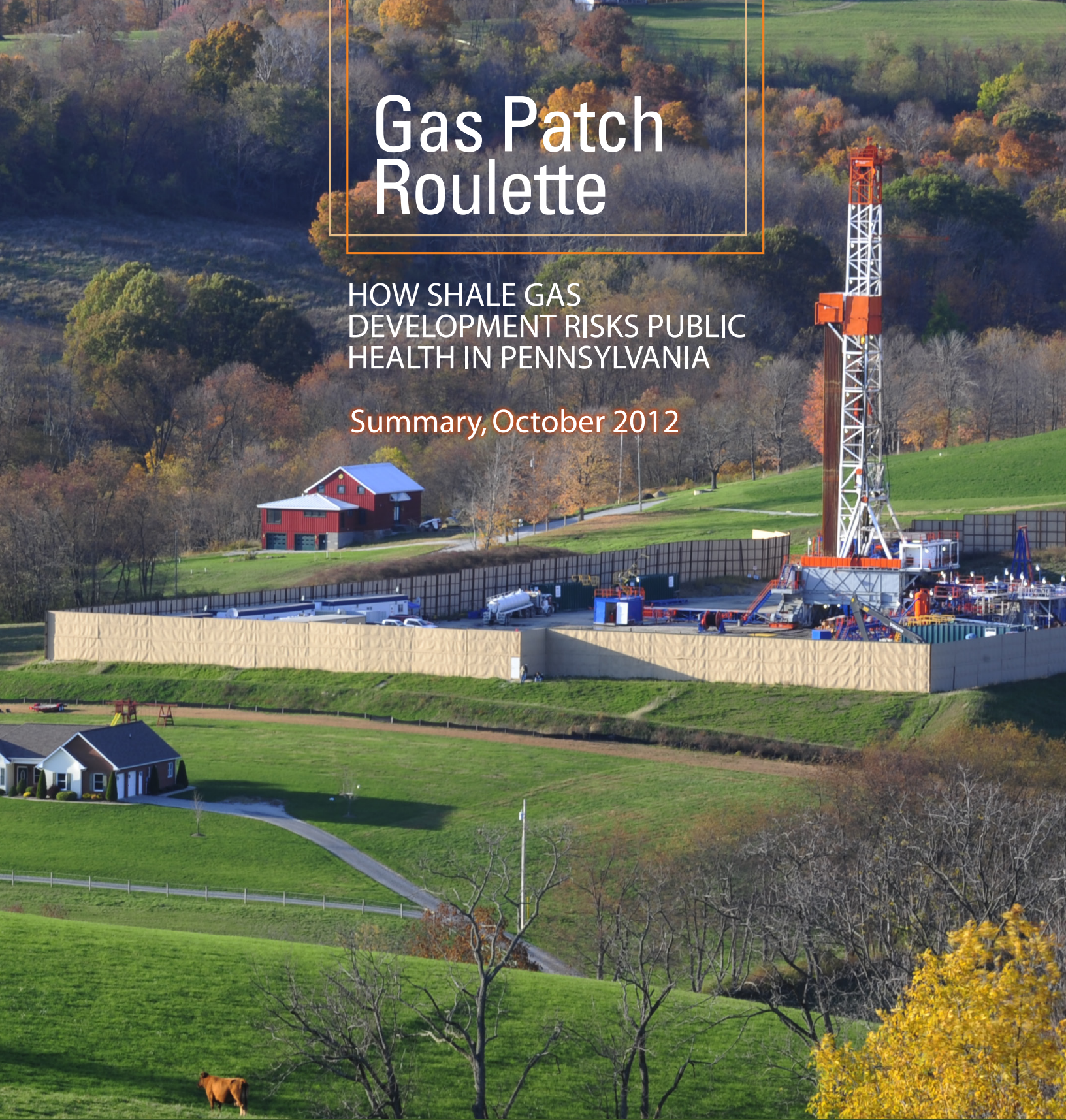


Gas Patch Roulette

HOW SHALE GAS
DEVELOPMENT RISKS PUBLIC
HEALTH IN PENNSYLVANIA

Summary, October 2012



EARTHWORKS™

OIL & GAS ACCOUNTABILITY PROJECT

Gas Patch Roulette:

HOW SHALE GAS DEVELOPMENT RISKS PUBLIC HEALTH IN PENNSYLVANIA— SUMMARY

The shale gas (and oil) boom enabled by horizontal hydraulic fracturing has been accompanied by increasing reports of health problems attributed to pollution from oil and gas development. The relationship between expanding development and health problems is hotly disputed—and is the focus of this research project.

The primary reasons that public health risks posed by increasing gas development are disputed:

- **A lack of established science.** Widespread scientific investigation has only recently begun to investigate the relationship between gas development and public health impacts.
- **State governments**, which are largely responsible for protecting the public from irresponsible oil and gas development, have until recently refused to consider the issue.
- Even as they have become widespread, individual **reports of health problems** in the gas patch have been continually dismissed as anecdotal by industry and government.

With these reasons in mind, in 2011-2012, Earthworks' Oil & Gas Accountability Project (OGAP) investigated and documented the experiences of residents and some air and water quality parameters in portions of Pennsylvania's gas patches.

THE PROJECT'S MAIN CONCLUSIONS ARE:

1. Contaminants associated with oil and gas development are present in air and water in many communities where development is occurring.
2. Many residents have developed health symptoms that they did not have before—indicating the strong possibility that they are occurring because of gas development.
3. By permitting widespread gas development without fully understanding its impacts to public health—and using that lack of knowledge to justify regulatory inaction—Pennsylvania and other states are risking the public's health.



The many stages of gas development create multiple pathways for exposure to air and water pollution. Gas facilities such as open impoundment pits are often built very close to homes, schools, farm fields, and other places where people spend a lot of time. Wells and equipment like compressors and separators emit volatile organic compounds, chemicals, and other substances into the air, while contaminants can leak, spill, and evaporate from pits. Photo by Robert Donnan

THE PROJECT

Over several months, we collected health surveys focusing on oil and gas development—the largest set in the Marcellus Shale region to date. We surveyed 108 residents in 14 Pennsylvania counties, with the largest number (85 percent) collected in Bedford, Bradford, Butler, Fayette, and Washington counties.¹ The surveys focused on:

- Health symptoms and their onset;
- Distances from facilities (wells, compressor stations, and waste impoundment pits); and
- Any associations between odors and symptoms.

To identify the presence of Volatile Organic Compounds (VOCs) and other substances, 34 air tests (using Summa Canisters) and 9 water tests (using U.S. Environmental Protection Agency-approved TO-14 and TO-15 methods) were conducted at more than half of the households where health surveys were completed.



THE FINDINGS

Overall, the most frequently reported types of symptoms were related to sinus and respiratory systems; mood and energy; neurological concerns (such as tremors or dizziness); muscle and joint weakness or pain; digestive and stomach problems; irritation of the eyes, ears, nose, and mouth; and skin reactions.

Those living closer to gas facilities reported higher rates of symptoms of impaired health. For example, when facilities were 1500-4000 feet away, 27 percent of participants reported throat irritation; this increased to 63 percent at 501-1500 feet and to 74 percent at less than 500 feet. At

the farther distance, 37 percent reported sinus problems; this increased to 53 percent at the middle distance and 70 percent at the shortest distance. For severe headaches, 30 percent reported them at the farther distance, but about 60 percent at the middle and short distances. This same pattern also existed among different age groups, with the percentages of several

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of the top symptoms reported in each group increasing the closer respondents lived to gas facilities.

Surveyed children averaged 19 health symptoms, including some that seem atypical in the young, such as severe headaches, joint pain, and forgetfulness. Among all the survey respondents, it was children living within 1500 feet of facilities who had the highest occurrence of frequent nosebleeds (56%). And for the oldest respondents (over 56 years of age), rates of throat and nasal irritation, sinus problems, eye burning, severe headaches, and skin rashes were 14-28 percent higher among those living within 1500 feet of facilities than at longer distances.

The most frequently reported symptoms were very similar among smokers and non-smokers, and non-smokers experienced high levels of symptoms that are commonly considered to be side effects of smoking (such as persistent hoarseness, throat irritation, sinus problems, nasal irritation, shortness of breath, and sleep disturbances).

One of the most common complaints of survey participants was bad odors, with more than 80 percent reporting that they smelled them sometimes or constantly. Participants associated specific odors and health symptoms; for example chlorine, diesel, and rotten/sour gas smells were associated with headaches and dizziness, while ammonia, sulfur, chlorine, gas, and chemical smells were associated with respiratory, sinus, and throat irritation.

More than half of the water well samples had elevated levels of methane and some had iron, manganese, arsenic, and lead at levels higher than the Maximum Contaminant Levels (MCLs) set by the PA Department of Environmental Protection (DEP). All of the air samples were taken in rural and residential areas; in several, higher levels of the BTEX chemicals (benzene, toluene, ethylbenzene, and xylene, which are known carcinogens) were detected, as compared to samples taken by the DEP in 2010. Some of our samples had higher concentrations of ethylbenzene and xylene than the DEP detected at an industrial site near oil refineries, as well as benzene levels above the national average for urban areas.

Finally, many of the chemicals detected in the air and water samples have been associated by state and federal agencies with both oil and gas operations and with many of the health symptoms reported in the surveys. Overall, we found that 68 percent of respondents at households where chemicals were detected reported symptoms known to be associated with those chemicals.



PHOTOS

TOP-DOWN: Roberto M. Esquivel / Harold-Standard; Frank Finan; Nadia Steinzor

UPPER LEFT: Nadia Steinzor.

Conclusions and Recommendations

Some proponents of gas development equate the absence of incontrovertible evidence linking particular facilities and specific impacts with proof that gas development does not harm health. And until very recently, regulators often made the same argument to justify lack of investigation into the issue, as well as lack of more stringent oversight of the industry.



The information gathered through this survey and testing project strongly undermines that argument. By demonstrating that Pennsylvania residents living near gas facilities have high incidences of negative health symptoms,

those responsible for protecting the public good can no longer simply state that the public health risks of gas development are negligible.

To protect the public health, our primary recommendation is:

Pennsylvania (and other states) should put public health first and refuse to permit new gas development until they can assure affected communities that they (a) fully understand the associated public health risks and (b) have taken all necessary steps to prevent those health risks.

To achieve this, we also recommend the following:

GIVE PUBLIC HEALTH A CENTRAL ROLE IN GAS DEVELOPMENT DECISIONS: States should conduct Health Impact Assessments (HIAs) to analyze health and environmental risks from gas development and help prevent problems from occurring. Departments of Health should have the resources necessary to track reports of problems near gas facilities, respond to citizen complaints, and train health and medical professionals on exposure pathways and health symptoms related to gas operations.²

According to Thomas Jefferson, “The purpose of government is to enable the people of a nation to live in safety.” Decisionmakers have the responsibility to take seriously their citizens’ reports of health problems, to take the steps necessary to address them and, ultimately, to safeguard public health and safety. The findings of this survey and testing project in Pennsylvania—coupled with similar patterns seen elsewhere and an emerging body of scientific and community-based research—provide a sufficient basis for strong action without further delay.

DEVELOP NEW TESTING MEASUREMENTS: Federal agencies should develop guidelines for interpreting air and water tests that take into account low-level, chronic exposure to multiple chemicals. Drinking water and air standards should be established for those chemicals for which none currently exist.

PACE PERMITS, STRENGTHEN REGULATIONS: Regulatory agencies like the DEP should have a long-term, comprehensive plan for the scope and pace of permits for wells and other facilities and give greater priority to air and water quality and health risks in decisions. Measures should be considered with regard to setback distances from facilities; requirements for operators to use advanced technologies to reduce emissions, odors, and noise; and the elimination of open waste pits. Baseline testing should be carried out for both private wells and public drinking water supplies prior to drilling and (for air) at or near a range of facilities during all phases of operations.

CLOSE THE ENFORCEMENT GAP: Inadequate oversight of gas operations and a lack of accountability among operators mean that actual risks and damage to air and water quality are frequently not documented or addressed. States need to strengthen inspection protocols, increase penalties for violations, and respond to citizen reports of problems.³

END EXEMPTIONS FOR THE OIL AND GAS INDUSTRY: Closing loopholes in key provisions of U.S. environmental laws would make it possible to more fully identify and calculate impacts to air and water quality and health and increase the availability and transparency of information on contaminants and exposure pathways.⁴

PROHIBIT NON-DISCLOSURE AGREEMENTS: NDAs have in recent years become more common in oil and gas damages cases as part of negotiations over such aspects as monetary compensation and medical expenses.⁵ As a result, documentation, testimony, and information critical to understanding and preventing health and environmental impacts are often not available.

ENDNOTES

- 1 This project represents a scaling-up of OGAP’s prior community-based health survey and environmental testing work in Pavillion, Wyoming (2010) and DISH, Texas (2009), as well as case studies of residents who developed health problems while living near gas facilities in Texas. See “Community Health Survey of Current and Former Residents of DISH, Texas,” 2009, <http://earthworksaction.org/publications.cfm?pubID=438>; “Community Health Survey Results of Pavillion, Wyoming,” 2010, http://earthworksaction.org/PR_PavillionHealthSurvey.cfm; and Natural Gas Flowback: How the Texas gas boom affects community health and safety, 2011, http://www.earthworksaction.org/library/detail/natural_gas_flowback.
- 2 The Southwest Pennsylvania Environmental Health Project has prepared useful materials and presentations in this regard. See “Health concerns in the era of gas drilling—a basic toolkit for health care providers,” www.environmentalhealthproject.org/resources/medical-resources (accessed September 15, 2012).
- 3 Earthworks. *Breaking all the Rules: The Crisis in Oil & Gas Regulatory Enforcement*. <http://enforcement.earthworksaction.org>.
- 4 Earthworks. “Loopholes for Polluters: The oil and gas industry’s exemptions to major environmental laws.” 2011.
- 5 Earthjustice, “Fracking Damage Cases and Industry Secrecy,” <http://earthjustice.org/features/campaigns/fracking-damage-cases-and-industry-secrecy> (accessed July 10, 2012).



For the full report go to: <http://health.earthworksaction.org>

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