



**ACR**

AT WINROCK INTERNATIONAL

# Orphaned Oil and Gas Wells



## WHAT IS THE CHALLENGE?

The oil and natural gas industry has been drilling wells for more than 160 years, leaving a legacy of unplugged wells that can have acute and chronic environmental impacts.



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Orphaned wells are unplugged wells that no longer have a responsible operator. Many of these wells have fallen into advanced states of disrepair and are often leaking methane when left unplugged or are improperly plugged. The U.S. Environmental Protection Agency (EPA) estimates that orphaned and abandoned wells emit an estimated 7-20 million or more metric tons (MT) CO<sub>2</sub>e per year, though the actual number may be much larger. Methane is a highly potent GHG with immediate negative impacts after it enters the atmosphere, therefore addressing methane emissions associated with orphaned wells will have an early positive impact on the climate.

This benefit is an addition to helping address a wide range of other environmental concerns, including the potential pollution of groundwater, emission of toxic gases blended with methane, and potentially deadly gas blowouts from unplugged or improperly plugged wells.

### **A number of challenges exist in addressing the issue:**

1. We don't know how much we don't know. It is acknowledged that the EPA is vastly underestimating the size of the problem – both in the number of wells, which can be difficult to locate, and associated methane emissions. One of the main factors contributing to this potential underestimation is that the total population of orphaned oil and gas (OOG) wells is still unknown. Estimates in EPA reports cite 2.3 to 3.2 million orphaned and abandoned wells.

But new research suggests the problem is likely to be many times larger. For example, Dr. Mary Kang, a leading researcher on orphaned wells at McGill University, and other scientists who have studied



OOG wells in the U.S. note that in Pennsylvania alone, the number of these wells is as high as 750,000. Wells are also present in large numbers in other oil producing states such as Texas, Oklahoma, and Louisiana. It is also unclear how much methane these wells are leaking- generally the emissions are dominated by high-emitting wells, which ACR's methodology prioritizes for plugging.

The problem may only grow more severe in time as more wells drilled decades ago reach their expected end of life and could easily become OOG wells. Most wells are expected to have a 30-year operation timeframe and the peak of active drilling rigs creating wells occurred from 1980-1985 in the United States.

2. Regulation exists, but in many cases, it is insufficient to address actual plugging costs and environmental concerns. In addition, challenges in enforcement and significant opportunities for operators to delay plugging are persistent. For example, before a well is plugged, wells are often "idled" for a certain amount of time. The maximum length of time that a well can be idled varies from state to state, or province to province, after which wells are considered temporarily abandoned (T.A.), though terminology will vary. The initial term of the T.A. stage varies from as little as 12 months in certain states to as long as 60 months. However, many states and provinces allow the T.A. stage to be extended and even perpetuated by demonstrating that the well has "future utility." The requirements for determination of "future utility," however, are not applied uniformly. Ultimately, the T.A. extension process allows wells that in many cases will never be productive again to remain in that status for decades, which allows methane to continue to emit and the risk of groundwater contamination to persist long past the point that these wells could have been plugged/ remediated. If regulation of the oil and gas industry becomes more stringent, there may be an increase in orphaned wells as operators are unable to meet their asset retirement obligations.
3. While state and provincial regulations do require that operators demonstrate financial assurance through bonds to meet well closure obligations, reports show that bonding amounts are grossly insufficient to cover plugging documented wells, leading to challenges when it comes time for operators to fulfill their retirement obligations.

4. Proper plugging and remediation of all of the U.S. and Canada's OOG wells is now an extremely large financial burden for local and federal governments, and there are significant backlogs because of lack of resources, equipment, and experienced personnel. Reports cite prices that range from USD 24-435 billion to plug and remediate up to 500,000 wells for the lower value and an estimate of most of the existing documented OOG wells for the upper value. And as cited earlier, the number of wells is likely to be in the millions.

## HOW DO CARBON MARKETS HELP ADDRESS THIS CHALLENGE?

Carbon markets can provide financial incentives for additional action that complements state and government led initiatives. While not a silver bullet, carbon finance can provide an innovative contribution by supporting continuous improvement and increased knowledge and data, as well as promoting a long-term solution with results that are measured, monitored and verified over the course of decades.

In spite of recent U.S. federal funds being channeled toward this problem, along with existing programs to address orphaned wells in Canada, the inventory of orphaned wells will likely increase and it is unknown how many wells will become orphaned and what the associated plugging costs will be.

By leveraging the carbon market to financially support the plugging of orphaned wells, it is possible to direct a significant level of capital to help address the problem, alongside other partners.

## ACR'S METHODOLOGY

ACR has published a first of its kind Methodology for the Quantification, Monitoring, Reporting and Verification of Greenhouse Gas (GHG) Emission Reductions from the Plugging of Orphaned Oil and Gas (OOG) Wells. The methodology, developed with the support of Dr. Mary Kang of McGill University, provides the eligibility requirements and accounting framework for the creation of carbon credits from the reduction in methane emissions by plugging OOG wells.

The ACR methodology is designed to address a clear gap in our current ambition, ability and resources to plug orphaned wells. It is intended to incentivize the plugging



of leaking oil and gas wells in the U.S. and Canada, creating a pathway for carbon markets to help finance this activity and will help focus funds on higher emitting wells. We expect it will drive investment in innovation and technology, which leads to the collection of more data. Our hope is that as we better understand this issue, legislative and other solutions can be developed that will help to address the situation based on a stronger understanding of what it will take to solve it.

The potential costs for capping wells vary widely. While carbon credit purchases may be enough to cover the full costs of capping some wells, most funding will be supplemental to additional state, non-profit and federal funding for well capping. Each state has different rules and regulations that will determine whether participating in the carbon market is the right investment. For some states the contribution to bonds to cover the costs of wells may be adequate, but that isn't guaranteed now or in the future.

### **ADDITIONAL BENEFITS**

Unplugged oil and gas wells impose more than climate costs. Impacts can include air pollution, groundwater contamination, soil degradation, damage to ecosystems, and risk of explosions, all of which pose threats to human health. Plugging OOG wells can mitigate these impacts, providing both short- and long-term environmental benefits.

### **Contact ACR**



For more information or questions on A/R carbon projects, please contact the ACR forestry team at [ACR@winrock.org](mailto:ACR@winrock.org)