

Tradewater OOG – Great Plains 1

Tradewater, LLC



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Section 1: Project Overview

1.1 PROJECT TITLE

Tradewater OOG – Great Plains 1 (hereinafter referred to as “Project”).

1.2 METHODOLOGY

Open Carbon Protocol - Quantification, Monitoring, Reporting, and Verification of Greenhouse Gas Emissions Reductions and Removals from Plugging Orphaned Oil and Gas Wells in the United States, August 2025.

1.3 PROJECT SUMMARY

Background Information

There are over 100,000 orphaned oil and gas wells sitting unplugged throughout the United States, putting the air, soil, water, and communities around them at risk of contamination by methane and other harmful gases and fluids. The wells in this project, located in the Great Plains region of the United States, address a unique and urgent problem. Each well was left on private landowner property while actively leaking methane. Each of these wells present elevated shut-in pressure, which indicates that there are large quantities of methane that would be emitted into the atmosphere over time if not plugged. Further, gas wells are typically expensive and labor-intensive to plug and because of this, they have sat unaddressed for long periods of time. Permanently plugging the wells included in this project will mitigate the active and potential emissions that would have been released if they remained unplugged.

The Project will measure the quantity of potential emissions avoided by obtaining pre-plugging measurements from the wells in accordance with the Methodology before plugging the wells and confirming successful emissions mitigation through post-plugging emissions testing. Tradewater will contract a third-party company comprised of oil and gas experts to perform plugging activities. For all the wells in the project, plugging activities will follow best practices, state requirements, and industry-approved methods. Post-plugging emissions confirmation samples will be recorded for each well to confirm that the well locations have no remaining emissions, and a permanence check will be completed 12 to 18 months after completion of the post-plugging emissions confirmation to assure the permanence of the project.

The Methodology applies the principle of potential to emit as it is a recognition of the stored, quantifiable methane that will eventually be released without permanent plugging. The Project Activity ensures that each well’s potential to emit is mitigated.

Project Activity

The project activity is the plugging of five wells located in Kansas, United States resulting in the avoidance of methane emissions.

Description of Project Technologies, Products, Services, and Expected Level of Activity

For Plugging

Plugging activities follow state regulations and are included in each individual well’s Plugging Plan. Tradewater contracted a third-party company comprised of oil and gas experts to perform plugging activities. For all the wells in the project, they will be plugged with a minimum of 50’ of cement above perforations or open hole sections. Additionally, a cast iron bridge plug will be placed above each cement top for producing sections, with additional cement placed on top of the bridge plug to surface. Post-plugging emissions confirmation samples will be recorded for each well to confirm that the well locations have no remaining emissions.

For Measurement

Trained Tradewater Well Services team members and qualified professionals from the oil and gas industry follow industry standards and best practices; local, state, and federal laws and regulations; and requirements under the Methodology for measurements. Technologies used are appropriate for the parameter being measured and users follow the user guides for each instrument for calibration frequency, operation procedures, and operating limits.

1.4 PROOF OF PROJECT ELIGIBILITY

The project is eligible under the Methodology for the *Quantification, Monitoring, Reporting, and Verification of Greenhouse Gas Emissions Reductions and Removals from Plugging Orphaned Oil and Gas Wells in the United States, August 2025* (the “Methodology”).

Criteria	Requirement	Evidence of Eligibility
Location (Section 2.2)	The well is located in the United States.	The wells included in the Project are located in Kansas, United States.
Emission Status (Section 2.2)	The well is actively leaking methane in its undisturbed state, prior to any project activities taking place. A well is considered to be leaking if methane is escaping through the casing, surface equipment, or other parts of any production infrastructure that have deteriorated or were not properly decommissioned.	The wells included in the Project were emitting methane when they were first accessed by Tradewater, as confirmed by documentation provided to the VVB.

<p>Well Classification (Section 2.2, Table 8)</p>	<p>The well meets the definition of orphaned oil and gas well as defined in Table 8 of the Methodology at the time the project developer either received the authority to plug the well or moved to take operatorship of the well in order to plug.</p> <p>Table 8: An orphaned oil and gas well refers to either:</p> <ol style="list-style-type: none"> 1) A well that has no solvent operator, or no operator recognized by the respective jurisdictional body, to conduct proper plugging and decommissioning activities and has been, or inevitably will be, left to the respective jurisdictional body to manage; or 2) A well that is not being actively produced and that was going to be imminently listed as an orphaned well and left to the respective jurisdictional body to manage, but for some intervening factor, as attested to by a representative from the cognizant regulatory body. Example: A well that was not being actively produced and that was going to be added to an orphan well list, but that was purchased at a bankruptcy auction by a third party operator as part of a larger portfolio of wells, may still be eligible under this methodology, provided a representative from the cognizant regulatory body attests to the well’s operator history. 	<p>The wells included in the project have no actively licensed operator in Kansas, and no operator recognized by the Kansas Corporation Commission (KCC) to conduct proper plugging and decommissioning activities. They were registered on the Kansas Geological Survey (KGS) database as of 11/11/2024 (prior to the first access of the first well). This list includes all wells in the state, with various attributes including last known operator (“current operator”) and classification (“Status”), where a classification of “ON LIST” corresponds to abandoned or orphaned wells as recognized by the KCC. Tradewater confirmed with the state regulator that the wells in the project do not have an actively licensed operator recognized by the jurisdictional body, despite the last known operator being listed.</p>
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<p>Reporting Period (Section 2.4)</p>	<p>The reporting period commences on the date the first well in the project is plugged. This is also considered the project start date. The reporting period ends when the last well in the project passes the Post-Plugging Leak Test.</p>	<p>The reporting period is expected to begin in October 2025, on the date the first well will be plugged, and end in November 2025, on the date the last well to be plugged undergoes the post-plugging leak test.</p>
<p>Project Start Date (Section 2.4)</p>	<p>The reporting period commences on the date the first well in the project is plugged. This is also considered the project start date. The project start date must be on or after May 9, 2025.</p>	<p>The Project start date is the date when the first well is plugged. The start date is expected to be in November, 2025. This date occurs after May 9, 2025.</p>
<p>Crediting Period (Section 2.5)</p>	<p>The methodology applies a 20-year crediting period to each well. The 20-year crediting period is applied to each well, from the date it is plugged, regardless of project start date. The 20-year crediting period is applied regardless of which quantification module is used.</p>	<p>The crediting period for the Project is a 20-year period applied to each well. The crediting period is expected to begin in November 2025, on the date which the first well was plugged, and expected to end in November 2045, 20 years from the plugging of the last well in the project.</p>
<p>Regulatory Surplus (Section 3.1)</p>	<p>To meet the regulatory surplus criterion, project developers must show compliance with the eligibility criteria and attest that the project is not receiving government funding for the plugging activities.</p>	<p>Tradewater, LLC, is a private company and is not receiving any government funding for the plugging activities. An attestation is included in the project materials provided to the VVB.</p>
<p>Prior Consideration (Section 3.2)</p>	<p>To meet the prior consideration requirement, project developers must demonstrate that carbon credit revenue was part of the decision to plug orphan wells. This ensures that the project activity was not planned or financially committed prior to the consideration of crediting. Acceptable forms of evidence may include, but are not limited to, dated internal memos, board resolutions, project plans, investor pitch decks, or other documentation showing that carbon credit revenues were a factor in the decision to proceed.</p>	<p>Tradewater began work on this project under a different carbon program and methodology, in which the mechanism for any work on the project was the intent to include in a carbon project for the purposes of carbon credit issuance. Tradewater is a carbon project developer. Although work began prior to the publication of the OneShot methodology, the wells could not be considered for plugging without the carbon program mechanism. Additional evidence is submitted alongside other project documentation.</p>
<p>Performance Standard (Section 3.3)</p>	<p>By setting clear eligibility criteria that focus on wells outside the scope of government plugging efforts, the methodology ensures that private investment in well remediation leads</p>	<p>The plugging of orphaned wells in the U.S. is determined to be additional by the performance standard set in the Methodology, provided the Project meets all eligibility criteria. The Project meets the</p>

	to genuine, additional emission reductions. Therefore, so long as the project and each individual well meet all eligibility criteria in the methodology, the project is considered to pass the performance standard and is considered additional.	eligibility criteria as described in this section.
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1.5 PROJECT LOCATION

The Project includes five wells in Kansas, United States. The API Number, Well Name, county, and geographic coordinates for well access are listed in the table below.

Project Wells

API Number	Well Name	County	GPS Coordinates
1512529000000	THOMPSON EAST 3	Montgomery	37.088179, -95.927502
15125312530000	ADAMS 1-16	Montgomery	37.1710684, -95.541826
15099228940000	ROHLING 1-2	Labette	37.115927, -95.520469
15099228960000	ROHLING 3-2	Labette	37.109016, -95.519866
15125268670000	BARTON 'A'3	Montgomery	37.242755, -95.739065

1.6 OWNERSHIP AND COMPLIANCE WITH LAWS, STATUTES, AND OTHER REGULATORY FRAMEWORKS

Tradewater performs an evaluation of the relevant state’s regulations as they relate to orphaned oil and gas wells, specifically how the wells are classified, how Tradewater can legally evaluate and plug them, and the plugging regulations which must be followed.

In Kansas, all oil and gas wells are tracked on the Kansas Geological Survey (KGS) database which is maintained by the Kansas Corporation Commission (KCC). The KCC follows the Kansas Administrative Regulations, or K.A.R.

The wells in the KGS database include several identifying metrics which are defined in the Oil and Gas Well Database Abbreviations page. Tradewater received further clarification from the Director at the KCC to understand without question that the wells included in the project are considered “orphaned” (using the Methodology’s definition) in that:

- The wells have no actively licensed operator recognized by the KCC

- There is no operator recognized to conduct proper plugging and decommissioning of the wells
- The wells are determined to be improperly plugged and left to the KCC to manage

Tradewater then followed the requirements for first taking ownership of the well and added the well to Tradewater Well Services’ license (form T-1) and then notified the jurisdiction of the intention to plug (K.A.R. 82-3-113; form CP-1). For plugging the wells, K.A.R 82-3-114 for Plugging Methods and Procedures were followed and executed by a licensed plugger. After plugging, Tradewater files a Well Plugging Record (K.A.R. 82-3-117, form CP-4) with the KCC.

Additional requirements, such as pit permits (K.A.R. 82-3-600) and disposal of wastes (K.A.R. 82-3-607) are followed.

After plugging, the KCC reviews the plugged well and signs off on the Well Plugging Record. This is done to confirm that plugging is done in conformance with the steps set out in the regulations.

1.7 PROOF OF TITLE

Tradewater LLC is the Project Proponent. Tradewater LLC led all plugging activities via Tradewater Well Services LLC and possessed the right to all carbon credits derived from plugging the orphaned gas wells in this Project. Access to the landowner’s property is obtained through a Landowner Carbon Benefit Acknowledgement that provides Tradewater Well Services the right to access the property, plug the wells, and explicit proof of title to the carbon credits. Tradewater Well Services is a wholly-owned subsidiary of Tradewater, LLC (and Tradewater, LLC manages Tradewater Well Services), and Tradewater Well Services transferred its rights to the carbon credits to Tradewater, LLC.

As orphan wells exist without a solvent or designated owner, the responsibility of the well is conveyed to the State, and no specific entity is legally responsible for (by title) or held liable for the potential and fugitive emissions from any leaking well. Transfer of ownership is required in order to plug an orphaned well in Kansas. Tradewater Well Services filed for the ownership of the wells included in the Project via Form T-1 and received approval and therefore authority to plug the wells.

No other parties can claim or produce proof of title. Tradewater would not be financially incentivized to carry out the plugging activities without exclusive ownership of credits.

1.8 PARTIES

Entity	Responsibility	Name	Title, Project Role	Contact
Tradewater, LLC 1016 W Jackson Blvd 1007 Chicago, IL 60607	Project Proponent, Carbon Credit Title	Gabe Plotkin	Founding Partner Strategic Advisor	(312) 273-5122 gplotkin@tradewater.us
		Cassandra Whitford	Senior Manager, Methane Program, Project Expert	(312) 273-5122 cwhitford@tradewater.us

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United States		Kapilan Tamilselvan	Environmental Project Manager, Project Expert	(312) 273-5122 ktamilselvan@tradewater.us
		Safira Andriani	Environmental Project Manager, Project Expert	(312) 273-5122 sandriani@tradewater.us
		Gina Sabatini Mattei	Manager of Verification, Project Manager	(312) 273-5122 <u>gsabatini@tradewater.us</u>
Tradewater Well Services, LLC	Service Provider	Timothy H. Brown	Manager	(312) 273-5122 tbrown@tradewater.us
Kansas Corporation Commission	Regulator	Ryan A. Hoffman	Regulatory Contact, Director, KCC, Conservation Division	Ryan.hoffman@ks.gov

Section 2: Methodology

2.1 APPROVED METHODOLOGY

Open Carbon Protocol - Quantification, Monitoring, Reporting, and Verification of Greenhouse Gas Emissions Reductions and Removals from Plugging Orphaned Oil and Gas Wells in the United States, August 2025.

2.2 METHODOLOGY JUSTIFICATION

The Project involves the mitigation of eligible orphaned oil and gas wells by plugging those that emit methane as uncontrolled emissions. The Methodology is best suited to quantify, monitor, report, and verify this Project as it is specific to the sectoral scope and project activities implemented by the Project.

2.3 PROJECT BOUNDARIES

The geographic boundary of the Project is contained to the locations of the orphaned wells, which are located in Kansas, United States as specifically identified in Section A6 of this plan. The geographic boundary includes the wellhead, the surrounding area along the ground 1 meter in all directions, and any surface equipment linked to the well.

2.4 IDENTIFICATION OF GHG SOURCES AND SINKS

SSR	Description	GHG	Baseline (B) Project (P)	Included or Excluded
Emissions from orphaned oil and gas wells	Potential methane emissions from orphaned oil and gas wells	CH ₄	B	Included
On-site Fossil Fuel Use from Plugging	Emissions from fossil fuel combusted by mechanical equipment used on-site for plugging orphaned oil and gas wells	CO ₂ CH ₄ N ₂ O	P	Included
Materials Emissions from Concrete Used for Plugging	Emissions from concrete used to plug orphaned oil and gas wells	CO ₂ e	P	Included

2.5 BASELINE SCENARIO

The baseline scenario selected is the business-as-usual case, which is the orphaned wells’ continual release of methane into the atmosphere and the potential methane that would be emitted from the reservoir associated with the wells if they are not permanently plugged.

Kansas Statute 55-179 indicates that if the Kansas Corporation Commission finds a well to be abandoned and the operator is still solvent, the operator is responsible for either plugging the well or bringing it into regulatory compliance. Instead of being properly plugged or managed, the wells in this project were

orphaned by the formerly licensed operators and subsequently added to the State's list of wells for which they are responsible. Then, the KCC may elect to plug the well as funds become available. . There is no mandate for them to plug wells. The business-as-usual case means that these wells would continue to sit unplugged and emit methane to the atmosphere unmitigated. The wells' potential emissions are considered under this Methodology as part of the baseline.

2.6 WITH-PROJECT SCENARIO

The project scenario is the plugging of five orphaned gas wells in Kansas that would otherwise remain unplugged and emitting methane into the atmosphere. Pre- and post-plugging measurements were taken to monitor the emissions of the well prior to and after plugging to demonstrate the project activity's success.

The business-as-usual scenario involves the release of the wells' potential methane; the potential to emit represents the total volume of methane that a well would release into the atmosphere if left unplugged.

2.7 GHG EMISSIONS REDUCTIONS

The Project reduces GHG emissions by preventing the total and uncontrolled release of methane from orphaned gas wells to the atmosphere. In the baseline scenario, methane is released through continual leaks or from degrading surface equipment, degrading casing, or other physical changes in the well. The GHG emissions reductions were calculated per well by subtracting project emissions from the baseline emissions, which are the calculated emissions that are mitigated over the 20-year crediting period.

2.8 PERMANENCE

The risk of reversal is minimal for projects under this Methodology, and permanence requires the demonstration of project integrity and emissions prevention, both after the plug is set (post-plugging leak test) and again in between 12 and 18 months of plugging (permanence check). In order to demonstrate that plugging the orphaned gas wells in the Project resulted in avoided methane emissions, post-plugging emissions confirmation samples are taken and compared to background methane concentration levels. No atmospheric leakage was detected exceeding the allowable threshold as indicated by the Methodology at the time of the post-plugging leak test, and is to be reconfirmed during the Permanence Check

After an oil or gas well is plugged, a project developer must also obtain documentation from the relevant state regulatory authority certifying that each well in a project has been plugged. For the state of Kansas, this confirmation is through the KCC approval and filing of form CP-4 ("Well Plugging Record" form).

Section 3: Additionality

3.1 ADDITIONALITY

The business-as-usual case for orphaned wells is the continual release of methane and the potential methane that would be emitted from the reservoir associated with the well if not plugged permanently. Orphaned wells contain no solvent operator or no actively licensed operator responsible for plugging, so under the business-as-usual scenario there is no active engagement for plugging wells or managing the methane release. Orphaned wells often default to the State, which lacks the funding to plug the wells. There are no mandates for plugging these wells, and common practice does not include plugging of the wells in the absence of a legal requirement.

As a result of these conditions, plugging orphaned wells is considered additional as it goes well above and beyond the business-as-usual scenario.

3.2 PERFORMANCE STANDARD

The wells included in the Project meet the criteria for eligibility in the Methodology, and are therefore considered to pass the Performance Standard Test. The Methodology indicates that any project which meets the eligibility requirements would otherwise not have been implemented without financial incentive. As such, the Methodology excludes projects which receive government funding, which is addressed in Section 3.3.

3.3 REGULATORY SURPLUS TEST

In order to pass the regulatory surplus test, the Project must comply with the eligibility criteria and attest that the project is not receiving government funding for plugging activities. Tradewater is not receiving any government funding, and the project meets the eligibility criteria as outlined in the Methodology. Tradewater has provided an attestation as part of the project paperwork.

Eligibility criteria includes the following:

Project Eligibility

1. The project developer must not receive government funding for any activities connected with a project seeking credits under this methodology. As noted above, Tradewater has provided such an attestation.
2. The project developer must demonstrate they have the rights to the environmental attributes arising from plugging the well. Tradewater has provided a transfer of rights for the environmental benefits of each well from the landowners, as well as a transfer of rights from Tradewater Well Services to Tradewater, LLC, the project proponent.
3. The project developer can provide evidence that they have been access to well site to perform the various project activities. Attestations confirming access approval have been provided for each well.

4. The project developer can demonstrate they have received authority from the respective jurisdictional body at the time the well is plugged. In the state of Kansas, this involves taking ownership of the well through form T-1 and subsequent approval from the KCC, demonstrated as approved in their online portal. After this, Tradewater is obligated to submit various applications related to plugging activities, such as form CDP-1 (well pit creation) and CP-1 (well plugging). Tradewater also shares a plugging plan in conjunction with the other forms. If approved, this is reflected in the portal. Tradewater has provided screenshots of the approval.
5. At a minimum, wells must be plugged to the standards set by the governing jurisdiction. Approval of the final plugging plan and plugged wells by the jurisdiction demonstrates that these standards are met.
6. Plugging activities must comply with applicable environmental regulations and any other regulatory or legal requirements. Tradewater has followed all applicable environmental regulations and legal requirements as outlined in the local legislation and approved by the KCC.
7. The well site is available for a site visit by the VVB. Tradewater will work with the VVB to ensure wells are available for a site visit.
8. Each well in an aggregate project must be under the management of a single project developer. Tradewater is the sole project developer.

Well Eligibility

1. The well must be located in the United States. All wells in the project are located in the United States.
2. The well is actively leaking methane in its undisturbed state prior to any project activities taking place. While Tradewater conducted leak assessments prior to the publication of the Methodology (please see the project deviation for more information), Tradewater can confirm the wells were leaking prior to any activities as evidenced by time stamps present for sampling events and within field notes, as well as the assertions made in the deviation itself.
3. The well meets the definition of orphaned oil and gas well as defined by Table 8 of the Methodology. This is further proven by attestations provided by the KCC for each individual well.

As all eligibility criteria has been met, and Tradewater attests that the project is not receiving government funding for plugging activities, the project therefore passes the Regulatory Surplus Test.

Note there are no federal or state regulatory requirements that drive private entities to take responsibility for plugging orphaned oil and gas wells, leaving many unaddressed. There is no financial mechanism that further encourages plugging these wells by private groups. Therefore, actions taken to plug the wells by independent private entities within the scope of the Methodology satisfies regulatory additionality requirements.

3.4 PRIOR CONSIDERATION

Project developers are required to demonstrate that carbon credit revenue is a factor in the decision to plug the wells. Tradewater has provided proof of prior consideration in the project documents.

Tradewater is a mission-based carbon project developer that relies on carbon project work and the revenue resulting from successful carbon offset projects as its business model. While plugging leaking orphaned oil and gas wells is mission-aligned, it would not be possible without the revenue generated from carbon credits.

Section 4: Monitoring Plan

4.1 MONITORED DATA AND PARAMETERS

Data or Parameter Monitored	Flow Rate
Unit of Measurement	LPM (depending on instrument used), converted into MCF/day
Project Implementation	Field measurement
Technical Description of Monitoring Task	The flow meter is connected via a direct flow set up. Tradewater may use one of two different instruments with different set ups. For each flow meter setup, the gas first passes through a separator where fluid is separated out to prevent anything but gas to flow through the flow meter. Flow meter A produces a data point in MCF/day approximately once every 5 minutes. Flow meter B produces a data point in LPM approximately once every 10 seconds.
Data Source	Flow meter
Data Collection Procedures	Data is stored on the instrument software and downloaded into a readable format (Excel) and then transferred to SharePoint.
Methodology Reference	4.2.2
Data Uncertainty	Low
Monitoring Frequency	Approximately every 5 minutes or 10 seconds over the course of each sampling event.
Reporting Procedure	Excel download
QA/QC Procedure	Raw files are saved and untouched, whereas data is processed in a separate file. During measurement, at least two team members are responsible for instrument observation and data output monitoring. All processed data is checked by an internal reviewer.
Data Archiving	All measurements, regardless of inclusion in a project or not, are saved to the Tradewater SharePoint indefinitely.
Notes	Measured simultaneously with methane concentration, where applicable, and pressure.

Data or Parameter Monitored	Methane Concentration
Unit of Measurement	% volume
Project Implementation	Field measurement
Technical Description of Monitoring Task	The Methane Detector is used to measure methane concentration. Measurements are taken at approximately ambient pressure by way of a diffusion box. An average methane concentration is then determined.
Data Source	Methane Detector
Data Collection Procedures	Data is stored on the instrument, downloaded to instrument software, and then downloaded from instrument software into a readable format (Excel) and then transferred to SharePoint. Data may also be collected manually via log and photographed, digitized in Excel, and then transferred to SharePoint.
Methodology Reference	4.2.2
Data Uncertainty	Low
Monitoring Frequency	Once every ten seconds over the course of sampling events; for manual data collection, once every five minutes over the course of sampling events
Reporting Procedure	Excel download
QA/QC Procedure	Raw files are saved and untouched, whereas data is processed in a separate file. During measurement, at least two team members are responsible for instrument observation and data output monitoring and manually recording data. All processed data is checked by an internal reviewer.
Data Archiving	All measurements, regardless of inclusion in a project or not, are saved to the Tradewater SharePoint indefinitely.
Notes	Measured simultaneously with flow rate and pressure.

Data or Parameter Monitored	Methane Gas Bag Samples
Unit of Measurement	mol% of Methane

Project Implementation	Gas bag samples will be taken directly from the well gas flow during or immediately after each pre-plugging sampling event.
Technical Description of Monitoring Task	Gas samples will be collected at the outlet of the flow meters.
Data Source	Mole fraction (mol%) will be analyzed and reported according to the appropriate standards and the final Methane concentration values will be obtained from the report. Mol% is equivalent to %volume because the gas is assumed to be ideal.
Data Collection Procedures	Report is sent from the lab.
Methodology Reference	6.3.1.1 and Equation 5B
Data Uncertainty	Low
Monitoring Frequency	Samples will be taken during each pre-plugging sampling event. At least two samples will be taken for each pre-plugging event.
Reporting Procedure	PDF Lab Report
QA/QC Procedure	Lab report files are saved and untouched, whereas data is processed in a separate file.
Data Archiving	All measurements, regardless of inclusion in a project or not, are saved to the Tradewater SharePoint indefinitely.
Notes	Gas samples taken simultaneously or immediately after with wellhead pressure and flow.

Data or Parameter Monitored	Flowing Pressure
Unit of Measurement	psi
Project Implementation	Field measurement
Technical Description of Monitoring Task	The digital pressure gauge is connected using a tee setup on the existing wellhead.
Data Source	Pressure gauge
Data Collection Procedures	Data is stored on the instrument, downloaded to software, then downloaded to a computer in PDF form which is then uploaded to SharePoint.
Methodology Reference	4.2.2
Data Uncertainty	Low
Monitoring Frequency	Every 10 seconds over the course of sampling events
Reporting Procedure	PDF download

QA/QC Procedure	Raw files are saved and untouched, whereas data is processed in a separate file. During measurement, at least two team members are responsible for instrument observation and data output monitoring. All processed data is checked by an internal reviewer.
Data Archiving	All measurements, regardless of inclusion in a project or not, are saved to the Tradewater SharePoint indefinitely.
Notes	Measured simultaneously with methane concentration and flow rate.

Data or Parameter Monitored	n
Unit of Measurement	Number of 10-minute intervals from pre-plugging sampling events
Project Implementation	Averaged from 10 minutes' worth of data to create interval for assessing stability.
Technical Description of Monitoring Task	Simultaneous measurements of methane concentration when applicable, methane flow rate, and flowing pressure are taken using the respective instruments and data is processed to identify 10-minute windows of data which are averaged to create a single interval. There are 24 intervals. For sampling events where a gas bag sample is taken, the mol% reported by the lab analysis is used for all 10-minute windows of data.
Data Source	Methane detector or gas bag sample, flow meter, and digital pressure gauge
Data Collection Procedures	Data is downloaded from the three instruments or retrieved from a lab and raw versions saved and untouched. Copies of the raw data are processed to assess and define the intervals.
Methodology Reference	6.3.1.2 and 3; Equations 2, 3, 5A, and 5B
Data Uncertainty	Low
Monitoring Frequency	Data is assessed for each parameter twice per project (Measurement 1 and 2)
Reporting Procedure	Excel document

QA/QC Procedure	One member of the Tradewater team processes the data using custom-built tools, and a second team member reviews the tool and results for accuracy and conformity to the methodology.
Data Archiving	All measurements and assessments, regardless of inclusion in a project or not, are saved to the Tradewater SharePoint indefinitely.
Notes	N/A

Data or Parameter Monitored	Quantity of Fossil Fuels consumed in plugging operations and number of fossil fuel types
Unit of Measurement	Gallons; number
Project Implementation	Fuel used for plugging activities and considered for project emission deductions
Technical Description of Monitoring Task	<p>The plugging contractor tracks the amount of time each fuel-burning piece of equipment is on site and used in a plugging activity on a day-by-day basis. This time is tracked in invoices and field tickets, where the plugging contractor describes the field activities performed to plug the wells in the project. Fuel used is calculated or estimated using the known fuel burn for each piece of equipment. Fuel usage is then aggregated. The project proponent then converts the fuel usage into project emissions by using the working hours of the fossil fuel consuming equipment to calculate the fossil fuel usage based on the fuel consumption rate of each equipment.</p> <p>A Tradewater team member will also be in the field during plugging and may collect this information within a Field Operations Log.</p>
Data Source	Plugging company invoice, field ticket, or Field Operations Log
Data Collection Procedures	The plugging contractor supplies Tradewater with the fuel invoice or field ticket, or data is collected in a Field Operations Log.
Methodology Reference	Section 6.5, Equation 12
Data Uncertainty	Medium

Monitoring Frequency	1/fuel/plugging activity
Reporting Procedure	Invoice, field ticket, Field Operations Log
QA/QC Procedure	The project proponent will accept fuel numbers across multiple sites, even sites not included in the project, to garner the most conservative value for fuel usage in the project when relying on fuel invoices. Any discrepancies or errors are discussed with the plugging contractor and rectified. A Tradewater team member reviews the comments in the Field Log to assess the data and confirm accuracy.
Data Archiving	All invoices or field tickets, regardless of inclusion in a project or not, are saved to the Tradewater SharePoint indefinitely.
Notes	N/A

Data or Parameter Monitored	Pre-Plugging Leak Test (per Methodology) Post-Plugging Leak Test Permanence Check Background Measurements
Unit of Measurement	ppm
Project Implementation	Field measurement taken when first approaching the well to assess for leaks and after plugging the well
Technical Description of Monitoring Task	<p>The Methane Detector is used to measure methane concentration at any portion of the well casing, including plugged well casing that remains above grade after plugging. In some cases, plugged wells have already been cut off below grade but not yet buried; in this instance, any portion of the casing that is visible is measured. One meter in all directions from the wellhead location will be measured for both pre-plugging and post-plugging measurements. Measurements are taken at ambient pressure and temperature.</p> <p>Background measurements are also taken upwind and away from the wellhead to compare against leak tests at the wellhead to assess for any existing</p>

	leaks. See Notes regarding the pre-plugging leak test background measurements.
Data Source	Methane Detector
Data Collection Procedures	Data is stored on the instrument software, downloaded to instrument software, and then downloaded into a readable format (Excel) and then transferred to SharePoint.
Methodology Reference	Sections 4.2.1, 4.2.4
Data Uncertainty	Low
Monitoring Frequency	1/well per milestone
Reporting Procedure	Excel download
QA/QC Procedure	Raw files are saved and untouched, where data is processed in a separate file. During measurement, a team member is responsible for instrument observation and data output monitoring. All processed data is checked by an internal reviewer.
Data Archiving	All measurements, regardless of inclusion in a project or not, are saved to the Tradewater SharePoint indefinitely.
Notes	For this project, background readings for the pre-plugging leak tests were not taken as a result of the Methodology requirements being published after the wells were first accessed and assessed for leaks. A Deviation was submitted to the VVB and the Registry for approval.

Data or Parameter Monitored	Terminal Decline Rate
Unit of Measurement	percent
Project Implementation	When calculating emissions reductions using Module 1, a terminal decline rate is applied to conservatively forecast the volume of methane emissions from a given well overtime.
Technical Description of Monitoring Task	The average emissions rate for a well is determined and then compared to Table 5 to establish the appointed Terminal Decline Rate.
Data Source	Table 5

Data Collection Procedures	The 10-minute interval values for flow rate and methane concentration are averaged. The lowest measurement of a given well is used to compare to Table 5 and determine the terminal decline rate applied.
Methodology Reference	6.3.3 and Table 5
Data Uncertainty	Low
Monitoring Frequency	Once per well
Reporting Procedure	Excel
QA/QC Procedure	Because the terminal decline rate is chosen based on the measured parameters of flow rate and methane concentration, QA/QC is satisfied by the QA/QC for those parameters.
Data Archiving	All measurements, calculations, and resources, regardless of inclusion in a project or not, are saved to the Tradewater SharePoint indefinitely.
Notes	N/A

Data or Parameter Monitored	Concrete Used in Plugging
Unit of Measurement	M ³
Project Implementation	Quantifying concrete used in consideration of calculating project emissions
Technical Description of Monitoring Task	The plugging contractor will report the amount of concrete used in plugging activities, including any extra concrete mixed for the purposes of plugging, which will be illustrated on the plugging invoice, field tickets, or Field Operations Log and used for determining project emissions. This value may be reported in sacks and converted to volume. A Tradewater team member will also be in the field during plugging and may collect this information within a Field Operations Log.
Data Source	Plugging company invoice, Field Operations Log
Data Collection Procedures	The plugging contractor supplies Tradewater with the invoice or data is collected in a Field Operations Log.

Methodology Reference	5.2, Equations 11 and 13
Data Uncertainty	Low
Monitoring Frequency	Once per invoice or once per plugged well
Reporting Procedure	Invoice; Field Operations Log
QA/QC Procedure	A Tradewater team member calculates the amount of cement intended to use in plugging based on casing sizes. The amount reported by plugging contractors is compared against the calculated value and is considered reasonable if within one order of magnitude of the calculated cement amount.
Data Archiving	All invoices, regardless of inclusion in a project or not, are saved to the Tradewater SharePoint indefinitely.
Notes	N/A

Data or Parameter Monitored	Leakage Emissions
Unit of Measurement	Percent
Project Implementation	Leakage factor applied or withheld determined by adherence to setback distance regulations.
Technical Description of Monitoring Task	The current setback distance requirements are determined for the local jurisdiction and then compared against maps identifying oil and gas wells in proximity to the project well(s). If the nearby wells are within the setback distance, a 5% leakage factor is applied.
Data Source	Local regulation; oil and gas well maps
Data Collection Procedures	Data and resources are saved to the Tradewater Sharepoint.
Methodology Reference	Section 6.6, Equation 14
Data Uncertainty	Low
Monitoring Frequency	Once per project, per well
Reporting Procedure	Map and evaluation
QA/QC Procedure	One member of the Tradewater team processes the data, and a second team member reviews the resources and results for accuracy and conformity to the methodology.

Data Archiving	All resources are saved to the Tradewater Sharepoint, regardless if used in the project or not
Notes	N/A

4.2. QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

Additional QA/QC procedures include the following, as applicable: following calibration procedures as outlined by the equipment manuals, saving raw files and completing necessary data processing in a separate file, assessing data stability, utilizing field notes and instrument data outputs to corroborate timestamps, and periodic reviews of instrument outputs while taking data as well as while plugging. Moreover, at least two project members employed by the Project Developer are assigned to perform and/or observe measurement activities. Any data integration or analysis is performed by a project member and checked by an internal reviewer, both of whom are employed by the Project Developer. If any reports used include an extensive amount of data that is manually assessed or migrated, the project Developer selects a subset of data in each report to assess via a sampling and quality check process.

Section 5: GHG Quantification

5.1 BASELINE EMISSIONS

Section 6.1, Equation 1: Emissions from Baseline Scenario from the Methodology will be used to calculate baseline emissions (BE):

$$BE = BE_{B1}$$

Where

BE	Sum of the emissions under the baseline condition (t CO ₂ e)
BE_{B1}	Emissions from B1 Emissions from orphaned oil and gas wells calculated using a valid module

5.2 MODULE SELECTION

For this project, Tradewater intends to utilize Module 1, in which the following steps are taken:

1. Obtain qualified pre-plugging measurements
2. Compare the average flow rate to historical production data (if available)
3. Apply a terminal decline rate derived from aggregated data.

Section 6.3.1.2 Flow Rate and Pressure Measurements, equations 2 and 3:

$$Q_{avg} = \frac{\sum_{i=1}^n Q_i}{n}$$

Where

Q_{avg}	Average flow rate (MCF/day) at 60°F/1atm
Q_i	Flow rate for each 10-minute interval measured during the pre-plugging flow measurement (MCF/day) at 60°F/1atm
n	Number of 10-minute intervals

$$P_{avg} = \frac{\sum_{i=1}^n P_i}{n}$$

Where

P_{avg}	Average pressure (psi)
P_i	Pressure measured at each 10-minute interval during the pre-plugging flow measurement (psi)
n	Number of 10-minute intervals

5.3 QUANTIFICATION OF DATA FOR MEASUREMENTS 1 AND 2

Section 6.3.4 Quantification begins with determining the annual emissions over the 20-year crediting period utilizing Equation 4: Exponential Arps Equation.

$$Q_j = Q_{initial,CH_4} \times e^{-Dt_c}$$

Where

Q_j	Emissions in year, j (MCFCH4/year)
$Q_{jinitial,CH_4}$	Initial emissions rate (MCFCH4/year)
t_c	Time in crediting period (20 years)
e	Base of natural logarithm
D	Terminal decline rate (%)

The initial emissions rate ($Q_{initial,CH_4}$, the qualified pre-plugging measurement) for each well is calculated as the arithmetic mean of the 10-minute interval emission rates over the applicable measurement window. The lowest average emissions rate obtained during a pre-plugging measurement, expressed in MCFCH4/year, and is input into the exponential Arps equation.

Depending on the method for methane concentration measurement (simultaneous measurement or gas chromatography via a bag sample), $Q_{initial,CH_4}$ is then calculated using Equation 5A or 5B, shown below:

For initial methane emissions rate using simultaneous measurement method:

$$Q_{initial.CH_4} = \frac{\sum_{i=1}^n (Q_i \times 365 \times C_{i,CH_4})}{n}$$

Where

$Q_{jinitial,CH_4}$	Initial emissions rate (MCFCH4/year)
Q_i	Flow rate for each 10-minute interval measured during the pre-plugging flow measurement (MCF/day) at 60°F/1atm
C_{i,CH_4}	Average methane concentration for each 10-minute interval measured during the pre-plugging flow measurement (%)

n	Number of 10-minute intervals
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For initial methane emissions rate using gas chromatography approach:

$$Q_{initial,CH_4} = \frac{\sum_{i=1}^n (Q_i \times 365)}{n} \times C_{CH_4}$$

Where

$Q_{j,initial,CH_4}$	Initial emissions rate (MCFCH ₄ /year)
Q_i	Flow rate for each 10-minute interval measured during the pre-plugging flow measurement (MCF/day) at 60°F/1atm
$C_{,CH_4}$	Methane concentration value from the bag sample (% vol)
n	Number of 10-minute intervals

Equation 6: Cumulative Methane Emissions

$$E_{CH_4} = \sum_{j=0}^{19} Q_j$$

Where

E_{CH_4}	Cumulative methane emissions (MCFCH ₄)
Q_j	Emissions in year, j (MCFCH ₄ /year)
j	Years in the crediting period

To convert E_{CH_4} from MC_{CH_4} to $t CH_4$, use Equation 7:

$$1 MCF_{CH_4} \times \frac{1000 scf}{1MCF} \times \rho_{CH_4} \frac{lb}{scf} \times \frac{0.453592 kg}{lb} \times \frac{1 ton}{1000 kg} = 0.0192 t CH_4$$

Where

ρ_{CH_4}	density of methane, 0.0423 lb CH ₄ /scf CH ₄ (at 1 atm and 60° F)
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Thereby,

Equation 8: Baseline Methane Emissions

$$BE_{CH_4} = E_{CH_4} \times k$$

Where

BE_{CH_4}	Baseline emissions (t CH ₄)
E_{CH_4}	Cumulative methane emissions (MCFCH ₄)
k	Methane conversion factor, 0.0192 tCH ₄ / MCFCH ₄

The BE_{CH_4} value must be converted to t CO₂e using the latest 100-year global warming potential (GWP) for methane as published by the IPCC. At the time of the Methodology’s publication and of this report, the GWP for methane is 29.8.

Equation 9: Baseline Methane Emissions with GWP:

$$BE_{CO_2e} = BE_{CH_4} \times GWP_{CH_4}$$

Where

BE_{CO_2}	Baseline emissions (t CO ₂ e)
BE_{CH_4}	Baseline emissions (t CH ₄)
GWP_{CH_4}	Global warming potential of fossil methane, 29.8 (t CO ₂ e / t CH ₄)

5.4. HOLDBACK

To insure against the risk of leaks which may occur between the time the well undergoes the post-plugging leak test and the permanence check within the next 12 to 18 months following the post-plugging leak test, a credit holdback mechanism is required by the Methodology. This holdback is the volume of credits equal to the first 18 months of baseline emissions for the well.

The holdback equation is applied and is as follows, identified as Equation 10 in the Methodology:

$$Holdback = Q_0 + 0.5Q_1$$

Where

Q_0	Baseline emissions in year 0
Q_1	Baseline emissions in year 1

5.5 Project Emissions

Equation 11: Emissions from the Project Scenario

$$PE = PE_{P1} + PE_{P2}$$

Where

PE	Sum of the emissions under the project condition (t CO2e)
PE _{P1}	Emissions from P1 On-site Fossil Fuel Use from Plugging (t CO2e)
PE _{P2}	Emissions from P2 Concrete Used for Plugging (t CO2e)

Equation 12: Emissions from On-Site Fossil Fuel Use

$$PE_{P1} = \sum_1^y \frac{Q_f \times EF_f}{1000}$$

Where

PE _{P1}	Emissions from P1 On-site Fossil Fuel Use from Plugging (t CO2e)
Q _f	Quantity of fossil fuel f consumed in plugging operations (gal or m ³)
EF _f	Combustion emission factor for fossil fuel f (kg CO2e/gal or kg CO2e/m ³)
y	Total number of fossil fuels used in plugging operations

Equation 13: Emissions from concrete used for plugging

$$PE_{P2} = Unit_{concrete} \times EF_{concrete}$$

Where

PE _{P2}	Emissions from P2 Concrete Used for Plugging (t CO2e)
Unit _{Concrete}	Unit of concrete used in plugging operations (i.e., m3 or USD)
EF _{Concrete}	Emission factor for concrete (t CO2e/unit)

5.6 LEAKAGE

The Methodology requires an evaluation of setback compliance to mitigate the risk of leakage. Leakage is the negation of GHG emissions reductions achieved as a result of the Project due to emissions shifting outside of the project boundary. Setback distance references the required distance between wells drilled to prevent safety issues and other issues like gas migration. Tradewater assessed the setback distance for all wells in the project and determined they were within the state’s regulatory distance requirements. Since the wells followed the regulation, the risk of leakage is low (and no leakage deduction is required by the Methodology).

5.7 TOTAL GHG EMISSION REDUCTIONS

Net reductions are quantified using the equation from the Methodology below:

$$ER_{NET} = (BE - PE) \times (1 - LE)$$

Where

ER _{NET}	Net Emission Reductions (t CO ₂ e)
BE	Sum of the emissions under the baseline condition (t CO ₂ e)
PE	Sum of the emissions under the project condition (t CO ₂ e)
LE	Leakage emissions (percentage)

5.8 CREDIT ISSUANCE

The Methodology offers two credit issuance schedules:

1. Standard Issuance, in which 70% of the credits are issued (less the holdback) following a successful post-plugging leak test. The remaining 30%, plus the holdback, are issued upon a successful Permanence Check.
2. Issuance with Plugging Insurance, in which the project developer provides proof of insurance to cover the cost of re-plugging should a new leak occur. In this case, and upon a successful post-plugging leak test and positive verification statement, 100% of the credits, less the holdback, are issued. After the permanence check has been performed and no new leaks detected, the holdback may be requested for issuance.

Tradewater intends to utilize option 2 for the credit issuance.