



P.O. Box 10640 Bozeman, Montana 59719

(406) 460-0903

TO: Jim Griswold, NMOCD

FROM: Curtis Shuck, Chairman

DATE: April 15, 2023

RE: O'Brien Fee 18 #006 (30-005-61246) Orphan Well Post-Plugging Methane Monitoring

TECHNICAL MEMORANDUM

Well Done New Mexico LLC and the Well Done Foundation, Inc. (WDF) performing contract professional services methane monitoring for the State of New Mexico Energy, Minerals and Natural Resources Department – Oil Conservation Division (OCD) under Purchase Order #52100-00000073985 for Orphan Oil & Gas Wells in Chaves County, NM.

The site conditions found at the O'Brien Fee 18 #006 by the WDF Measure 1 Field Team on March 18, 2023, revealed a backfilled and graded location. The WDF Measure 1 Team took site photographs, performed field gas measurements and collected a gas sample for immediate laboratory analysis.

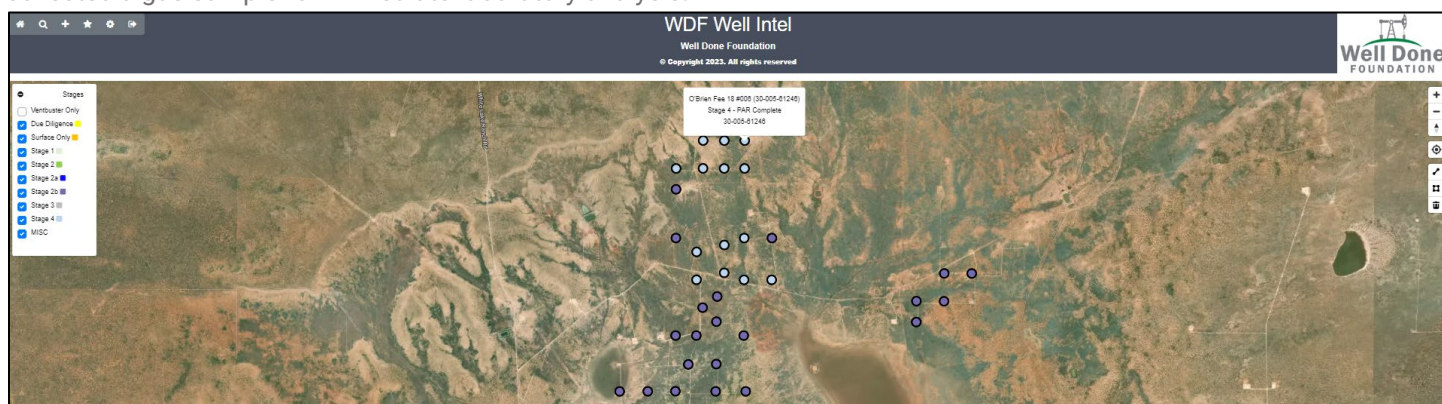


Image 1.1 – O'Brien Fee 18 #006 (30-005-61246) Orphan Well in Chaves County, NM

The Pre-Plugging Methane Flow Calculations were based on the O'Brien Field Averaging Analysis conducted by the Well Done Foundation and Well Done New Mexico LLC and dated March 30, 2023 that included a total of 26 orphan wells. 16 of the O'Brien Field Wells, or 61.54%, were randomly selected and monitored using Ventbuster™ Instruments VB100 Series Ultra-Low Flow Meter with GPS. The Methane Concentration and Methane Flow results of the 16 monitored wells were then averaged and applied to the 10 wells, or 38.46% that were not measured. This resulted in 91,741.25 ppm in methane gas concentration and 0.61 cubic meters per day of wellhead emissions. Therefore, the adjusted average methane gas emission measured at this wellhead is calculated at **1.67 grams per hour (g/hour)**.¹

The State of New Mexico used the methane flow data collected by WDF to prioritize the O'Brien Fee 18 #002 orphan well plugging under the IJA Program and began mobilizing a contractor to location. J A Drake Well Service, Inc. of Farmington, NM was awarded the plugging contract.

WDF arrived at the O'Brien Fee 18 #006 location on March 18, 2023, to perform post-plugging orphan well methane testing and sampling on behalf of the State of New Mexico. **WDF post plugging field gas tests revealed 0.00% of methane or H₂s gasses. The post plugging collected gas samples, analyzed by Laboratory Services, Inc. confirmed 0.00 ppm or methane gas and 0.00 ppm of H₂s gas. THEREFORE, the total Methane Gas Emissions Reduction is: 1.67 g/hour.**

¹ Methane Calculation: 717 grams CH₄ per cubic meter (717 x 0.61 m³/day = 437.37 g/day total /24 = 18.22 g/hour x 0.091741 (methane concentration) = **1.67 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 did 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.



333 Main Street Shelby, Montana 59474 / P.O. Box 10640 Bozeman, MT 59179

(406) 460-0903

TO: Jim Griswold, OCD
FROM: Curtis Shuck, WDNM
DATE: March 30, 2023
RE: O'Brien Orphan Well Field Averaging

MEMORANDUM

Well Done New Mexico LLC performed an Orphan Well Methane Emission Averaging Analysis on the O'Brien Field in Chaves County, NM that included 26 Orphan Wells in total. Of the total 26 Orphan Wells in the study group, 16 of them (61.54%) were randomly selected for the full Methane Emissions Testing, and the average of the Methane Concentration, in PPM, and the Average of the Methane Flow, in m3/day, was calculated and applied to the 10 Orphan Wells (38.46%) that did not receive the full Methane Emissions Testing.

The results of the O'Brien Field Averaging Analysis are shown below and attached herewith:

O'Brien Orphan Well CH4 Averaging - Applied to the 10 Wells Outside Sample Set - CES										
Prepared: 3.30.2023										
Well Name	Well #	API #	County	Purchase Order	Gas Sample	CH4/PPM	Total LELs/PPM	CH4 Flow @ m3/day	Methane Emission @ g/hour	Post Plug CH4
O'Brien Deming 13	1	30-005-60922	Chaves	52100-72995	19-Feb	1,380	8,390	0.02	0.001	
O'Brien Deming 6	1	30-005-60634	Chaves	52100-72995	18-Dec	0	5,800	0.000	0.000	
O'Brien Deming 6	2	30-005-60730	Chaves	52100-72995	18-Dec	0	3,110	0.000	0.000	
O'Brien Fee 18	1	30-005-60619	Chaves	52100-72995		91,741.25	132,849	0.6088	1.668	
O'Brien Fee 18	2	30-005-60640	Chaves	52100-72995	21-Feb	493,430	764,050	2.400	35.378	
O'Brien Fee 18	3	30-005-60725	Chaves	52100-72995		91,741.25	132,849	0.6088	1.668	
O'Brien Fee 18	4	30-005-60902	Chaves	52100-72995	19-Feb	0	4,100	0.000	0.000	
O'Brien Fee 18	6	30-005-61246	Chaves	52100-72995		91,741.25	132,849	0.6088	1.668	
O'Brien Fee 19	1	30-005-60528	Chaves	52100-72995		91,741.25	132,849	0.6088	1.668	
O'Brien Fee 19	2	30-005-60565	Chaves	52100-72995		91,741.25	132,849	0.6088	1.668	
O'Brien Fee 19	3	30-005-60566	Chaves	52100-72995		91,741.25	132,849	0.6088	1.668	
O'Brien Fee 19	4	30-005-60654	Chaves	52100-72995		91,741.25	132,849	0.6088	1.668	
O'Brien Fee 19	5	30-005-60716	Chaves	52100-72995		91,741.25	132,849	0.6088	1.668	
O'Brien Fee 19	6	30-005-60804	Chaves	52100-72995		91,741.25	132,849	0.6088	1.668	
O'Brien Fee 19	7	30-005-60905	Chaves	52100-72995	21-Feb	8,610	11,520	0.04	0.01	
O'Brien Fee 19	8	30-005-61021	Chaves	52100-72995		91,741.25	132,849	0.6088	1.668	
O'Brien Fee 24	1	30-005-60803	Chaves	52100-72995	19-Feb	160,400	252,660	0	0	
O'Brien Fee 24	2	30-005-60923	Chaves	52100-72995	21-Feb	8,860	8,891	0.14	0.035	
O'Brien Fee 25	5	30-005-60655	Chaves	52100-72995	23-Feb	44,050	133,860	0.01	0.013	
O'Brien Lightcap 7	1	30-005-60815	Chaves	52100-72998	18-Dec	0	3,680	0	0	0 Not Plugged
O'Brien Lightcap 7	2	30-005-60816	Chaves	52100-72998	19-Dec	0	3,230	0	0	0
O'Brien LLL	1	30-005-62194	Chaves	52100-72998	20-Dec	510	2,128	0	0	0
O'Brien P	1	30-005-62192	Chaves	52100-72998	21-Dec	0	9,070	0	0	0 Not Plugged
O'Brien P	2	30-005-62247	Chaves	52100-72998	21-Dec	141,550	202,980	0	0	0
O'Brien P	3	30-005-62267	Chaves	52100-72998	21-Dec	609,570	709,530	7.13	129.843	0
O'Brien R	1	30-005-62190	Chaves	52100-72998	20-Dec	0	2,580	0	0	0
Total O'Brien Wells						Sample Total CH4 PPM	Sample Total Explosive Gas PPM	Sample Total Flow m3/day	Sample Total CH4 Emission g/hour	Total O'Brien CH4 Emission g/hour
26						1,467,860	2,125,579	9.7400	165.3890	
O'Brien Well Sample Set Applied 16						Sample Avg CH4 PPM	Sample Avg Explosive Gas PPM	Sample Average Flow m3/day	Sample Avg CH4 Emission g/hour	181.960
% of Total O'Brien Wells Tested 61.54						91,741.25	132,849	0.6088	1.6680	
% of Total O'Brien Wells Averaged 38.46										

- ¹ Methane Calculation: 717 grams CH4 per cubic meter (717 x 0.6088 g/m3/day = 436.51 g/day total /24 = 18.19 g/hour x 0.091741) (methane concentration) < 1.67 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].

¹ Methane Calculation: 717 grams CH4 per cubic meter (717 x 0.6088 m3/day = 436.51 g/day total /24 = 18.19 g/hour x 0.091741 (methane concentration) = 1.67 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].

Image 2.1 – Well Done New Mexico LLC O'Brien Field Averaging Memorandum

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).

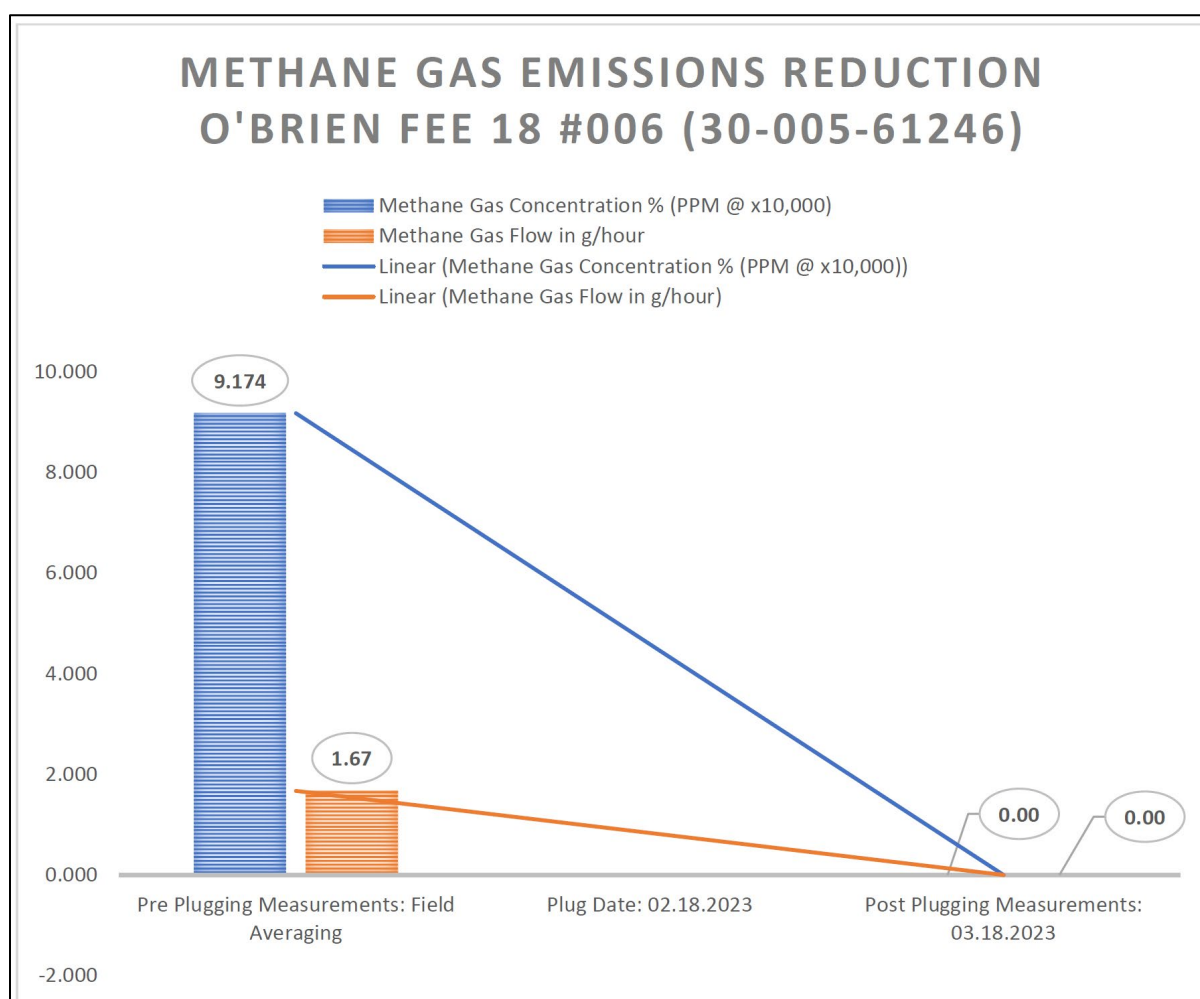


Image 3.1 – O'Brien Fee 18 #006 (30-005-61246) Methane Gas Emissions Reduction Pre Plugging to Post Plugging

TECHNICAL FINDINGS

O'Brien Fee 18 #006 (30-005-61246):

- Total C1 through C6 Gas Concentration: 132,849 ppm
- Total Measured Wellhead Gas Emissions: 0.61 m3/day
- Methane Gas Concentration: 91,741 ppm
- Calculated Average Wellhead Methane Gas Emissions: 1.67 g/hour
- Post Plugging Methane Gas Concentration: 0.00 ppm
- Post Plugging Methane Flow: 0.00 g/hour

CONCLUSIONS

- The O’Brien Fee 18 #006 (30-005-61246) was emitting Methane gas pre-plugging at the average rate of 1.67 g/hour, which was above 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.
- Post Plugging, the O’Brien Fee 18 #006 (30-005-61246) presented 0.00 ppm of Methane gas emissions from field gas tests and laboratory analysis of WDF collected gas samples.

FIELD NOTES



Well Site

InfoWell FileImagesWell DataRegulatoryField NotesLive Data ViewAccessRemove Well

Date03/18/2023

New Noteces: On location with WDF Measure1 Team to collect Gas Sample for Laboratory Analysis. Site photo documentation. Field Gas Analysis.

Add

Image 4.1 – O’Brien Fee 18 #006 (30-005-61246) Field Notes from WDF Well Intel™ Orphan Well Project Management IoT

Appendix A – Site Photos for O'Brien Fee 18 #006 (30-005-61246)



1) O'Brien Fee 18 #006 – Field Methane Measurement



2) O'Brien Fee 18 #006 – Post Plug Gas Sample



3) O'Brien Fee 18 #006 – Location Condition Post Plug



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575.397.3713 2609 W Marland Hobbs NM 88240

C6+ Gas Analysis Report

16404G	OBrien Fee 18 #6	OBrien Fee 18 #6	
Sample Point Code	Sample Point Name	Sample Point Location	
Laboratory Services	2023066038	Tedlar Bag	CES - Spot
Source Laboratory	Lab File No	Container Identity	Sampler
USA	USA	USA	New Mexico
District	Area Name	Field Name	Facility Name
Mar 18, 2023 12:25	Mar 18, 2023 12:25	Mar 24, 2023 08:46	Mar 24, 2023
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)	99.7930	99.79229	
CO2 (CO2)	0.0390	0.03944	
Methane (C1)	0.0000	0	
Ethane (C2)	0.0000	0	0.0000
Propane (C3)	0.0000	0	0.0000
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+)	0.1680	0.16827	0.0730
TOTAL	100.0000	100.0000	0.0730

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:	Feb 13, 2023

Gross Heating Values (Real, BTU/ft³)			
14.696 PSI @ 60.00 Å°F	14.73 PSI @ 60.00 Å°F		
Dry	Saturated	Dry	Saturated
8.6	9.3	8.6	9.3

Calculated Total Sample Properties	
GPA2145-16 *Calculated at Contract Conditions	
Relative Density Real	Relative Density Ideal
0.9711	0.9712
Molecular Weight	
28.1291	

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

Field H2S
0 PPM

PROTREND STATUS:

Passed By Validator on Mar 27, 2023

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	Mar 27, 2023 2:44 pm	Methane = 0 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 210095

DEFINITIONS

Operator: CANYON E & P COMPANY 251 O'Connor Ridge Blvd. Irving, TX 75038	OGRID: 269864
	Action Number: 210095
	Action Type: [UF-OMA] Post-Plug Methane Monitoring (UF-OMA-MMB)

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.

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

QUESTIONS

Action 210095

QUESTIONS

Operator: CANYON E & P COMPANY 251 O'Connor Ridge Blvd. Irving, TX 75038	OGRID: 269864
	Action Number: 210095
	Action Type: [UF-OMA] Post-Plug Methane Monitoring (UF-OMA-MMB)

QUESTIONS

Prerequisites	
[OGRID] Well Operator	[269864] CANYON E & P COMPANY
[API] Well Name and Number	[30-005-61246] O'BRIEN FEE 18 #006
Well Status	Plugged (not released)

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

Reason For Filing	Post-Plug Methane Monitoring
Date of monitoring	03/18/2023
Latitude	33.617355
Longitude	-104.0231323

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

Flow rate in cubic meters per day (m³/day)	0.00
Test duration in hours (hr)	1.0
Average flow temperature in degrees Celsius (°C)	10.0
Average gauge flow pressure in kilopascals (kPag)	0.0
Methane concentration in part per million (ppm)	0
Methane emission rate in grams per hour (g/hr)	0.00
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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