



P.O. Box 10640 Bozeman, Montana 59719

(406) 460-0903

TO: Jim Griswold, NMOCD

FROM: Curtis Shuck, Chairman

DATE: July 23, 2023

RE: Artesia Metex #038 (30-015-00950) 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 Artesia Metex #038 by the WDF Measure 1 Field Team on May 27, 2023, revealed a cement filled casing to within 7" of the surface. The WDF Measure 1 Team took site photographs, performed field gas measurements and collected a gas sample for immediate laboratory analysis.



Image 1.1 – Artesia Metex #038 (30-015-00950) Orphan Well in Eddy County, NM

The Pre-Plugging Methane Flow Calculations were conducted by the Well Done Foundation and Well Done New Mexico LLC and monitored using Ventbuster™ Instruments VB100-54 Series Ultra-Low Flow Meter with GPS on March 10, 2023. The Methane Concentration was measured at 9,820 ppm and Methane Flow was measured at 5.18 cfd. Therefore, the adjusted average methane gas emission measured at this wellhead is calculated at **0.04 grams per hour (g/hour)**.¹

The State of New Mexico used the methane flow data collected by WDF to prioritize the Artesia Metex #038 orphan well plugging under the IJA Program and began mobilizing a contractor to location. A-Plus P&A Well Service, Inc. of Farmington, NM was awarded the plugging contract.

WDF arrived at the Artesia Metex #038 location on May 27, 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: 0.04 g/hour.**

¹ Methane Calculation: 717 grams CH₄ per cubic meter (717 x 0.15 m³/day = 107.55 g/day total /24 = 4.48 g/hour x 0.009820 (methane concentration) = **0.04 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].



Test Report

Start Date: Fri Mar 10 2023 18:45:04 GMT+0000 (Coordinated Universal Time)
 End Date: Sat Mar 11 2023 18:13:53 GMT+0000 (Coordinated Universal Time)
 Device: VB100-0054
 Well Licensee: 30-015-00950
 Well Name: Artesia Metex 038
 UWI: 30-015-00950
 Well License Number: 30-015-00950
 Surface Location: State of NM
 Bottom Hole Location: Unknown

Test Operator: Sean O. Jacobson
 Authorized By: State of NM
 Test Reason: IJA Pre Plugging
 Scope Of Work: 12 Hour
 AFE Number: 52100-0000072986
 GPS: 32.71917,-104.23335
 Notes: GTG
 Prepared By: Curtis Shuck

Flow / Pressure Test

Flow Duration

23 hrs 27 minutes

Duration

Average Flowrate

5.1841

cfd

Average Pressure

0.5170

psig

Average Flow Temperature

69.8986

°F

Average CH4 Mass

0.04 g/hr

Methane Calculation: 717 grams CH4 per cubic meter ($717 \text{ g/m}^3 \times 0.1468 \text{ m}^3/\text{day} = 105.26 \text{ g/day total} / 24 = 4.39 \text{ g/hour} \times 0.00982 \text{ (methane concentration)} = 0.04 \text{ g/hour CH4}$). **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 0.0448 pound per cubic foot [lb/ft³], or 0.0004144 ounce per cubic inch [oz/inch³].

Flow / Pressure / Temperature Timeseries

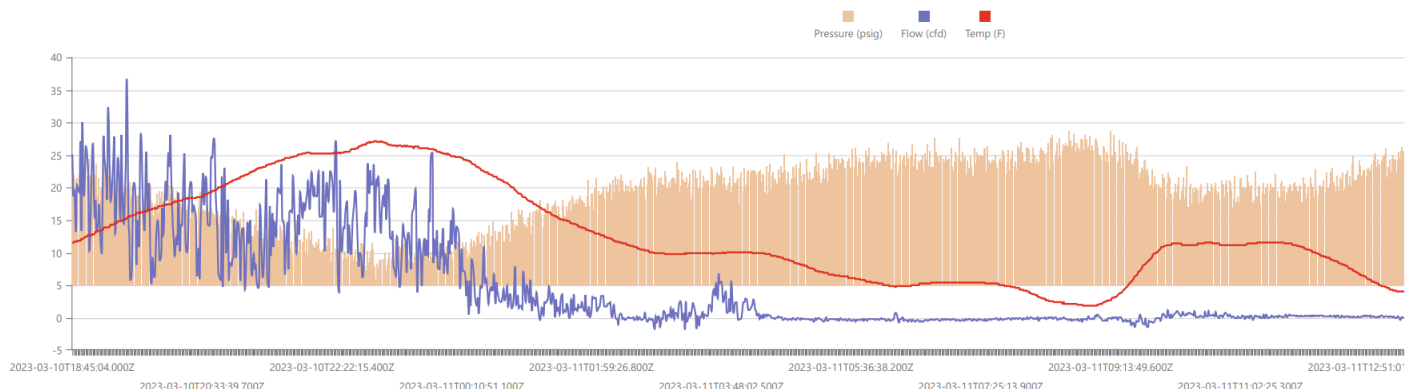


Image 2.1 – Artesia Metex #038 Pre Plugging Test Report

This orphan well did 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.

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).

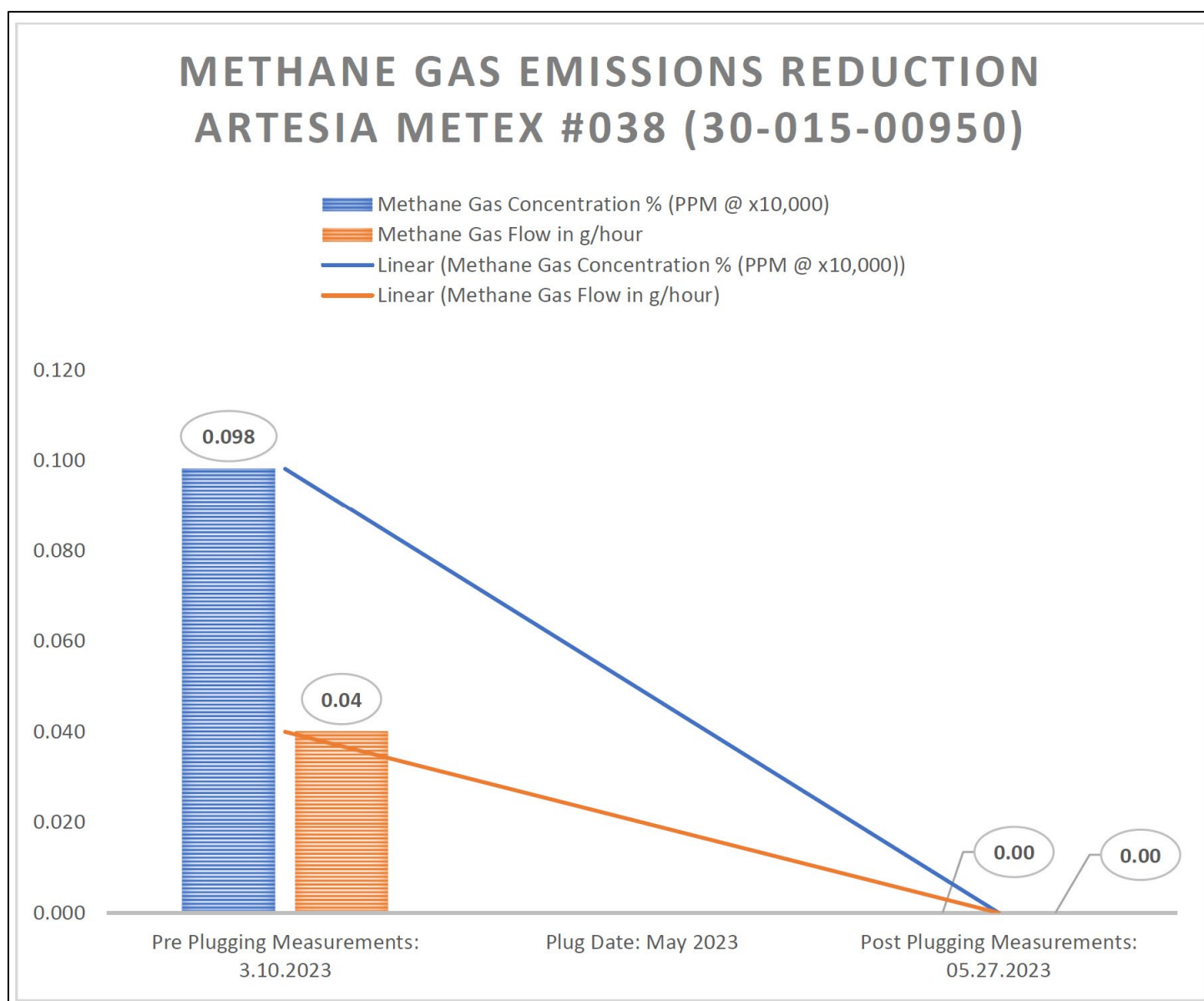


Image 3.1 – Artesia Metex #038 (30-015-00950) Methane Gas Emissions Reduction Pre Plugging to Post Plugging

TECHNICAL FINDINGS

Artesia Metex #038 (30-015-00950):

- Total C1 through C6 Gas Concentration: 18,990 ppm
- Total Measured Wellhead Gas Emissions: 0.15 m³/day
- Methane Gas Concentration: 9,820 ppm
- Calculated Average Wellhead Methane Gas Emissions: 0.04 g/hour
- Post Plugging Methane Gas Concentration: 0.00 ppm
- Post Plugging Methane Flow: 0.00 g/hour

CONCLUSIONS

- The Artesia Metex #038 (30-015-00950) was emitting Methane gas pre-plugging at the average rate of 0.04 g/hour, which was 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.
- Post Plugging, the Artesia Metex #038 (30-015-00950) presented 0.00 ppm of Methane gas emissions from field gas tests and laboratory analysis of WDF collected gas samples.

FIELD NOTES

#	Date	Note
1	2023-05-27	ces: On location with Measure1 for post plug sampling. Cement to within 9" of top of casing. Collect gas sample for Lab Analysis. Place green ribbon at casing. OK for cutoff.
2	2023-03-11	Arrived 11:12am 3/11/2023. Rigged down flow test. SP VB #54
3	2023-03-10	Arrived 11:31am 3/10/2023. Rigged up flow test. SP VB #54
4	2023-03-10	Arrived 11:54am 3/10/2023. Rigged up flow test. SP VB #40
5	2023-02-27	Arrived 12:13am 2/27/2023. Rigged down flow test.
6	2023-02-26	Arrived 11:34am 2/26/2023. Rigged up Ventbuster #16 for flow testing.

Image 4.1 – Artesia Metex #038 (30-015-00950) Field Notes from WDF Well Intel™ Orphan Well Project Management IoT

Appendix A – Site Photos for Artesia Metex #038 (30-015-00950)



1) Artesia Metex #038 – Cement



2) Artesia Metex #038 – Gas Sample



3) Artesia Metex #038 – Ribbon



www.permianls.com
575.397.3713 2609 W Marland Hobbs NM 88240

C6+ Gas Analysis Report

17157G	Artesia Metex #038 Post Plug	Artesia Metex #038 Post Plug	
Sample Point Code	Sample Point Name	Sample Point Location	
Laboratory Services	2023069834	bag	CES - Spot
Source Laboratory	Lab File No	Container Identity	Sampler
USA	USA	USA	New Mexico
District	Area Name	Field Name	Facility Name
May 27, 2023 15:15	May 27, 2023 15:15	Jun 6, 2023 09:10	Jun 6, 2023
Date Sampled	Date Effective	Date Received	Date Reported
Luis			
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)	97.6810	97.6806	
CO2 (CO2)	0.0470	0.04707	
Methane (C1)	0.0000	0	
Ethane (C2)	0.3160	0.31624	0.0840
Propane (C3)	0.1700	0.16959	0.0470
I-Butane (IC4)	0.0320	0.03226	0.0100
N-Butane (NC4)	0.0970	0.09686	0.0310
I-Pentane (IC5)	0.0570	0.05732	0.0210
N-Pentane (NC5)	0.1020	0.10181	0.0370
Hexanes Plus (C6+)	1.4980	1.49826	0.6500
TOTAL	100.0000	100.0000	0.8800

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: Jun 5, 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
97.6	96.9	97.8	97.1

Calculated Total Sample Properties

GPA2145-16 *Calculated at Contract Conditions

Relative Density Real	Relative Density Ideal
1.0061	1.0060
Molecular Weight	
29.1401	

C6+ Group Properties

Assumed Composition

C6 - 60.000% C7 - 30.000% C8 - 10.000%

Field H2S
0 PPM

PROTREND STATUS:

Passed By Validator on Jun 9, 2023

DATA SOURCE:

Imported

PASSED BY VALIDATOR REASON:

First sample taken @ this point, composition looks reasonable

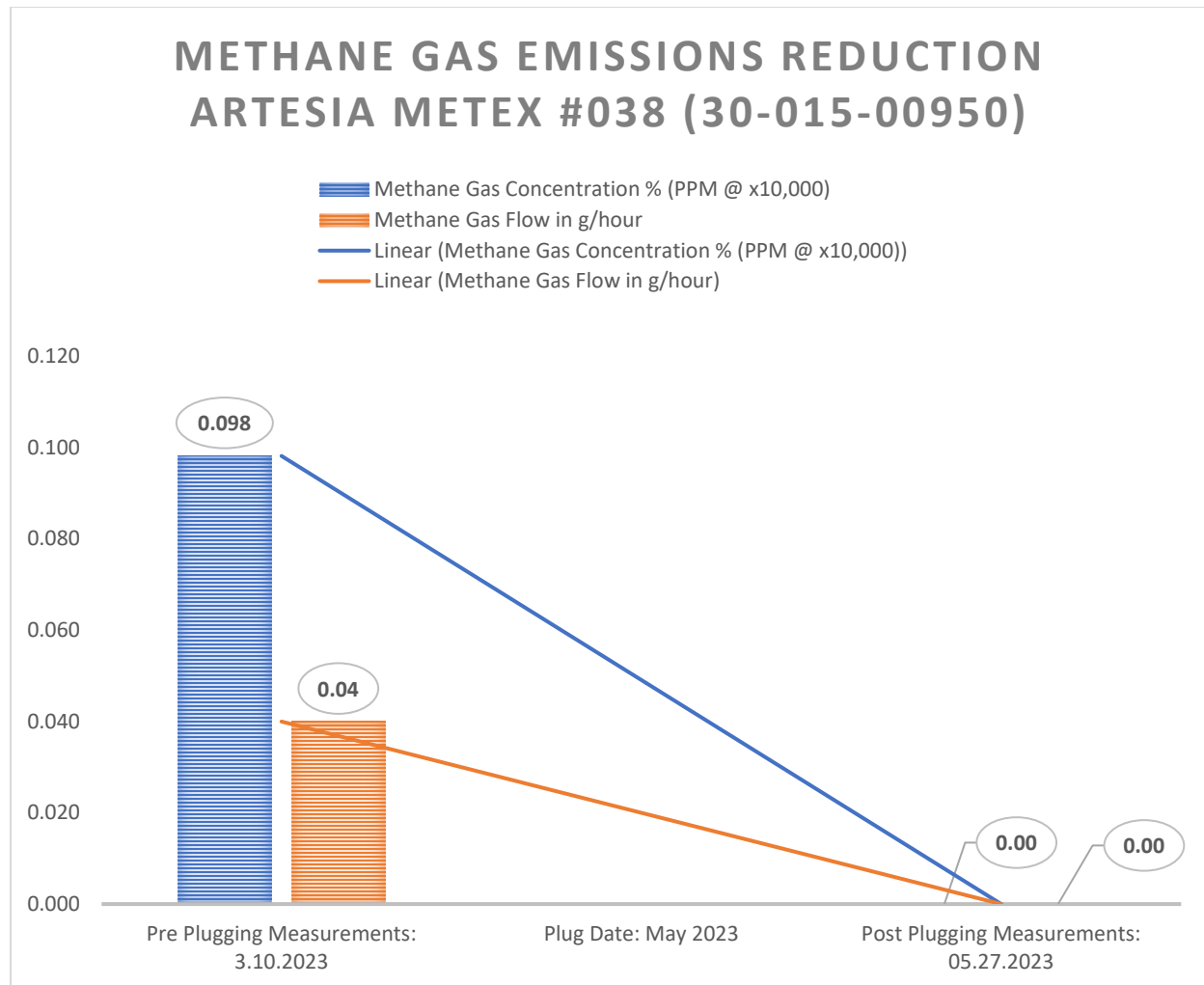
VALIDATOR:

. Rush

VALIDATOR COMMENTS:

OK

Source	Date	Notes
Luis Cano	Jun 7, 2023 3:08 pm	Methane: 0 PPM
Luis Cano	Jun 7, 2023 3:08 pm	Methane: 0 PPM
. Rush	Jun 9, 2023 2:46 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 243465

DEFINITIONS

Operator: CANYON E & P COMPANY 251 O'Connor Ridge Blvd. Irving, TX 75038	OGRID: 269864
	Action Number: 243465
	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.

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QUESTIONS

Action 243465

QUESTIONS

Operator: CANYON E & P COMPANY 251 O'Connor Ridge Blvd. Irving, TX 75038	OGRID: 269864
	Action Number: 243465
	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	[30-015-02138] ARTESIA METEX UNIT #042
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	05/27/2023
Latitude	32.7209854
Longitude	-104.2159729

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)	20.0
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	Other

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

Name of monitoring contractor	Well Done New Mexico LLC
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