

State Notes

TOPICS OF LEGISLATIVE INTEREST

Fall 2023



History of the Orphan Well Program and the Effects of the Infrastructure Investment and Jobs Act (IIJA)

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Executive Summary

- The State orphan well program has plugged a total of 389 wells across the State since 1995.
- The Orphan Well Fund (OWF) provides an estimated \$1.0 million annually to the Department of Environment, Great Lakes, and Energy (EGLE) for plugging and remediation of orphaned wells.
- The Infrastructure Investment and Jobs Act (IIJA) included \$4.7 billion for plugging orphan wells, remediation, and restoration activities; \$4.3 billion from this funding was designated for state programs.
- Michigan received \$31.0 million of the funding for state programs, which was included in the fiscal year (FY) 2022-23 budget.
- Michigan's funding included \$25.0 million in initial grants that were required to be under contract within 90 days after receipt of the Federal funds.
- From 2011 to 2022, the State spent \$14.5 million on plugging 79 orphan wells.
- The IIJA investment in orphan wells will represent a 241% increase in orphan well spending over the next decade.
- With the estimated IIJA funding, plus historical OWF levels of funding, Michigan is projecting to plug up to 102 orphan wells (or 22.7%) of the current population in the next nine years.

Introduction

The Orphan Well Fund (OWF) was established with the passage of Public Act (PA) 308 of 1994, which created the OWF within the Michigan Department of Treasury. The OWF is subject to Part 616 (Orphan Well Fund) of the Natural Resources and Environmental Protection Act (NREPA). An orphan well is an abandoned or improperly closed oil, gas, or brine disposal well in which the owner is unknown or insolvent, or in which an imminent public health and safety threat exists.

The OWF supports EGLE's Orphan Well Program (OWP). The OWP is administered by the Oil, Gas, and Mineral Division at EGLE, in which the Fund provides an estimated \$1.1 million annually to support the State in addressing orphan wells. Funding is used for plugging wells, interim responses, remedial investigations, remediation, and site restoration.¹

The OWF is funded by the greater of \$1.0 million or 2.0% of the severance tax on oil or gas produced in the State. This amount is deposited into the OWF each fiscal year and when the unspent balance in the Fund exceeds \$3.0 million, deposits from the severance tax cease until the Fund balance falls below \$3.0 million. In addition, any money received from cost recoveries (such as the sale of scrap metals from prior owners or operators of orphaned or abandoned wells) is credited to the Fund.²

¹ Department of Environment, Great Lakes, and Energy. Orphan Well Program Overview. October 10, 2023.

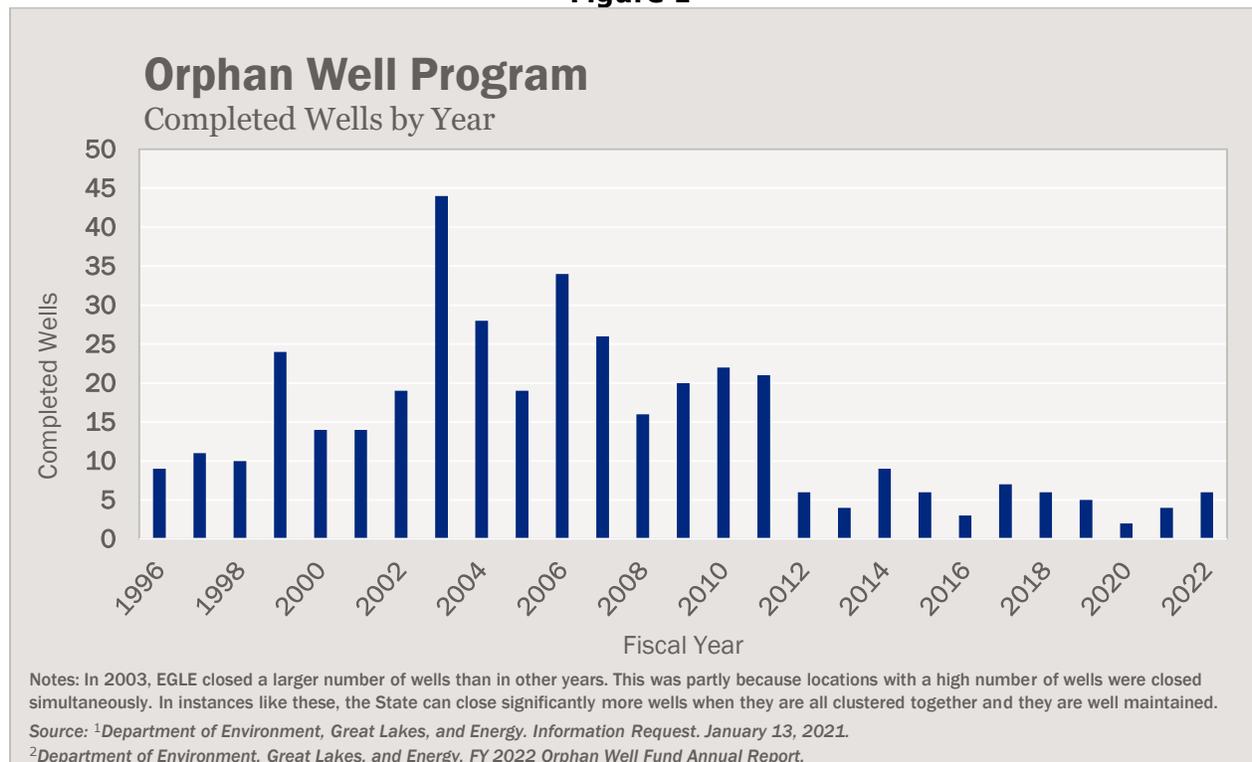
² Michigan Senate Fiscal Agency. Department of Environment, Great Lakes, and Energy Line Item and Boilerplate History. February 8, 2022.



Program History and Current Orphan Well Status

The data for the number of orphan wells closed by the OWP, dating back to 1995, is summarized in [Figure 1](#). The OWP has successfully plugged a total of 389 orphan wells in the period represented in [Figure 1](#).³ [Table 1](#) provides a summary of OWP expenditures for FYs 2010-11 through 2021-22; during that time, the State has spent \$14.5 million and has plugged 79 wells. The Department reported that the State had 440 orphan wells as of December 2022, all located in the Lower Peninsula. The locations of these well sites are summarized in [Figure 2](#).

Figure 1



Why Do Orphan Wells Occur?

The decision to close an oil or natural gas well typically represents a business decision made by the private entity, or their insolvency. Several factors can play a role in their decision-making process such as the maximum daily average a well is producing (production capacity), the price of crude oil or natural gas (market price), domestic and international demand (market demand), and other economic variables (circumstances such as natural disasters, environmental disasters, trade relations, wars, etc.).⁴

³ Department of Environment, Great Lakes, and Energy. Information Request. January 24, 2021.

⁴ While a detailed discussion on the topic of how the oil marketplace operates is a useful subject, it is not the focus of this paper. As it relates to the question of "why do orphan wells occur" this paper is intended only as a high-level overview.

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ORPHAN WELL PROGRAM EXPENDITURES FROM 2011-2022								
Fiscal Year	Expenditures							Total Expenditures by Year
	<i>Plugging, Response Activity, and Site Restoration</i>	<i>Remedial Investigation, Remediation</i>	<i>Program Costs²</i>	<i>Central Administrative Costs</i>	<i>Plugging and Site Restoration</i>	<i>Response Activity</i>	<i>Administrative Costs</i>	
2011	\$1,104,840	\$278,201	\$65,604	\$56,633	\$0	\$0	\$0	\$1,505,278
2012	569,710	36,637	257,601	57,514	0	0	0	\$921,462
2013	186,108	227,986	37,202	83,668	0	0	0	\$534,964
2014	587,808	333,176	246,029	80,957	0	0	0	\$1,247,970
2015¹	0	0	0	0	740,843	679,399	258,590	\$1,678,832
2016	0	0	0	0	602,970	36,352	279,146	\$918,468
2017	0	0	0	0	532,843	299,648	254,309	\$1,086,800
2018	0	0	0	0	675,079	22,909	302,370	\$1,000,358
2019	0	0	0	0	795,199	364,089	403,668	\$1,562,956
2020	0	0	0	0	678,862	898	391,548	\$1,071,308
2021	0	0	0	0	819,349	90,348	405,872	\$1,315,569
2022	0	0	0	0	859,318	148,873	602,561	\$1,610,561
Total Expenditures by Category	\$ 2,448,466	\$876,000	\$606,436	\$278,772	\$5,704,463	\$1,642,516	\$2,898,064	\$14,454,526

Notes: ¹ Starting in 2015, the Orphan Well Fund annual report began grouping expenditures into three categories instead of four. This change reflected the Orphan Well Program's start of doing environmental remediation projects. Previously, the focus had been on plugging wells and performing interim responses to environmental pollution related to projects.

² Program costs include wages, contractual services, supplies, materials, and travel expenses.

Source: Department of Environment, Great Lakes, and Energy. Orphan Well Program Annual Reports for FYs 2011 through 2022. December 27, 2022.

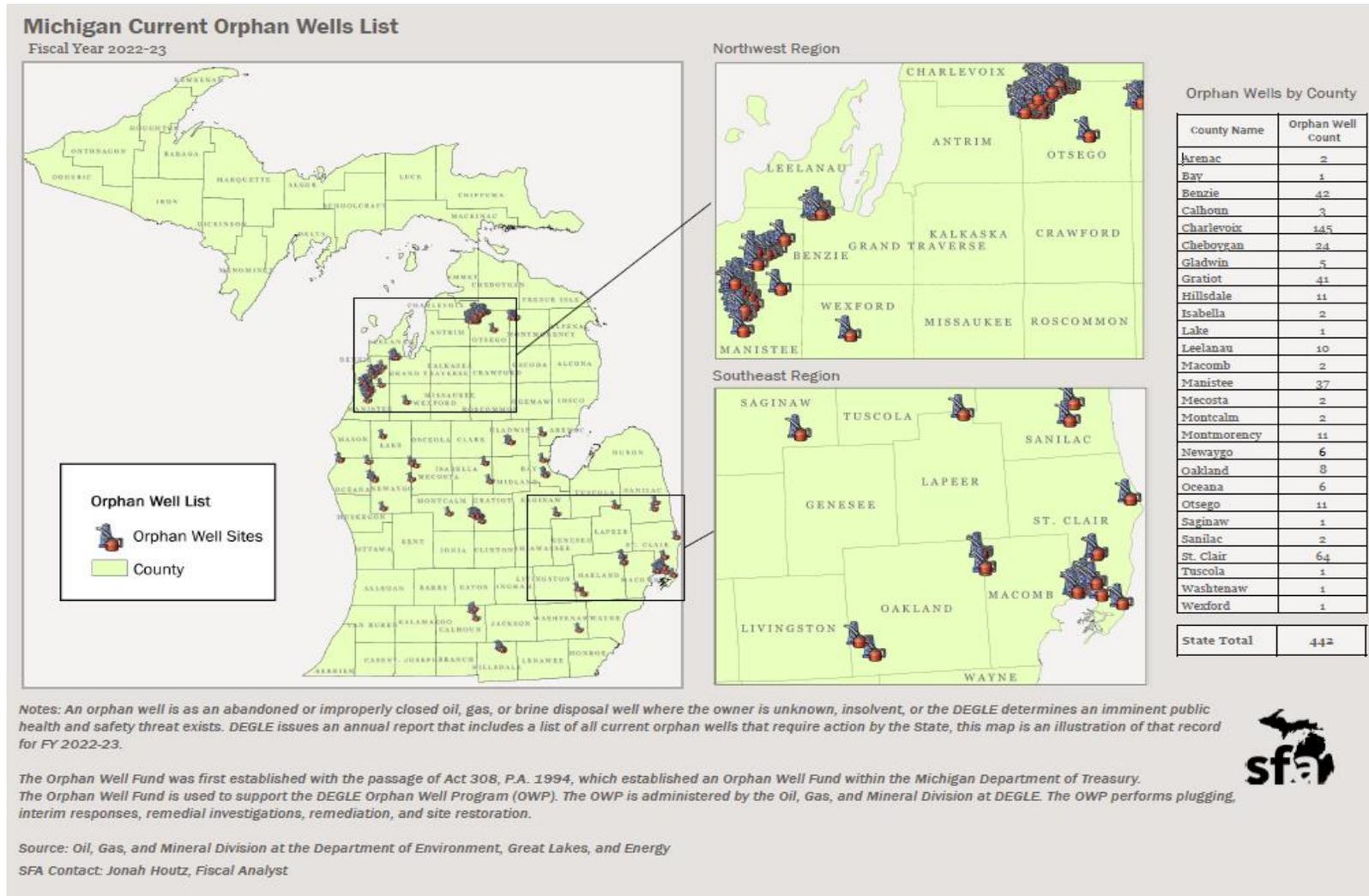
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Figure 2



Notes: An orphan well is as an abandoned or improperly closed oil, gas, or brine disposal well where the owner is unknown, insolvent, or the DEGLE determines an imminent public health and safety threat exists. DEGLE issues an annual report that includes a list of all current orphan wells that require action by the State, this map is an illustration of that record for FY 2022-23.

The Orphan Well Fund was first established with the passage of Act 308, P.A. 1994, which established an Orphan Well Fund within the Michigan Department of Treasury. The Orphan Well Fund is used to support the DEGLE Orphan Well Program (OWP). The OWP is administered by the Oil, Gas, and Mineral Division at DEGLE. The OWP performs plugging, interim responses, remedial investigations, remediation, and site restoration.

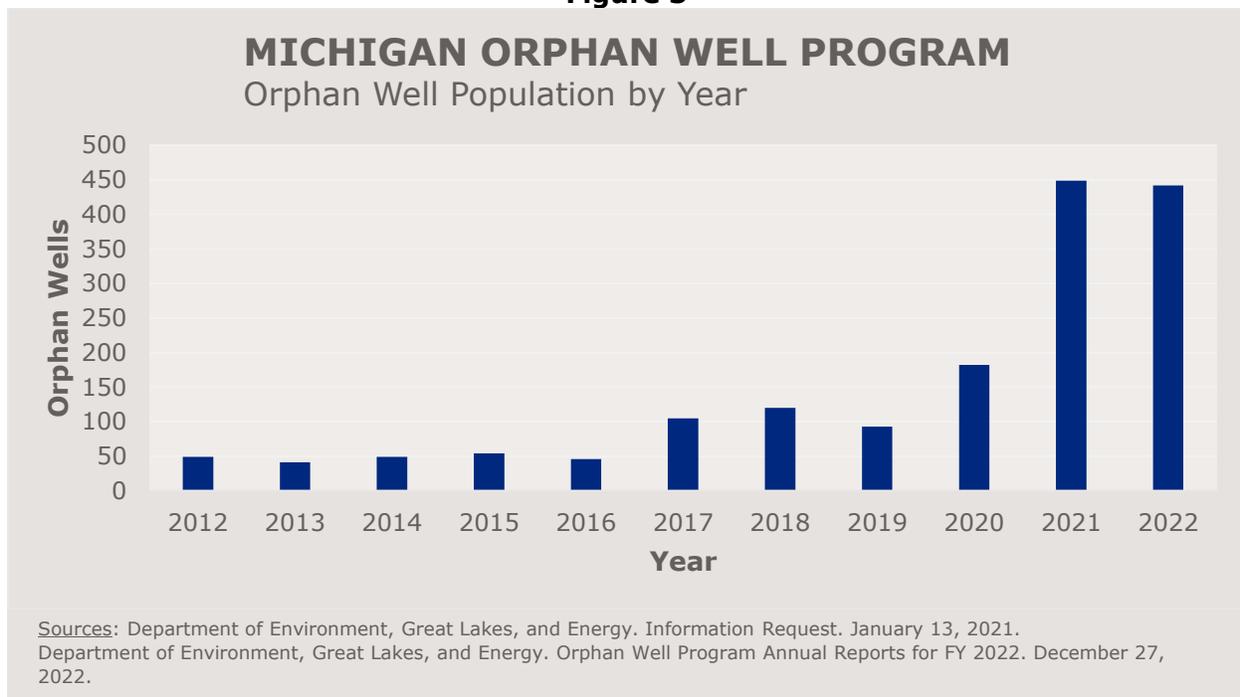
Source: Oil, Gas, and Mineral Division at the Department of Environment, Great Lakes, and Energy
SFA Contact: Jonah Houtz, Fiscal Analyst



An economically viable well is known as a marginal well. A well that is not viable and operating at a loss forces a business decision regarding the well's continued operation. Generally, a well is classified either as an idle well (it is not producing but the owner has been given permission from the State to remain idle) or as not producing (the operator has not received the State's permission to remain idle). The latter case may occur when an owner becomes insolvent or is working with EGLE for permission to idle production.

The factors mentioned above plus overall variability of the oil marketplace can lead to great variability in the number of orphan wells present within the State. As shown in [Figure 3](#), beginning in 2012 the orphan well population increased from 49 wells to 442 wells, representing a 916% increase over that 10-year period.³

Figure 3



[Table 2](#) demonstrates how the variability in crude oil prices can affect an oil well's profitability and determine whether it will remain open. The production capacity represents the well's daily capacity to produce barrels of oil (B/D); however, it is not uncommon for a well's productive capacity to diminish over its useful life (this reduction over time was not incorporated into the example).

Gross revenue represents the amount of money earned by multiplying the total oil produced and sold by the specified price of crude oil, before adjusting for expenses. The operating expenses in this example are divided between fixed and variable costs. Fixed costs are expenses that are at a fixed rate regardless of the output of production. This category includes estimates for land acquisition, permitting and bonding, drilling and discovery, the cost of machinery, insurance, etc. The example below includes capital expenditures that are normally considered "sunk costs" and are grouped as fixed costs and amortized over the well's life expectancy of 20 years.

According to the United States Energy Information Administration the total capital costs per well for an onshore well is between \$4.9 million to \$8.3 million, with significant variability between



individual wells depending on several factors.⁵ In the [Table 2](#) example, the fixed costs are estimated in between those two figures, at \$6.5 million. Variable costs are those expenses that change with the output of production and include estimates⁵ for oil and gas royalties, labor, gathering and processing, transportation, maintenance, etc. While taxes are an additional part of calculating the profitability of any business, for this example, property taxes, oil and gas severance tax, sales tax, etc., were not incorporated. Earnings before taxes were calculated using all the items outlined above; the outcome is calculated as either a positive net income or a net loss. Revenue minus variable costs is the measure of a well’s ability to pay all day-to-day operating expenses. If a well owner can break even, it can sometimes sustain operations for short periods of time before having to grapple with closing operations or experiencing solvency issues.

Table 2
Price of Crude Oil and the Effect on Profitability of Oil Wells

	Well A		Well B	
	\$95	\$40	\$95	\$40
Dollars Per Barrel				
Production Capacity				
Barrels Per Day (B/D)	50		20	
Annual Gross Revenue	1,733,750	730,000	693,500	292,000
Operating Expenses				
Fixed Costs	(325,000)	(325,000)	(325,000)	(325,000)
Variable Costs	(492,750)	(492,750)	(295,650)	(295,650)
Total Cost	(817,750)	(817,750)	(620,650)	(620,650)
Income Before Taxes	916,000	(87,750)	72,850	(328,650)
Revenue Less Variable Costs	1,241,000	237,250	397,850	(3,650)

Sources: U.S. Energy Information Administration. Trends in U.S. Oil and Natural Gas Upstream Costs. March 2016.

Note: This example is for illustrative purposes only and is not an exhaustive analysis of the effect of crude oil prices on the breakeven point for private oil wells operating in Michigan.

What does the IIJA mean for Orphaned Wells in Michigan?

The IIJA included a total of \$4.7 billion for orphaned well programs. From that total, \$4.3 billion is allotted for states to perform orphaned well plugging, remediation, and restoration activities. The funding is spread across six national programs summarized in [Table 3](#). The funding is allocated to Federal, state, and tribal programs and will be managed by the US Department of Interior (DOI). State programs will receive the largest portion of funding totaling approximately \$4.3 billion as summarized in [Table 4](#). State funding was divided across three programs categorized as initial grants, formula grants, and performance grants.

⁵ US Energy Information Administration. Trends in U.S. Oil and Natural Gas Upstream Costs. March 2016.



Table 3

National Infrastructure Investment in Orphan Wells Programs (millions of dollars) ¹	
Federal Program	\$250.0
Initial state grants	\$775.0
State formula grants	\$2,000.0
Tribal program	\$150.0
Secretary and Interstate Oil and Gas Compact Commission	\$32.0
State performance grants (matching and regulatory improvement)	\$1,500.0
Total.....	\$4,707.0

Source: ¹ Federal Funds Information for States. State Allocations. January 4, 2022

Table 4

Infrastructure Funding for Orphaned Wells States' Programs (millions of dollars)		
Program	States¹	Michigan Share²
Initial Grants	\$775.0	\$25.0
Formula Grants	\$2,000.0	\$5.8
Performance Grants ³	1,500.0	TBD
Total.....	\$4,275.0	\$30.8

Sources: ¹ Federal Funds Information for States. State Allocations. January 4, 2022

² Department of Environment, Great Lakes, and Energy. Information Request. January 13, 2021.

³ Performance grants, also known as matching and regulatory improvement grants, will have further directions released later this year.

- **Initial Grants:** The IIA provided \$775.0 million for initial grants for states that requested funding. States that submitted and met the required certifications received up to \$25.0 million each. States that failed to meet these certifications could still receive up to \$5.0 million if they demonstrated an ability to use funding as prescribed. States had one year to obligate any funding awarded through this program.
 - *Michigan:* Michigan applied for and received the \$25.0 million initial grant which was appropriated in the FY 2022-23 budget. The Department notes the initial grant disbursement is less flexible and primarily meant to put oil and gas workers back to work quickly, while abating environmental risks associated with orphaned sites. This funding must be under contract within 90 days after receiving the grant. The use of program funding will be primarily for plugging and restoration of sites but also may be used to remediate contaminated soil discovered at a plugging operation. Funding may not be used for ground water contamination remediation. The Department plans to use this \$25.0 million first to target a large portion of the current OWP list.⁶ The FY 2022-23 budget included \$31.0 million in Federal funding from the IIA for the OWP, which included the \$25.0 million from initial grants. Additionally, the FY 2023-24 budget includes \$5.2 million GF/GP to match an additional \$5.2 million Federal funding for the OWP.

⁶ Department of Environment, Great Lakes, and Energy. Information Request. January 13, 2021.



- **Formula Grants:** The IIJA provides \$2.0 billion in formula grants for states. The DOI gave states until December 30, 2021, to notify it of their intention to apply for the formula grant program. On January 5, 2021, the DOI published a memo stating that 26 states had submitted a notice of intent to apply for the formula grants. A detailed guidance document was released in July 2023 outlining the procedure for applying for formula grants.
 - *Michigan:* The FY 2022-23 budget included \$31.0 million in Federal funding from the IIJA for the OWP, which included the \$5.8 million from the initial formula grant offerings.
- **Performance Grants:** The IIJA provides \$1.5 billion in performance grants. There are two components to these grants for which states may apply: matching grants and regulatory improvement grants.
 - The first component is regulatory improvement grants for states that have strengthened plugging standards and implemented orphaned well improvements over the last 10 years. States that apply and qualify would receive a grant 180 days after receiving their initial grant.
 - *Michigan:* According to EGLE, this component of the performance grants could provide up to \$20.0 million in grants for each regulatory improvement the State makes in the areas of financial assurance, policies that limit the risk of future orphan well liabilities, or well integrity regulations. The Department notes that in 2015, Michigan doubled its single well bond amounts within Part 615 (Supervisor of Wells) of NREPA, already qualifying the State for a \$20.0 million grant.
 - The second component is referred to as matching grants. Under this program, states would receive grant funding equal to the difference in their average annual amount spent between FY 2010-11 through FY 2019-20 to plug, remediate, and reclaim orphaned wells, as well as to decommission associated infrastructure; and the amount it will spend using the matching grant for the same purposes. This component is capped at \$30.0 million per state between FY 2021-22 through FY 2030-31.⁷

Projections of Completed Orphan Wells by FY 2029-30

Table 5 provides a perspective of what an injection of \$31.0 million in Federal funding could mean for Michigan's OWP. The data used for this projection were provided in the previous 10-years of OWP annual reports, including estimates of funding under the IIJA as provided by EGLE, and using the Bureau of Economic Analysis' price deflators for government purchases at the state and local level for purchases that are categorized as construction. The methods and sources used to develop this projection are summarized below the table. A couple of limitations of the available data include the following:

1. While the historic three-year average cost for plugging a well is \$392,379, that cost is not representative of the price for each well currently on the State's orphan well list. The cost to close wells varies greatly and many of the 440 wells on the current list could be closed for as little as \$15,000. The State prioritizes those wells that pose the greatest risk to public health

⁷ Federal Funds Information for States. State Allocations. January 4, 2022.



and the environment. This leads to the State closing those wells that often require the greatest amount of remediation and often are the most labor intensive to address. The Department has indicated that many of the 440 wells on the current list could be closed for as little as \$15,000, representing a reduction in cost per well of \$377,379. This estimate is based on historical data and does not include this variation in cost per well.

2. Michigan may receive additional funding from the DOI over the next eight years as it continues to develop and roll out its performance grant programs. Any change in revenue over this period would adjust the projection.

According to the current projection, EGLE estimates that if the OWF continues to provide similar levels of annual funding, and using the \$31.0 million in IIJA funding, the State could see a reduction of up to 102 orphan wells, or 22.7%, of the current population over the next nine years.

Conclusion

While it is anticipated that the State is going to be the benefactor of a significant increase in one-time revenue related to orphan wells because of the IIJA, this funding will address only approximately 22.7% of the State's current orphan well population. Examination of this topic reveals that there are several factors to take into consideration. First, the longer an orphan well is left unaddressed, the higher the remediation cost can be. Moreover, the orphan wells list is not a static list, as many factors can contribute to whether an oil well is shuttered and becomes an orphan well.

If the State were interested in further addressing its current orphan well population, policy makers could consider the following different policy tools to support the OWP:

1. An increase to the revenue cap on the severance tax from oil or gas, and/or increasing the balance restrictions for the OWF from \$3.0 million.
2. Consider increasing the OWF limits mentioned above and indexed to a measure of inflation for the construction industry.
3. One-time funding to meet match requirements under the IIJA to secure additional Federal funding for Michigan.
4. Other tools that could be used to supplement State resources to provide a long-term sustainable revenue stream to fund the work of the OWP could include the following:
 - a. Increased bond thresholds.
 - b. New dedicated revenue streams tied to the price of fuel.
 - c. New regulatory fees assessed during a well's life cycle (beginning, middle, or end).

As decision makers evaluate different tools to address orphan wells, it is important to note that the IIJA includes additional funding opportunities through the use of performance grants for states. This grant program could be used in conjunction with the tools mentioned above to support the State's OWP. The guidance for the performance grant program has yet to be finalized, but these performance grants could benefit any plan that policymakers consider as they evaluate the issue of orphan wells in Michigan.



Table 5

PROJECTION OF COMPLETED WELLS BY FY 2029-30						
Fiscal Year	Expenditures		Revenue		Totals by Year	
	<i>GDP Deflator¹</i>	<i>Cost Per Well²</i>	<i>Orphan Well Fund³</i>	<i>IIJA Funding⁴</i>	Total Funding	Estimated Wells
2022	4.95%	\$392,379	\$1,316,611	\$0	\$1,316,611	3
2023	3.32	411,802	1,316,611	31,000,000	32,316,611	78
2024	3.29	425,474	1,316,611	0	1,316,611	3
2025	3.28	439,472	1,316,611	0	1,316,611	3
2026	3.29	453,887	1,316,611	0	1,316,611	3
2027	3.41	468,819	1,316,611	0	1,316,611	3
2028	3.45	484,806	1,316,611	0	1,316,611	3
2029	3.45	501,532	1,316,611	0	1,316,611	3
2030	3.41	518,835	1,316,611	0	1,316,611	3
Totals by Category		\$4,097,005	\$11,849,499	\$31,000,000	\$42,849,499	102

Sources and Notes: ¹GDP Deflator consists of a forecast from the Bureau of Economic Analysis for Price Deflators for Government Purchases, at the State and Local Government level, covering purchases in the category of construction costs.

²Cost per well calculated using the three-year average expenditures for the Orphan Well Fund (OWF) annual report provided by EGLE. This average was calculated using the cost of plugging and restoration, response activity, and administrative costs each year divided across completed projects. To account for inflationary forces the three-year average is adjusted at the same rate as the GDP deflator. It is important to note that every project requires a unique approach to resolving environmental issues; therefore, the average was used as the tool for smoothing out this expenditure line.

³The OWF revenue was calculated using the three-year average of total expenditures from the OWF annual report provided by EGLE. This average was calculated using the cost of plugging and restoration, response activity, and administrative costs each year divided by the number of years. No additional adjustment was performed, as revenue in the OWF annual reports appears to be largely uniform across the last eight years.

⁴IIJA funding disbursements are relatively unknown. With exception of the initial grants for \$25.0 million, which must go under contract within 90 days, the estimated schedule was developed strictly for the purpose for creating a reasonable projection, and not based on any defined schedule.