

Workshop Summary

“Regulators, Industry, and Communities: Analyzing the Challenges of Improperly Abandoned and Orphaned Wells”

October 21, 2020 at 3pm EDT

Overview

On Wednesday, October 21st, 2020 the Center for Scientific Evidence in Public Issues (EPI Center) at the American Association for the Advancement of Science (AAAS) hosted a virtual workshop entitled, “Regulators, Industry, and Communities: Analyzing the Challenges of Improperly Abandoned and Orphaned Wells”.

The goal of the workshop was to facilitate a discussion among scientific researchers, industry, regulators, non-governmental and community organizations, legal experts, financial analysts, and other stakeholders to identify the most pressing issues related to orphaned and improperly abandoned wells. This was an interactive, by invitation only event designed to share existing evidence, surface knowledge gaps, elucidate research needs and areas for future work, and discuss constraints to implementing evidence-informed solutions.

Introduction to the AAAS EPI Center:

AAAS is the world's largest multidisciplinary scientific society and a leading publisher of cutting-edge research through its *Science* family of journals. Founded in 1848, AAAS seeks to advance science, engineering, and innovation throughout the world for the benefit of all people.

The AAAS EPI Center is an initiative designed to deliver clear, concise, and actionable scientific evidence to policymakers and other decision-makers. The EPI Center makes it easier for policymakers and other decision-makers to access relevant scientific evidence and integrate that evidence into their decision-making process. The EPI Center synthesizes and distills scientific evidence on key societal issues in a way that makes it clear how that evidence can inform policy making and decisions at the local, state, and federal levels.

Background:

The COVID-19 pandemic and fluctuating price of oil and natural gas have brought orphaned and improperly abandoned wells to the attention of the public and policymakers, raising concerns over how financially distressed companies will properly shut down or slow production from wells they no longer have the resources to operate. Decisionmakers at all levels of government must be made aware of the potential economic, environmental, and human health impacts associated with orphaned or improperly abandoned wells. These wells can emit gases or fluids that pose a risk to the environment and the health of neighboring communities. In some cases, operators or companies may declare bankruptcy, neglect to close wells, and fail to allocate any or adequate funds to plug their wells in absentia. When wells are

“orphaned,” federal and state regulatory agencies assume responsibility for locating and properly plugging these wells; managing and investigating fluid migration, harmful emissions, and other environmental concerns; and paying for remediation using taxpayer funds. When oil prices fall, more wells are rendered unprofitable and may be orphaned as companies become insolvent. State and federal regulatory agencies, already under budget constraints due to the global pandemic, will be burdened with a growing number of orphaned wells and the associated impacts.

Many communities living in proximity to oil and gas operations across the country are familiar with the potential environmental and human health risks associated with orphaned or improperly abandoned wells. Communities and their advocates have engaged elected officials and regulators to address their concerns and mitigate these impacts. In some instances, communities have taken it upon themselves to locate, document, and plug orphaned wells.

The issues posed by orphaned wells are complex. In order to address them it is crucial to understand 1) the scientific evidence related to the environmental and human health impacts; 2) intricate legal concepts and transparency of ownership; 3) the patchwork of state-by-state regulations and bonding requirements; and 4) industry best practices. Furthermore, while the number of these wells may increase, the workforce capable of addressing them is shrinking as companies furlough or lay-off skilled workers. To that end, cooperation between industry, researchers, regulators, advocates, and the public should be encouraged as this topic represents an opportunity to find unexpected common ground and maximize efficiencies and effectiveness in addressing these wells.

Partner:

The AAAS EPI Center was proud to host this event in collaboration with [RESOLVE](#), an independent, nonpartisan, nongovernmental organization that forges sustainable solutions to critical social, health, and environmental challenges by creating innovative partnerships where they are least likely and most needed. RESOLVE works across sectors, borders, and political lines to engage with business, government, foundation, NGO, and community leaders – a complement to the AAAS EPI Center’s mission.

Workshop Summary

Session 1

The virtual workshop, “Regulators, Industry, and Communities: Analyzing the Challenges of Improperly Abandoned and Orphaned Wells”, was divided into two parts. The first comprised presentations by six distinguished panelists and a moderated Q&A period. At the outset, participants were welcomed by Dr. Rebecca Aicher, Project Director for the AAAS EPI Center, and Abby Dilley, the facilitator for the event and Vice President of Programs and Senior Mediator at RESOLVE.

Panel 1:

- **Dr. Mary Kang**, Assistant Professor of Civil Engineering and Applied Mechanics, McGill University
- **Luke Plants**, Chief Operating Officer, Plants & Goodwin Inc.
- **Daniel Raimi**, Senior Research Associate, Resources for the Future; Lecturer, Gerald R. Ford School of Public Policy at the University of Michigan

Each panelist gave a short presentation to share their expertise and relevant background knowledge to provide context for the day's discussion. The first presenter was Dr. Mary Kang. Dr. Kang's main research areas are groundwater hydrology and the environmental impacts of subsurface-based energy development. Her presentation focused on providing working definitions of abandoned and orphaned wells, as well as research related to methane emissions from such wells. Dr. Kang explained how the term "abandoned" encompasses various types of wells. **Orphaned, deserted, long-term idle and abandoned** are wells with no recent production and no responsible operator. Abandoned wells also include wells that have been plugged to prevent migration of gas or fluids ([EPA Greenhouse Gas Inventory 2018](#)). Terms like **inactive, temporarily abandoned, shut-in, dormant and idle** describe wells with no recent production that are not plugged.

During her presentation, Dr. Kang focused primarily on field measurements conducted in Pennsylvania and around the Appalachian Basin and highlighted the need for further studies of methane emissions from these wells and across other basins or on private land in the United States. Dr. Kang's remarks were followed by a presentation by Luke Plants, COO of Plants & Goodwin Inc. Plants & Goodwin has been the largest well plugging and abandonment contractor in the northeast United States since 2017. Mr. Plants shared his experience addressing the unique challenges posed by orphaned wells and the decommissioning process, including accessing these wells and assessing their condition before properly plugging the well and remediating the site. Daniel Raimi, the last presenter from the first panel, works on energy policy issues including oil and gas regulation and taxation. In his remarks, he emphasized the need for immediate action to properly plug orphaned wells, particularly in light of the anticipated increase in the number of these wells. Mr. Raimi concluded by describing multiple policy options for managing orphaned and abandoned oil and gas wells that could be implemented at the state or federal level.

During the Q&A, participants were eager to learn more about the technical challenges posed by legacy orphaned wells and what makes them particularly difficult to manage. Luke Plants was able to briefly describe the condition many of these wells are currently in and how Plants & Goodwin handles on-site plugging and remediation efforts. He also explained where, how, and why the costs associated with plugging an orphaned well might vary by state or site and what factors determine cost estimates, including depth, size, condition, access, and the availability of information. Mary Kang detailed what data gaps or uncertainties still persist (related to methane emissions from these wells and their relative contribution to nationwide estimates of greenhouse gas emission from oil and gas development), as well as the need for more data about the location and potential impacts from orphaned or improperly abandoned oil and gas wells.

After these clarifying questions, Abby Dilley introduced the second set of panelists.

Panel 2:

- **Dr. Seth Shonkoff**, Executive Director, PSE Healthy Energy; Visiting Scholar, University of California – Berkeley; and Affiliate, Lawrence Berkeley National Lab
- **Seth Pelepko**, Environmental Program Manager, Bureau of Oil and Gas Planning and Program Management, Pennsylvania Department of Environmental Protection
- **Uduak-Joe Ntuk**, California State Oil and Gas Supervisor, California Geologic Energy Management Division (CalGEM)

The second panel was designed to further explore environmental and human health impacts from orphaned or improperly abandoned oil and gas wells and the regulatory tools states and the federal government have in place to manage these wells and mitigate impacts. The first presenter was Dr. Seth Shonkoff. Dr. Shonkoff is an environmental and public health scientist by training with more than 20 years of experience in water, air, climate, and population health research at the energy interface. During his presentation, Dr. Shonkoff discussed the public health and environmental impacts from abandoned and orphaned oil and gas wells and the need for increased monitoring and scrutiny of these wells, especially as communities grow and expand into areas of legacy oil and gas development. Dr. Shonkoff's remarks were followed by presentations by two regulators. The first was Seth Pelepko of the Pennsylvania Department of Environmental Protection. Mr. Pelepko's expertise includes stray gas migration casework, gas and oil well integrity, and legacy oil and gas wells. He shared his experience locating, plugging, and remediating orphaned wells in Pennsylvania and the difficulties his state has encountered trying to determine the scale of the problem, mitigate impacts from these wells, and raise awareness and financial support for their efforts. Mr. Pelepko shared anecdotes about problematic wells found in proximity to people's homes or in inaccessible locations and the myriad challenges posed by the thousands of these wells scattered across the landscape in Pennsylvania. Mr. Pelepko's remarks were complemented by those of Uduak-Joe Ntuk, California State Oil & Gas Supervisor. Supervisor Ntuk directs California's statewide regulatory, technical, and field operations agency designed to emphasize the safe development of oil and natural gas. He also serves as a representative to the Interstate Oil and Gas Compact Commission (IOGCC). Supervisor Ntuk shared his experience dealing with orphaned and improperly abandoned wells in California and the steps taken to address these wells across the state. This includes recent regulatory and legislative changes to direct funding to well plugging and abandonment programs and increase collaboration with industry on these issues. Supervisor Ntuk also detailed nationwide efforts to address and mitigate the impacts from orphaned or improperly abandoned wells and the potential use of federal stimulus funding for this purpose, along with exploratory bi-lateral efforts between the United States and Canada.

With these presentations, participants were given context for what strategies have been or are being used to address and manage orphaned or improperly abandoned oil and gas wells that are the responsibility of the states. Pennsylvania and California, both very active on this topic, have undertaken different approaches based on the data and scientific evidence available to them. Both Mr. Pelepko and Supervisor Ntuk acknowledged that data gaps, limited resources and capacity, and other uncertainties have hampered their efforts, but they are hopeful that collaboration and additional research can answer

remaining questions. Understanding the range of options and different strategies possible can help inform decision-making elsewhere across the country.

After the second panel, there was a moderated Q&A session. The panelists were asked to answer a series of questions prepared ahead of time, as well as those submitted from the audience, and respond to each other's answers. The audience was particularly interested in learning more about the lack of research regarding potential impacts on human health, R&D and information sharing to improve well plugging and abandonment practices broadly, and proposed financial mechanisms to pay for nationwide efforts to put oil and gas workers back to work plugging orphaned wells. They were also interested to hear from Mr. Pelepko and Supervisor Ntuk how Pennsylvania and California prioritize which wells need the most urgent attention and their greatest concerns about orphaned and improperly abandoned wells. Participants agreed that the growing number of, and risks posed by, orphaned and improperly abandoned wells are significant and worth immediate attention. Participants interest in next steps ranged from the need for increased scrutiny to additional scientific research to discussing appropriate, timely policy responses.

The recorded session is available on the AAAS EPI Center's website, here:

<https://www.aaas.org/events/workshop-analyzing-challenges-improperly-abandoned-and-orphaned-wells>

Session 2

After a short break, participants reconvened for the second session. The second session was closed-door. No video recording or transcript was taken during the session and none will be shared publicly. Notes were taken, but no quotes or other comments made by participants will be shared for attribution. Rather, this session was an informal opportunity for participants to engage with each other to learn about their respective priorities, concerns, and how their work informs the management and regulation of orphaned or improperly abandoned oil and gas wells. Participants were divided into four breakout groups. Breakout groups fostered opportunities to connect and learn in a peer-to-peer setting.

Each of the four breakout groups was led by a moderator who began the session by asking participants,

“What topics or issues have we not mentioned or discussed thus far?”

Participants raised several topics, mostly related to financing and possible federal regulation. It was noted that there are currently two bills, one in the House and the other in the Senate, being written to use federal stimulus funds to put oil and gas workers back on the job plugging orphaned wells. The current iterations of the House and Senate bills include different dollar amounts and requirements for regulatory reforms attached to the money allocated to states for this purpose. There is some bi-partisan support for federal stimulus funding to employ furloughed oil and gas workers plugging orphaned wells, and participants were hopeful that there could be Federal action on this issue in the new year.

The conversations varied in each breakout group. Generally, participants were excited to share their perspectives and learn from others who work on these issues in other states. Participants found that they generally shared similar concerns, including concerns about limited resources, and called for

collaboration across stakeholder groups that possess different types of data, including data dispersed across regulators, academia, NGOs, and industry.

Participants identified additional topics deserving further discussion, including:

- Oil and gas well bonding and insurance reform
- Comprehensive well life-cycle management approaches
- Transparency of well ownership and transfer status
- Innovative financial mechanisms to pay for well plugging and abandonment, including entrepreneurship and public-private partnerships
- Viability of potential federal stimulus funding
- Efficacy of federal versus state policy solutions and coordination across these levels of government
- Inclusion of local- and county-level officials in the decision-making process
- Potential international collaborations
- Research and development for improving well plugging and abandonment techniques and ensuring modern practices are successful and long-lasting
- Adequate workforce retention and expertise
- Future research priorities (including but not limited to):
 - Methane emissions in previously inaccessible plays and basins across the U.S.
 - Methane emissions from orphaned wells and their relative contribution to global climate change and total greenhouse gas emissions in the US from the oil and gas industry
 - Emerging technology to locate undocumented, legacy orphaned wells
 - Emerging technology to measure and monitor methane emissions from the oil and gas industry more broadly
 - Potential human health effects from orphaned or improperly abandoned oil and gas wells
 - Impacts on communities living in proximity to orphaned or improperly abandoned oil and gas wells

Stakeholders still have questions about how many and where orphaned or improperly abandoned wells are located across the United States' oil and gas-producing states. Estimates range into the millions of wells, but more accurate estimates, specifically at the local and state-levels, would greatly improve our ability to assess the risk and prioritize next steps. Stakeholders are also concerned by the potential economic burden of plugging orphaned wells. Cost estimates vary widely state-by-state and well-by-well. These estimates will ultimately determine what the total cost may be for managing, plugging, and remediating orphaned and improperly abandoned oil and gas wells across the country or in a single state. This calculus will inform decisionmakers' ability to formulate timely and appropriate policy responses and coordinate efforts across multiple levels of government. Further exploration of these topics will help clarify the true scale of the problem and appropriate solutions.

Ultimately, the virtual workshop, “Regulators, Industry, and Communities: Analyzing the Challenges of Improperly Abandoned and Orphaned Wells” provided an opportunity to begin building the relationships and sharing the information needed to shape a compelling narrative, engage with policymakers, and spur action to address the risks associated with orphaned and improperly abandoned wells. Participants agreed that decisionmakers need to be made aware of the importance and growing scale of the problems caused by improperly abandoned and orphaned wells, whether environmental, public health, or economic. Delaying difficult discussions to generate solutions will only compound these challenges. The AAAS EPI Center is considering numerous follow-up activities and materials to complement the discussion and will be engaging further on orphaned and improperly abandoned wells and related issues in the near future.

Additional Information

For information about this event or to learn more about the AAAS Center for Scientific Evidence in Public Issues (EPI Center), please visit our webpage: <https://www.aaas.org/programs/epi-center> or email Rebecca Aicher at raicher@aaas.org. We can also be found on Twitter [@AAASEPICenter](https://twitter.com/AAASEPICenter).