



P.O. Box 10640 Bozeman, Montana 59719

(406) 460-0903

TO: Randy Pancheco, APWS; Jim Griswold, NMOCD

FROM: Curtis Shuck, Chairman

DATE: November 18, 2022

RE: Schwalbe #002 (30-025-25646) Orphan Well Pre-Plugging Methane Monitoring

TECHNICAL MEMORANDUM

The Well Done Foundation, Inc. (WDF) performing contract professional services methane monitoring for A-Plus Well Services, Inc. (APWS) for the State of New Mexico Energy, Minerals and Natural Resources Department – Oil Conservation Division (OCD) under Purchase Order #10000002000038AA for Orphan Oil & Gas Wells in Lea County, NM.

The site conditions found at Schwalbe #002 by the WDF Measure 1 Team on October 28, 2022, at 4:49 P.M. revealed a leaking wellhead with high concentrations of methane gas present and leaking by the production valve at the 2-3/8" tubing and from the 4" casing. The WDF Team performed field gas measurements, collected gas samples and performed a 18.2-hour Methane Emissions Flow Monitoring Test using Ventbuster™ Instruments VB100-052 Ultra-Low Flow Meter with GPS for site location verification.



Image 1.1 – Schwalbe #002 (30-025-25646) Lea County, New Mexico

The findings from the Pre-Plugging Methane Flow Monitoring Test, using Ventbuster™ Instruments VB100-052 Ultra-Low Flow Meter with GPS, resulted in 0.01 cubic meters of total measured wellhead emissions over the 18.2-hour period that established an average methane flow rate of <0.01 m³/day. WDF then isolated a 3.1-hour interval measurement within Test ID: b282f363, taken during normalized flow, that resulted in an average methane flow rate of 0.03 m³/d and 0.01 grams per hour (g/hour). A composite gas sample was collected at the wellhead by WDF during the methane flow test beginning on October 28, 2022, and at the end of the methane flow test on October 29, 2022, approximately 18.2-hours later. Methane gas concentration levels were measured at 9,010 ppm, pursuant to Test ID 2022059558 performed by Laboratory Services of Hobbs, NM on November 1, 2022, at 3:55 P.M. Therefore, the average methane gas emission measured at this wellhead is calculated at **<0.01 grams per hour (g/hour)**.¹ The peak methane gas emission was recorded at 10:00 A.M. on October 29, 2022 and would indicate that this orphan well has a much higher emission rate potential of **0.01 grams per hour (g/hour)** and beyond.

¹ Methane Calculation: 554 grams CH₄ per cubic meter (554 x 0.03 = 16.62 g/day total / 24 = 0.69 g/hour x 0.009010 (methane concentration) = **<0.01 g/hour CH₄**). **Methane, gas** weighs 0.000554 gram per cubic centimeter or 0.554 kilogram per cubic meter, i.e. density of methane, gas is equal to 0.554 kg/m³; at 0°C (32°F or 273.15K) at standard atmospheric pressure. In Imperial or US customary measurement system, the density is equal to 0.0346 pound per cubic foot [lb/ft³], or 0.0003202 ounce per cubic inch [oz/inch³].

This orphan well does not exceed the >1 g/hour federal program reporting requirements for methane emissions reductions as described in Section 40601 (Orphaned well site plugging, remediation, and restoration) of Title V (Methane Reduction Infrastructure) of the 2021 Bipartisan Infrastructure Law (BIL; Public Law 117-58)².



Interval Report

Interval Start Date: Saturday, October 29th, 2022, 7:52 AM MDT
Interval End Date: Saturday, October 29th, 2022, 11:01 AM MDT
Device: VB100-0052
Well Licensee: NMOCD
Well Name: Schwalbe #002
UWI: 30-025-25646
Well License Number: 30-025-25646
Surface Location: Lea County - Private
Bottom Hole Location: unknown

Test Operator: Francis Vernwald
Authorized By: NMOCD
Test Reason: IJJA Pre Plug
Scope Of Work: 12-Hour
AFE Number: NMOCD038AA / APWS22.001
GPS: 33.51428,-103.15589
Notes: GTG

Flow Test

Average Flowrate

0.03

m3/d

0.01

g/ hour

Average Flow
Temperature

13.8

°C

Average Flow
Pressure

-1.8

kPag

Flow Duration

3.1

hours

Image 2.1 – Schwalbe #002 (30-025-25646) Methane Monitoring Dashboard

BACKGROUND

The Schwalbe #002 (30-025-25646) Orphan Well is located in Lea County, NM at Latitude 33.514259, Longitude - 103.158533 was measured and monitored by the WDF Field Team on 10/28-29/2022 following a Safety Briefing. Per the WDF protocol, the GPS coordinates were updated and the well was photographed from four (4) compass point aspects and closeups capturing the wellhead, field gas analysis results and gas sampling and uploaded to the WDF Well Intel™ IoT site. A Field Gas Analysis was conducted to detect Methane and H2s gas presence and concentration levels using a Honeywell BW Quattro Multi Gas Meter, serial number: QA121-012211.

² These April 11, 2022 Guidelines were developed to meet the federal program reporting requirements for methane emissions reductions as described in Section 40601 (Orphaned well site plugging, remediation, and restoration) of Title V (Methane Reduction Infrastructure) of the 2021 Bipartisan Infrastructure Law (BIL; Public Law 117-58).

WDF Well Intel

Well Site

Info	Well File	Images	Well Data	Regulatory	Field Notes	Access	Remove Well
Name	SCHWALBE #002						
Stage	Stage 2b - Contract Monitoring Completed						⌵
GPS	33.514259		✓	-103.1558533		✓	
API	30-025-25646						
Contract ID	NMOCD 0038AA / APWS22.001						

Image 3.1 – WDF Well Intel™ Orphan Well Project Management IoT

The WDF Field Team collected Gas Sample #1 and #2 using a 1 Liter Tedlar/TO-Plus Gas Sampling Bag from the 2-3/8" production tubing which was flowing gas past the valve and at the 4" casing port at the beginning of the Flow Test at approximately 4:02 P.M MDT on 10.28.2022 as the well was being prepared for the Preliminary Flow Measurement. Gas Sample #2 was collected in the same 1 Liter Tedlar Bag on 10.29.2022 before the Preliminary Flow Test was concluded 10:54 A.M. MDT. The collected Gas Sample was secured and placed in a storage cooler for transport to Laboratory Services, Inc. in Hobbs, NM.

WDF rigged up the Ventbuster™ Instruments VB100-052 Continuous Ultra-Low Flow Meter with GPS for testing site confirmation for a minimum 12-Hour Methane Emission Test and began Test ID: b282f363, verifying a cellular signal, cloud link and GPS coordinates on October 28, 2022.

WDF returned to location on 10.29.2022 (approximately 18.2-hours) to conclude the Pre-Plugging Methane Emission Flow Test and rig the VB100-052 down and secure the wellhead. A "Green Ribbon" was placed at the Wellhead indicating that WDF had concluded the Pre-Plugging Methane Flow testing.

TECHNICAL FINDINGS

Schwalbe #002 (30-025-25646):

- **Total C1 through C6 Gas Concentration: 12,830 ppm**
- **Total Measured Wellhead Gas Emissions: 0.01 m3/day**
- **Methane Gas Concentration: 9,010 ppm**
- **Calculated Average Wellhead Methane Gas Emissions: 0.01 g/hour**
- **Peak Methane Flow Measured at: 0.01 g/hour**

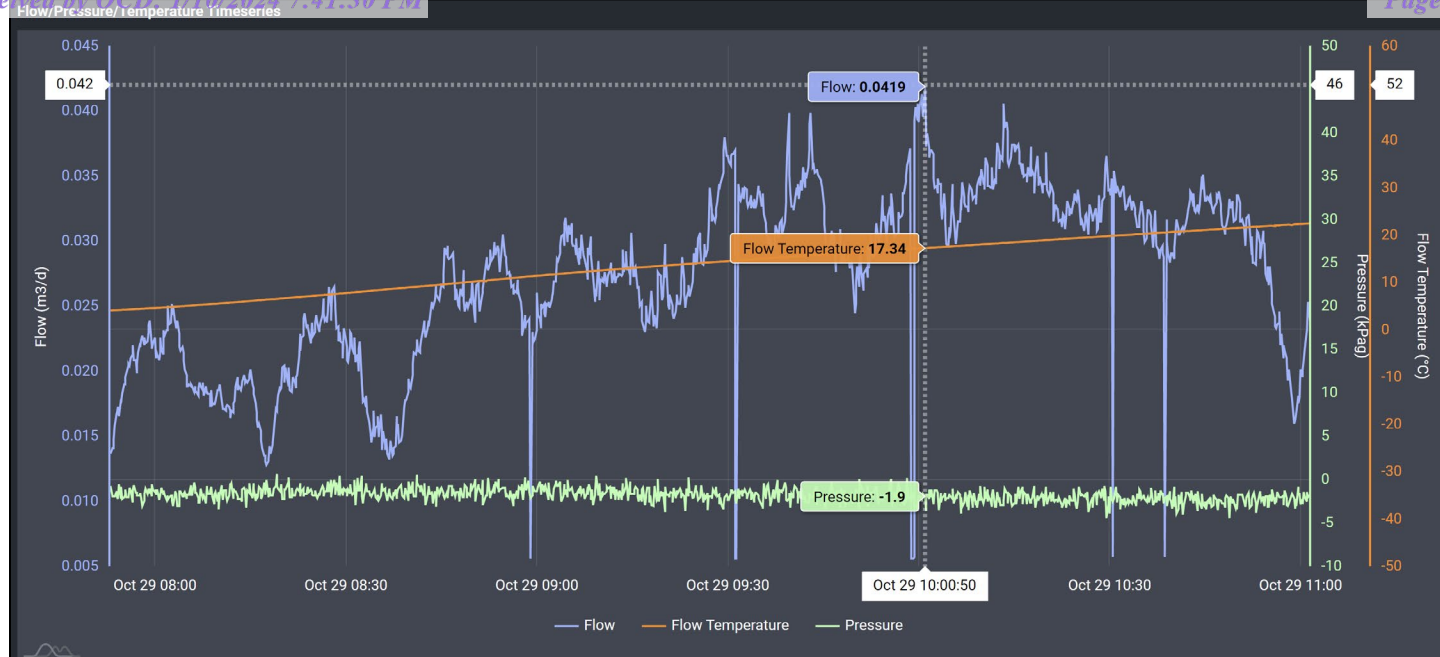


Image 4.1 – Schwalbe #002 (30-025-25646) Methane Flow/Pressure/Temperature Timeseries & Peak Flow

CONCLUSIONS

- The Schwalbe #002 (30-025-25646) is currently emitting Methane at the average rate of 0.01 g/hour, which is below the Federal minimum threshold for reporting described in Section 40601 (Orphaned well site plugging, remediation, and restoration) of Title V (Methane Reduction Infrastructure) of the 2021 Bipartisan Infrastructure Law (BIL; Public Law 117-58) which is >1g/hour.
- WDF did capture a Methane Flow Peak at 0.01 m3/day recorded at 10:00 A.M on October 29, 2022, which indicates a much higher potential for Methane Emissions that exceed the Federal minimum threshold, therefore plugging of this well however should be a priority in the NMOCD schedule.

FIELD NOTES

#	Date	Note
1	2022-10-28	WDF Measure 1 Team on the Schwalbe #002 location at 4:30 PM to take site photos, perform Methane Field Gas detection test, collect gas samples for laboratory analysis . Rig up VB100-052 and confirm live test in progress.
2	2022-10-29	WDF Measure 1 back on location of the Schwalbe #002. Collect gas sample #2. Close out Methane Flow Test and rig down VB100-052. Place green ribbon @ Well and secure location. WILDCATS OUT!

Image 4.2 – Schwalbe #002 (30-025-25646) Field Notes from WDF Well Intel™ Orphan Well Project Management IoT

Appendix A – Site Photos for Schwalbe #002 (30-025-25646)



1) Schwalbe #002 (30-025-25646) – North Facing



2) Schwalbe #002 (30-025-25646) – East Facing



3) Schwalbe #002 (30-025-25646) – Well Head



4) Schwalbe #002 (30-025-25646) – Gas Sample



15191G	Schawlb #002 Pre Plug	Schawlb #002 Pre Plug	
Sample Point Code	Sample Point Name	Sample Point Location	
Laboratory Services	2022059558	Tedlar Bag	Dave F - Spot
Source Laboratory	Lab File No	Container Identity	Sampler
USA	USA	USA	New Mexico
District	Area Name	Field Name	Facility Name
Oct 28, 2022 17:28	Oct 28, 2022 17:28	Nov 1, 2022 06:53	Nov 1, 2022
Date Sampled	Date Effective	Date Received	Date Reported
Torrance			
Ambient Temp (°F)	Flow Rate (Mcf)	Analyst	Press PSI @ Temp °F Source Conditions
Well Done Foundation		NG	
Operator		Lab Source Description	

Component	Normalized Mol %	Un-Normalized Mol %	GPM
H2S (H2S)	0.0000	0	
Nitrogen (N2)	98.6690	98.66908	
CO2 (CO2)	0.0480	0.04764	
Methane (C1)	0.9010	0.90121	
Ethane (C2)	0.0770	0.07701	0.0210
Propane (C3)	0.0160	0.01615	0.0040
I-Butane (IC4)	0.0000	0	0.0000
N-Butane (NC4)	0.0000	0	0.0000
I-Pentane (IC5)	0.0000	0	0.0000
N-Pentane (NC5)	0.0000	0	0.0000
Hexanes Plus (C6+)	0.2890	0.28892	0.1250
TOTAL	100.0000	100.0000	0.1500

Method(s): Gas C6+ - GPA 2261, Extended Gas - GPA 2286, Calculations - GPA 2172

Analyzer Information			
Device Type:	Gas Chromatograph	Device Make:	Shimadzu
Device Model:	GC-2014	Last Cal Date:	Sep 26, 2022

Gross Heating Values (Real, BTU/ft³)			
14.696 PSI @ 60.00 Å°F		14.73 PSI @ 60.00 Å°F	
Dry	Saturated	Dry	Saturated
25.8	26.2	25.9	26.3

Calculated Total Sample Properties	
GPA2145-16 *Calculated at Contract Conditions	
Relative Density Real	Relative Density Ideal
0.9702	0.9703
Molecular Weight	
28.1057	

C6+ Group Properties		
Assumed Composition		
C6 - 60.000%	C7 - 30.000%	C8 - 10.000%

Field H2S
0 PPM

PROTREND STATUS: Passed By Validator on Nov 1, 2022
DATA SOURCE: Imported

PASSED BY VALIDATOR REASON:
 Close enough to be considered reasonable.

VALIDATOR:
 Luis Cano
VALIDATOR COMMENTS:
 OK

Source	Date	Notes
Luis Cano	Nov 1, 2022 3:55 pm	Methane PPM: 9,010

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

DEFINITIONS

Action 302413

DEFINITIONS

Operator: ROBINSON OIL INC P.O. Box 1829 Eunice, NM 88231	OGRID: 37636
	Action Number: 302413
	Action Type: [UF-OMA] Pre-Plug Methane Monitoring (UF-OMA-MMA)

DEFINITIONS

The Orphan Well Mitigation Activity (OMA) forms are a subset of the OCD's forms exclusively designed for activities related to State of New Mexico's contracted plugging and reclamation activities. Specifically, these forms are used for orphan wells or associated facilities which are in a "Reclamation Fund Approved" status. This status represents wells or facilities where the OCD has acquired a hearing order allowing the OCD to perform plugging or reclamation on wells and associated facilities that no longer have a viable operator to perform the necessary work. These forms are not to be utilized for any other purpose.

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QUESTIONS

Action 302413

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Operator: ROBINSON OIL INC P.O. Box 1829 Eunice, NM 88231	OGRID: 37636
	Action Number: 302413
	Action Type: [UF-OMA] Pre-Plug Methane Monitoring (UF-OMA-MMA)

QUESTIONS

Prerequisites	
[OGRID] Well Operator	[37636] ROBINSON OIL INC
[API] Well Name and Number	[30-025-25646] SCHWALBE #002
Well Status	Reclamation Fund Approved

Monitoring Event Information*Please answer all the questions in this group.*

Reason For Filing	Pre-Plug Methane Monitoring
Date of monitoring	10/28/2022
Latitude	33.514259
Longitude	-103.158533

Monitoring Event Details*Please answer all the questions in this group.*

Flow rate in cubic meters per day (m³/day)	0.03
Test duration in hours (hr)	3.1
Average flow temperature in degrees Celsius (°C)	13.8
Average gauge flow pressure in kilopascals (kPag)	-1.8
Methane concentration in part per million (ppm)	9,010
Methane emission rate in grams per hour (g/hr)	0.01
Testing Method	Steady State

Monitoring Contractor*Please answer all the questions in this group.*

Name of monitoring contractor	Well Done New Mexico LLC
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