Progress Report: Oilfield Site Restoration using IIJA Funds

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Project Overview

In November 2021, President Joe Biden signed into law the Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law. Section 40601 of the IIJA included $4.6 billion for orphaned well site plugging, remediation, and restoration. Louisiana has already received a $25 million initial grant but is slated to receive significantly more. At the time of the IIJA passage, Louisiana had approximately 4,600 "orphaned" oil and gas wells.

Researchers at LSU, led by the LSU Center for Energy Studies, were requested by DNR to estimate the costs of plugging wells and compare with the methane emitted. A progress report was provided in March of 2023 in advance of the 2023 Regular Legislative Session of the Louisiana Legislature. This current progress report is timed with the completion of the initial grant that ended at the end of September 2023.[6] At this time, the Louisiana Department of Natural Resources is in the process of submitting paperwork for the formula grant.

Two contractors have been actively plugging and abandoning (P&A) wells and conducting site restoration: Dynamic Group, LLC, and Lemoine. Both contractors have hired subcontractors to conduct a pre-plug environmental assessment of each site, which includes an estimate of methane leaking, if any. EisnerAmper[7] is the professional services firm hired to support DNR's management of the program. Data presented in this short summary report was provided by a combination of DNR, EisnerAmper, the contractors, and environmental subcontractors. Data has been analyzed by CES and summarized. All data presented is that which was available at approximately the end of November 2023, unless otherwise noted.

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Table 1 shows the status of orphan and idle wells in Louisiana. At the beginning of 2023, there were 4,610 orphan wells in Louisiana. As of the end of September, approximately 530 wells had been P&Aed under this program.[8] From January to November, though, an additional 670 wells in net entered the orphan well program.[9] Thus, today there are approximately 4,750 orphan wells that have not been permanently P&Aed.[10] We estimate there are approximately 16,100 "idle" wells in Louisiana currently that have not been designated as orphans. These are wells that are either designated by the operator as idle or have not produced hydrocarbons in five years, but also have not been P&Aed.

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[6] Note that an extension has been granted and thus work is ongoing.
[7] Formerly Postlethwaite & Netterville (P&N).
[8] In addition, approximately 115 orphaned wells were plugged in wildlife refuge areas owned by the U.S. Fish and Wildlife Service at a cost of approximately $4 million. This document focuses on orphaned wells on Louisiana state lands.
[9] Wells can enter or exit the program for various reasons, such as OSR abandonment, EPA abandonment, operators using a cooperative agreement to abandon wells, operators/landowners taking over wells to restore production, etc.
[10] Note there is not perfect consistency over the time period, but this provides sufficient perspective.

Table 1: Orphan & Idle Well Status	
Orphan Well Counts in January 2023 (A)	4,610
Orphan Wells Plugged through September (B)	530
Change in Orphan Well Counts Since January (other factors) (C)	670
Current Orphan Well Count (A) + (C) - (B)	4,750
Total Idle Wells in Louisiana	16,100

Note: All numbers rounded to nearest 10 wells based on current estimates.

Table 2 shows the reported costs of the program. To date, the total amount spent on the program associated with the 518 wells with reported cost data is $21.7 million, implying costs of approximately $41,900 per well.[11]

Table 2: Well P&A Costs		
Orphan Wells Plugged with Cost Data Reported		518
Cost of Completed P&Aed Wells (millions)	$	21.7
Cost per Completed Well	$	41,900

Note: Costs as of approximately the end of September 2023.

Table 3 summarizes two sets of methane emissions measurements from largely different groups of wells. The first set of measurements was made by environmental contractors using a two-step process. For each measured well, the contractors performed an initial survey of the site using an optical gas imaging (OGI) camera to identify specific leaks. Then, they measured the concentration of methane at identified leaks using a SEMTECH HI-FLOW device. The second set of measurements was conducted by researchers at LSU using a more sensitive chamber method. For each measurement, the researchers enclosed the wellhead within an acrylic chamber. Then, they recorded how the concentration of methane in the chamber changed over time using either a Cavity Ringdown Spectroscopy CH_4 analyzer for low concentrations or Bascom-Turner Gas Rover for high concentrations. Finally, they calculated emission rates from the concentration data. LSU researchers also collected gas samples at discrete time intervals from the chamber and analyzed them in the laboratory.

To date, environmental contractors have conducted a methane measurement on 842 wells and have detected methane leakage from 189 of these wells. Assuming the leak rates are relatively constant over the course of the day of measurement, this sums to 27.8 thousand standard cubic feet (mscf) of leaked gas per day. For perspective, using these measurements, the combined leaks from these wells are equivalent to approximately the energy content of 240 gallons of gasoline per day. Although not shown here, over 50 percent of the methane leakages detected come from just 10 of the more than 800 wells measured. Thus, there are many wells with very small leaks, but a handful of wells with much larger leaks.

Next, Table 3 shows the measurements taken by researchers at LSU. To date, 59 wells have been measured, with methane being detected in 51 (or 86 percent) of the wells measured. Thus, the more detailed chamber-based measurements are finding a higher share of wells with leaks. From these 51 wells with detected emissions, a total of 4.53 mscf/day of methane is detected, or approximately 0.08 mscf/day per well. We caution against drawing conclusions from comparisons between the contractor and LSU measurements at this point because the measurements come from different wells. However, we do note that the LSU measurements find a larger proportion of leakers and larger leaks (on average) relative to the contractors. The LSU team is actively engaged in research to estimate aggregate emissions from all Louisiana orphan wells based on this data, and to reconcile differences between the two measurement techniques.

[11] These costs are based on Construction Management at Risk (CMAR) contractor submitted costs. These costs are subject to change as reports (PayApps) from contractors are finalized. These costs include CMAR General Conditions costs spread across completed wells. Costs do not include other costs such as EisnerAmper, LSU, and internal DNR costs.

Table 3: Methane Measurement		
	Contractors	LSU
Wells Measured	842	59
Methane Detected	189	51
Share with Methane Detected	22%	86%
Methane Detected (mscf/day)		
Total Methane	27.8	4.53
Average Methane per Well	0.03	0.08

Note: Methane measurements as of approximately the end of November 2023.

About the LSU Center for Energy Studies

The Louisiana State University Center for Energy Studies (LSU-CES) was created by the Louisiana Legislature in 1982 with the stated mission of conducting, encouraging, and facilitating research and analysis to address energy-related problems or issues affecting Louisiana's economy, environment, and citizenry. The Center's goal is to provide a balanced, objective, and timely treatment of issues with potentially important consequences for Louisiana. More information on LSU-CES can be found on our webpage here.