



P.O. Box 10640 Bozeman, Montana 59719

(406) 460-0903

TO: Randy Pancheco, APWS; Jim Griswold, NMOCD

FROM: Curtis Shuck, Chairman

DATE: October 3, 2022

RE: Twin Lakes SA #081 (30-005-60993) 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 at the Twin Lakes Field in Chavez County, NM.

The site conditions found at Twin Lakes SAU #081 by the WDF Measure 1 Team on August 22, 2022, at 3:45 P.M. revealed a leaking wellhead with high concentrations of methane and H₂s gas present and leaking by the production valve at the 2-3/8" tubing. The WDF Team performed field gas measurements, collected gas samples and performed a 24.9-hour Methane Emissions Flow Monitoring Test using Ventbuster™ Instruments VB100-034 Ultra-Low Flow Meter with GPS for site location verification.

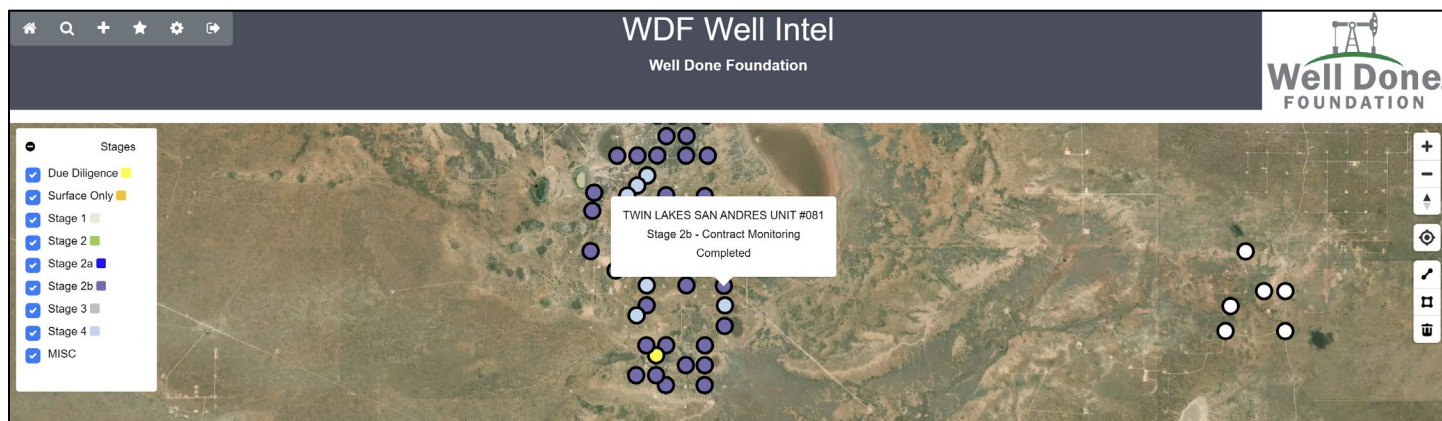


Image 1.1 – Twin Lakes SAU Field

The findings from the Pre-Plugging Methane Flow Monitoring Test, using Ventbuster™ Instruments VB100-0034 Ultra-Low Flow Meter with GPS, resulted in 0.09 cubic meters per day of total measured wellhead emissions. A composite gas sample was collected at the wellhead by WDF during the flow test beginning on August 22, 2022 and at the end of the flow test on August 23, 2022, approximately 24.9-hours later. Methane gas concentration levels were measured at 170,460 ppm, pursuant to Test ID 2022057512 performed by Laboratory Services of Hobbs, NM on August 31, 2022 at 1:16 P.M. Therefore, the adjusted methane gas emission measured at this wellhead is calculated at **0.46 grams per hour (g/hour)**.¹

¹ Methane Calculation: 717 grams CH₄ per cubic meter (717 x 0.09 m³/day = 64.53 g/day total /24 = 2.69 g/hour x 0.170460 (methane concentration) = **0.46 g/hour CH₄**). **Methane, gas** weighs 0.000717 gram per cubic centimeter or 0.717 kilogram per cubic meter, i.e. density of methane, gas is equal to 0.717 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 0.044 pound per cubic foot [lb/ft³].

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.



Test Report

Start Date: Monday, August 22nd, 2022, 4:29 PM MDT
End Date: Tuesday, August 23rd, 2022, 5:24 PM MDT
Device: VB100-0034
Well Licensee: NMOCD
Well Name: Twin Lakes SA-81
UWI: 30-005-60993
Well License Number: 30-005-60993
Surface Location: Private
Bottom Hole Location: Unknown

Test Operator: SOS
Authorized By: NMOCD
Test Reason: IJJA PRE PLUG
Scope Of Work: 12-Hour
AFE Number: NMOCD038AA/APWS22.001
GPS: 33.56107,-104.01944
Notes: GTG

Flow Test

Average Flowrate 0.09 m3/d 0.46 g/hour	Average Flow Temperature 25.7 °C	Average Flow Pressure 0.0 kPag	Flow Duration 24.9 hours
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Image 2.1 – Twin Lakes SAU #081 (30-005-60993) Methane Monitoring Dashboard

BACKGROUND

The Twin Lakes SAU #081 (30-005-60993) Orphan Well is located in Chavez County, NM at Latitude 33.56108304165336, Longitude -104.01945296386114 was measured and monitored by the WDF Field Team on 8/22-23/2022 following a Safety Briefing. Per the WDF protocol, 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	TWIN LAKES SAN ANDRES UNIT #081						
Stage	Stage 2b - Contract Monitoring Completed						⌵
GPS	33.56108304165336		✓	-104.01945296386114		✓	
API#	30-005-60993						
Contract ID:	1000002000038AA						

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

The WDF Field Team collected Gas Sample #1 using a 1 Liter Tedlar/TO-Plus Gas Sampling Bag from the 2-3/8" production tubing which was flowing gas past the valve at the beginning of the Flow Test at approximately 4:30 P.M MDT on 8.22.2022 as the well was being prepared for the Flow Measurement and Gas Sample #2 in the same 1 Liter Tedlar Bag the following day, 8.23.2022 before the Flow Test was concluded 5:41 P.M. MDT.

WDF rigged up the Ventbuster™ Instruments VB100-034 Continuous Ultra-Low Flow Meter with GPS for testing site confirmation for a minimum 12-Hour Methane Emission Test and began Test ID: 2ae02218, verifying a cellular signal, cloud link and GPS coordinates. WDF collected Gas Sample #2 in the same Tedlar/TO Plus Gas Sample Bag prior to the VB Test being concluded on 8.23.2022 to ensure the Methane Emission Flow was normalized. The collected Gas Sample was secured and placed in a storage cooler for transport to Laboratory Services, Inc. in Hobbs, NM.

WDF returned the following day (approximately 24.9 hours) to conclude the Pre-Plugging Methane Emission Flow Test and rig the VB100-034 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

Twin Lakes SAU #081 (30-005-60993):

- **Total C1 through C6 Gas Concentration: 521,820 ppm**
- **Total Measured Wellhead Gas Emissions: 0.09 m3/day**
- **Methane Gas Concentration: 170,460 ppm**
- **Calculated Wellhead Methane Gas Emissions: 0.46 g/hour**

Flow/Pressure/ Temperature Timeseries

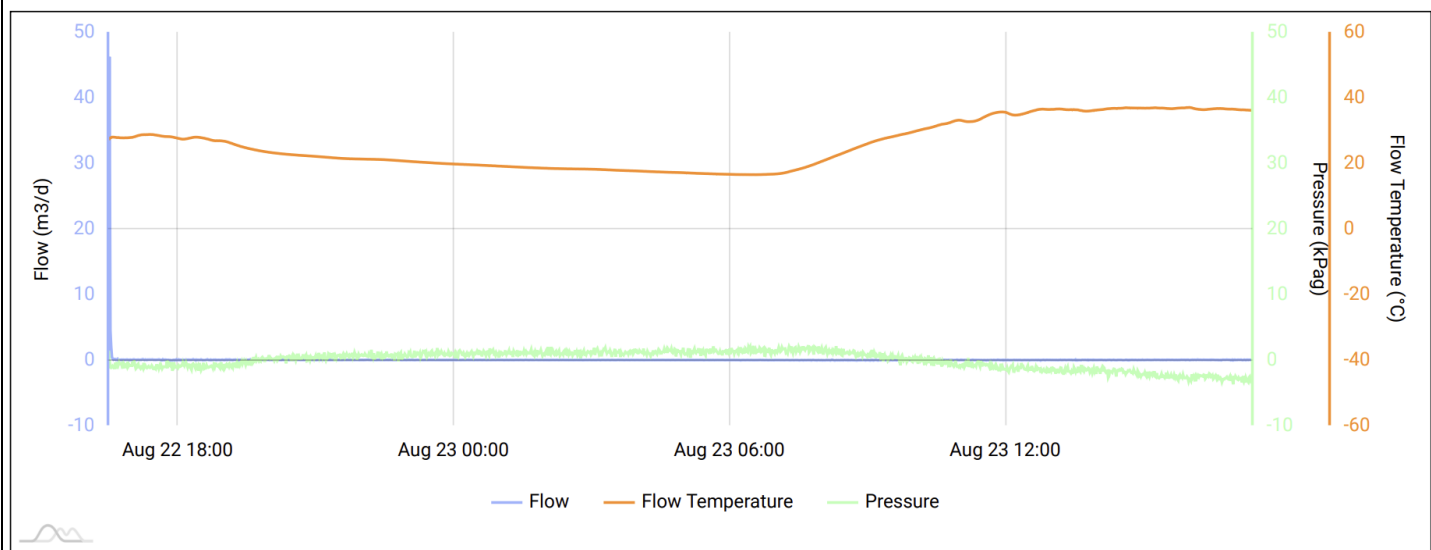


Image 4.1 – Twin Lakes SAU #081 (30-005-60993) Methane Flow/Pressure/Temperature Timeseries

CONCLUSIONS

- The Twin Lakes SA #081 (30-005-60993) is currently emitting Methane at the rate of 0.46 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.
- Plugging of this well however should still be a priority in the NMOCD schedule due to the potential for increased emissions.

FIELD NOTES

#	Date	Note
1	2022-08-22	ces: WDF Measure 1 Team arrived at #081 at approximately 1545 and photographed the well and location. Using the BW Quattro gas detection was performed at the 2-3/8" tubing, 4-1/2" casing and at the surface casing vent. High concentrations of methane and H2s were found to be present at the 2-3/8" tubing. Gas #1 sample was collected for lab analysis using a 1-Liter Tedlar Gas Sample Bag. Team rigged up VB100-034 for methane emissions flow measurements and began Test ID: ae02218. Gas sample #2 was taken using the same Tedlar Bag once the VB Test was in progress.
2	2022-08-22	ces: USE EXTREME CAUTION - HIGH H2s !!!!!!!
3	2022-08-22	Weather Observations: Overcast skies, light winds out of the NW <2.0 mph. Temps of approximately 87.0 degrees with fairly high humidity (52%) given the rains over weekend.
4	2022-08-23	ces: Rig down VB100-034 and secure wellhead. Place "Green Ribbon" at well as indication that WDF monitoring is complete. GTG - Wildcat Out!

Image 4.2 – Twin Lakes SAU #081 (30-005-60993) Field Notes



1) Twin Lakes SA #081 (30-005-60993) – North Facing



2) Twin Lakes SA #081 (30-005-60993) – Field Gas Reading



3) Twin Lakes SA #081 (30-005-60993) – Monitoring



4) Twin Lakes SA #081 (30-005-60993) – Monitoring Complete



14817G	Twin Lakes SA #81	Twin Lakes SA #81	
Sample Point Code	Sample Point Name	Sample Point Location	
Laboratory Services	2022057512	Tedlar Bag	Stacy - Spot
Source Laboratory	Lab File No	Container Identity	Sampler
USA	USA	USA	New Mexico
District	Area Name	Field Name	Facility Name
Aug 22, 2022 15:50	Aug 22, 2022 15:50	Aug 30, 2022 14:03	Aug 30, 2022
Date Sampled	Date Effective	Date Received	Date Reported
System Administrator			
Ambient Temp (°F)	Flow Rate (Mcf)	Analyst	Press PSI @ Temp °F Source Conditions
Well Done Foundation		NG	
Operator		Lab Source Description	

Component	Mol %	GPM
H2S (H2S)	1.0150	
Nitrogen (N2)	46.3120	
CO2 (CO2)	0.4910	
Methane (C1)	17.0460	
Ethane (C2)	14.4190	3.8550
Propane (C3)	14.3870	3.9630
I-Butane (IC4)	1.7970	0.5880
N-Butane (NC4)	3.0730	0.9690
I-Pentane (IC5)	0.6770	0.2480
N-Pentane (NC5)	0.3930	0.1420
Hexanes Plus (C6+)	0.3900	0.1690
TOTAL	100.0000	9.9340

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

Gross Heating Values (Real, BTU/ft³)			
14.696 PSI @ 60.00 Å°F		14.73 PSI @ 60.00 Å°F	
Dry	Saturated	Dry	Saturated
1,020.9	1,004.4	1,023.3	1,006.7

Calculated Total Sample Properties	
GPA2145-16 *Calculated at Contract Conditions	
Relative Density Real	Relative Density Ideal
1.0710	1.0674
Molecular Weight	
30.9159	

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

Field H2S
10150 PPM

PROTREND STATUS:

Passed By Validator on Aug 31, 2022

DATA SOURCE:

Imported

PASSED BY VALIDATOR REASON:

First sample taken @ this point, composition looks reasonable

VALIDATOR:

Brooke Rush

VALIDATOR COMMENTS:

OK

Source	Date	Notes
Brooke Rush	Aug 31, 2022 1:16 pm	Methane= 170,460 ppm

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 295410

DEFINITIONS

Operator: BLUE SKY NM, INC. 7941 Katy Freeway Houston, TX 77024	OGRID: 300825
	Action Number: 295410
	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 295410

QUESTIONS

Operator: BLUE SKY NM, INC. 7941 Katy Freeway Houston, TX 77024	OGRID: 300825
	Action Number: 295410
	Action Type: [UF-OMA] Pre-Plug Methane Monitoring (UF-OMA-MMA)

QUESTIONS

Prerequisites	
[OGRID] Well Operator	[300825] BLUE SKY NM, INC.
[API] Well Name and Number	[30-005-60993] TWIN LAKES SAN ANDRES UNIT #081
Well Status	Plugged (not released)

Monitoring Event Information

Please answer all the questions in this group.

Reason For Filing	Pre-Plug Methane Monitoring
Date of monitoring	08/22/2022
Latitude	33.56107
Longitude	-104.01944

Monitoring Event Details

Please answer all the questions in this group.

Flow rate in cubic meters per day (m³/day)	0.09
Test duration in hours (hr)	24.9
Average flow temperature in degrees Celsius (°C)	25.7
Average gauge flow pressure in kilopascals (kPag)	0.0
Methane concentration in part per million (ppm)	170,460
Methane emission rate in grams per hour (g/hr)	0.46
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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