

Oil and Gas Well Plugging in Pennsylvania: The Regulatory Landscape and Opportunities for Reform

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Highlights

- The Pennsylvania Oil and Gas Act of 1984 requires well owners and operators to plug their wells within one year of ending production and authorizes the state's Department of Environmental Protection (PA DEP) to implement and enforce the law. The state is responsible for plugging wells that owners and operators neglect to plug.
- Owners and operators regularly abandon their wells without plugging them. Recent statutory amendments limit PA DEP's authority to increase the value of bonds required for plugging when the agency issues new well permits, but the agency retains authority to deter abandonment without plugging through civil, administrative, and criminal penalties.
 - Other states provide examples of innovative solutions to deter unplugged abandonment, though legislative changes may be required if Pennsylvania were to implement these solutions.
 - EPA's methane emissions guidelines include requirements for wells closing in Pennsylvania, though the effects of these changes remain to be seen.
- PA DEP will likely need more funding to find and plug older wells, since operators were not required to register oil and gas wells with the state until 1985.
 - Pennsylvania's investments in plugging have historically been low, but Governor Shapiro has increased funding for the program.
 - Federal funds from the Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act (IRA) have accelerated plugging.

Background

Oil and natural gas wells may continue to emit methane and other pollutants to the air, soil, and groundwater when they are no longer actively producing. Once an operator is finished with a well, properly plugging it can reduce or stop much of this pollution.¹ Many states require owners and operators to properly plug their closed wells, yet over three million wells throughout the United States remain unplugged.² Well plugging is expensive and existing incentives and penalties are inadequate to gain compliance.

¹ Under Pennsylvania law, plugging is used "to stop vertical flow of fluids or gas within the well bore." 58 Pa. Cons. St. § 3220. Even plugged wells emit some methane but plugging greatly reduces emissions. Recently, Deputy Secretary of Pennsylvania Oil and Gas Management Kurt Klappowski pointed out that "[i]mproperly plugged or unplugged wells can cause a myriad of problems, including gas migration into occupied structures, water supply impacts, surface water impacts, hazardous air pollutant emissions, methane emissions, and soil and groundwater contamination." James P. Williams, Amara Regehr, and Mary Kang, Methane Emissions from Abandoned Oil and Gas Wells in Canada and the United States, 55 Env. Science & Technology 563 (2021); Testimony of Deputy Secretary Kurt Klappowski Before the House Environmental Resources and Energy Committee (Mar. 25, 2024),

https://www.legis.state.pa.us/WU01/LI/TR/Transcripts/2024_0584_0001_TSTMNY.pdf.

² Groom, *Special Report: Millions of abandoned oil wells are leaking methane, a climate menace*, Reuters, June 17, 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/>.



The Pennsylvania Oil and Gas Act of 1984 (the Oil and Gas Act) requires well owners and operators to plug their wells prior to closure and within one year of ending production.³ The Oil and Gas Act authorizes the Pennsylvania Department of Environmental Protection (PA DEP) to implement and enforce plugging requirements. It also requires well operators to file a bond with PA DEP when applying for a permit which the agency returns after the well is plugged.⁴ Some owners and operators choose to forfeit their bonds and abandon their wells without plugging,⁵ in which case the Oil and Gas Act authorizes PA DEP to impose additional administrative, civil, and criminal penalties, and the well becomes the responsibility of the state. For older wells (pre-1985) the state may not be able to identify an owner or operator, and it takes on the financial responsibility of plugging these “orphan wells.”

Locating unplugged wells can be challenging since many wells were drilled before states had or enforced permit requirements regarding closure, and because private landowners may not report wells found on their properties. Pennsylvania has traditionally not invested resources to find and plug orphan wells, but Governor Shapiro has increased funding to do so in the past two years.

Under the Biden administration, the federal government also took steps to help states address their unplugged abandoned wells and deter future incomplete abandonment.⁶ The Inflation Reduction Act (IRA) appropriates funds for states to find and plug unplugged wells within their borders. Additionally, EPA finalized two rules that some expect will affect well plugging.

In Section I of this paper, we evaluate PA DEP’s existing requirements for well plugging and identify opportunities to update the state’s regulations. We describe Pennsylvania’s incentives for owners and operators to plug closed wells. Although PA DEP has limited authority to increase bond incentives, we highlight how the agency could use administrative, civil, and criminal penalties to deter future unplugged well abandonment. We also compare Pennsylvania’s incentives and penalties with those of other oil and gas producing states and discuss how those fit within EPA’s rules for oil and gas wells. In Section II, we briefly explain PA DEP’s regulatory tools to locate orphan wells and highlight that the state’s potential need for additional funding. Section III discusses the state and federal funds available for PA DEP to plug unplugged wells. Finally, we identify additional questions and considerations for stakeholders and policymakers regarding methane emissions from unplugged wells.

³ A well is considered abandoned if it has not been “used to produce, extract or inject any gas, petroleum or other liquid within the preceding 12 months;” if “equipment necessary for production, extraction or injection has been removed;” or if it is “considered dry and not equipped for production within 60 days after drilling, re-drilling or deepening.” There is, however, an exception for wells that the Department of Environmental Protection deems “inactive,” as we describe further in Section ID. 58 Pa. Cons. Stat. § 3203.

⁴ See *id.* at § 3225.

⁵ *Id.* at § 3203.

⁶ Although we discuss federal requirements for wells located on private lands, we do not discuss requirements for wells located on federal lands in Pennsylvania, which are regulated by the Bureau of Land Management (BLM). In April 2024, BLM finalized a rule that increases the minimum bond for oil and gas wells on federal public lands to \$150,000. Fluid Mineral Leases and Leasing Process, 89 Fed. Reg. 30916, 30976 (Apr. 23, 2024).



I. PA DEP's Regulatory Authority to Compel Plugging of Abandoned Wells

In 2022, PA DEP reported that the most frequent oil and gas violation between 2017 and 2021 for conventional (as opposed to fracked) wells was “failure to plug (a) well upon abandoning it.”⁷ Where a state inspector determines that an owner or operator failed to plug their well, PA DEP must first issue a notice of violation and hold a hearing, after which they can assess a penalty.⁸ The Oil and Gas Act provides PA DEP with several tools to address plugging violations, including administrative orders, bonds, civil penalties, permit denials, inactive status denials, or criminal referrals.⁹ PA DEP is also responsible for implementing EPA's current methane rule for existing oil and gas wells.¹⁰

A. Administrative orders

When PA DEP issues a notice of violation for failure to plug a well, they may also issue an administrative order requiring the owner or operator to plug the well.¹¹ In a 2022 report, PA DEP recommended that the state develop a template administrative order to ease the regulators' paperwork burden and allow the department to issue more notices of violation.¹² Independent of these recommended reforms, in recent years, PA DEP has issued more notices of violation (although the majority of these were not for failure to plug a closed well).¹³

B. Bonds

The Oil and Gas Act requires owners and operators to submit a bond when applying for a well permit.¹⁴ If the owner or operator does not plug the well as required, they forfeit the bond to the state, which uses the money to defray the state's cost of plugging the well.¹⁵

⁷ PA DEP, *Report and Recommendations on PA DEP's oversight of the oil and gas industry*, Table 3 (Dec. 29, 2022)

https://files.dep.state.pa.us/OilGas/BOGM/BOGMPortalFiles/Governor's_Lapsing_Statement_Report_2022-12-29.pdf.

⁸ 58 Pa. Cons. Stat. § 3256.

⁹ PA DEP outlined several of these strategies in its 2022 Report and Recommendations. *Id.*

¹⁰ Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review, 89 Fed. Reg. 16,820 (Mar. 8, 2024).

¹¹ For example, where there are violations of administrative orders, PA DEP has statutory authority to deny future permits or block permit transfers. See *id.* at 11 citing 58 Pa. Cons. Stat. §§ 3211(k) and 3223.

¹² *Id.*

¹³ In 2022, 671 out of 6,776 total notices of violation were issued for failure to plug upon abandonment. In 2021, PA DEP issued 5837 total notices of violations; in 2020, PA DEP issued 5063 total notices of violation; and in 2019, PA DEP issued 2748 total notices of violation. See PA DEP Office of Oil and Gas Management Weekly Workload Report for Dec. 29, 2023 (available for download at <https://drive.google.com/file/d/1RoEWbAk7W0ctr462vVgPQfqYQS7lj65K/edit>); see also PA DEP 2022 Oil and Gas Report, <https://storymaps.arcgis.com/stories/a090f1b68daa477cae2706538f6a2c74> (last visited Sep. 3, 2024); see also PA DEP 2022 Well Violations Summary, https://files.dep.state.pa.us/OilGas/BOGM/BOGMPortalFiles/2022AnnualReport/2022_Oil_and_Gas_Annual_Report-Violations_Summary.pdf (last visited Sep. 3, 2024).

¹⁴ PA DEP allows owners or operators to file surety bonds (through a surety company) or collateral bonds. See 25 Pa. Code § 78.301 et seq.; 58 Pa. Cons. Stat. § 3225.

¹⁵ *Id.*



The cost to plug a well ranges from \$20,000 to \$100,000, though some wells may be significantly more expensive, and many factors affect cost.¹⁶ In 2022 statutory amendments to the Oil and Gas Act, Pennsylvania's legislature set bonds at \$2,500 for conventional (not fracked) wells and starting at \$4,000 for unconventional (fracked) wells.¹⁷ Despite these rates being significantly lower than the cost of plugging a well, the 2022 amendments restrict PA DEP from changing the bond rates for conventional wells until 2032.¹⁸ Thus, Pennsylvania will remain a state where it is less expensive for operators to forfeit their bond than plug their well.

Pennsylvania's bond rates are among the lowest in the nation, with states such as Wyoming, New Mexico, and California setting bonds at \$10,000 to \$40,000 for a single well.¹⁹ While some states do have lower bonds than Pennsylvania, these states' legislatures have not restricted regulatory authority to adjust the rates. For example, although Ohio's statute sets a rate of \$5,000 per well, it authorizes the chief of the Division of Oil and Gas Resources Management to increase the rate to \$15,000 for well owners who have failed to comply with plugging provisions in the past.²⁰

Most states authorize their environmental agency to allow operators with multiple wells to submit "blanket bonds," which serve as collateral for all their drilling permits. However, here too, Pennsylvania has one of the lowest requirements and is one of the only states to set a

¹⁶ Well depth, age, and location contribute to plugging costs, and natural gas wells are generally more expensive to plug than oil wells. In rare cases, plugging can cost up to \$1 million for a single well. See The 2022-2023 Oil Well Abandonment and Remediation, California Legislative Analyst's Office (Jan. 31, 2022), <https://lao.ca.gov/Publications/Report/4508>; Daniel Raimi et al., *Decommissioning Orphaned and Abandoned Oil and Gas Wells: New Estimates and Cost Drivers*, Resources for the Future (July 14, 2021) <https://www.rff.org/publications/journal-articles/decommissioning-orphaned-and-abandoned-oil-and-gas-wells-new-estimates-and-cost-drivers/#:~:text=We%20analyze%20data%20from%20up,exceed%20%241%20million%20per%20well.>

¹⁷ For fracked wells, bonds may be higher for deeper well bores. A fracked well in Pennsylvania is drilled from a "geological shale formation existing below the base of the Elk Sandstone or its geologic equivalent stratigraphic interval where natural gas generally cannot be produced at economic flow rates or in economic volumes except by vertical or horizontal well bores stimulated by hydraulic fracture treatments or by using multilateral well bores or other techniques to expose more of the formation to the well bore." Where not noted in this paper, dollar amounts refer to non-fracked wells, and dollar amounts for fracked wells may be higher. See 58 Pa. Cons. Stat. §§ 3201; 3225.

¹⁸ The agency may still set higher bonds for unconventional wells. After 2032, PA DEP can adjust the bond rates for conventional wells every two years. 58 Pa. Cons. Stat. § 3225.

¹⁹ These three states also require higher bonds for deeper well bores, which may be more expensive to plug. New Mexico's legislature gives the Energy, Minerals and Natural Resources Department's Oil Conservation Division latitude to set single-well bonds at "amounts determined sufficient to reasonably pay the cost of plugging the wells" Wyoming requires \$10.00 per foot of the well bore. The minimum amount is \$10,000 per well site. California's legislature passed a bill in 2023 that requires \$25,000 for wells shallower than 10,000 feet and \$40,000 for wells over 10,000 feet. See N.M. Stat. Ann. § 70-2-14; N.M. Code R. § 19.15.8; Wyo. Admin. Code 055.0001.3; Cal. Pub. Res. Code § 3204. Daniel Raimi et al., *Decommissioning Orphaned and Abandoned Oil and Gas Wells: New Estimates and Cost Drivers*, Resources for the Future (July 14, 2021) <https://www.rff.org/publications/journal-articles/decommissioning-orphaned-and-abandoned-oil-and-gas-wells-new-estimates-and-cost-drivers/#:~:text=We%20analyze%20data%20from%20up,exceed%20%241%20million%20per%20well.>

²⁰ Ohio Rev. Code. Ann. § 1509.071.



flat bond that does not increase with the number of wells an owner or operator controls.²¹ For conventional wells, Pennsylvania sets the blanket bond at \$25,000—meaning that \$25,000 is the maximum bond that an owner or operator must pay, whether they own ten or 1,000 wells. Similar to the single-well bonds, Pennsylvania’s legislature restricted PA DEP from changing the blanket bonds for conventional wells until 2032.²²

In August 2023, environmental groups filed a lawsuit asking a Pennsylvania state court to find the 2022 statutory amendments unconstitutional under Pennsylvania’s Environmental Rights Amendment, which makes the state a trustee of its natural resources.²³ Environmental groups argue that the 2022 statutory amendments set bonds too low for PA DEP to act as a trustee and “ensure timely remediation of environmental harm caused by th[e] wells.”²⁴ Litigation is ongoing.

C. Civil Penalties and Liens

The Pennsylvania Oil and Gas Act authorizes PA DEP to assess civil penalties and liens against owners and operators who do not properly abandon their wells. After PA DEP issues a notice of violation, they can assess a civil penalty based on “the cost of remedying the harm...and any other relevant factor.”²⁵

The act sets the maximum civil penalty at “\$25,000 plus \$1,000 for each day during which the violation continues.” If an operator in violation does not pay their civil penalty, the agency also has statutory authority to assess liens on the real and personal property of the violator.²⁶ In recent years, PA DEP has increased their civil enforcement efforts, and since January 2023, DEP assessed \$2.3 million in civil penalties for improper well abandonment (as compared to \$100,000 in forfeited bond money).²⁷ Thus, unlike the bond requirements, these penalties could “provide a significant deterrence effect if...used consistently for significant violations.”²⁸

²¹ Ohio and West Virginia are the only other states that offer a single blanket bond that does not change regardless of the quantity of wells being drilled by a single entity. By contrast, New Mexico divides well owners and operators into eight different categories depending on their number of wells and assesses tiered bonds as low as \$50,000 and as high as \$1,000,000. Compare Ohio Admin. Code Rule 1501:9-1-03 and W.V. Code § 22-6-26 with Cal. Pub. Res. Code § 3204-3205.1 and N.M. Stat. Ann. § 70-2-14.

²² 58 Pa. Cons. Stat. § 3225.

²³ *Clean Air Council et al. v. Pennsylvania* (Pa. Aug. 23, 2023).

²⁴ Complaint at 57, *Clean Air Council et al. v. Pennsylvania* (Pa. Aug. 23, 2023).

²⁵ “In determining the amount, the department shall consider willfulness of the violation, damage or injury to natural resources of this Commonwealth or their uses, endangerment of safety of others, the cost of remedying the harm, savings resulting to the violator as a result of the violation and any other relevant factor.” 58 Pa. Cons. Stat. § 3256.

²⁶ 58 Pa. Cons. Stat. § 3256.

²⁷ Testimony of Deputy Secretary Kurt Klapkowski Before the House Environmental Resources and Energy Committee (Mar. 25, 2024),

https://www.legis.state.pa.us/WU01/LI/TR/Transcripts/2024_0584_0001_TSTMNY.pdf.

²⁸ PA DEP, *Report and Recommendations on PA DEP’s oversight of the oil and gas industry* (Dec. 29, 2022) https://files.dep.state.pa.us/OilGas/BOGM/BOGMPortalFiles/Governor's_Lapsing_Statement_Report_2022-12-29.pdf.



Other states similarly allow civil actions, and some states go further to allow injunctions and citizen suits. New Mexico's statute, for example, allows the Oil Conservation Division to "obtain injunctions, prohibitory and mandatory, including temporary restraining orders and temporary injunctions."²⁹ If the department seeks and is granted an injunction, a court could order operators to immediately plug their wells, halt future drilling operations, or block permit transfers. Pennsylvania's Oil and Gas Act does not explicitly authorize injunctions, although it does grant the Department broad authority to "issue orders to aid in enforcement" of the statute.³⁰

Wyoming allows injunctions, and also allows "[a]ny person adversely affected" to "bring a civil suit or action against the commission or the state oil and gas supervisor or both."³¹ Though Pennsylvania does not authorize citizen suits, constitutional challenges under the Environmental Rights Amendment may serve a similar purpose.³²

D. Revoking, Denying, and Blocking Permits

The Oil and Gas Act authorizes PA DEP to deny drilling permit requests and in some cases, to revoke existing permits from owners and operators who are in violation of an administrative order.³³ PA DEP may deny new permit requests if the applicant has not met the bonding requirements or the department has issued a notice of violation against the applicant and the applicant is still in violation of a statute or regulation.³⁴ Additionally, PA DEP must approve all permit transfers *unless* the applicant has not filed bonds or is in violation of a statute or regulation.³⁵ However, a recent report highlights a growing phenomenon in which large oil companies sell their old wells to smaller companies. The smaller companies do not plug the wells they purchased and instead enter bankruptcy court, shielding their executives from liability.³⁶ If the seller has filed the required bonds and has not yet violated the law, PA DEP lacks authority to block a permit transfer.

Other states are exploring policies to discourage this permit transfer practice. For example, California recently passed the Orphan Well Prevention Act, which prohibits companies from transferring ownership of a low-producing well unless the state collects a bond that would cover the full cost of remediation.³⁷ Similarly, New Mexico tried in early 2024 to pass a bill that would give their environmental agency authority to block some transfers that create a high risk for well abandonment, but the bill has been postponed indefinitely.³⁸

²⁹ N.M. Stat. Ann. § 70-2-28.

³⁰ 58 Pa. Cons. Stat. § 3253(b).

³¹ Wy. Stat. § 30-5-113.

³² Pa. Const. art. 1 § 27.

³³ 58 Pa. Cons. Stat. § 3211(k).

³⁴ 58 Pa. Cons. Stat. § 3211(e).

³⁵ *Id.*

³⁶ Mark Olade and Nick Bowlin, The Rising Cost of the Oil Industry's Slow Death, ProPublica (Feb. 22, 2024), <https://www.propublica.org/article/the-rising-cost-of-the-oil-industrys-slow-death>.

³⁷ A.B. 1167, 2023-2024 Leg. Sess. (Cal. 2023).

³⁸ H.B. 133, 56th Leg. (N.M. 2024). <https://www.nmlegis.gov/Legislation/Legislation?Chamber=H&LegType=B&LegNo=133&year=24> (not sure how to add this the right way)



The Oil and Gas Act authorizes PA DEP to suspend or revoke existing well permits if an operator continues to violate of “any [] statute administered by the department” that is likely to result in “an unsafe operation or environmental damage.”³⁹ According to current PA DEP policy, “[r]evoking a permit or registration is an action of last resort where a well or other facility is malfunctioning or incapable of being repaired, or the permit or registration was based on false or deficient information that cannot be remedied, or the operator displays a lack of intention or ability to comply with the law.”⁴⁰

E. Penalties related to well status

The Oil and Gas Act exempts some wells from plugging requirements Pennsylvania has granted them “inactive status,” meaning that they are not currently producing, but they will produce in the future.⁴¹ The Act authorizes PA DEP to deny “inactive status” under certain circumstances, including if an owner or operator fails to demonstrate when the well will be used again.⁴² In its 2022 report, PA DEP noted that it was considering requiring operators to file more detailed plans explaining how and when they will use their non-producing wells again. If this information is required, PA DEP could use it to deny more applications for inactive status. While the Oil and Gas Act allows wells to remain idle for five years with possible extensions, a recent LA Times report found that only 50 percent of wells in California that have been non-producing for 10 months ever produce again.⁴³ Other states are considering solutions for idle wells. For example, a recently introduced bill in California would require operators to plug between 10 and 20 percent of their idle wells per year.⁴⁴

F. Criminal Penalties

Pennsylvania’s Oil and Gas Act also authorizes PA DEP to refer willful violators of plugging laws to a state prosecutor for criminal enforcement.⁴⁵ Though rare, PA DEP has used this authority. For example, in 2015, an operator who had been referred to a state prosecutor

³⁹ 58 Pa. Cons. Stat. § 3253(b).

⁴⁰ PA DEP, *Report and Recommendations on PA DEP’s oversight of the oil and gas industry* (Dec. 29, 2022) https://files.dep.state.pa.us/OilGas/BOGM/BOGMPortalFiles/Governor's_Lapsing_Statement_Report_2022-12-29.pdf.

⁴¹ Of course, once the wells return to active status, they must be plugged before closing. 58 Pa. Cons. Stat. § 3214.

⁴² The Oil and Gas Act requires PA DEP to grant inactive status if the following conditions have been met: “(1) the condition of the well is sufficient to prevent damage to the producing zone or contamination of fresh water or other natural resources or surface leakage of any substance; (2) the condition of the well is sufficient to stop the vertical flow of fluids or gas within the well bore and is adequate to protect freshwater aquifers, unless the department determines the well poses a threat to the health and safety of persons or property or to the environment; (3) the operator anticipates construction of a pipeline or future use of the well for primary or enhanced recovery, gas storage, approved disposal or other appropriate uses related to oil and gas well production; and (4) the applicant satisfies the bonding requirements...” The department could more heavily scrutinize these requirements, for example, by requiring more proof that the well will be used again. 58 Pa. Cons. Stat. § 3214.

⁴³ Mark Olalde and Ryan Menezes, *The Toxic Legacy of Old Oil Wells: California’s Multibillion-Dollar Problem*, LA Times, Feb. 6, 2020.

⁴⁴ A.B. 1866, 2023-2024 Leg. Sess. (Cal. 2024).

⁴⁵ 58 Pa. Cons. Stat. § 3255.



was found guilty of falsifying plugging contracts, and the operator was sentenced to six months in prison and forced to pay \$236,000 in restitution.⁴⁶

G. Pennsylvania's Implementation of EPA's Rules

In December 2023, EPA finalized its guidelines for methane emissions from existing oil and natural gas sources.⁴⁷ EPA's rule includes requirements to reduce emissions from operating wells and also requires operators to file closing reports with plans for plugging⁴⁸ and report any changes in ownership.⁴⁹ Under section 111(d) of the Clean Air Act, Pennsylvania must submit to EPA by early 2026 a state plan to establish, implement, and enforce standards for existing sources.⁵⁰ While states have some discretion, the requirements must be at least as stringent as EPA's presumptive standards.⁵¹ This rule is currently being challenged, and the D.C. Circuit declined to stay the rule.⁵² [We will continue to follow litigation on the rule and any changes proposed by the Trump administration.](#)

II. PA DEP's regulatory tools to locate orphan wells

Oil and gas wells have been drilled in Pennsylvania since 1859, but the state did not require permits for drilling until 1956 and did not require owners and operators to register old wells until 1985.⁵³ The Oil and Gas Act defines wells permitted prior to 1985 for which there is no known owner as orphan wells.⁵⁴ PA DEP reported in 2022 that orphan wells comprise around 60 percent of the non-plugged conventional wells in Pennsylvania.⁵⁵

In addition to having a significant number of orphan wells, locating them is an ongoing challenge for Pennsylvania. The Oil and Gas Act requires anyone who discovers an abandoned well to report it to DEP within 60 days,⁵⁶ but it is unclear how this provision is enforced because the Oil and Gas Act specifies that landowners are not the responsible owners for wells found on their property, and PA DEP's typical enforcement mechanisms

⁴⁶ EPA, U.S., Pennsylvania Collaborate on Well-Plugging Case to Protect Drinking Water, <https://www.epa.gov/pa/us-pennsylvania-collaborate-well-plugging-case-protect-drinking-water> (Apr. 2, 2015).

⁴⁷ Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review, 89 Fed. Reg. 16820 (Mar. 8, 2024). The pre-publication text was released in December 2023 and was published in the Federal Register in March 2024.

⁴⁸ *Id.* at 17065.

⁴⁹ *Id.* at 17110.

⁵⁰ EPA also finalized a rule in early 2024 a rule to implement the IRA's Waste Emission Charge, which exempts plugged wells, but it's not yet known what the impact of this rule will be in Pennsylvania and whether the new federal administration will propose any changes to this rule. Waste Emissions Charge for Petroleum and Natural Gas Systems, 89 Fed. Reg. 91094 (Nov. 18, 2024).

⁵¹ *Id.* at 17009.

⁵² *State of Texas v. EPA*, Docket No. 24-1054 (D.C. Cir.).

⁵³ PA DEP, *Rewriting Pennsylvania's Legacy: Orphan Well Plugging Grant Program* (last visited Apr. 9, 2024).

⁵⁴ Pennsylvania defines an orphan well as "[a] well abandoned prior to April 18, 1985, that has not been affected or operated by the present owner or operator and from which the present owner, operator or lessee has received no economic benefit other than as a landowner or recipient of a royalty interest from the well." 58 Pa. Cons. Stat. § 3203.

⁵⁵ PA DEP, *Report and Recommendations on PA DEP's oversight of the oil and gas industry* (Dec. 29, 2022) https://files.dep.state.pa.us/OilGas/BOGM/BOGMPortalFiles/Governor's_Lapsing_Statement_Report_2022-12-29.pdf.

⁵⁶ 58 Pa. Cons. Stat. § 3213.



(e.g., administrative orders and penalties) do not apply.⁵⁷ Under Pennsylvania's Environmental Good Samaritan Law, if a person plugs a well for which they have no responsibility, they receive some liability protection.⁵⁸ Notably, PA DEP has warned landowners that "attempts to...improperly rid [their] property of any evidence of the well, or other careless activities can make [them] financially responsible" for the well.⁵⁹ Despite the Good Samaritan Law, landowners may be hesitant to report wells identified on their property as this may decrease their property values.⁶⁰

III. PA DEP's Funding for Plugging

Pennsylvania is responsible for paying to plug orphan wells and uses a mix of state and federal funds. The Pennsylvania legislature authorizes five funds to help PA DEP finance its Well Plugging Program and other plugging efforts directly and indirectly:⁶¹

- The Abandoned Well Plugging Fund
- The Orphan Well Plugging Fund
- The Unconventional Gas Well Fund
- The Marcellus Legacy Fund
- The Environmental Stewardship Fund

The Abandoned Well Plugging Fund and the Orphan Well Plugging Fund are the main sources of funding for the state's well plugging efforts,⁶² and both are funded through

⁵⁷ *Id.* "For purposes of subsection (a)(4) and (5), the term 'owner' does not include an owner or possessor of surface real property, on which an abandoned well is located, who did not participate or incur costs in, and had no right of control over, the drilling or extraction operation of the abandoned well."

⁵⁸ 27 Pa. Cons. Stat. § 8101 *et seq.*

⁵⁹ The Oil and Gas Act provides that there is no liability shield for "injury or damage resulting from the person's acts or omissions which are reckless or constitute gross negligence or willful misconduct." Moreover, PA DEP explains that "if an oil or gas company gives or sells a well to...a landowner for use in heating a home, garage, barn or for some other 'home-use' reason; all regulatory obligations, including well decommissioning, are transferred" to that landowner. PA DEP, *Landowners' Guide to Oil and Gas Wells*, <https://www.dep.pa.gov/Business/Energy/OilandGasPrograms/OilandGasMgmt/LegacyWells/Pages/Landowner-Information.aspx> (last visited Apr. 10, 2024);

27 Pa. Cons. Stat. § 8107.

⁶⁰ Max Harleman, Jeremy Weber, and Daniel Berkowitz, *Environmental Hazards and Local Investment: A Half-Century of Evidence from Abandoned Oil and Gas Wells*, 9 J. Assoc. Env. & Resource Econ. 721 (July 2022).

⁶¹ PA DEP, *Oil and Gas Program Three Year Regulatory Fee and Program Cost Analysis to the Environmental Quality Board* (2022), https://files.dep.state.pa.us/PublicParticipation/Public%20Participation%20Center/PubPartCenterPortalFiles/Environmental%20Quality%20Board/2022/February%2015,%202022/02_Oil%20and%20Gas%203-Year%20Fee%20Report_FINAL_2.1.2022.pdf.

⁶² *Id.*



nominal surcharges on oil and gas well drilling permits.⁶³ Both funds may only be used for plugging the state's unplugged abandoned and orphan wells.⁶⁴

In recent years, PA DEP has maintained that these two funds are “not sufficient.”⁶⁵ According to PA DEP, the Well Plugging Program's expenditures have fallen significantly since the mid-2000s, dropping from \$3.5 million in 2008 to less than \$500,000 in 2021,⁶⁶ although PA DEP increased spending on well plugging in 2022.⁶⁷ The decline in spending has resulted in a precipitous fall in the annual number of plugged wells, though this trend is likely to reverse as the state's 2024-2025 budget includes \$11 million to find and plug improperly abandoned and orphan wells.⁶⁸ Federal money from the Infrastructure Investment and Jobs Act (IIJA) and Inflation Reduction Act (IRA) could increase the Well Plugging Program's resources in the short term, although more state and federal investments may be needed to continue plugging efforts in the future.

Since the Well Plugging Program began, state and federal funds have enabled PA DEP to plug 3,000 orphan and improperly abandoned wells, but the state will need significantly more funding to plug the remaining wells.⁶⁹ PA DEP estimates that there are approximately 200,000 improperly abandoned and orphan wells in the state, though some research

⁶³ See PA DEP, *Oil and Gas Program Three Year Regulatory Fee and Program Cost Analysis to the Environmental Quality Board* (2022), https://files.dep.state.pa.us/PublicParticipation/Public%20Participation%20Center/PubPartCenterPortalFiles/Environmental%20Quality%20Board/2022/February%2015,%202022/02_Oil%20and%20Gas%203-Year%20Fee%20Report_FINAL_2.1.2022.pdf.

⁶⁴ 58 Pa. C.S. §3271 provides that the “Orphan Well Plugging Fund” must be “expended by the department to plug orphan wells.” Similarly, under 58 Pa. C.S. §3271, the Abandoned Well Plugging Fund must be “expended by the department to plug abandoned wells.”

⁶⁵ Notably, PA DEP recently reported that they have not historically used civil penalties and fines to pay for the plugging program because “relying on penalties to fund fundamental elements of a regulatory program is not appropriate and is contrary to sound public policy.” PA DEP, *FY 2023-2024 Legislative Budget Hearings* at 71-72, https://files.dep.state.pa.us/DataAndTools/DEPLegislativeBudgetHearingMaterials/2023-24/DEP_FY2023-24_Legislative_Budget.pdf; PA DEP, *Rewriting Pennsylvania's Legacy Orphan Well Plugging Grant Program* (last visited Apr. 10, 2024); PA DEP, *Oil and Gas Program Three-Year Regulatory Fee and Program Cost Analysis Report to the Environmental Quality Board*, https://files.dep.state.pa.us/PublicParticipation/Public%20Participation%20Center/PubPartCenterPortalFiles/Environmental%20Quality%20Board/2022/February%2015,%202022/02_Oil%20and%20Gas%203-Year%20Fee%20Report_FINAL_2.1.2022.pdf (Feb. 2022).

⁶⁶ PA DEP, *DEP Well Plugging Program*, <https://www.dep.pa.gov/Business/Energy/OilandGasPrograms/OilandGasMgmt/LegacyWells/Pages/Well-Plugging-Program.aspx#:~:text=The%20Oil%20and%20Gas%20Act,plugging%20orphan%20or%20abandoned%20wells.>

⁶⁷ *Id.*

⁶⁸ *Shapiro Administration Plugs 200th Orphaned and Abandoned Well, Surpassing Total from Previous 9 Years Combined and Continuing Historic Progress to Protect Public Health and Create Jobs* (Mar. 12, 2024), <https://www.governor.pa.gov/newsroom/shapiro-administration-plugs-200th-orphaned-and-abandoned-well-surpassing-total-from-previous-9-years-combined-and-continuing-historic-progress-to-protect-public-health-and-create-jobs/#:~:text=The%20Governor's%202024%2D25%20budget,and%20abandoned%20wells%20as%20possible.>

⁶⁹ Tom Decker, *Plugging Pennsylvania's Abandoned Oil and Gas Wells*, PA DEP (Jan. 27, 2023), <https://www.dep.pa.gov/OurCommonWealth/pages/Article.aspx?post=91#:~:text=Since%20the%20Well%20Plugging%20Program,on%20the%20abandoned%20well's%20risk.>



estimates that the number may be closer to 750,000.⁷⁰ At a median cost of \$76,000 to plug a well, it would cost Pennsylvania \$5.7 billion to plug 750,000 wells.⁷¹

A. Federal funds accelerate plugging.

Through the IRA and the IIJA, the federal government will invest up to \$500 million to plug orphan and improperly abandoned wells in Pennsylvania. Although the federal government has not yet disbursed all the funds, Governor Shapiro's office has used the funding that Pennsylvania has received to accelerate the DEP's well plugging operations.

i. Infrastructure Investment and Jobs Act (IIJA)

The IIJA appropriates \$4.7 billion "to plug, cap and reclaim orphaned oil and gas wells"⁷² on federal, state, and private lands,⁷³ and the Pennsylvania government expects to receive over \$400 million of this funding. The IIJA divides this funding into three grant categories:

- (1) **Initial Grants**, of \$25 million.⁷⁴
- (2) **Formula Grants**, which total \$2 billion and are allocated based on the eligible states' quantity of unplugged wells, among other factors; and
- (3) **Performance Grants**, which total \$1.5 billion and are divided between Matching Grants (MG) and Regulatory Improvement Grants (RIG).

⁷⁰ Compare Pa. Dep't Env. Prot., *2018 Oil and Gas Annual Report* (2018), <https://gis.dep.pa.gov/2018OilGasAnnualReport/index.html> with Mary Kang et al., *Identification and characterization of high methane-emitting abandoned oil and gas wells*, 29 Proc. Nat'l Acad. Sci. USA 13636 (2016).

⁷¹ \$75,000 is the median cost to plug a well with surface restoration, without surface restoration, the median cost is \$20,000. However, some wells cost more than \$1 million to plug and restore. Daniel Raimi et al., *Decommissioning Orphaned and Abandoned Oil and Gas Wells: New Estimates and Cost Drivers*, 55 J. Env. Sci. & Tech. July 14, 2021, <https://pubs.acs.org/doi/10.1021/acs.est.1c02234>.

⁷² The federal government includes what Pennsylvania defines as improperly abandoned wells in its definition of orphaned wells.

⁷³ U.S. Dep't of Interior, *Through President Biden's Bipartisan Infrastructure Law, 24 States Set to Begin Plugging Over 10,000 Orphaned Wells* (Aug. 25, 2022), <https://www.doi.gov/pressreleases/through-president-bidens-bipartisan-infrastructure-law-24-states-set-begin-plugging>.

⁷⁴ Initial grants start at \$5 million, but Pennsylvania received a grant of \$25 million. To qualify for a grant larger than \$5 million, a state must verify that it is a member of the Interstate Oil and Gas Compact Commission, contains one or more orphaned wells, and will use at least 90% of requested grant funding to "issue new contracts, amend existing contracts, or issue grants for plugging, remediation, and reclamation work." A state may apply for the smaller \$5 million grant if it (a) did not receive a larger Initial Grant and (b) certifies that it currently operates a "plugging, remediation, and reclamation program," has the capacity to initiate such a program, or plans to leverage the requested funds to carry out the administrative actions necessary to apply for a Formula Grant or a Performance Grant. DOI, State Orphan Well Program, <https://www.doi.gov/state-orphaned-wells-program> (last visited Oct. 9, 2024).



To date, Pennsylvania has received a \$25 million Initial Grant,⁷⁵ which it used to plug 226 orphan and improperly abandoned wells.⁷⁶ Governor Shapiro credited the initial grant as a key reason for his administration's early successes plugging wells. In a press release, the Shapiro administration explained that the state was able to plug "more wells in just the first 14 months than in the previous 9 years combined."⁷⁷ The IJA resources allowed the DEP to enter plugging contracts with local companies, who used the increased capital to "hire more staff, purchase equipment, and project their business operations into the future."⁷⁸

In July 2023, the Department of the Interior (DOI) announced that Pennsylvania is eligible to receive a \$76 million Phase 1 formula grant and \$305 million in total formula grant funding. States must use formula grants to reduce and measure methane emissions from orphaned wells, by plugging, remediating, and reclaiming wells on state and private land, tracking methane emissions, and remediating soil, water, and land adjacent to orphaned wells, among other authorized uses.⁷⁹

The \$1.5 billion available in Performance Grants (PG) include Matching Grants (MG) and Regulatory Improvement Grants (RIG). Similar to the formula grants, states must use these resources to reduce and measure methane emissions on state and private land.⁸⁰ Under the MG program, a state is eligible for a maximum grant of \$30 million over a period of ten years if it certifies that it will increase state spending on well plugging.⁸¹ Under the RIG program, a state is eligible to receive a total of \$40 million if it meets two conditions:

⁷⁵ On August 25, 2022, the Department of Interior approved Pennsylvania's application for a \$25 million Initial Grant, with a "date of receipt" of October 1, 2022. PA DEP, *Infrastructure Investment and Jobs Act*, [https://www.dep.pa.gov/Business/Energy/OilandGasPrograms/OilandGasMgmt/LegacyWells/Pages/Infrastructure-Investment-and-Jobs-Act-\(IJA\).aspx](https://www.dep.pa.gov/Business/Energy/OilandGasPrograms/OilandGasMgmt/LegacyWells/Pages/Infrastructure-Investment-and-Jobs-Act-(IJA).aspx) (last visited Oct. 9, 2024).

⁷⁶ According to a tracker maintained by the PA DEP, the Initial Grant funding has enable the DEP to plug 220 wells as of Jan. 30, 2025, with an additional wells currently in progress. PA DEP, Oil and Gas IJA Project Tracker <https://padep-1.maps.arcgis.com/apps/instant/portfolio/index.html?appid=064e373125c34182b2e132dd50d7c619> (last visited Jan. 30, 2025); PA DEP, *Infrastructure Investment and Jobs Act*, [https://www.dep.pa.gov/Business/Energy/OilandGasPrograms/OilandGasMgmt/LegacyWells/Pages/Infrastructure-Investment-and-Jobs-Act-\(IJA\).aspx](https://www.dep.pa.gov/Business/Energy/OilandGasPrograms/OilandGasMgmt/LegacyWells/Pages/Infrastructure-Investment-and-Jobs-Act-(IJA).aspx) (last visited Oct. 9, 2024).

⁷⁷ PA Office of the Governor, 2024-2025 Budget Info, <https://www.governor.pa.gov/newsroom/shapiro-administration-secures-over-44-4-million-in-additional-federal-funding-to-reduce-methane-emissions-ramp-up-plugging-of-oil-and-gas-wells/> (last visited Oct. 9, 2024).

⁷⁸ *Id.*

⁷⁹ *Infrastructure Investment and Jobs Act*, PL 117-58, November 15, 2021, 135 Stat 429 § 40601.

⁸⁰ Dep't of Interior, State Orphaned Wells Program, <https://www.doi.gov/state-orphaned-wells-program> (last visited Oct. 9, 2024).

⁸¹ Pennsylvania may need to demonstrate a commitment to increasing state spending on well plugging. If passed, Governor Shapiro's budget could be a start. Other states provide other examples. Like Pennsylvania, California received the maximum \$25 million Initial Grant. However, California has supplemented its award with an historic state investment in state well plugging efforts. For FY 2022/2023 and 2023/2024, the California government apportioned a total of \$100 million of general fund resources to plug orphaned wells. These combined resources have enabled California's Geologic Energy Management Division (CalGEM) State Oil and Gas Well Abandonment Program to accelerate well plugging operations, including through an initial commitment of \$80 million in state and federal funds to plug and abandon 378 of the state's "highest-priority orphan wells." California's investments suggest that federal resources are most effective when they are supplemented by commensurate state investments.



1. The state has “strengthened plugging standards and procedures” to protect “groundwater and other natural resources, public health and safety, and the environment.”
2. The state has “made improvements to state programs designed to reduce future orphan well burdens” and “reforms to programs relating to well transfer or temporary abandonment.”⁸²

In May 2024, the DOI released MG Program Guidance for states, which explains application instructions and acceptable uses for MG funds.⁸³ The guidance provides that states must submit applications by the last day of the first quarter of each fiscal year.⁸⁴ In October 2024, the DOI released draft state guidance on the RIG program for public comment.⁸⁵ Although not all funding has been distributed, Pennsylvania indicated that it intends to receive the maximum \$70 million in Performance Grants.⁸⁶

ii. Inflation Reduction Act (IRA)

The Inflation Reduction Act (IRA) created the Methane Emissions Reduction Program, which seeks to “improve methane monitoring and to reduce methane” emissions by providing “technical assistance and up to \$1.3 billion in financial assistance” to eligible states. On December 15, 2023, EPA and DOE announced a “conditional commitment” of \$350 million to 14 eligible states to “help measure and reduce methane emissions.”⁸⁷ Unlike the IIJA grants, IRA money gives states greater flexibility, allowing them to pursue a broader set of projects intended to reduce methane emissions.

Under this program, Pennsylvania received a \$44 million grant, second in scale only to Texas’ \$134 million grant.⁸⁸ According to Governor Shapiro, the grant enables the PA DEP to “plug hundreds of low-producing oil and gas wells with significant methane emissions.”⁸⁹ Using this money, the PA DEP created a voluntary grant program for small well operators to plug marginally-producing wells, which account for over 87,000 of the state’s operational oil

⁸² Request for Information To Inform the Orphaned Wells Program Office’s Development of Regulatory Improvement Grants Under the Bipartisan Infrastructure Law, 88 Fed. Reg. 72,528 (Oct. 20, 2023).

⁸³ Dep’t of Interior, Matching Grants Guidance, (May 2024)

<https://www.doi.gov/sites/default/files/documents/2024-09/doi-final-orphaned-well-state-matching-grants-guidance052024.pdf>.

⁸⁴ *Id.*

⁸⁵ Dep’t of Interior, *Orphaned Wells Program Office*

Draft State Regulatory Improvement Grants Guidance,

<https://www.doi.gov/sites/default/files/documents/2024-09/doi-draft-state-rig-orphan-well-guidance-public-commentoct-2024.pdf> (Oct. 2024).

⁸⁶ *Infrastructure Investment and Jobs Act (IIJA) Update Shale Network Workshop Presentation* (May 2023),

<https://bpb-us-e1.wpmucdn.com/sites.psu.edu/dist/5/153082/files/2023/05/Wise.pdf>.

⁸⁷ Dep’t of Energy, *Funding Notice: IRA: Mitigating Emissions from Marginal Conventional Wells*

<https://www.energy.gov/fecm/funding-notice-ira-mitigating-emissions-marginal-conventional-wells> (last visited Oct. 9, 2024).

⁸⁸ *Id.*

⁸⁹ PA Office of the Governor, 2024-2025 Budget Info, <https://www.governor.pa.gov/newsroom/shapiro-administration-secures-over-44-4-million-in-additional-federal-funding-to-reduce-methane-emissions-ramp-up-plugging-of-oil-and-gas-wells/> (last visited Oct. 9, 2024).



and gas wells.⁹⁰ The objective of the program is to plug economically insignificant wells before they become improperly abandoned.

IV. Looking Ahead

Even without legislative changes, Pennsylvania's executive branch can use its existing authority to slow the rate of well abandonment and accelerate the state's plugging of orphan wells. Although the legislature has set the bond ceiling too low to incentivize plugging, PA DEP has the authority to issue administrative and civil penalties to deter new unplugged abandoned wells. Governor Shapiro has increased funding for the program and the state has applied for the maximum in federal funding. Increased resources and enforcement will be key for the state to continue to plug wells and reduce methane emissions.

⁹⁰ *Id.*