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Benefits of the Legacy Pollution Clean-Up Programs in the Bipartisan Infrastructure Law.

Thank you for the opportunity to appear before you today to discuss the new orphan oil and gas well closure funding, an important component of the Infrastructure Investment and Jobs Act (IIJA). Environmental Defense Fund (EDF) is a non-profit environmental research and advocacy organization working to identify science- and market-based solutions to major environmental challenges.

We are deeply grateful for the work done by this committee in forging a consensus in support of addressing the problem of orphan wells. Orphan wells are inactive, unplugged oil and gas wells that have no solvent owner of record and for which clean-up and closure responsibility fall to the states, federal land management agencies and Tribes. They pose a variety of public health, environmental, and economic hazards across twenty-eight states, and it is time to clean up the backlog of such sites and to prevent more of them in the future.

In Section 40601 of the IIJA, "Orphaned Well Site Plugging, Remediation and Restoration," Congress made it possible to jumpstart the closure and cleanup of tens of thousands of orphaned oil and gas wells across the country, creating or retaining tens of thousands of jobs and laying the groundwork for reducing future environmental, health and economic burdens from today's currently active wells.

EDF was pleased to work with states, the Biden Administration, and with many of your offices to develop the orphan well provisions of the IIJA. We believe that the program stands as a perfect example of the potential for multiple stakeholders to come together in reasonable dialogue in order to solve longstanding environmental challenges. We intend to continue working to ensure that the program will operate – and succeed – as Congress intended it to, and as the states, their communities, and industries need it to.

History of Orphan Wells

The United States has a long history of oil and gas development. The first commercial oil well was drilled in Titusville, PA in 1859, and since then over four million wells have been drilled in more than thirty states across the country.[1,2] Oil and gas wells can be productive for decades, but at the end of their useful lives, they must be properly closed in order to prevent environmental, public health, climate and economic harms. However, due to a variety of regulatory and

[1] Drake Well Museum and Park, Pennsylvania Historical & Museum Commission, https://www.drakewell.org.

[2] Kang, M, et al., *Orphaned oil and gas well stimulus—Maximizing economic and environmental benefits*. ELEM SCI ANTH, 9: 1 (2021), DOI: https://doi.org/10.1525/elementa.2020.20.00161.

economic factors, numerous wells that should have been plugged and remediated have too often not been – and this population today likely numbers over one million wells, according to state, federal and academic estimates.[3]

Wells that are not properly plugged at the end of their useful lives and that do not have identifiable, financially solvent owners are considered to be "orphan wells," and responsibility to plug and remediate them falls to the regulating jurisdiction.[4] Approximately 90% of such wells are on state and private land, with the remainder on federal and Tribal land.

When defining orphan wells, states use key terms of art: 1) "documented" wells are those wells with known locations, that have no known financially solvent responsible party, and that are on state plugging lists; and 2) "undocumented" wells are those wells the existence of which is known or suspected but without exact locations or confirmed ownership status.

In December 2021, states intending to apply for the IIJA's $2 billion "Formula Grant" section submitted to the Department of Interior their counts of documented orphan wells, which totaled approximately 130,000.[5]

Around the same time, the Interstate Oil and Gas Compact Commission released its 2021 Orphan and Idle Well Report, in which states estimated that they have up to an additional 800,000 undocumented orphan wells, largely in Appalachia.[6]

Together, these two categories make up the nation's inventory of approximately one million orphan wells.

The Harm Done by Orphan Wells

Orphan wells can cause a variety of harms that closure and remediation using IIJA funding will address. There are five major problem areas associated with orphan wells:

1) Methane emissions: Unplugged oil and gas wells emit methane at 5,000 times the rate of plugged wells.[7] The entire population of inactive and unplugged wells in the U.S. is estimated by EPA to release 7 million metric tons of CO2 equivalent emissions in the form of methane, and possibly up to three times that amount, making these wells

[3] *Id*.
[4] Interstate Oil & Gas Compact Commission, *State and Provincial Regulatory Strategies*, 2021, https://iogcc.ok.gov/sites/g/files/gmc836/f/documents/2022/iogcc_idle_and_orphan_wells_2021_final_web_0.pdf.
[5] U.S. Department of the Interior, *Overwhelming Interest in Orphan Well Infrastructure Investments*, press bulletin (5 January 2022), https://content.govdelivery.com/accounts/USDOI/bulletins/30416b5.
[6] *Id*. at 4.
[7] Townsend-Small et al., *Emissions of coalbed and natural gas methane from abandoned oil and gas wells in the United States*, GEOPHYS. RES. LETT., 43, 2283–2290, (11 March 2016), doi:10.1002/2015GL067623.

responsible for 0.1-0.3% of the entire U.S. climate footprint.[8] Methane from these wells can also migrate underground, leak into enclosed structures and cause explosions – a safety hazard which happens with some regularity across the country.[9,10,11]

2) Ecosystem impacts: Orphan wells can leak chemical-laden salty water in underground aquifers and at the surface, which can impact surface waters and land resources. A 2011 study found that 14-22% of oil and gas contamination episodes were associated with orphaned wells.[12]

3) Air toxics and public health: Orphan wells can emit air toxics like benzene and hydrogen sulfide that are dangerous to human health. Studies investigating gas composition and emission rates from orphan wells are just getting underway, and currently we are not aware of science showing causal health impacts from orphan wells.[13] Nevertheless, we found that approximately 9 million Americans live within a mile of a documented orphan well. Any unmitigated air toxic releases near human habitation is concerning and should be the subject of more research.[14]

4) Property value diminution: Orphan wells have been shown to lower property values and deter economic development.[15] A study in Southwest Pennsylvania showed that, over fifty years, the two acres around orphan wells had roughly half as much building as the area around plugged wells. This has wide-ranging impact, including on school funding and basic municipal maintenance.

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[8] U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2016: Abandoned Oil and Gas Wells*, memorandum (April 2018), https://www.epa.gov/sites/default/files/2018-04/documents/ghgemissions_abandoned_wells.pdf.

[9] Sophie Quinton, *Why 'Orphan' Oil and Gas Wells Are a Growing Problem for States*, STATELINE—an initiative of The Pew Charitable Trusts (9 July 2018), https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2018/07/09/why-orphan-oil-and-gas-wells-are-a-growing-problem-for-states.

[10] Nichola Groom, *Special Report: Millions of abandoned oil wells are leaking methane, a climate menace*, REUTERS COMMODITIES NEWS (16 June 2020), https://www.reuters.com/article/us-usa-drilling-abandoned-specialreport/special-report-millions-of-abandoned-oil-wells-are-leaking-methane-a-climate-menace-idUSKBN23N1NL.

[11] Cathy Bussewitz and Martha Irvine, *Forgotten oil and gas wells linger, leaking toxic chemicals*, ABC NEWS (29 July 2021), https://abcnews.go.com/US/wireStory/forgotten-oil-gas-wells-linger-leaking-toxic-chemicals-79142639.

[12] Scott Kell, *State Oil and Gas Agency Groundwater Investigations and their Role in Advancing Regulatory Reforms; A Two-State Review: Ohio and Texas*, THE GROUND WATER PROTECTION COUNCIL (August 2011), http://www.atlanticaenergy.org/pdfs/natural_gas/Environment/State%20Oil%20&%20Gas%20Agency%20Groundwater%20Investigations_US_GWProCoucil.pdf.

[13] *Id*. at 10.

[14] Maxine Joselow, *Abandoned wells are a huge climate problem*, THE WASHINGTON POST (15 October 2021), https://www.washingtonpost.com/politics/2021/10/15/abandoned-wells-are-huge-climate-problem/.

[15] Max Harleman and Jeremy Weber, *Other Voices: Plugging abandoned wells boosts local economies*, PITTSBURGH POST-GAZETTE (18 July 2021), https://www.post-gazette.com/opinion/Op-Ed/2021/07/18/Other-Voices-Plugging-abandoned-wells-boosts-local-economies/stories/202107180012.

5) Conflicts with other subsurface uses: The presence of orphan wells makes it difficult to pursue other subsurface economic activity. These wells act as conduits for fluid flow and make it impossible to achieve geologic containment for stored natural gas, CO2, and hydrogen.[16] Hydraulic fracturing is often impossible to execute in proximity to orphan wells, and a fair amount of industry-led plugging today is the closure of older vertical wells to permit the development of new, horizontal, hydraulically fractured wells.[17]

The Promise of the IIJA's Orphan Well Closure Funding

The IIJA provides $4.7 billion to states, federal land management agencies and Tribes to plug and remediate documented orphan wells through 2030. This funding is sufficient to plug more than 50,000 documented orphan wells across the country, assuming an average cost of $75,000 per well for plugging and remediation (based on state estimates and corroborated by academic study) -- and accounting for essential administrative overhead like additional procurement managers, permitters, and especially inspectors.[18] There is reason to believe that states, BLM and Tribes will find new economies of scale as the program ramps up, allowing the existing funding to go further.[19] During this time period, states will also continue with their existing state-funded orphan well programs, covering even more wells.

In addition to addressing the harms outlined above, this program is meant to create or retain tens of thousands of oilfield services jobs across the country.[20] Much of this work will take place in economically depressed areas, and these prevailing wage-exceeding jobs will help support local economic development.

There is also opportunity for some of these orphan wells and their sites to be beneficially reused for new energy systems. The Department of Energy is investigating possible geothermal and energy storage applications, as well as opportunities for using wells to monitor CO2 sequestration sites.[21] And where the well sites have access roads and are near utility hookups, there is a possibility for renewable energy reuse, including conversion to wind or solar.[22]

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[16] Ide et al., *CO_2 leakage through existing wells: current technology and regulations*, THE CARBON CAPTURE & SEQUESTRATION TECHNOLOGIES PROGRAM AT MIT (2006), https://sequestration.mit.edu/pdf/GHGT8_Ide.pdf.
[17] Brownlow et al., *Spatial Risk Analysis of Hydraulic Fracturing near Abandoned and Converted Oil and Gas Wells*, GROUNDWATER 55:2, 268-280 (27 September 2016), https://doi.org/10.1111/gwat.12471.
[18] Raimi et al., *Decommissioning Orphaned and Abandoned Oil and Gas Wells: New Estimates and Cost Drivers*, ENVIRON. SCI. TECHNOL. 55:15, 10224-10230 (14 July 2021), https://doi.org/10.1021/acs.est.1c02234.

[19] Alberta Energy Regulator, *Area-Based Closure* (1 September 2019), https://uat.aer.ca/regulating-development/project-closure/liability-management-programs-and-processes/area-based-closure.
[20] Raimi et al., *Green Stimulus for Oil and Gas Workers: Considering a Major Federal Effort to Plug Orphaned and Abandoned Wells*, Resources for the Future report (20 July 2020), https://www.rff.org/publications/reports/green-stimulus-oil-and-gas-workers-considering-major-federal-effort-plug-orphaned-and-abandoned-wells/.
[21] U.S. Department of Energy, Office of Energy Efficiency & Renewable Energy, *DOE Awards $8.4 Million for Accessing Geothermal Potential from Abandoned Oil and Gas Wells*, award announcement (12 January 2022), https://www.energy.gov/eere/articles/doe-awards-84-million-accessing-geothermal-potential-abandoned-oil-and-gas-wells
[22] Tony Seskus, *How Alberta could give old oil wells new life—but it has nothing to do with crude*, CBC NEWS (1 May 2020), https://www.cbc.ca/news/business/orphan-wells-repurposed-for-other-uses-1.5547701.

The Department of Energy has been funded at $30 million to help states find, characterize, and reduce environmental impacts from the larger population of undocumented orphan wells. DOE is planning a five-year project, taking advantage of the work that Los Alamos National Lab, National Energy Technology Lab, Lawrence Livermore National Lab, Lawrence Berkeley National Lab and Sandia National Lab have already done in this space. The Department is working work closely with states, BLM and Tribes to develop protocols and help execute this work.[23] This effort could bring to light hundreds of thousands of additional orphan wells that would then need to be closed or, in some cases, used beneficially.

Recommendation: **EDF recommends that Congress increase the funding of this program to allow DOE to conduct more of this work in more states and more comprehensively than current funding will allow**.

What's Already Underway

Anticipating the passage of IIJA's orphan well closure funding, states have spent the better part of a year preparing to properly execute on this historic orphan well closure funding opportunity. Since 2020, states have increased their documented orphan well count from about 57,000 to almost 130,000 by reviewing records and sending inspectors into the field to verify well status. Through the Interstate Oil and Gas Compact Commission, states have been meeting to share knowledge on the latest plugging and remediation practices, procurement strategies, cost-containment measures, and similar nuts-and-bolts topics necessary to scale up their existing orphan well programs, in some cases by forty times or more.[24]

The IIJA provides states with three grant opportunities – Initial Grants ($775 million total), which are up to $25m per state (there is also a smaller capacity-building $5m initial grant option); Formula Grants ($2 billion total), which are allocated to the states based on their number of documented orphan wells, closure costs and oil and gas job losses; and Performance Grants ($1.5 billion total), which provides up to an additional $70 million per state to incentivize regulatory reforms that will reduce future orphan well burdens. Separately, the federal land management agencies are allocated $250 million, and Tribes are allocated $150 million for orphan well closure, on public and Tribal lands respectively. The Department of Energy has been allocated $30 million to help find, characterize, and prioritize undocumented orphan wells.

States are developing plans to spend the Initial Grant funds quickly and effectively – there is a statutory deadline of May 13th for states to apply for the $25m grants, and on March 17th, the Department of Interior released Draft Guidance with details on both the initial and the

[23] U.S. Department of Energy, Office of Fossil Energy and Carbon Management, *Undocumented Orphaned Wells Workshop* announcement and registration, https://www.energy.gov/fecm/events/undocumented-orphaned-wells-workshop.

[24] J.D. Prose, *Up from the ground comes a bubbling gas: Feds giving PA $400M to plug dangerous orphan wells*, YORK DAILY RECORD (14 March 2022), https://www.ydr.com/story/news/2022/03/15/pa-pennsylvania-could-get-400-million-plug-orphaned-oil-and-gas-wells/6997211001/.

subsequent Formula Grants, which are based on each state's documented orphan well population, expected costs and industry job losses.[25]

Initial Grants will likely cover state activities for the remainder of this year – 90% of the funds from this grant must be obligated within 90 days (the other 10% can be used for administrative costs). This funding is meant to jumpstart the program and gets boots on the ground for the highest priority and most shovel-ready projects.

DOI's Draft Guidance raises many key issues related to methane emissions monitoring, water contamination characterization, prioritization, public input, technical plugging requirements, labor and workforce considerations, and state/federal/Tribal cooperation. These are nuanced issues that deserve careful consideration and stakeholder discussion. DOI is working to finalize guidance soon in order to give states time to apply for the Initial Grants, though because of the short timeline, open technical questions will invariably remain.

Recommendation: **EDF strongly recommends that DOI pursue significant and deep stakeholder engagement with the states/IOGCC, Tribes, BLM, impacted community members, eNGOs, academia and the oilfield services industry to think through options on these issues and find mutually acceptable pathways that achieve the program goals**.

Additionally, DOI should work with the states on the unallocated portion of the Formula Grants, the first installment of which was announced on January 31st of this year. The state oil and gas agencies rely on the Formula Grant allocations to support additional hiring and other capacity-building efforts in order to scale up the agencies to accommodate the new level of orphan well plugging activity. Full allocations are also critical to attract market participants and allow the oilfield service sector the opportunity to plan for multi-year capacity expansions and undertake necessary job training.

Recommendation: **DOI should articulate what additional information is needed from the states, and by when, to enable the allocation of the remaining Formula Grants, ideally sometime this year**.

Looking Ahead

Funding for the program runs through 2030. Over the next eight years, states, federal land management agencies and Tribes will be plugging and remediating many tens of thousands of documented orphan wells and sites, while DOE will be working with states to find, characterize and prioritize hundreds of thousands of undocumented orphan wells. By the end of the funding period, stakeholders should have a good understanding of the cost of the remaining work on orphan wells – which might run into the tens of billions of dollars between the currently documented orphan wells that IIJA funding will not cover, and the undocumented orphan wells yet to be brought into the program.

[25] U.S. Department of the Interior, *Biden-Harris Administration Releases Draft Guidance, Invites Public Comment on New Orphaned Well Program*, press release (17 March 2022), https://www.doi.gov/pressreleases/biden-harris-administration-releases-draft-guidance-invites-public-comment-new.

For Congress to feel confident in allocating more funds to plug the existing population of orphan wells, EDF believes two conditions must be met. First, states, federal land management agencies and Tribes will have to show they can work together to efficiently and effectively plug and remediate very large numbers of orphan wells and sites – i.e. the funding in IIJA must be put to very good use. The second condition is that overseeing jurisdictions will also have to show that they are ensuring that the currently active oil and gas well fleet, which numbers approximately one million wells nationwide, is on track to be plugged in a timely fashion at the end of their useful lives, using industry money.[26]

Additional Reforms Needed

It is one thing for the public to pay for wells that have already become orphaned and for which there is no other recourse. It is another thing to ask the public to pay for the plugging and remediating of wells orphaned from today forward – a potential liability potentially costing tens of billions of dollars. It is time to reform the past policies that allowed for this buildup of an enormous orphan well backlog.

Recommendation: **All oil and gas regulating agencies should be working toward ensuring that all oil and gas wells are plugged and remediated at the end of their useful lives in a timely fashion, using industry money**.

Every state and the BLM already require wells to be plugged once they stop producing. And all jurisdictions have financial assurance requirements, sometimes referred to as bonding requirements, that require operators to put up some funds in advance in case of a bankruptcy or death of an operator. In practice, those funds have been insufficient to cover all of the wells that have become orphaned, leading to today's backlog.

Some fraction of the current orphan well population, likely a large fraction, was orphaned in the pre-regulatory era, before there were any kind of permitting or plugging requirements, let alone financial assurance. But a lot have been orphaned since those policies were put into place, indicating a problem with the policies.

Regulators have a variety of tools to ensure well-plugging, and the appropriate path forward will vary from state to state. One major one is to adjust financial assurance requirements so that wells have guaranteed funding to cover their plugging in case of the owner's bankruptcy or death. These requirements can be risked-based, as in Colorado where a new financial assurance requirement adopted in March 2022 takes into account operator size and health, as well as the current and future productivity of the operators' wells.[27]

[26] U.S. Energy Information Administration, *The Distribution of U.S. Oil and Natural Gas Wells by Production rate*, report (January 2022), https://www.eia.gov/petroleum/wells/pdf/full_report.pdf.

[27] Colorado Oil & Gas Conservation Commission, Department of Natural Resources, *Colorado Oil & Gas Conservation Commission Votes Unanimously to Adopt SB 19-181 New Financial Assurance Rules*, press release (1 March 2022), https://cogcc.state.co.us/documents/media/Press_Release_FA_Rulemaking_Adoption_20220301.pdf.

A notable policy in Arkansas requires essentially full-cost financial assurance for low-flow wells on sale or transfer.[28] This is important because the transferring of wells to progressively less financially secure owners is the most common pathway to orphaning – the Arkansas rule breaks this chain.

It is also essential for states and BLM to build sufficient and secure orphan well funds to cover the wells for which insufficient closure funds have been set aside. Because of their low productivity, it is too late for those wells to generate enough revenue to pay for their own plugging. This can be done through a combination of fees and other contributions, including fees for long-term idle wells, which are the most likely to become orphaned.

It is worth noting that IIJA contains $70 million per state in performance grants to reward and incentivize states that pursue these reforms, with $20 million per state available for reforms to financial assurance, well transfer and idle well management, $20 million per state for updated technical requirements for plugging, and up to $30 million per state in federal matching funds for increases in state orphan well closure funding.

A world where all oil and gas wells are properly plugged is achievable through policy changes that do not exacerbate the current orphan problem and are affordable to the industry as a whole. The oil and gas industry is proud to provide essential energy to Americans and the world, and it should also be proud of cleaning up after itself. EDF expects industry to work with regulating agencies and other stakeholders to figure out how best to achieve this goal.

We plan to do our part as an environmental stakeholder to continue to bring key parties together to develop policies; enumerate technical protocols; and secure funding to clean up America's backlog of orphan wells while ensuring that communities and natural resources are protected in the future.

Finally, I want to again commend this committee for its leadership in recognizing the importance of the orphan well issue and for crafting a solution that industry, states, and stakeholders can all get behind.

[28] Arkansas Oil & Gas Commission, *General Rules* (December 2020), https://www.aogc.state.ar.us/Rules/rulesregs.pdf.