

OHIO AUDITOR OF STATE
KEITH FABER



Ohio Department of
Natural Resources
Orphan Well Program

Performance Audit

August 2022

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To the Governor's Office, General Assembly, Director and Staff of the Ohio Department of Natural Resources, Ohio Taxpayers, and Interested Citizens:

The Auditor of State's Office recently completed a performance audit of the Orphan Well Program (the Program), which is administered by the Ohio Department of Natural Resources (ODNR or the Department). This service to ODNR and to the taxpayers of the state of Ohio is being provided pursuant to the Ohio Revised Code §117.46.

This performance audit report contains recommendations, supported by detailed analysis, to enhance the Program's overall economy, efficiency, and/or effectiveness. This report has been provided to the Department and its contents have been discussed with the appropriate staff and leadership within ODNR. The Department is reminded of its responsibilities for public comment, implementation, and reporting related to this performance audit per the requirements outlined under §117.461 and §117.462. In future compliance audits, the Auditor of State will monitor implementation of the recommendations contained in this report, pursuant to the statutory requirements.

It is my hope that ODNR will use the results of the performance audit as a resource for improving operational efficiency as well as the Program's overall effectiveness. The analysis contained within are intended to provide management with information to consider while making decisions about the Program's operations.

This performance audit report can be accessed online through the Auditor of State's website at <http://www.ohioauditor.gov> and choosing the "Search" option.

Sincerely,

A handwritten signature in black ink that reads "Keith Faber".

Keith Faber
Auditor of State
Columbus, Ohio

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Ohio Department of Natural Resources

Performance Audit Summary

WHAT WE LOOKED AT

The Ohio Department of Natural Resources (ODNR) has 10 divisions and is responsible for maintaining the balance between the wise use and protection of Ohio's natural resources. The Oil and Gas Resources Division (the Division) is responsible for regulating Ohio's oil and natural gas industry while ensuring the state's abundant natural resources are developed and managed responsibly. The responsibilities of the Division include plugging orphan wells under a program known as the Orphan Well Program (the Program).

Orphan wells are abandoned oil and gas wells that have no legal owner. Many orphan wells pose a serious risk to the environment and are considered a public safety hazard. ODNR reported to the Interstate Oil & Gas Compact Commission in calendar year (CY) 2020 that an estimated 36,000 to 66,000 orphan wells exist in the Ohio. To mitigate the dangers associated with orphan wells, the Division was given the responsibility of locating and plugging orphan wells across the state. In order to accomplish this task, the Division first locates wells and confirms their orphan status. Once a well is confirmed to be an orphan well, the Division uses third-party contractors to conduct the plugging process.

Orphan well plugging is paid out of the Oil and Gas Well Fund (the Fund). The Fund receives 90 percent of the severance tax on non-horizontal oil and natural gas wells, with some additional funding coming from regulatory fees for oil and gas well drilling, permit fees for plugging and abandoning wells, and civil penalties from violations of regulations. House Bill (HB) 225 of the 132nd General Assembly, effective in FY 2019, updated ORC §1509.071 to set an annual requirement for the Division to spend at least 30 percent of the previous fiscal year's Fund revenue on plugging orphan wells; previously, in FY 2011, the requirement had been set at 14 percent of the previous fiscal year's Fund revenue.

Historically, the Division has been unsuccessful in reaching the spending requirement. Our audit examined the history of the oil and gas industry in Ohio to understand why the Division has failed to meet mandated spending requirements. We also examined the Orphan Well Program's current operations to determine if the Division could make any immediate changes that would allow it to meet the current spending requirements.

WHAT WE FOUND

The Division has been able to increase the number of orphan wells that are plugged on an annual basis from 15 wells in FY 2017 to 181 wells in FY 2021. However, despite the increase in the number of wells that were plugged, the Division still fell short of the required spending target. In FY 2021, the Division spent \$11.2 million on orphan well plugging contracts. The spending requirement in that year was \$23 million, meaning the Division spent about 50 percent of its targeted requirement. Although ODNR has made progress in reaching the requirement, significant work remains to create a sustainable plugging program that can consistently meet expenditure requirements established in the ORC.

Plugging orphan wells can be difficult due to a variety of factors, including the general nature of the wells. Because most orphan wells were generally abandoned in the 19th or early 20th century, documentation pertaining to their location and ownership is often not readily available. In addition, wells have historically been found in remote areas where geographic features such as hills and forests can make access to the wells difficult. The lack of solid information about location and legal status for suspected orphan wells means that doing the background research and legal work necessary to prepare a well for plugging can require a significant investment of time. Finally, wells were sometimes abandoned due to issues with the initial drilling, which can mean that the Division may need to develop creative solutions to address complex plugging problems. All this pre-work creates a substantial demand on Division resources.

In addition to the inherent challenges of finding and plugging orphan wells, meeting the expenditure requirements established in ORC § 1509.071 is further complicated by ODNR's historical interpretation of ORC § 1509.071(E)(1), which states that "The chief [of the Division] shall not make expenditures for salaries, maintenance, equipment, or other administrative purposes, except for costs directly attributed to the plugging of an idle and orphaned well." This means the expenditures related to pre-work by ODNR employees before contracting out the plugging component of the work are not counted against the 30 percent requirement, meaning that substantially mitigating the overall orphan well problem will require the Division to expand significant resources beyond the 30 percent expenditure requirement.

It should be noted that the federal Infrastructure Investment and Jobs Act (IIJA), passed in FY 2022, is expected to provide an average of \$36 million in federal grants toward plugging orphan wells in each year from FY 2023 to FY 2030. The funds can be used on supplementing the internal tasks associated with orphan well plugging, including locating, researching, and planning of orphan wells. This will likely help the Division plug more wells.

Key Observations

Key Observation 1: The Division has historically struggled to develop a fully accurate inventory of orphan wells. The low-end estimate is that there could be 36,000 orphan wells, statewide. Of the possible 36,000 orphan wells, the Division maintains an inventory of almost 1,000 known orphan wells. However, the existing orphan well inventory includes a significant number of wells that could have issues with either their location or status as orphan wells. Inventory limitations may hinder the Division’s ability to attract qualified plugging contractors, leaving it a small pool of viable contractors. In addition, the Division does not track all key data points related to bidding or contracting, nor does the Division store data in such a way to support the creation and curation of modern business intelligence tools.

Key Observation 2: The Division has never met the expenditure requirements established in the ORC. This is in part due to recent significant increases in tax revenues associated with oil and gas exploration in the state. Revenue from the severance tax has increased from \$7 million in FY 2012 to \$72 million in FY 2021, with a commensurate increase in expenditure requirements. The Division has significantly increased the number of orphaned wells plugged and corresponding financial outlay between FY 2019 and FY 2021, but it is still short of expenditure requirements.

Key Observation 3: The Division has historically elected to perform most preparation work using ODNR employees. The reliance on state employees creates a budgetary and logistical constraint on the Orphan Well Program, as the Division can only increase efforts dedicated to well plugging preparation work as fast as it can recruit, train, and hire permanent employees. Increasing the use of contractors could help the Division overcome these constraints.

SUMMARY OF RECOMMENDATIONS

Recommendation 1: The Division collects extensive data on orphan wells. However, of the 970 wells in the orphan well inventory, 704 of the wells, or 72 percent, may lack accurate location and environmental data. Furthermore, the analysis found that key pieces of data that are helpful for tracking the orphan well plugging process are either missing or not regularly curated in a manner that makes the data useful for management decision-making. The Division should improve the quality of orphan well data by collecting more data, aggregating data for business intelligence, and reducing the need for manual processes. Easily accessible data on the orphan well process will be essential as the Division works to increase its annual plugging capacity.

Recommendation 2: The Division is required, per ORC § 1509.071, to spend 30 percent of the previous year’s Oil and Gas Fund revenue plugging orphan wells. The Division has historically struggled to meet this goal. ODNR should develop and publish a compliance plan to increase the capacity of the Division under the current interpretation of ORC § 1509.071. This compliance plan should include a plan to accurately capture all direct and indirect costs associated with researching, locating, and plugging orphan wells. In addition, the Division should make efforts to maximize the use of existing contractors within the current interpretation of the ORC. This published plan will allow the legislature to better understand the undertaking the Division would need to implement to reach the required spending amounts.

Recommendation 3: ORC § 1509.071 sets an expenditure requirement equal to 30 percent of the previous year’s Oil and Gas Fund revenue to be spent plugging orphan wells. Even though an orphan well requires a significant amount of pre-work before it can be put out to bid, ODNR’s interpretation of ORC § 1509.071 limits which expenditures can be counted against the 30 percent requirement to only contract payments directly for the plugging of wells. If ODNR can expand the interpretation of ORC to include all direct costs associated with plugging an orphan well, the Division would come closer to reaching its 30 percent spending requirement and have more money available for locating and conducting background research and verification on orphan wells.

During the audit, ODNR worked with the General Assembly to change the text of ORC § 1509.071 (E) (1) to state that “The chief may make expenditures for salaries, maintenance, equipment, or other administrative purposes, for costs directly attributed to the locating, analyzing, stabilizing, designing, plugging, remediating, or restoring an orphaned well, and for determining if a well is an orphaned well.” In FY 2021, this change would have increased the Division’s expenditures from \$11.2 million to \$14.2 million, bringing the Division’s 14.9 percent of the previous year’s revenue to 19.0 percent of the previous year’s revenue. Moreover, the change in ORC § 1509.071 will help the Division more accurately assign the full cost of locating, researching, and plugging orphan wells. In addition, the Division expects to receive an additional \$36 million per year as part of the Federal Infrastructure Investment and Jobs Act (2021) and that additional funding will be used to help bolster the Orphan Well Program.

Abbreviations

| | |
|---------------------|--|
| ODNR | Ohio Department of Natural Resources |
| FY | Fiscal Year |
| OPT | Ohio Performance Team |
| ORC | Ohio Revised Code |
| The Division | The Division of Oil and Gas Resources |
| Lidar | Light Detection and Ranging |
| EPA | Environmental Protection Agency |
| FTE | Full Time Equivalent |
| SB | Ohio Senate Bill |
| HB | Ohio House Bill |
| IIJA | Infrastructure Investment and Jobs Act |
| The Program | Orphan Well Program |
| The Fund | The Oil and Gas Well Fund |
| RBDMS | Risk-Based Data Management System |
| NRE | Natural Resource Engineer |
| OAKS BI | Ohio Administrative Knowledge System |

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Introduction

The Ohio Department of Natural Resources (ODNR or the Department) manages nearly 600,000 acres of land, including 74 state parks, 21 state forests, 136 state nature preserves, and 117 wildlife areas. Additionally, the Department is responsible for managing more than 120,000 acres of inland waters, 7,000 miles of streams, 481 miles of the Ohio River, and more than 2 million acres of Lake Erie. Critically, ODNR is tasked with maintaining the balance between the wise use and protection of these spaces and Ohio’s natural resources. In the most recent state budget, the Department was appropriated more than \$1 billion for the two-year period in order to carry out this important mission.

The regulation and oversight of oil and natural gas exploration and production falls under the Division of Oil and Gas Resources (the Division) within ODNR. In addition to the regulation of ongoing exploration and production, the Division is responsible for identifying oil and gas wells that have been abandoned without proper remediation. Once these wells are abandoned and documented, the Division engages with outside contractors that have expertise in well drilling and plugging, to properly plug the wells and prevent environmental damage. This program is supported through the Oil and Gas Well Fund (the Fund), which receives revenue from taxes, civil penalties, and fees paid by companies or individuals that extract oil or gas in Ohio.

The Division has a spending requirement of 30 percent of the previous fiscal year’s Oil and Gas Well Fund revenue on contracts for plugging orphan wells. In the most recent state budget, more than \$22 million was appropriated to the Division for the purposes of plugging wells for FY 2022. This appropriation reflects the estimated amount that would need to be spent on contractors in order to reach the 30 percent requirement. However, despite having a legislative requirement and appropriate funding, the Division routinely fails to meet the spending threshold. In FY 2021, it spent 14.9 percent of the previous year’s revenue on well plugging.

The Ohio Auditor of State, through its Ohio Performance Team (OPT), is required by Ohio Revised Code (ORC) § 117.46 to complete at least four performance audits of state agencies¹ or, at its discretion, institutions of higher education during each biennium. In 2021, OPT initiated a performance audit² of the Department’s Orphan Well Program in order to identify ways in which operations could be improved to meet the spending requirement for the plugging of abandoned wells. This report contains the findings from our audit and recommendations, which will assist Department management in making decisions related to the Program.

¹ At least two of the audits shall be of state agencies selected from a list comprised of the administrative departments listed in section 121.02 of the Revised Code and the department of education and at least two of the audits shall be of other state agencies.

² Performance audits are conducted using Generally Accepted Government Auditing Standards guidelines; see **Appendix A** for more details.

Ohio Department of Natural Resources

The Department was created by the Ohio General Assembly in 1949 to provide management for the development, use, and enjoyment of the natural resources of the state. ODNR currently has 10 operating divisions and 2,300 employees. A Director, along with two Assistant Directors and a Deputy Director, oversees the Department. All ODNR divisions have three overlapping responsibilities: resource management, recreation, and regulation. The 10 divisions and functional areas are:

- **Division of Engineering:** Provides professional and technical engineering and related administrative support services required by ODNR.
- **Division of Forestry:** Promotes and applies management for the sustainable use and protection of Ohio's private and public forestlands.
- **Division of Geological Survey:** Provides geologic information and services needed for responsible management of Ohio's natural resources.
- **Division of Mineral Resources Management:** Manages the environmental and safety aspects of the coal and mineral mining industries while protecting citizens, land, and water resources.
- **Division of Natural Areas and Preserves:** Preserves state nature preserves and natural areas of Ohio's pre-settlement past, rare and endangered species, and wondrous geological features.
- **Division of State Parks and Watercraft:** Provides outdoor recreation and boating opportunities by balancing outstanding customer service, education, protection, and conservation of Ohio's state parks and waterways.
- **Division of Water Resources:** Manages statewide oversight of dams, levees, and floodplains, and oversees the collection and management of data related to the state's water resources.
- **Division of Wildlife:** Conserves and improves fish and wildlife resources and their habitats for sustainable use and appreciation by all.
- **Division of Coastal Management:** Protects and restores the resources of Ohio's Lake Erie coastline and watershed.
- **Division of Oil and Gas Resources:** Regulates Ohio's oil and natural gas industry while ensuring the state's abundant natural resources are managed and developed responsibly.

Orphan Well Program

The Division of Oil and Gas Resources (the Division) was established in 1965 and is responsible for regulating and overseeing Ohio's oil and natural gas industry and for the protection of all Ohioans and the environment. The Division has the responsibility to ensure the state's abundant natural resources are managed properly. The Division has more than 130 employees, including inspectors, engineers, geologists, attorneys, hydrologists, surveyors, health physicists, and support personnel.

Prior to the 20th century, oil and gas exploration was less well regulated than it is today. From the 1860s until the onset of regulations in the mid-20th century, around 175,000 oil and gas wells were drilled in Ohio; if a well ran dry, it was common practice during this time to simply abandon it. Abandoned or “orphan” wells are oil or gas wells with no known owner; most of Ohio’s orphan wells are from the pre-regulation period. The State considers a well as orphaned if there is no party that can be held legally responsible for plugging the well. Orphan wells pose an environmental and public safety hazard as they may leak oil or gas into the surrounding air, soil, or groundwater. The Orphan Well Program (the Program) was created in 1977 to address those wells that were abandoned without proper remediation.

How Wells are Drilled

In order to extract oil or gas, a hole is drilled several thousand feet into the ground, and then a metal pipe of approximately five inches in diameter is inserted. This pipe is then used to extract oil or gas from far below the surface. To properly plug a well after it is no longer useful, the metal pipe is removed, and the well hole is closed using concrete. Additional measures may also be needed to clean the area around the well to restore the spot to its original, natural condition.

Because the oil and gas industry operated in Ohio for more than a century with little regulation, there are numerous orphan wells throughout the state. According to data submitted by ODNR to the Interstate Oil & Gas Compact Commission, there are between 36,000 and 66,000 undocumented orphan wells in Ohio. Once the Division is aware of and has determined a well is orphaned, it is then responsible for preparing and overseeing the contractors who do the actual remediation work. This process can take over 300 hours of staff time for a single well and, as of November 2021, there were nearly 1,000 orphan wells that had been identified and were in the queue to be plugged.

Oil and Gas Well Fund

While oil and gas production has fluctuated over the last 150 years, Ohio has experienced an oil boom since 2013. This boom has been driven largely by shale oil and natural gas found in the eastern portion of the state. Between 2012 and 2019, oil production in the state increased by over 500 percent, from just under 5 million barrels in 2012 to over 27.6 million barrels in 2019. During that same time period, natural gas production in the state increased by almost 3,000 percent, from 86,700 MMCF to 2,600,000 MMCF.³ At the same time, revenue entering the Oil & Gas Well Fund from Ohio’s tax on oil and gas extraction increased by over 1,000 percent, from \$7.2 million in 2012 to \$72 million in FY 2021. The chart below shows the tax revenue from 2012 through 2021. While revenues have leveled off in recent years, they remain significantly higher than the previous decade.

³ MMCF = million metric cubic feet

Oil & Gas Well Fund Revenue, FY 2012-2021

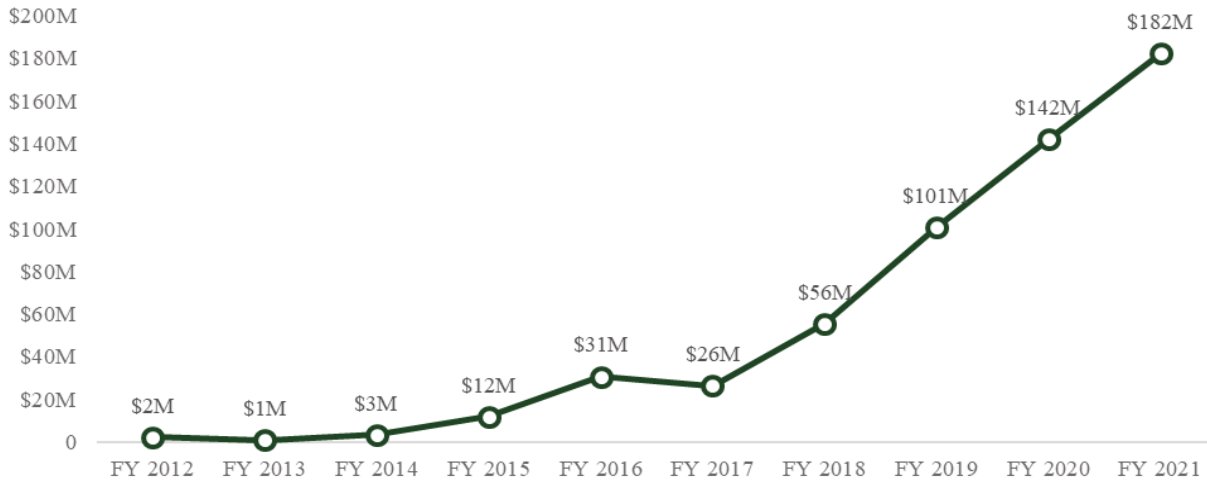


Source: OAKS BI

The vast majority, 90 percent, of the severance tax revenues are directed to the Oil and Gas Well Fund (the Fund), which is used to operate the Division. The Fund also receives revenues from application and regulatory fees for oil and gas well drilling, permit fees for plugging abandoned wells, and civil penalties for violations of regulations. The Fund pays for all activities of the Division, which, in addition to plugging orphan wells, also includes the regulation and inspection of over 65,000 active oil and gas wells in Ohio.

The tax revenues which are directed to the Fund are limited in their use. This means that if the Division does not expend the entirety of its appropriation each year, the funds cannot be used for other Departmental purposes. As seen in the chart below, the overall Fund balance has increased over time and currently has more than \$180 million in unused fund balance that can only be used for Divisional purposes.

Oil & Gas Well Fund Balance, FY 2012-2021

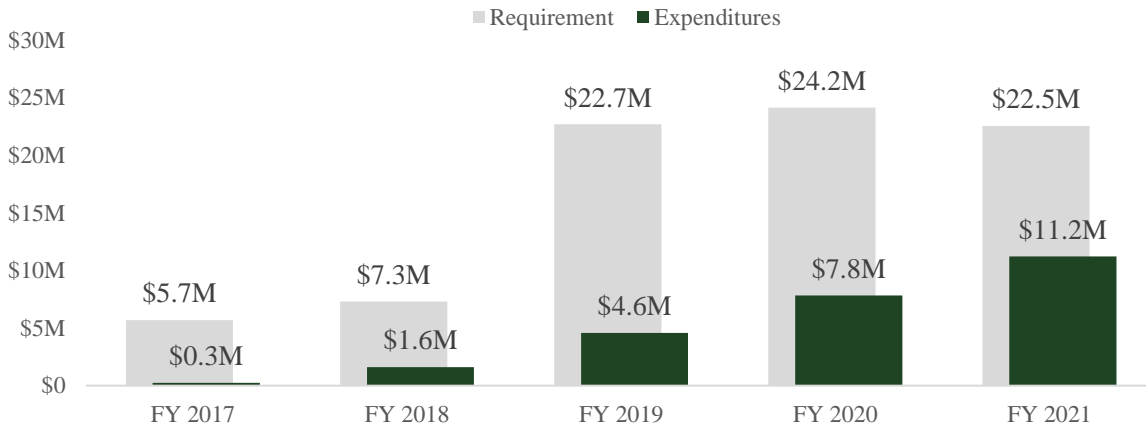


Source: OAKS BI

Program Revenues and Expenditures

The Division receives an appropriation in the state budget for operational purposes. This appropriation is broken down into two line items. One line item funds the general operations of the Division, while the other funds the Orphan Well Program. From FY 2011 through FY 2018, the Division had a spending requirement of 14 percent of the previous fiscal year’s severance tax revenues for the Program. Beginning in FY 2019, the requirement was increased to 30 percent of the previous year’s revenues. While expenditures have increased significantly during the past six years, as seen in the chart below, at no point has the Division come close to the required expenditure rate.

Oil & Gas Well Plugging Contract Expenditures



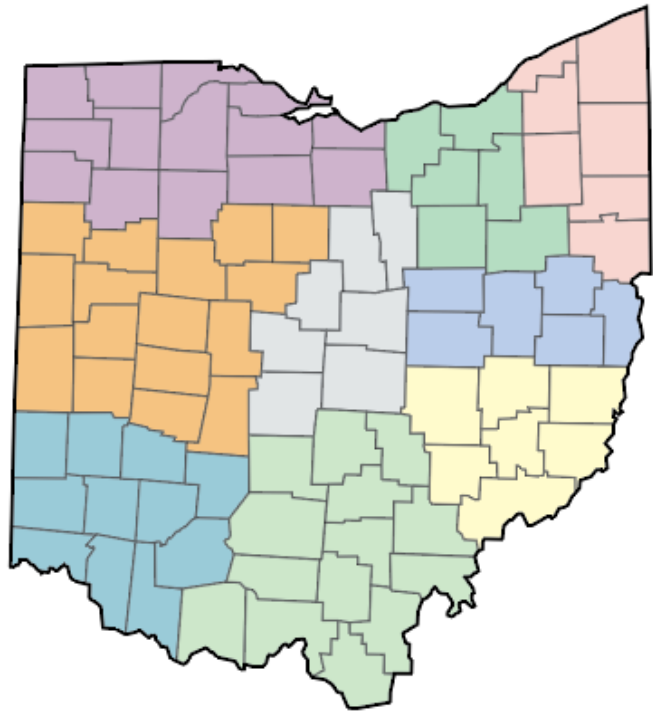
Source: OAKS BI

In FY 2021, the most recent fiscal year of data, the Division spent approximately \$11.2 million on oil and gas well plugging contracts. In the previous year, the tax revenues were approximately \$72.4 million, which means that the Division was required to spend \$21.7 million on orphan well plugging contracts. The state budget provided an appropriation of \$28.2 million, which gave the Division authority to spend the funds necessary to reach the requirement. The \$11.2 million spent was less than half of required expenditure amount.⁴

Program Staffing

The Division has more than 130 employees to handle all aspects of Division business, including approving new drilling permits, inspecting active oil and gas wells, and handling all aspects of Division administration. According to a survey of Division staff, in FY 2021, approximately 25 percent of the Division’s time was spent on some aspect of the Orphan Well Program, on either the discovery, preparation, or inspection of plugging operations.

The Program is currently split into regions that cover roughly 86 percent of the state’s counties. The Division does not have a dedicated southwest region due to the lack of oil wells in the area. Each region has at least one Natural Resource Engineer and inspector assigned to the respective counties; however, some regions use engineers and inspectors from nearby regions if there is no engineer or inspector on assignment. Natural Resource Engineers and inspectors are responsible for inspecting, coordinating, and monitoring active plugging sites along with orphan well plugging sites. Each region in the state has a limited number of engineers and inspectors. These engineers and inspectors are responsible for daily site visits that may take them across their respective regions in a single day. As it relates to orphan wells, engineers and inspectors are primarily responsible for handling contractors once they have begun the plugging process. This includes signing off on change orders, inspecting current plugging operations, and communicating with other officials within the Division about ongoing projects.



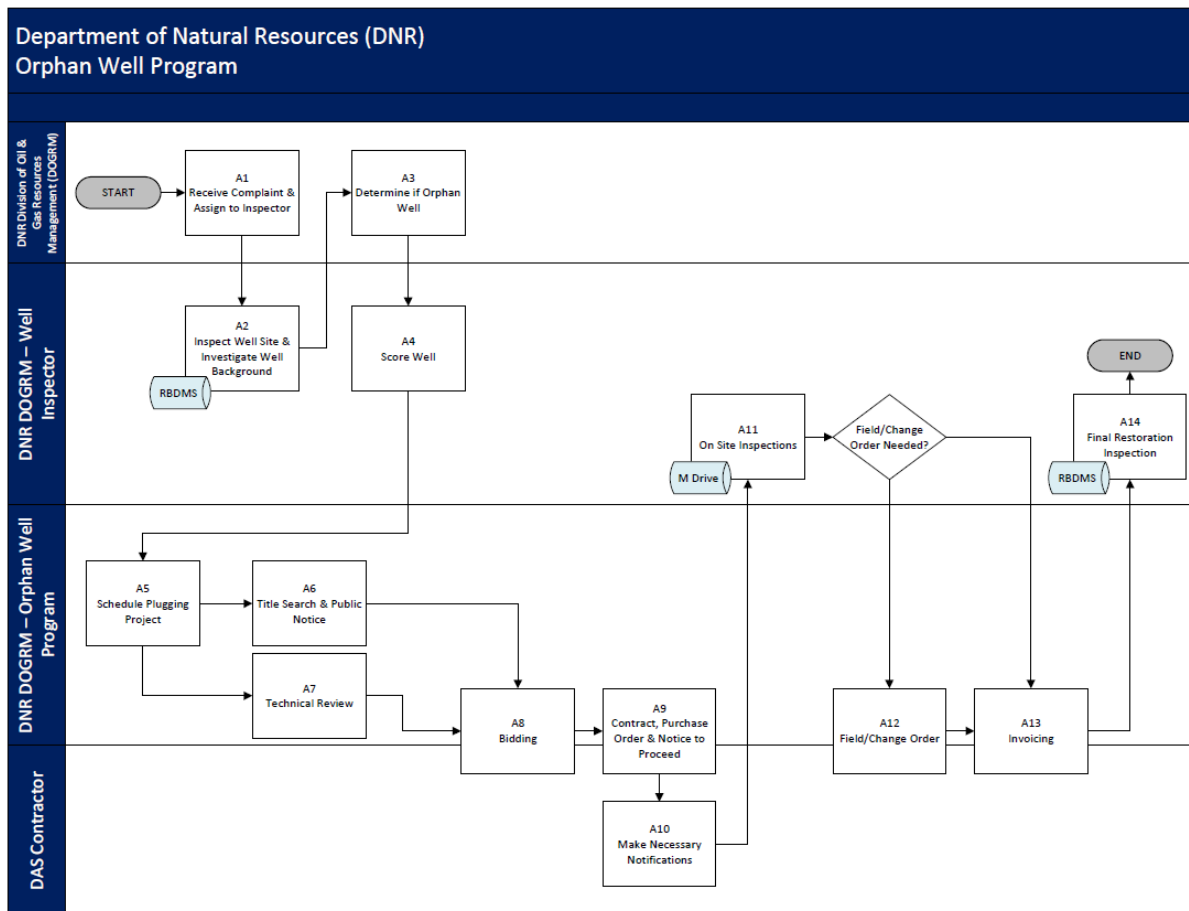
⁴ The \$11.2 million figure represents actual spending in FY 2021. The encumbered amount in each fiscal year may differ.

While the Division spends a significant amount of time to ensure orphan wells are prepared for plugging, ODNR’s historical interpretation of ORC § 1509.071 limits the Division from including the cost of finding or preparing wells toward the 30 percent expenditure requirement.

Orphan Well Plugging Process

There are multiple ways by the Division may begin the orphan well plugging process. Under the traditional program, the Division receives a complaint from a landowner, hunter, or anyone who may happen upon an orphan well. Once notified, the Division will investigate the orphan well to decide who is responsible for plugging. If it is found that a well has no legal owner, the Division will then take the responsibility to plug the well. The following process map illustrates the Division’s orphan well plugging process.

Traditional Orphan Well Plugging Process Map



Source: OBM Office of Internal Audit

Historical records were and are still used to determine the location of many orphan wells. More recently, the Division has begun using proactive approaches, which include reviewing pre-1965 records, conducting in-person inspections, and using drone technology. Furthermore, there is currently a program to map out the entire state using Light Detection and Ranging (LIDAR) technology. The LIDAR is carried by fixed wing aircraft over the state and offers a three-dimensional model of the scanned area. The statewide LIDAR program has been underway since 2016 and is expected to be completed by June 2022. Once the LIDAR project is finished, ODNR expects significantly more opportunities to proactively find orphan wells.

Contractors do the actual plugging of orphan wells. Contractors who wish to work with the Division go through a process to be approved by the Ohio Department of Administrative Services. Currently, there are 44 contractors who are approved to work for the Division; only 20 of those contractors plugged one or more orphan well in FY 2021. Further, only 11 of those contractors plugged five or more wells in that time period.

Program Results

The Division has significantly increased the number of wells it has been able to award to contractors on an annual basis. As seen in the below visual, in FY 2013, the Division awarded 10 wells; in FY 2021, the Division awarded 202 wells, an increase of 1,920 percent.⁵ However, the Division has failed to meet the spending requirement set forth in code. This is due in part to the increase in required spending from 14 percent to 30 percent of excise tax revenue, and it is compounded by the overall growth in tax revenue due to the increase in oil and gas production in the state.

Alternative Plugging Options

In addition to the traditional method, there are three other methods that may be used to plug a well, depending on the exact circumstances:

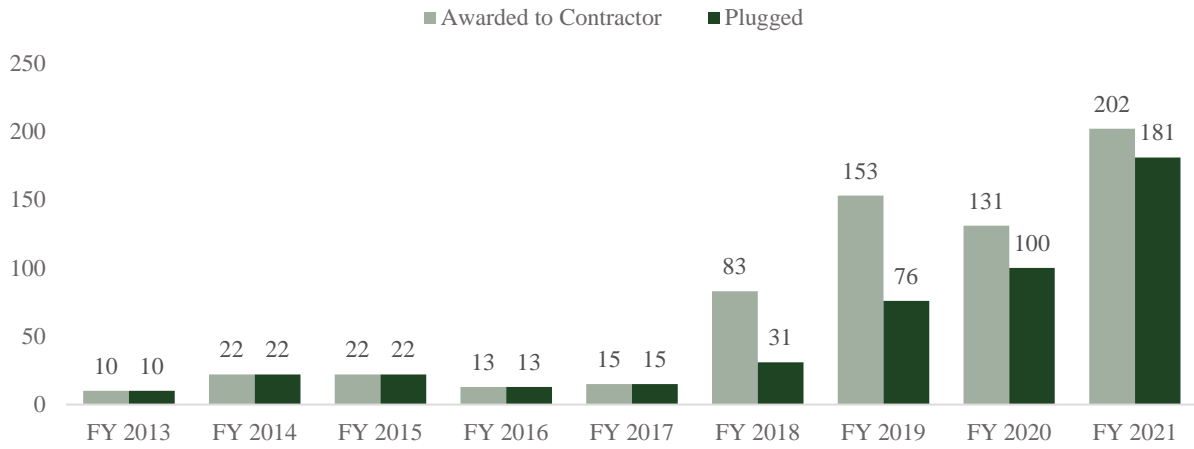
Landowner Pass Through – in this process, a landowner can find a contractor themselves and receive a reimbursement from the Division once the well is plugged.

Well Referral and Design Consultant (new in FY 2023) – in this process, a consultant is used to locate the orphan well, conduct the background research, and design a plugging solution.

Construction Manager at Risk (new in FY 2023) – in this process, a consultant is tasked with the plugging of a well and asked to provide input on the designing of solutions. This process is specifically designed to attract larger companies and will be funded by the IJA.

⁵ Note that for some fiscal years, there may be a difference between the number of orphan wells awarded and plugged, as a well may be awarded in one fiscal year and plugged in a subsequent year.

Orphan Wells Awarded & Plugged Annually, FY 2013-2021



Source: ODNR Division of Oil & Gas

Recommendation 1: Improve Data Quality

The Division collects extensive data on orphan wells. However, of the 970 wells in the orphan well inventory, 704 of the wells, or 72 percent, may lack accurate location and environmental data. Furthermore, the analysis found that key pieces of data that are helpful for tracking the orphan well plugging process are either missing or not regularly curated in a manner that makes the data useful for management decision-making. The Division should improve the quality of orphan well data by collecting more data, aggregating data for business intelligence, and reducing the need for manual processes. Easily accessible data on the orphan well process will be essential as the Division works to increase its annual plugging capacity.

Impact

A more accurate orphan well database will assist the Division in taking a data-driven approach to future improvements. Having complete data on orphan wells across the state will allow for the Division to plug as many wells as possible and increase the likelihood of reaching the ORC mandated minimum spending requirements. Having accurate data will also allow the legislature to better understand the needs of ODNR and the State.

Background

The Division has historical data regarding the location of hundreds of thousands of active and inactive wells across the state. This data is recorded in the Division's Risk-Based Data Management System (RBDMS), which is updated weekly and is available for the public to download on ODNR's website. The RBDMS contains comprehensive well data for over 100,000 wells permitted since 1980. Historical well card information from the Division of Geological Survey for wells permitted before 1980 is also included. Users of the database can view and interact with data on completion, permit, and production information for active wells; inactive and orphan well plugging records and inventory data are also available, though incomplete (see [Manual Processes](#) section below). Locations of active, inactive, and orphan wells in the state can also be viewed on ODNR's Oil and Gas Well Locator, an interactive GIS map.

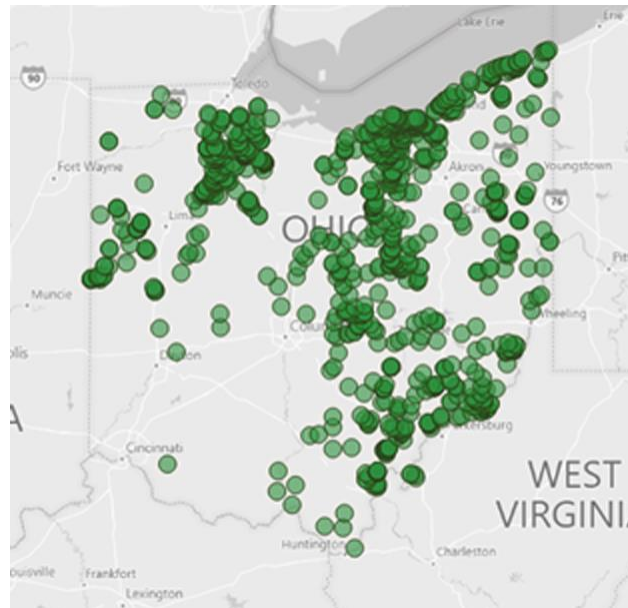
Orphan Well Inventory

Each year, the Division discovers new orphan wells through various means, including landowner complaints, public information campaigns, and drone detection. Once the Division is notified of a potential orphan well, employees go through a multiple-step process of assessing the well. This process includes conducting historical research on the well, verifying that a discovered well has no legal owner, and scoping the potential hazards for plugging the well. During this process, employees rate an orphan well on a scale from 1-4 based on the urgency with which it needs to be plugged (see [Inadequacies in Business Intelligence](#) for more information). If a well is

verified as an orphan well, it is entered into the Division’s internal inventory of the known orphan wells in the state. The map below shows the location of all wells in the orphan well inventory as of November 2021.

Division leadership selects wells based first on the priority score described above. In addition, the Division generally tries to put together packages that contain multiple wells in close geographic proximity; this allows for a more attractive bid to companies. Once a project is created, it is entered into that fiscal year’s plugging schedule, a separate internal spreadsheet that is maintained by the Division. After the well is plugged, the record of the plugging is entered into the Division’s internal plugging record, which is also a separate spreadsheet. These spreadsheets are used to record the data on the wells and the respective well projects. In total, the Division utilizes at least three separate data sheets to house information.

Orphan Wells in Inventory, Nov. 2021



Methodology

The Division provided OPT with its orphan well plugging records from April 2019 to November 2021, its schedule of well plugging projects from April 2017 to July 2021, a copy of its orphan well inventory as of November 2021, and a list of purchase orders related to orphan well plugging projects from July 2018 to November 2021. OPT analyzed these documents to check for incomplete or missing data. Auditors matched up a well’s unique identifying number, known as an API⁶ number, across the inventory, schedules, and plugging records. With this, auditors were able to observe which wells were present in which documents, identify the time elapsed between important stages in the orphan well plugging process, and identify other notable patterns. Auditors then conducted interviews with Division leadership to gather explanations for gaps in the data and confirm whether certain data fields are not aggregated or simply not collected.

⁶ API stands for the American Petroleum Institute. Their numbering system is an industry standard that is used nationwide.

Analysis

After analysis of the data and discussions with Division leadership, OPT noted significant gaps in the quality of orphan well data. In some cases, the Division does not collect the data; in other cases, the data exists in disparate locations but is not aggregated for business intelligence. Additionally, the Division's orphan well plugging records are updated manually, which introduces the possibility of error.

Lack of Data

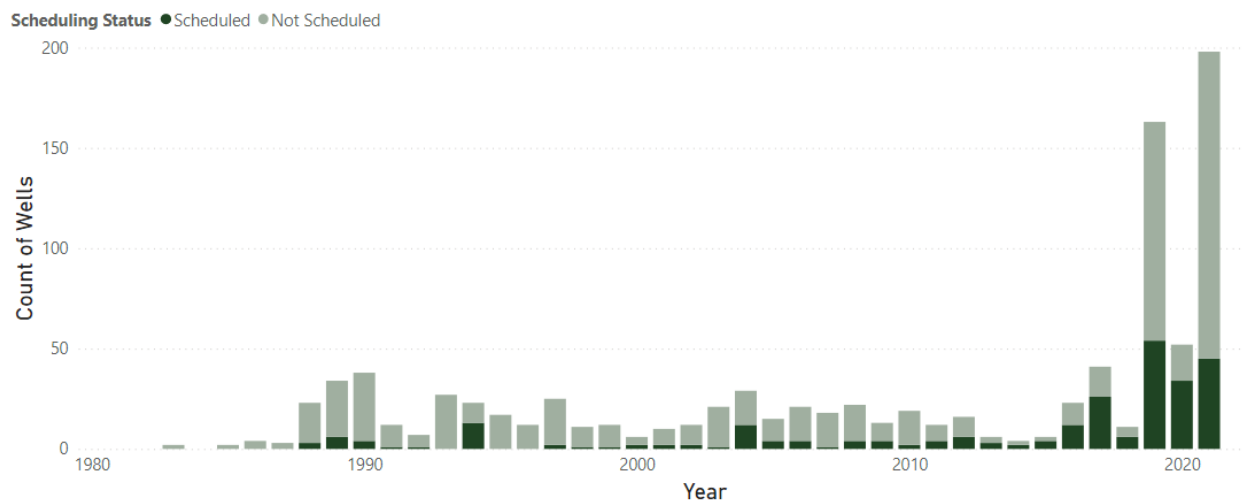
For a well to enter the orphan well inventory, it must first be declared orphan-ready by the Division. For this to happen, the well must be verified as an orphan well according to legal standards, meaning that the Division must determine that the well is not in production and has no identifiable owner. Being declared orphan-ready does not indicate that the well is suitable for plugging.

As of November 2021, there were 970 wells in the orphan well inventory. Many of these wells lack precise location and environmental data. Because GPS technology was less advanced in prior decades, the coordinates recorded for wells that have been in the inventory for a long time are not as precise as wells that have entered the inventory in recent years. Additionally, an orphan well that was declared orphan-ready decades ago might have undergone changes that could have altered its project readiness. Due to these factors, if a well is scheduled to be plugged, its status is re-evaluated by Division employees before it is put out to bid, and its location data is updated. This means that inventory wells that have been scheduled, or put out to bid, have been re-evaluated, and their location data likewise has been updated.

Using API numbers to match the wells in the inventory to those on the FY 2018-2021 schedules reveals that only 266 of the 970 wells, or 28 percent, have been put out to bid. This means that 704 of the wells in the orphan well inventory, or 72 percent, have not been re-evaluated for accurate location and environmental data. The Division could significantly increase the number of wells available to be plugged by making a priority of assuring that the orphan well inventory contains accurate and actionable data.

The following visual displays the wells in the November 2021 orphan well inventory by the year they were declared orphan-ready. The visual gives a general idea of how long ago certain wells were entered into the orphan well inventory. As seen, a significant number of wells were entered into the inventory in just the last three years. However, there are wells that were entered into the inventory as early as 1983, and the average "age" of an inventory well is 11.9 years. The visual further delineates wells by whether they have been put out to bid (scheduled) or not put out to bid (not scheduled). Wells that are both "older" and have not yet put out to bid are the most likely to have inaccurate location and environmental data.

Orphan Wells in Inventory by Year Declared Orphan-Ready



Furthermore, there are 63 wells in the November 2021 orphan well inventory that had already been plugged as of that date. More than half of these wells were plugged in the few months prior. Division leadership informed auditors that there is a lag between when a well is plugged and when it taken off the inventory; a plugging report must be submitted in the RBDMS and approved by management before the well is removed from the inventory.

Inadequacies in Business Intelligence

Business intelligence is a way of looking at data that provides important information to decision-makers. While the Division does collect data, it does not aggregate its data in a way that allows for data driven decisions to be made. Primarily, the Division does not aggregate its inventory, scheduling, and plugging spreadsheets into a unified database. Without aggregated data, making timely data driven decisions becomes exceedingly difficult. Tracking these wells through their full lifecycle—from being entered into the inventory database to being plugged—would allow the Division to identify time gaps that may exist, pinpoint wells that may be stuck at a certain stage and observe programmatic processes in a holistic view.

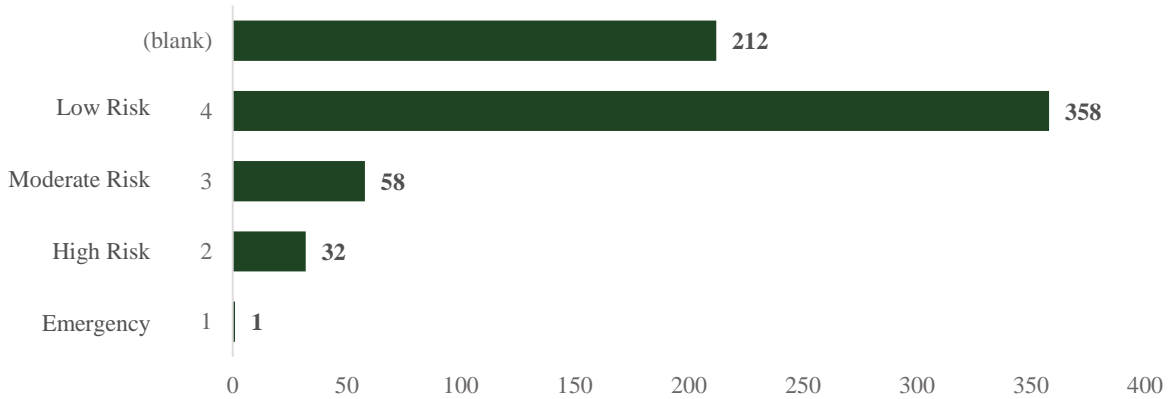
Within the individual data sheets, certain data fields are absent. For example, many orphan wells in the plugging schedules do not have urgency scores associated with them. The Division assigns each orphan well a number from one to four indicating the urgency by which the well should be plugged; a score of “1” correlates to “emergency or emergency action”, while a score of “4” indicates that a well is low risk. These scores are necessary for the Division to schedule plugging wells and creating bids.

The visual below illustrates the urgency scores of the 661 orphan wells that were scheduled between April 2017 and July 2021. Of these wells, 212 are missing an urgency score. Without this information, the Division cannot accurately track whether it is more frequently creating projects for high or low risk orphan wells. In addition, urgency scores are absent altogether from the orphan well inventory spreadsheet. This missing data does not allow for the Division to

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easily view and decide which wells should be plugged. Furthermore, urgency scores are similarly absent from the plugging records, making analysis of the scores of plugged wells difficult.

Orphan Wells Scheduled by Urgency Score, Apr 2017 - July 2021



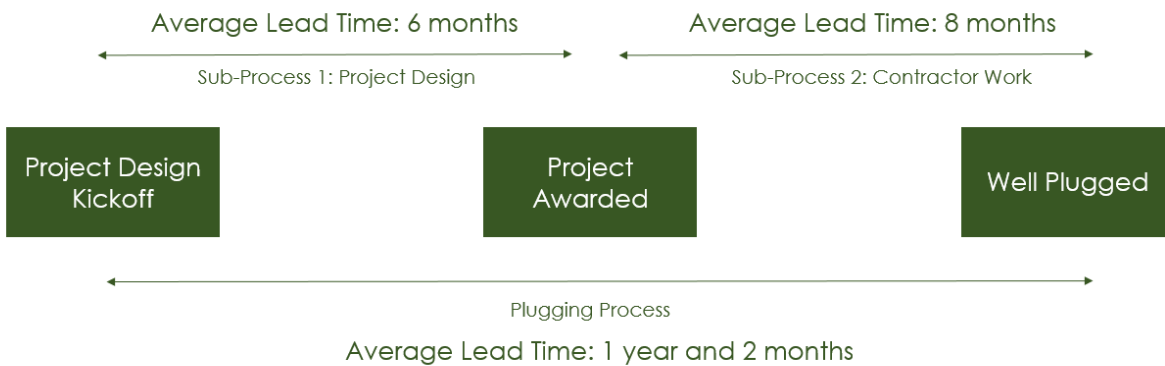
Source: ODNR Division of Oil & Gas

Additionally, the Division does not change the status of a well to reflect that it is in contract. When a well enters the orphan well inventory, it is marked “OR”, or orphan-ready; when it is plugged, it is marked “PA”, or plugged and abandoned. In between those stages, the well was put into a contract to be plugged, but the status of the well remained as “OR”. This means that without digging through individual project documentation, the Division cannot know the number of wells it has in contract at any given time.

The Division’s data spreadsheets do not synthesize certain dates in a way that allows for critical lead times to be assessed for business intelligence. While the approximate start date for the design of a plugging project and the exact date on which a well was plugged are found in the Division’s schedules and plugging records, respectively, the date that a well was awarded to a contractor is not linked to that well in the Division’s data. This award date is a crucial step in the orphan well plugging process as it can be used to calculate how long a well takes to be awarded from the time its parent project is kicked off, or the length of the design process, and how long a well takes to be plugged from the time when the project is awarded, or the contractor’s plugging speed.

A proxy for the project award date can be found in Ohio Administrative Knowledge System (OAKS BI). Once a well plugging project is awarded to a contractor, a purchase order is approved and forwarded to the chosen contractor, alongside a notice to proceed. That purchase order approval date is on or very close to the exact date on which the project was awarded, meaning it can be used as an excellent proxy for that project’s award date. However, the purchase order approval date found in OAKS BI is attached to a plugging project—not the wells within those projects. Some additional work is required to attach these dates to individual wells in the Division’s spreadsheets.

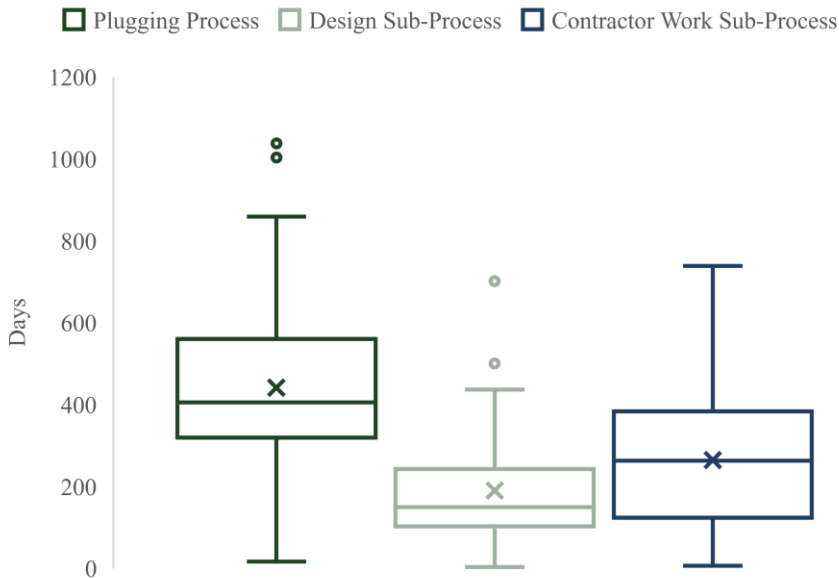
The chart below illustrates the significant dates in the orphan well plugging process. Because the Division has both the approximate design start date and the plugged date for individual wells in its spreadsheets, it could easily calculate the lead times across the entire plugging process for these wells—auditors found that time gap to be an average of 440 days, or about one year and two months. However, the date on which a project was awarded—which occurs in between a well’s design start date and its plugged date—is available in OAKS BI but is not currently synthesized into the Division’s data in a manner that allows for individual wells’ lead times to be assessed for the two sub-processes seen below.



Utilizing purchase order numbers, auditors matched purchase order approval dates to their corresponding projects, and further, the wells within those projects. Through this work, auditors were able to deduce the lead times, when dates were available, for the project design and contractor work sub-processes. As seen above, the average length of the project design process is roughly six months, which the Division has corroborated anecdotally. The average length of time for the contractor to plug a well after being awarded a project is roughly eight months; this aligns with the current obligation for Division contractors to plug a well within one year of the project being awarded to them. Still, lead times can vary greatly. The two rightmost plots in the visual below provide examples of what the Division could observe if it incorporated project award dates into its data for individual wells. If constructed, the Division would be able to utilize these plots to investigate wells with unusually large lead times.⁷

⁷ According to Division leadership, wells may experience delay due to the limited capacity of its contractors. The program’s approved contractors are in close communication with the Division; if the Division requires an emergency well to be plugged immediately; contractors will accommodate this need and delay the plugging of less-urgent wells.

Orphan Well Plugging Process Lead Times



The leftmost plot shows the variance in lead-time to get an orphan well plugged, from the date the project design starts to the date the well is plugged. The two plots to the right show the variance in lead-time for the project design and contractor work sub-processes, which together make up the whole plugging process. With the Division's current data arrangement, only the leftmost plot can be readily constructed.

Source: ODNR Division of Oil & Gas; OAKS BI

Finally, the Division is not able to analyze the frequency or magnitude of change orders that occur in its orphan well plugging projects for business intelligence purposes. This prevents the Division from assessing its contract contingencies. Change orders occur when the scope of the project grows beyond what was initially agreed upon. The Division usually builds a contingency into its plugging projects that seeks to account for these additional payments. According to Division leadership, the typical contingency is 5 to 15 percent of the base amount, with an average of 10 percent. If a change order payment is larger than the contingency, then a new purchase order is created and marked as a change order, allowing it to be identified in the data. However, if a change order payment falls within the contingency (e.g., if the contingency is \$5,000 and the change order is only \$500), then the payment is made without the creation of a new purchase order, meaning it cannot be identified in the data. As such, Division leadership cannot observe how often contract contingencies are used without sifting through individual project documentation. More detailed information about change orders may help the Division better plan for future projects, by gaining a more detailed understanding of budgets and timelines.

Manual Processes

Division employees that manage oil and gas well projects, orphan or other, enter data on the wells at hand into the RBDMS. However, according to Division leadership, employees managing orphan well projects do not consistently differentiate between the plugging of an orphan well and the plugging of a non-orphan well when entering data into the RBDMS. Furthermore, auditors

found that some plugged orphan wells were not logged as plugged in the RBDMS. These reporting discrepancies require that Division leadership keep a spreadsheet wherein they manually enter data on plugged orphan wells. This manual process introduces the possibility of error in the plugging records. To amend this, the Division should ensure standard reporting practices among its employees for logging orphan wells into the RBDMS.

Furthermore, the Division's schedules, plugging records, inventory, and other spreadsheets are maintained separately and cannot be integrated, as was done in this analysis, without considerable manual work. Tracking orphan well data in a more unified manner may reduce the amount of manual work needed to match up a well's information across separate spreadsheets.

Conclusion

The Division maintains a multitude of internal sheets to record data on its orphan wells, including an inventory, a series of schedules, and a plugging record. However, location data for wells that were entered into the inventory in past decades have not been verified, important data fields are missing from the Division's internal sheets, and the Division's orphan well plugging records require manual upkeep. The Division should ensure that the orphan well data is completely verified and aggregated for business intelligence. Without easily accessible data on orphan well urgency scores, significant dates along the well plugging process, and more, the Division cannot make data-driven decisions on all aspects of the Orphan Well Program's operations.

Recommendation 2: ORC Compliance Plan

The Division is required, per ORC § 1509.071, to spend 30 percent of the previous year’s Oil and Gas Fund revenue plugging orphan wells. The Division has historically struggled to meet this goal. ODNR should develop and publish a compliance plan to increase the capacity of the Division under the current interpretation of ORC § 1509.071. This compliance plan should include a plan to accurately capture all direct and indirect costs associated with researching, locating, and plugging orphan wells. In addition, the Division should make efforts to maximize the use of existing contractors within the current interpretation of the ORC. This published plan will allow the legislature to better understand the undertaking the Division would need to implement to reach the required spending amounts.

Impact

For the Division to hit the 30 percent spending requirement set forth by ORC, the Division will have to double annual well plugging, which could require a commensurate increase in the Division’s internal capacity to find, plan, and plug orphan wells.

Methodology

For this analysis, OPT calculated the amount of plugging contract spending, the number of plugged wells, and the number of full time equivalent (FTEs) that the Division would need to reach the ORC spending requirement. This calculation was based on data from FY 2021 and included the Fund’s revenue of the same year. The analysis assumes that ODNR’s current interpretation of the ORC has not been changed to count labor costs toward the spending requirement.

Auditors calculated the average total cost to plug a well. This considers the sum of two components—the average Division internal labor cost per well, and the average plugging contract cost per well. For the former, auditors divided the annual labor cost of the Orphan Well Program (see [Recommendation 3](#)) by the number of wells plugged in FY 2021. For the latter, auditors summed the purchase orders for orphan well plugging projects over a three-year period, including emergency plugging projects and change orders, and then divided by the number of wells plugged in these projects. Totaling these two figures resulted in the average total cost to plug a well.

As per ODNR’s interpretation of ORC § 1509.071, only the contract cost per well was counted toward the spending requirement in this analysis. This value was used to scale up the Program’s current capacity to a hypothetical state that complies with the ORC. This shows how considerable a capacity increase would be needed for the Division to reach its requirement.

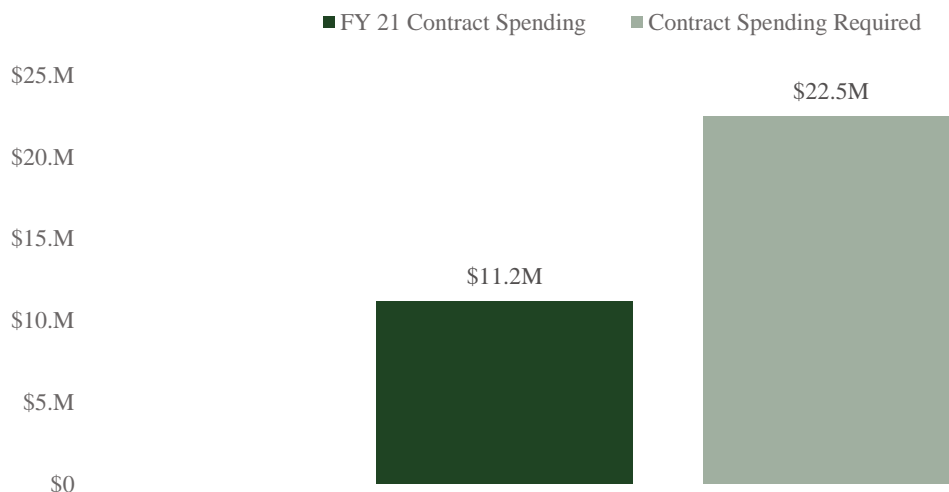
To determine the actual spending requirement for the Division’s orphan well plugging operations, auditors took 30 percent of the revenue accrued by the Fund in FY 2020. Auditors then divided this expenditure requirement by the average plugging contract cost per orphan well. The resulting figure represented the quantity of wells that would have to be plugged by the Division in order to hit the spending goal.

Along with increasing the number of wells plugged, the Division would also need to increase its FTE count to support the increased number of wells plugged. To calculate the current FTE count for the Orphan Well Program, auditors divided the total hours dedicated to the Program in a year (see [Recommendation 3](#)) by the number of regular hours available to the typical Division employee. To find the hypothetical FTE count that would be necessary to support the additional wells plugged that would be required to hit the spending requirement, auditors developed a metric of FTE count per well. The FTE per well metric was found by dividing the current FTE count by the number of wells plugged in FY 2021. The number of wells that would need to be plugged to hit the spending goal, found previously, was then multiplied by this metric. This revealed the FTE count that would be required to plug this higher quantity of wells.

Analysis

The average internal labor cost per well is about \$17,000, while the average plugging contract cost per well is about \$60,000. Together, the average total cost to plug a well is about \$77,000. Under ODNR’s ORC interpretation, only spending on plugging contracts counts toward the 30 percent spending requirement. To reach the ORC spending requirement in FY 2021, the Division would have needed to spend approximately \$23 million on plugging contracts.

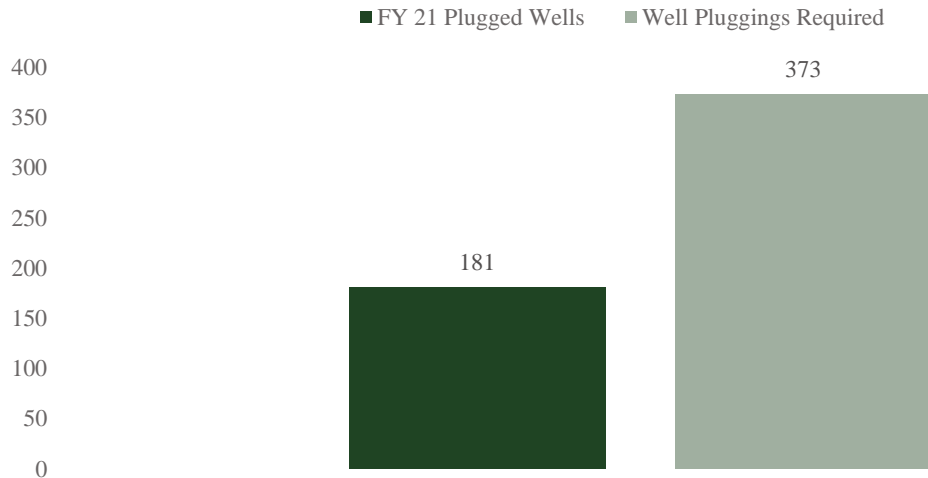
Contract Spending: Current State vs. Compliance with ORC



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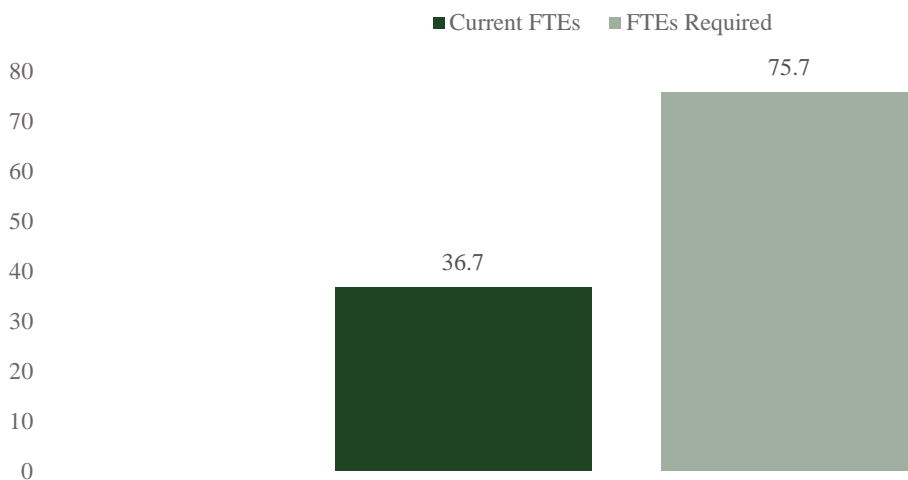
Using the methodology described in the above section, OPT found that the Division would need to plug an estimated 373 wells to spend \$23 million. This would be a 106 percent increase from the 181 orphan wells that the Division plugged in FY 2021.

Well Plugging: Current State vs. Compliance with ORC



To support the necessary well plugging increase, the Division would need to employ additional FTEs. Currently, the Division employs 36.7 FTEs for the Orphan Well Program. The Division plugged 181 orphan wells in FY 2021 with 36.7 FTEs, which equates to 0.2 FTEs per well. The Division would need to employ 75.7 FTEs to meet the ORC spending requirement, or an additional 39 FTEs from current staffing. This increase in staffing would also be a 106 percent increase in current program staffing levels, assuming current level of efficiency.

FTEs: Current State vs. Compliance with ORC



Increasing the number of wells put to bid would open more work up to the Division’s bank of 44 approved contractors. On average, a well plugging crew can plug a single well in about 10 business days, so any given contractor can be expected to be able to plug about 24 wells per year. Hypothetically, this means that the 44 approved contractors could be able to plug around 1,000 wells per year.

At its current program capacity, the Orphan Well Program risks underutilizing its bank of approved contractors. Only 20 of the 44 approved contractors plugged an orphan well in FY 2021. Furthermore, with almost 1,000 orphan wells in its inventory, the Division can build out hundreds more potential bids for contractors. These bids will need to contain multiple orphan wells in proximity of each other for contractors to consider it economically feasible.

Recommendation 1 furthers this point to show the current shortfalls of the Orphan Well Program and the data required to increase its bid capacity.

The table below summarizes the Program’s current state and outlines the increases in program capacity that would be required to reach the ORC spending requirement. Importantly, Division leadership informed auditors that the cost to plug a well had gone up by an estimated 67 percent in the six months leading up to June 2022. Using purchase order data from FY 2022, auditors were able to calculate a new average contract payment per well to be roughly \$110,500, an 82.8 percent price increase from the \$60,400 average contract payment per well calculated previously from July 2018 through November 2021 purchase order data. The programmatic increases required to hit the ORC spending requirement under both historical and FY 2022 pricing are considered in the table below.

Program Capacity Required for ORC Compliance

| | FY 2021 Current State | ORC Compliance: Historical Pricing | ORC Compliance: FY 2022 Pricing |
|--------------------------------|------------------------------|---|--|
| Contract Spending | \$11,233,180 | \$22,546,822 | \$22,546,822 |
| Avg. Contract Payment per Well | \$62,062 | \$60,437* | \$110,497 |
| Wells Plugged Annually | 181 | 373 | 204 |

Source: Division of Oil and Gas and OAKS BI

* Based on a three-year average of purchase orders from July 2018 to November 2021.

The IJJA, passed by the US Congress in 2021, will allocate \$4.7 billion to plugging orphan wells across the country. Ohio will be eligible for over \$300 million spread out between FY 2023 and FY 2030. Federal funding from IJJA would allow the Division to hire contractors to augment existing staff, thereby allowing the Division to locate and prepare orphan wells to be put out to bid without a significant increase to its staff. These federal dollars also have the possibility to inspire additional oil and gas companies to begin plugging orphan wells, therefore expanding the number of contractors available to plug wells. These funds could significantly aid in plugging the estimated 36,000 orphan wells that remain around Ohio.

Whatever requirement ODNR pursues, significantly increasing the number of wells plugged each year will require the Division to take a different approach when compared to what it has historically done. Specific changes the Division may need to consider are as follows:

- **Increase Use of Contractors:** The Division currently uses ODNR employees for the vast majority of orphan well pre-work. The Division would need to double its internal staff just to process enough wells to meet the expenditure requirements set in the ORC, and expanding the plugging program to more aggressive requirements may require even more hiring. The Division may need to explore the use of contractors and/or public-private partnerships as an alternative to having to significantly grow internal staff. The Division can hire contractors using the Fund or use grant dollars provided by the IJA.
- **Review Well Plugging Inspections:** The Division currently inspects the well plugging process more frequently than what is strictly required by the ORC. Orphan well plugging is inherently complex, and it can be difficult to predict exactly how frequently inspections may need to be conducted; however, ORC § 1509.14 allows the Division to accept a detailed written account of the plugging activity in lieu of inspection by Division personnel. Exercising this option more frequently may free up staff time that could be redirected to other steps in the plugging process.
- **Focus on Building an Accurate Orphan Well Inventory:** The Division currently has 970 orphan wells in its orphan well inventory, which is known to contain less than wholly accurate location data for suspected orphan wells (see [Recommendation 1](#)). Achieving the throughput needed to hit ambitious goals will require the Division to have an accurate inventory of orphan wells, which will help keep contractors engaged.

Conclusion

The Division is not currently meeting the requirement spending set in ORC § 1509.071. For the Division to hit this requirement, it would need to spend over \$11 million more in contracts than what was spent in FY 2021, or at least \$22.5 million in total. To expend this amount, the Division would need to expand the Orphan Well Program by 106 percent; this would involve more than doubling the number of orphan wells plugged and more than doubling the FTE count. To augment its capacity to plug wells, the Division may consider increasing the use of contractors, reviewing well plugging inspections, and building an accurate orphan well inventory.

Recommendation 3: Clarify ORC

ORC § 1509.071 sets an expenditure requirement equal to 30 percent of the previous fiscal year's Oil and Gas Fund revenue to be spent plugging orphan wells. Furthermore, ORC § 1509.071(E)(1) states that "The chief [of the Division] shall not make expenditures for salaries, maintenance, equipment, or other administrative purposes, except for costs directly attributed to the plugging of an idle and orphaned well." Even though orphan wells require a significant amount pre-work before a well can be put out to bid, ODNR's interpretation of ORC § 1509.071 limits which expenditures can be counted against the 30 percent requirement. If ODNR can expand the interpretation of the ORC to include all direct costs associated with plugging an orphan well, the Division would come closer to reaching its 30 percent spending requirement and have more money available for locating and conducting due diligence on orphan wells.

Impact

ODNR's current interpretation of ORC § 1509.071 drastically understates the amount of work that may be needed to locate wells and plan a plugging project. Having a clarified interpretation of ORC § 1509.071 that permits the use of reserved funds for well plugging pre-work would open the opportunity for the Division to identify and prepare for bid a higher number of wells each year. This along with its direct costs for outside contractors would help the Division to spend closer to the 30 percent spending requirement and reach the requirement benchmark.

During the audit, ODNR worked with the General Assembly to change the text of ORC § 1509.071 (E) (1) to state that "The chief may make expenditures for salaries, maintenance, equipment, or other administrative purposes, for costs directly attributed to the locating, analyzing, stabilizing, designing, plugging, remediating, or restoring an orphaned well, and for determining if a well is an orphaned well." In FY 2021, this change would have increased the Division's expenditures from \$11.2 million to \$14.2 million, bringing the Division's 14.9 percent of the previous year's revenue to 19.0 percent of the previous year's revenue. Moreover, the change in ORC § 1509.071 will help the Division more accurately assign the full cost of locating, researching, and plugging orphan wells. In addition, the Division expects to receive an additional \$36 million per year as part of the Federal Infrastructure Investment and Jobs Act (2021) and that additional funding will be used to help bolster the Orphan Well Program.

Background

The Division is fully supported through the Oil and Gas Well Fund, which primarily derives its revenue from a severance tax on oil and gas extraction within the state. Currently, the ORC tasks the Division with spending 30 percent of the previous fiscal year's Fund revenue directly on plugging orphan wells. The rapid increase in severance tax revenue resulting from a drilling boom over the past decade has made this moving requirement difficult to achieve. In FY 2021, the Oil and Gas Well Fund revenue reached over \$72 million, meaning the orphan well plugging spending requirement was more than \$21 million. Comparatively, the Oil and Gas Well Fund

revenue in FY 2012 was approximately \$7.2 million. In FY 2021, the Division spent \$11.2 million, or 14.9 percent of the previous year’s fund revenue on orphan well plugging contracts, which was under the 30 percent requirement for FY 2021.

Under the current interpretation of ORC § 1509.071, the Division is limited to only include expenditures paid to contractors towards the 30 percent spending requirement. The complete process of plugging an orphan well requires multiple internal processes outside of contractors, however. These internal processes, which include locating orphan wells, designing projects to plug the wells, and overseeing the plugging, are not counted towards the 30 percent requirement spending.

Methodology

To better understand the complete plugging process and discover more information about the Division, OPT visited multiple orphan well plugging sites in southeast Ohio (see [Appendix B](#) for photographs). During the site visits, OPT was able to gather information and understanding around the complicated nature of orphan well plugging; to plug a single well, a significant labor burden is demanded not only from the plugging contractor, but from the Division employees. In any given year, Division employees will need to work on finding, researching, and plugging orphan wells.

The Division employs over 130 FTEs assigned to variety of roles, including the inspection of active wells, legal research, and administrative tasks. These employees may split their time between many programs, of which the Orphan Well Program is only one. Some Division employees devote an estimated 100 percent of their time to the Program, some devote only a portion of their time, and others devote none of their time. OPT analyzed the direct cost of Division labor spent on the Program to calculate the direct costs that might impact ODNR’s future efforts to meet the 30 percent expenditure goal.

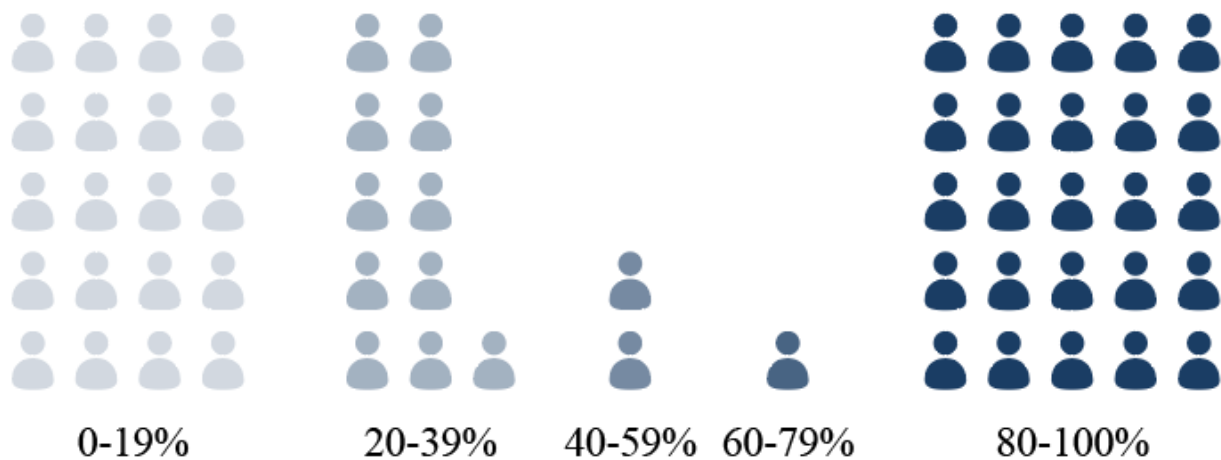
To narrow down the labor cost of the entire Division to the labor cost of only the Orphan Well Program, OPT was provided with an internally conducted survey wherein Division employees were asked to estimate the amount of time they dedicate to the three main Program tasks in a year. These tasks included locating orphan wells, designing projects to plug the wells, and overseeing the plugging process.

To calculate wages and benefits paid out to Division employees for the hours they spent on the Program, OPT auditors used OAKS BI FY 2021 payroll data. These wages and benefits were totaled to determine the estimated direct labor cost of the Program in FY 2021. The resulting figure was then added to the orphan well plugging contract expenditure in FY 2021 to determine how close the Division would come to reaching its 30 percent mandated spending requirement if the current interpretation were expanded to include labor costs.

Analysis

Twenty-five Division employees use 80 percent or more of their time specifically on Orphan Well Program tasks. In addition, another 14 employees use at least 20 percent of their time on the Program. In total, 59 individual employees reported spending some portion of their work year on tasks related to orphan wells. Division employees dedicate an estimated 64,000 hours to the Program in a year.

Orphan Well Program Employees by Percent of Time Dedicated to Program



Source: ODNR Division of Oil & Gas

In FY 2021, the direct cost incurred by the Division for this work was over \$3 million, none of which is counted towards the 30 percent spending requirement under the current interpretation of the ORC. If the Division were permitted to count direct employee costs toward the spending benchmark, the Division would have expended \$14 million in FY 2021. This would have been equal to 19 percent of the previous fiscal year's Oil and Gas Well Fund revenue. This expenditure amount would have still been short of the goal established by ORC § 1509.071, but it would have moved the Division closer to meeting the requirement. Further analysis is conducted in [Recommendation 2](#) for how the Division could increase Orphan Well Program capacity to reach the 30 percent requirement under the current interpretation of the ORC.

Orphan Well Program Annual Labor Hours & Cost

| | Locating Wells | Designing Plugging Projects | Overseeing Plugging | Total |
|---------------------|-----------------------|--|--------------------------------|--------------|
| Hours Used Annually | 18,059 | 24,935 | 21,494 | 64,488 |
| Annual Labor Cost | \$855,011 | \$1,180,558 | \$1,017,642 | \$3,053,211 |

Conclusion

ORC § 1509.071 set a requirement for ODNR to expend 30 percent of the previous fiscal year's Oil and Gas Well Fund revenue on the plugging of orphan wells. The Division has never met this requirement, even before the legislature increased the spending requirement from 14 percent to 30 percent. Currently, only contractor costs for well plugging count against this goal. However, the Division expends a significant amount of internal resources on finding, researching, and inspecting the plugging of orphan wells. Those resources are currently not counted towards the 30 percent requirement.

Client Response Letter

Audit standards and AOS policy allow clients to provide a written response to an audit. The letter on the following pages is the Department's official statement in regards to this performance audit. Throughout the audit process, staff met with ODNR officials to ensure substantial agreement on the factual information presented in the report. When the Department disagreed with information contained in the report, and provided supporting documentation, revisions were made to the audit report.



Ohio Department of Natural Resources

MIKE DEWINE, GOVERNOR

MARY MERTZ, DIRECTOR

July 20, 2022
The Honorable Keith Faber
Auditor of State
88 East Broad Street
Columbus, OH 43215

Dear Auditor Faber:

The Ohio Department of Natural Resources (ODNR) appreciates the months of hard work your staff put forth to conduct a thorough performance audit of the Division of Oil and Gas Resources Management's Orphan Well Program.

ODNR staff have worked diligently to grow the Orphan Well Program since the beginning of the DeWine Administration. Significantly increasing the number of orphan wells plugged each year was one of my top priorities upon being appointed to serve as Director of the agency. As noted in your audit, in fiscal years 2013-2017, the Orphan Well Program oversaw the plugging of an average of 16 wells per year. In fiscal years 2018-2021, an average of 142 wells were plugged per year, demonstrating an increase of nearly 800 percent. And in FY22, I am pleased to report that we did award the entirety of the set-aside funding for oil and gas well plugging. We are excited about that success and expect to see that number grow even more with the launching of new, innovative opportunities for pluggers this year.

As noted in your report, ODNR staff do not plug orphan wells – that work is performed by private contractors. ODNR locates and verifies orphan wells, prepares bid packages for pluggers, and oversees the plugging process. Our challenge has been to attract more contractors to accomplish this important work.

Toward that end, ODNR has been working for the past two years to create a variety of opportunities for plugging companies of all sizes and capabilities so that Ohio may leverage every available state and federal dollar to plug orphan wells. We have hired outside contractors to assist in the development of plans to plug wells; secured additional contractors to act as construction managers to oversee the plugging of large packages of wells; expanded efforts to utilize technology to locate additional orphan wells in a manner which will increase efficiencies and generate larger projects; and revised the Landowner Passthrough Program to allow private landowners who want to move forward more quickly with well plugging to engage pluggers who do not wish to become certified through the DAS process.

The audit sets forth three key recommendations, which we welcome and have already begun to consider:

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Recommendation 1: The Division should improve the quality of orphan well data by collecting more data, aggregating data for business intelligence, and reducing the need for manual processes.

ODNR recognizes the need to enhance our data management. The Division is exploring options to improve in this area as part of overall efforts to improve data management across the Division, while not slowing down well plugging by collecting information that does not improve our process and program.

Recommendation 2: ODNR should develop and publish a compliance plan to increase the capacity of the Division under the current interpretation of ORC § 1509.071.

ODNR will explore the development of a compliance plan to ensure all interested parties better understand our efforts to grow the Orphan Well Program and further engage in plugging.

Recommendation 3: If ODNR can expand the interpretation of ORC to include all direct costs associated with plugging an orphan well, the Division would come closer to reaching its 30 percent spending requirement and have more money available for locating and conducting background research and verification on orphan wells.

As noted in the audit, ODNR worked with the General Assembly to implement this recommendation in May 2022. The Division is confident this law change will allow the agency to meet the statutorily defined spending requirement on the state funds allocated to plug orphan wells.

ODNR projects to receive \$326 million over the next eight years to plug orphan wells from the Federal Infrastructure, Investment, and Jobs Act. We look forward to the opportunity to make even more progress in plugging Ohio's orphaned oil and gas wells.

Ohio is fortunate to have one of the most well-funded orphan well programs in the country, and ODNR is committed to encouraging contractors to plug as many wells as possible using all funds available for the safety and protection of Ohioans and our landscape.

Sincerely,



Mary Mertz
Director

Appendix A: Purpose, Methodology, Scope, and Objectives of the Audit

Performance Audit Purpose and Overview

Performance audits provide objective analysis to assist management and those charged with governance and oversight to improve the Orphan Well Program performance and operations, reduce costs, facilitate decision making by parties with responsibility to oversee or initiate corrective action, and contribute to public accountability.

Generally accepted government auditing standards (GAGAS) require that a performance audit be planned and performed so as to obtain sufficient, appropriate evidence to provide a reasonable basis for findings and conclusions based on audit objectives. Objectives are what the audit is intended to accomplish and can be thought of as questions about the Program that the auditors seek to answer based on evidence obtained and assessed against criteria.

We conducted this performance audit in accordance with GAGAS. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Audit Scope and Objectives

In order to provide the institutions with appropriate, data-driven, recommendations, the following questions were assessed within each of the agreed upon scope areas:

Summary of Objectives and Conclusions

| Objective | Recommendation |
|--|---------------------|
| <p>What opportunities exist to improve the efficiency and effectiveness of ODNR’s compliance with legislative requirements set out in House Bill (HB) 225 (2018)/OCR 1509.071?</p> | <p>Rec. 1, 2, 3</p> |

Although assessment of internal controls was not specifically an objective of this performance audit, internal controls were considered and evaluated when applicable to scope areas and objectives.⁸

No internal control discrepancies were discovered during the course of the audit.

Audit Methodology

To complete this performance audit, auditors gathered data, conducted interviews with numerous individuals associated with the areas of ODNR operations included in the audit scope, and reviewed and assessed available information. Assessments were performed using criteria from a number of sources, including:

- Industry Standards;
- Leading Practices;
- Statutes; and
- Policies and Procedures.

Where needed, we selected states similar in population and other demographics to form the peer group for comparisons contained in this report. These peers are identified as necessary and appropriate within the section where they were used.

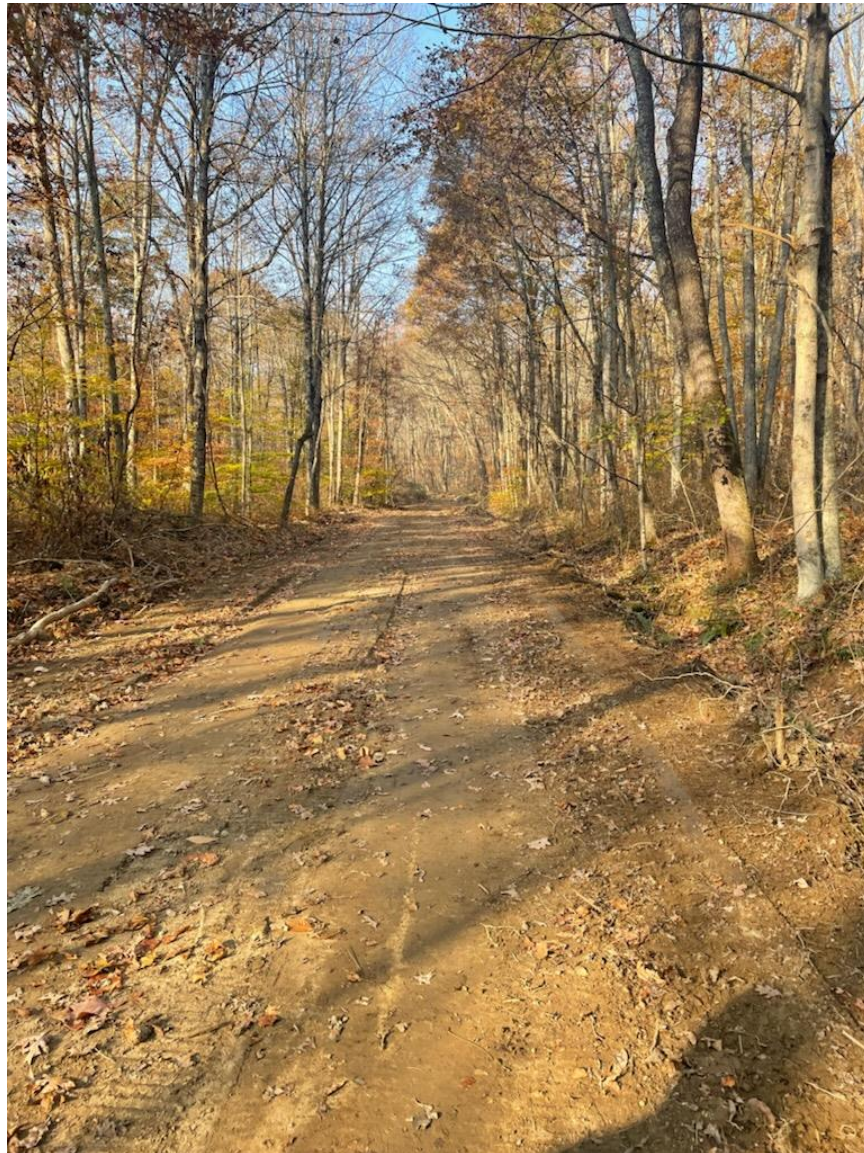
⁸ We relied upon standards for internal controls obtained from *Standards for Internal Control in the Federal Government* (2014), the U.S. Government Accountability Office, report GAO-14-704G

Appendix B: Orphan Well Site Visits

On November 10th, 2021, ODNR invited OPT team members to witness two orphan well plugging locations in progress. The purpose of the site visit was to meet several ODNR team members who work in the Orphan Well Program, speak with well plugging crew, and gain a greater understanding of some of the logistical complexities of plugging an orphan well.



Pictured above is Site A. This well was located alongside an abandoned county road in the Vinton Furnace State Forest. ODNR had to rebuild the abandoned road, which was last regularly used in the 1950s, in order to allow the plugging contractors to move their equipment on site. This site was also the location of numerous rattlesnake sightings, which required additional precautions.



Pictured above is the recreated road that was made in order to get the contractors plugging equipment to Site A. This path was semi-clear due to it being a former county road, but the actual road was no longer existent.



Pictured above is a closer photo of Site A, illustrating the orphan well plugging process.

Efficient • Effective • Transparent



Pictured above is an example from Site A of the debris that can be found within an orphan well. When debris is found during the plugging process, specific tools are needed to either remove the debris from the pipeline or destroy the debris to allow for cement to flow freely within the pipeline. Debris will alter the original plugging plans and cause change orders for a project. Change orders are anticipated during the bidding process. Contracts are designed to include a contingency to account for such issues.



Pictured above is Site B, located above an abandoned mine shaft in southeast Ohio.



Site B pipeline was sent through an abandoned mine shaft. The above photo shows the damage that acid mine drainage causes to metal casings. These metal pipelines are used for the transportation of oil from the earth to the surface.

OHIO AUDITOR OF STATE KEITH FABER



OHIO DEPARTMENT OF NATURAL RESOURCES

FRANKLIN COUNTY

AUDITOR OF STATE OF OHIO CERTIFICATION

This is a true and correct copy of the report, which is required to be filed pursuant to Section 117.26, Revised Code, and which is filed in the Office of the Ohio Auditor of State in Columbus, Ohio.



Certified for Release 8/9/2022

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