.pdf>

<sup>4</sup> <https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/basic-information-about-oil-and-natural-gas>

<sup>5</sup> <https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution>

<sup>6</sup> <https://emergency.cdc.gov/agent/benzene/basics/facts.asp>

<sup>7</sup> <https://www.osha.gov/SLTC/hydrogensulfide/hazards.html>

<sup>8</sup> <https://oilandgasthreatmap.com/threat-map/>

<sup>9</sup> <https://ehp.niehs.nih.gov/doi/10.1289/ehp.1306722>

<sup>10</sup> Hays J, Shonkoff SBC (2016) Toward an Understanding of the Environmental and Public Health Impacts of Unconventional Natural Gas Development: A Categorical Assessment of the Peer- Reviewed Scientific Literature, 2009-2015. PLoS ONE 11(4): e0154164. doi:10.1371/journal.pone.0154164

<sup>11</sup> <https://www.regulations.gov/document?D=BLM-2016-0001-9127>

Trump administration, however, rolled back the rule, leaving states to tackle the problem individually. Earlier this year, New Mexico Gov. Michelle Lujan Grisham instructed the New Mexico Environment Department to develop enforceable, statewide rules to reduce oil and gas sector methane (and associated) emissions.<sup>12</sup>

The New Mexico Environmental Public Health Network supports strong rules that would: prohibit venting of methane and associated chemicals and significantly curtail flaring; require operators to inspect facilities for leaks quarterly and to repair any leaks within 30 days of discovery; require operators to replace all high-bleed pneumatic devices with no-bleed devices within six months of the rule's implementation; require installation of vapor recovery units on storage tanks or otherwise reduce VOC emissions by at least 95% from baseline levels; and require operators to use automated well controls to minimize emissions during maintenance.<sup>13</sup>

While these regulations would not eliminate all methane and VOC emissions, they would significantly reduce them, thereby benefitting not only the climate, but also the health of the thousands of New Mexicans who live in or near the state's increasingly busy oil and natural gas fields.

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<sup>12</sup> <https://www.env.nm.gov/new-mexico-methane-strategy/>

<sup>13</sup> Based on (rescinded) 2016 Bureau of Land Management Rules on Waste Prevention, Production Subject to Royalties, and Resource Conservation <https://www.govinfo.gov/content/pkg/FR-2016-11-18/pdf/2016-27637.pdf> as well as methane emission rules from Colorado and Wyoming.