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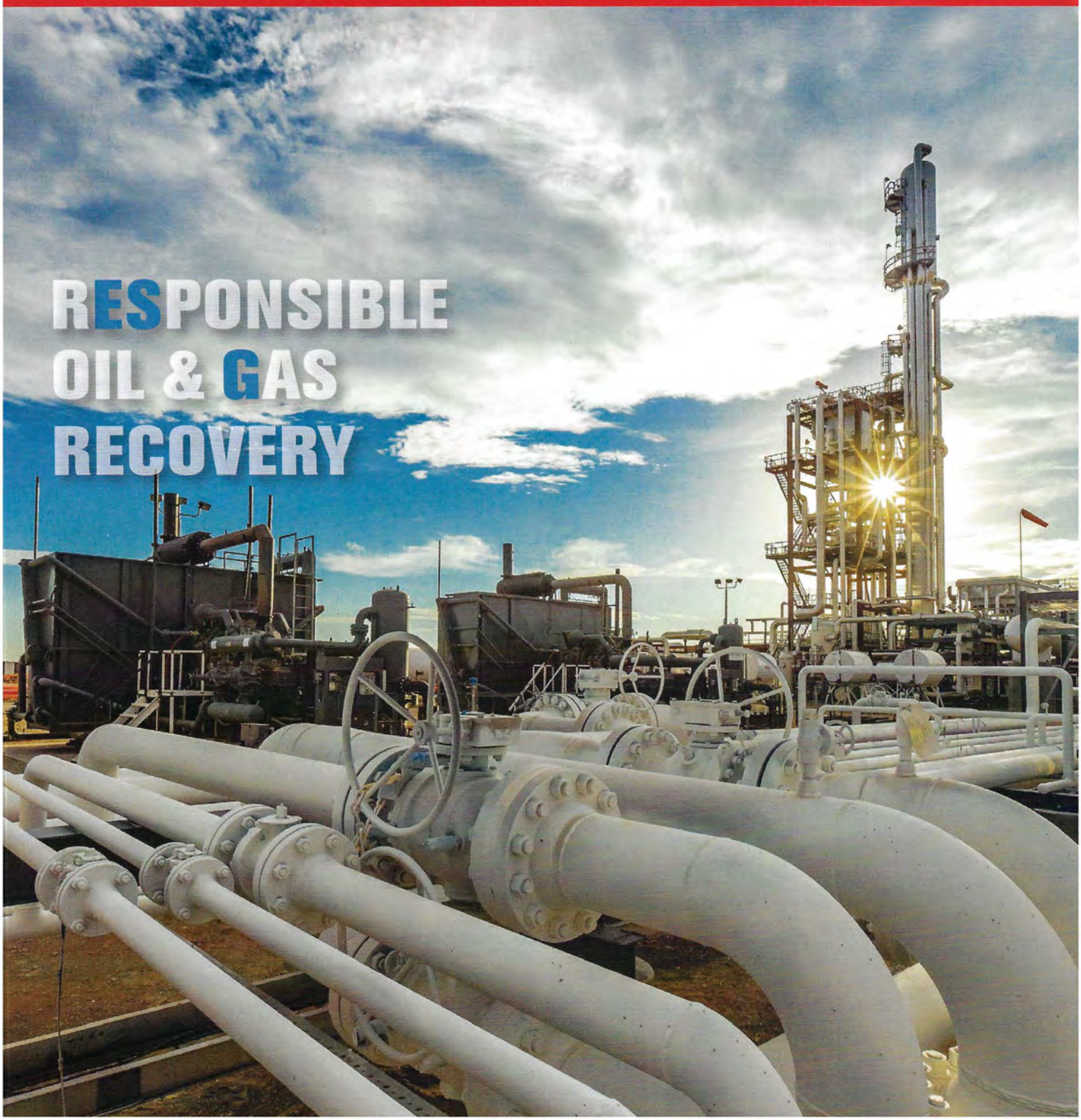


Funding Accelerates Efforts To Plug Abandoned Wells

By David Palmerton

Across the United States, the U.S. Environmental Protection Agency estimates, there are around 3.7 million abandoned oil and natural gas wells. Although many of these wells have yet to be documented, that is changing with the growing interest in addressing them. Citing applications for funding to plug wells, the U.S. Department of Interior puts the number of documented orphaned or abandoned wells around 130,000. Nearly half are in Appalachia.

Most abandoned and orphaned wells are ancient history, and current operators have no connection to them. Nevertheless, many companies drilling new wells today are plugging old wells voluntarily.

These companies recognize that fluid or gas migration from abandoned or orphaned wells can contaminate surface water, groundwater or drinking water. The wells also may emit hazardous air pollutants such as hydrogen sulfide, as well as greenhouse gasses. By plugging them, operators can protect their employees and neighbors while strengthening their reputations.

As an environmental consultant from 2005 to 2015, I managed the plugging of nearly 1,000 wells in Pennsylvania, New York and West Virginia. Shell Oil Co. and other conscientious operators plugged many of these wells after learning they had acquired them through land transactions.

Unfortunately, for every responsibly plugged well, many remain abandoned or orphaned.

Well Origins

There are several common ways through which wells become abandoned or improperly plugged. One of the primary causes is loss of ownership. According to regulations, the last entity to receive economic benefit from a well is responsible for plugging it. However, if the last entity cannot afford to plug the well, the responsibility falls on the prior owner or operator. Orphan wells' ownership, in most cases, has been lost through death, bankruptcy or abandonment.

Inadequate plugging is another common issue. In the early days, oil and gas regulatory frameworks focused on protecting oil and gas resources more than the environment. Before the 1950s, many wells either were left unplugged or plugged inadequately. When wells were plugged, the process often involved throwing in tree stumps, brush, wood and rocks alongside a sack of cement.

Inadequate plugging prevailed for some time. As we cleaned out old wells from the 1950s and '60s, the downhole junk we found included a deer skull, tools, brush, wireline and other trash.

World War II exacerbated the issue. Steel was in such short supply that people would pull and sell the surface casing from old wells. In some cases, this left behind a hole big enough to swallow a man.

This unplugged well is leaking oil. Other abandoned or orphaned wells pose less obvious but equally unwelcome risks. Fortunately, cleaning up wells is becoming easier thanks to funding from government agencies and private organizations.

Moreover, wells that were drilled using cable tools often did not cement in casings, leading to gas releases.

It does not help that plugging a well can be daunting and expensive. The financial assurance companies are required to meet often falls below plugging costs, which range from several thousand to hundreds of thousands of dollars for each well.

According to the Interstate Oil and Gas Compact Commission, the risk of a well becoming an orphan grows when it is transferred at an old age. Because wells' production declines over time, they tend to go to operators who have fewer resources than their previous owners. Sometimes the buyers lack the resources to properly operate or plug the wells and eventually abandon them.

Funding P&A Work

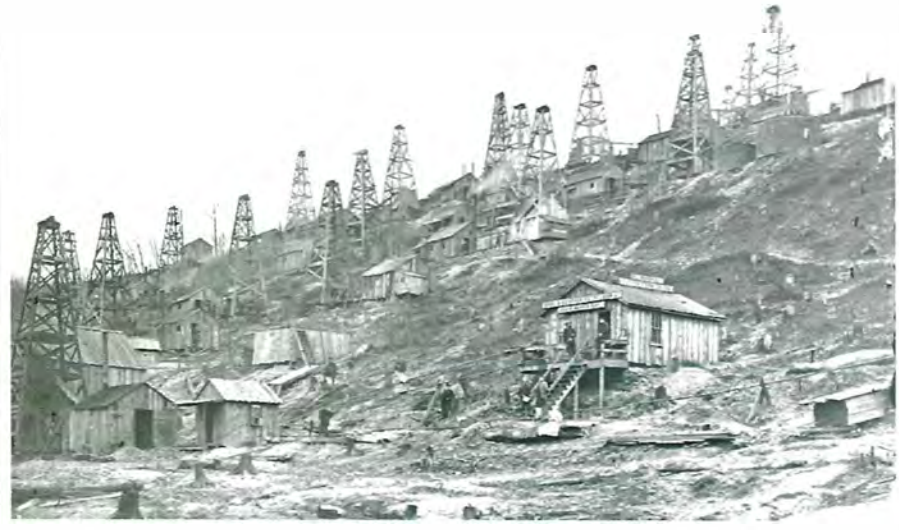
The Pennsylvania Department of Environmental Protection estimates that it will cost $1.8 billion to plug the 27,000 abandoned and orphaned wells identified on state and private property. The department adds that there may be as many as 200,000 unidentified wells, many of which were abandoned 50-100 years ago.

In recognition of the environmental and safety risks abandoned wells can pose, HR 3684, the "Infrastructure Investment and Jobs Act" that Congress passed in November 2021, allocated $4.7 billion to create a new federal program to address orphan wells. Nearly every state with documented orphaned wells submitted a notice of intent expressing interest in applying for a formula grant to address orphaned wells and well sites.

Twenty-two states applied for initial grant funding to plug wells. Kansas identified 2,352 wells for the initial grant, and at the other end of the spectrum, Alaska listed 12-18 wells. Each state developed a methodology for how many wells to list, including plugging and administrative costs, among other factors.

Pennsylvania pledged to plug more than 300 wells with initial funding. Ohio is plugging as many as 320 wells. West Virginia says it will plug 160 wells. And Kentucky—thanks to lower cost estimates—plans to plug 1,200 wells.

Initial grants have been released, and contractors are on board. West Virginia has four contractors: Next LVL Energy, Coastal Drilling East, WPS Environmental and North Wind Site Services. Kentucky has three contractors: CMC Inc., Indiana Petroleum Contractors and Womac Brothers Inc. Ohio has two: CSR Services and Next LVL Energy. Pennsylvania has four: Plants & Goodwin, Next LVL Energy, Hydrocarbon Services and Keystone Wireline Services.



Because historical well spacing practices used to be far tighter, finding one old well often will help uncover others.

Other Funding Sources

In addition to federal monies, Pennsylvania offers grants through the Marcellus Legacy Fund. These grants help municipalities, authorized organizations, colleges, watershed organizations, businesses and government councils to plug or vent abandoned or orphan wells, or to install mitigation systems that address stray gas migration concerns.

Nongovernmental organizations also back plugging efforts. For example, in Texas, the Brazos Valley Groundwater Conservation District provides grants to cover 75% of the plugging cost. In Iowa, landowners can get funding through the Grants to Counties well program. And in Missouri, a regulated community or nonprofit noncommunity public water system can obtain grants from the Missouri Department of Natural Resources. These are only a few examples of programs that can offset plugging costs.

Private organizations have a role as well. One example is the Well Done Foundation, a Montana-based nonprofit, which funds, finances and oversees plugging projects around the country. The Well Done Foundation is working with the American Carbon Registry (ACR) to create carbon credits for eliminating wells' GHG emissions. The ACR methodology provides a framework for quantifying, monitoring, reporting and verifying GHG emission reductions associated with plugging abandoned wells.

Environmental Innovators of America, an Oklahoma nonprofit created by top executives from several oil and gas companies, is another private group that is tackling the problem. Much of its work is funded by large corporate donations.

Finding Wells

In unconventional plays, older wells that are inadequately plugged or not plugged across the shale production zone can provide a pathway for stray gas to migrate from the shale formation to other zones. Because the old wells can transmit gas to freshwater or even the surface, smart companies will evaluate the potential for abandoned wells before drilling new wells in an area that historically has had oil and gas operations.

Any search for abandoned wells should begin by looking at available records. The most useful tool is old maps found in company records, state agencies' archives, historical oil museums and institutions, and books on oil and gas development. Title offices' records can provide lease history and sometimes plats.

When I was investigating the possibility of old wells on a former refinery site, I found a map from the late 1800s at the Drake Oil Museum that showed not only the well we unexpectedly uncovered during excavation operations, but also six others. These wells had wooden casing, a rare find.

To minimize costs, try to narrow the search as much as possible before conducting field surveys. These surveys are essential and can involve physical searches, magnetometers, infrared imaging, gas detection, geophysics, aerial photos and drones.

In Pennsylvania, if a survey reveals one old well, tight historical spacing practices often mean others are nearby. In the 1940s, the Drake property near Bradford, Pa., had more than 800 wells on 1,200 acres. In several other fields, the spacing was 200 feet, which means a single 100-acre property could contain 100 wells. While most will be placed at regular intervals, expect to find a few scattered single wells drilled earlier.

A Joint Effort

Identifying and successfully plugging old wells requires environmental expertise. While the process of permanently isolating and sealing a well can be simple, other work must take place first, such as ownership due diligence and managing the project's required permitting.

Part of plugging a well entails evaluating its type—either gas, oil or condensate—and condition. Does it have open casing? How large is that casing? Are the tubing and casing damaged or broken? Are there rods that will need to be pulled or nearby tanks and pipelines that must be decommissioned?

Often, obtaining grant money requires quantifying the potential methane emissions since such funds seek to target projects likely to have the most impact. Once the well is plugged, the emissions will need to be monitored to validate the GHG reductions.

Of course, these tasks require accessing the land, which can mean talking with landowners and securing the permits

needed to cross streams, work in wetland areas and transport equipment by highway. And once the well is plugged, site remediation and cleanup remain.

All these steps can be done quickly and efficiently, but take manpower, equipment and skill. In the short term, the infusion of funding from both government and private sources has highlighted constraints on the well plugging industry. The number of registered contractors in each stage is partially limited because registration requires a strong safety record, adequate insurance and bonds.

But in the long run, the funding should be an opportunity for companies with gumption, knowledge and resources. These companies will help states accelerate their efforts to plug abandoned wells, restore well sites and adjacent lands, and decommission associated pipelines, facilities and infrastructure. To enable this work, states will invest in locating and assessing undocumented orphan wells.

Addressing those wells can be challenging, but it is work worth doing. By taking advantage of expanding funding to plug old wells, companies, can create jobs, reduce health and safety risks for their employees and neighbors, and reinforce their reputations with investors and the public. ❐

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David Palmerton is a project director at SCS Engineers. His experience includes managing and performing numerous environmental assessments, due diligence and remediation projects. Palmerton has overseen the closure of large oil fields, plugged more than 1,000 oil and gas wells, deconstructed oil and gas pipelines and facilities, and performed risk assessments for gas storage and remediation of petroleum-contaminated soil and groundwater.