



P.O. Box 10640 Bozeman, Montana 59719

(406) 460-0903

TO: Jim Griswold, NMOCD

FROM: Curtis Shuck, Chairman

DATE: July 24, 2023

RE: Cato San Andres (CSAU) #101 (30-005-20010) 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 Cato San Andres Unit (CSAU) #101 by the WDF Measure 1 Field Team on June 29, 2023, revealed a cement filled casing, cut off 3' below the surface with a welded monument cap. The WDF Measure 1 Team took site photographs, performed field gas measurements and collected a gas sample for immediate laboratory analysis.

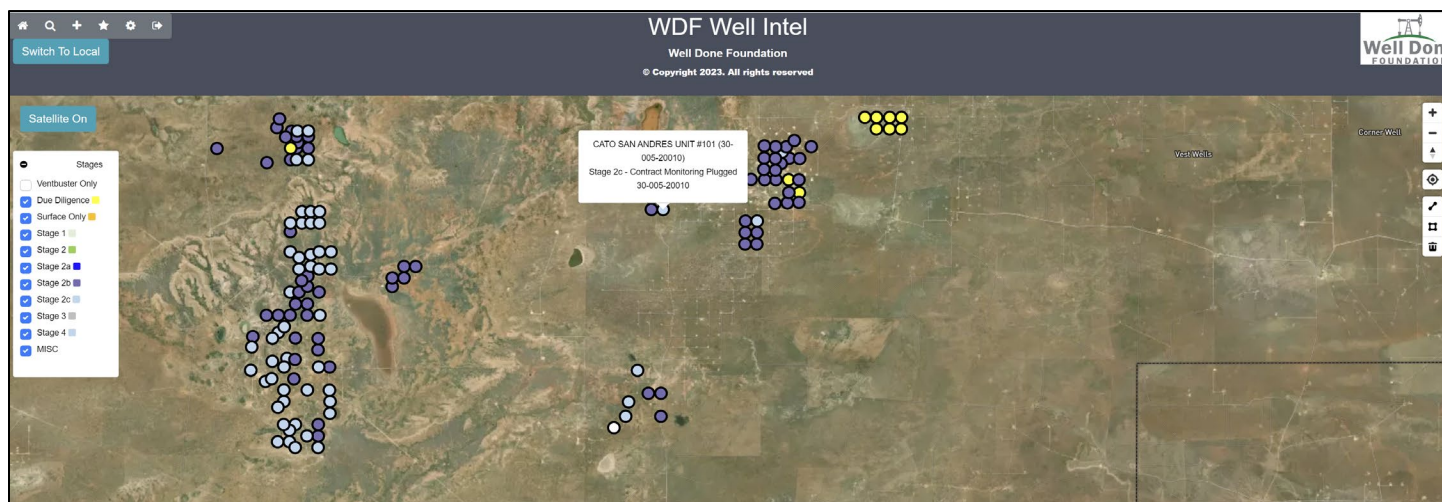


Image 1.1 – CSAU #101 (30-005-20010) Orphan Well in Chaves County, NM

The Pre-Plugging Methane Flow Calculations were conducted by the Well Done Foundation and Well Done New Mexico LLC and monitored using Ventbuster™ Instruments VB100-49 Series Ultra-Low Flow Meter with GPS on January 17, 2023. The Methane Concentration was measured at 5,170 ppm and Methane Flow was measured at <0.00 m3/d. Therefore, the adjusted average methane gas emission measured at this wellhead is calculated at **0.00 grams per hour (g/hour)**.<sup>1</sup>

The State of New Mexico used the methane flow data collected by WDF to prioritize the CSAU #101 orphan well plugging under the IIJA Program and began mobilizing a contractor to location. Drake Well Service, Inc. of Farmington, NM was awarded the plugging contract.

WDF arrived at the CSAU #101 location on June 29, 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: 0.00 g/hour.**

<sup>1</sup> Methane Calculation: 717 grams CH<sub>4</sub> per cubic meter (717 x 0.00 m<sup>3</sup>/day = 0.00 g/day total /24 = 0.00 g/hour x 0.00517 (methane concentration) = **0.00 g/hour CH<sub>4</sub>**). **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/m<sup>3</sup>; 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/ft<sup>3</sup>].



## Test Report

Start Date: Tue Jan 17 2023 23:33:51 GMT+0000 (Coordinated Universal Time)  
 End Date: Wed Jan 18 2023 19:21:55 GMT+0000 (Coordinated Universal Time)  
 Device: VB100-0049  
 Well Licensee: 30-005-20010  
 Well Name: Cato San Andres Unit 101  
 UWI: 30-005-20010  
 Well License Number: 30-005-20010  
 Surface Location: State of NM  
 Bottom Hole Location: Unknown

Test Operator: Sean O. Jacobson  
 Authorized By: State of NM  
 Test Reason: IUA Pre Plugging  
 Scope Of Work: 12 hour  
 AFE Number: 52100-00000073108  
 GPS: 33.61802,-103.89604  
 Notes: GTG  
 Prepared By: Curtis Shuck

## Flow / Pressure Test

### Flow Duration

19 hrs 47 minutes

Duration

### Average Flowrate

-8.2148

cf/d

### Average Pressure

0.1412

psig

### Average Flow Temperature

43.8884

°F

### Average CH4 Mass

-0.04 g/hr

**Methane Calculation:** 717 grams CH4 per cubic meter ( $717 \text{ g/m}^3 \times -0.2326 \text{ m}^3/\text{day} = -166.77 \text{ g/day total} / 24 = -6.95 \text{ g/hour} \times 0.00517 \text{ (methane concentration)} = -0.04 \text{ g/hour CH4}$ ). **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/m<sup>3</sup>; 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/ft<sup>3</sup>], or 0.0004144 ounce per cubic inch [oz/inch<sup>3</sup>].

## Flow / Pressure / Temperature Timeseries

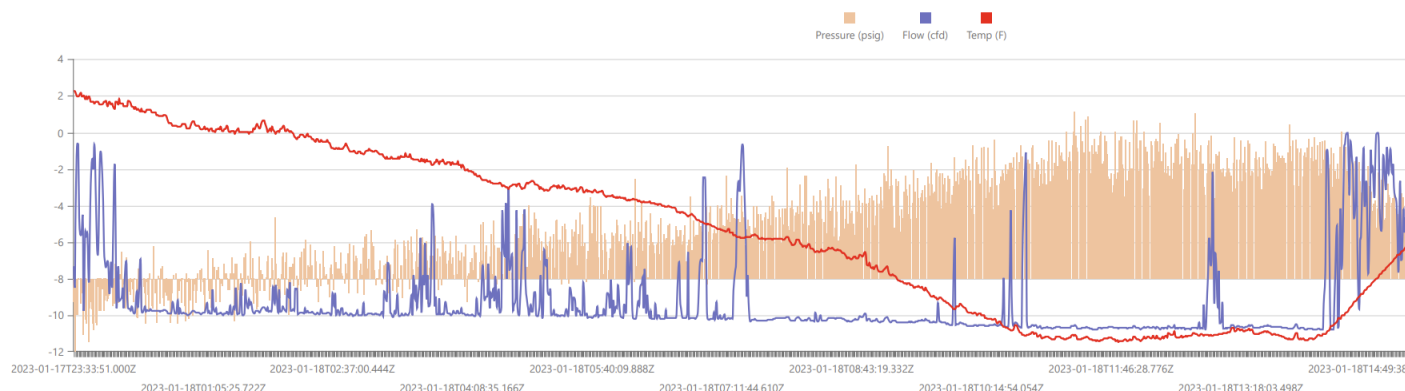


Image 2.1 – CSAU #101 Pre Plugging Test Report

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)<sup>2</sup>.

<sup>2</sup> 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).

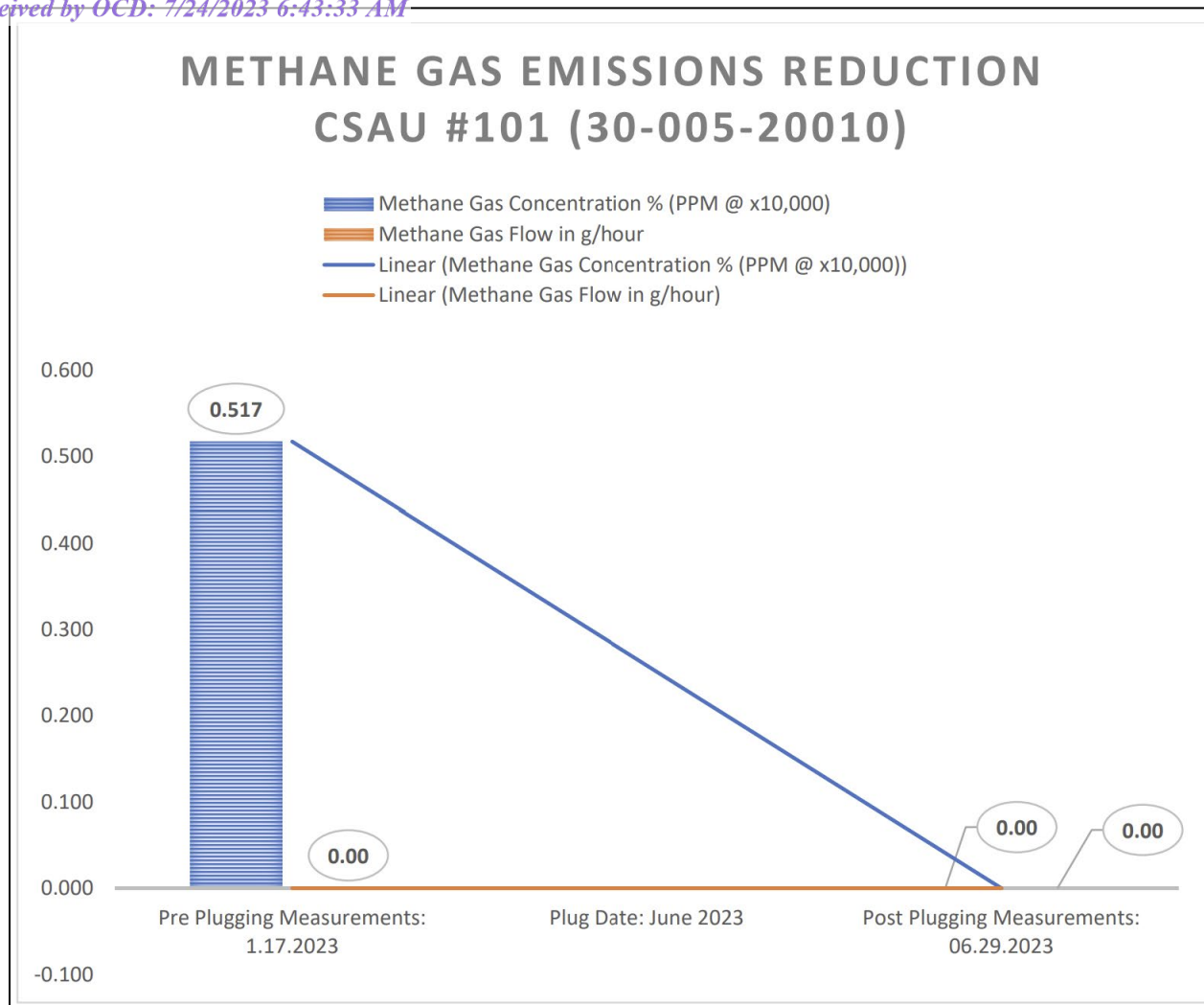


Image 3.1 – CSAU #101 (30-005-20010) Methane Gas Emissions Reduction Pre Plugging to Post Plugging

### TECHNICAL FINDINGS

CSAU #101 (30-005-20010):

- **Total C1 through C6 Gas Concentration: 14,170 ppm**
- **Total Measured Wellhead Gas Emissions: 0.00 m<sup>3</sup>/day**
- **Methane Gas Concentration: 5,170 ppm**
- **Calculated Average Wellhead Methane Gas Emissions: 0.00 g/hour**
- **Post Plugging Methane Gas Concentration: 0.00 ppm**
- **Post Plugging Methane Flow: 0.00 g/hour**

### CONCLUSIONS

- The CSAU #101 (30-005-20010) was emitting Methane gas pre-plugging at the average rate of 0.00 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 CSAU #101 (30-005-20010) 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	2023-06-29	ces: on location with WDF Measure 1 to perform post plugging methane monitoring. perform field gas analysis. collect gas sample for Laboratory analysis. place green ribbon at monument cap. Photos. WILDCAT OUT!
2	2023-01-18	Stopped test and rigged down VB100-49. Secure location and place green ribbon.
3	2023-01-17	Arrived at 4:12pm January 17th, 2023. Conducted field gas analysis and collected gas sample. Then rigged ventbuster #49 for flow testing.

Image 4.1 – CSAU #101 (30-005-20010) Field Notes from WDF Well Intel™ Orphan Well Project Management IoT





1) CSAU #101 - Field Gas



2) CSAU #101 - Gas Sample



3) CSAU #101 - Ribbon



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575.397.3713 2609 W Marland Hobbs NM 88240

## C6+ Gas Analysis Report

<b>17469G</b>	<b>CSA #101 Post Plug</b>	<b>CSA #101 Post Plug</b>	
Sample Point Code	Sample Point Name	Sample Point Location	
<b>Laboratory Services</b>	<b>2023071236</b>	<b>Tedlar Bag</b>	<b>CES - Spot</b>
Source Laboratory	Lab File No	Container Identity	Sampler
<b>USA</b>	<b>USA</b>	<b>USA</b>	<b>New Mexico</b>
District	Area Name	Field Name	Facility Name
<b>Jun 29, 2023 16:10</b>	<b>Jun 29, 2023 16:10</b>	<b>Jul 6, 2023 09:54</b>	<b>Jul 6, 2023</b>
Date Sampled	Date Effective	Date Received	Date Reported
<b>Admin</b>			
Ambient Temp (°F)	Flow Rate (Mcf)	Analyst	Press PSI @ Temp °F Source Conditions
<b>Well Done Foundation</b>		<b>NG</b>	
Operator		Lab Source Description	

Component	Normalized Mol %	Un-Normalized Mol %	GPM
H2S (H2S)	0.0000	0	
Nitrogen (N2)	98.2360	98.23555	
CO2 (CO2)	0.1100	0.11035	
Methane (C1)	0.0000	0	
Ethane (C2)	0.2300	0.22981	0.0610
Propane (C3)	0.2470	0.24695	0.0680
I-Butane (IC4)	0.0790	0.0786	0.0260
N-Butane (NC4)	0.1870	0.18666	0.0590
I-Pentane (IC5)	0.1110	0.11137	0.0410
N-Pentane (NC5)	0.1200	0.1204	0.0430
Hexanes Plus (C6+)	0.6800	0.68029	0.2950
TOTAL	100.0000	100.0000	0.5930

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

Analyzer Information	
Device Type:	Device Make:
Device Model:	Last Cal Date:

Gross Heating Values (Real, BTU/ft³)			
14.696 PSI @ 60.00 Å°F		14.73 PSI @ 60.00 Å°F	
Dry	Saturated	Dry	Saturated
63.3	63.1	63.4	63.2
Calculated Total Sample Properties			
GPA2145-16 *Calculated at Contract Conditions			
Relative Density Real		Relative Density Ideal	
0.9911		0.9911	
Molecular Weight			
28.7007			
C6+ Group Properties			
Assumed Composition			
C6 - 60.000%	C7 - 30.000%	C8 - 10.000%	
Field H2S			
0 PPM			

**PROTREND STATUS:**

Passed By Validator on Jul 11, 2023

**DATA SOURCE:**

Imported

**PASSED BY VALIDATOR REASON:**

First sample taken @ this point, composition looks reasonable

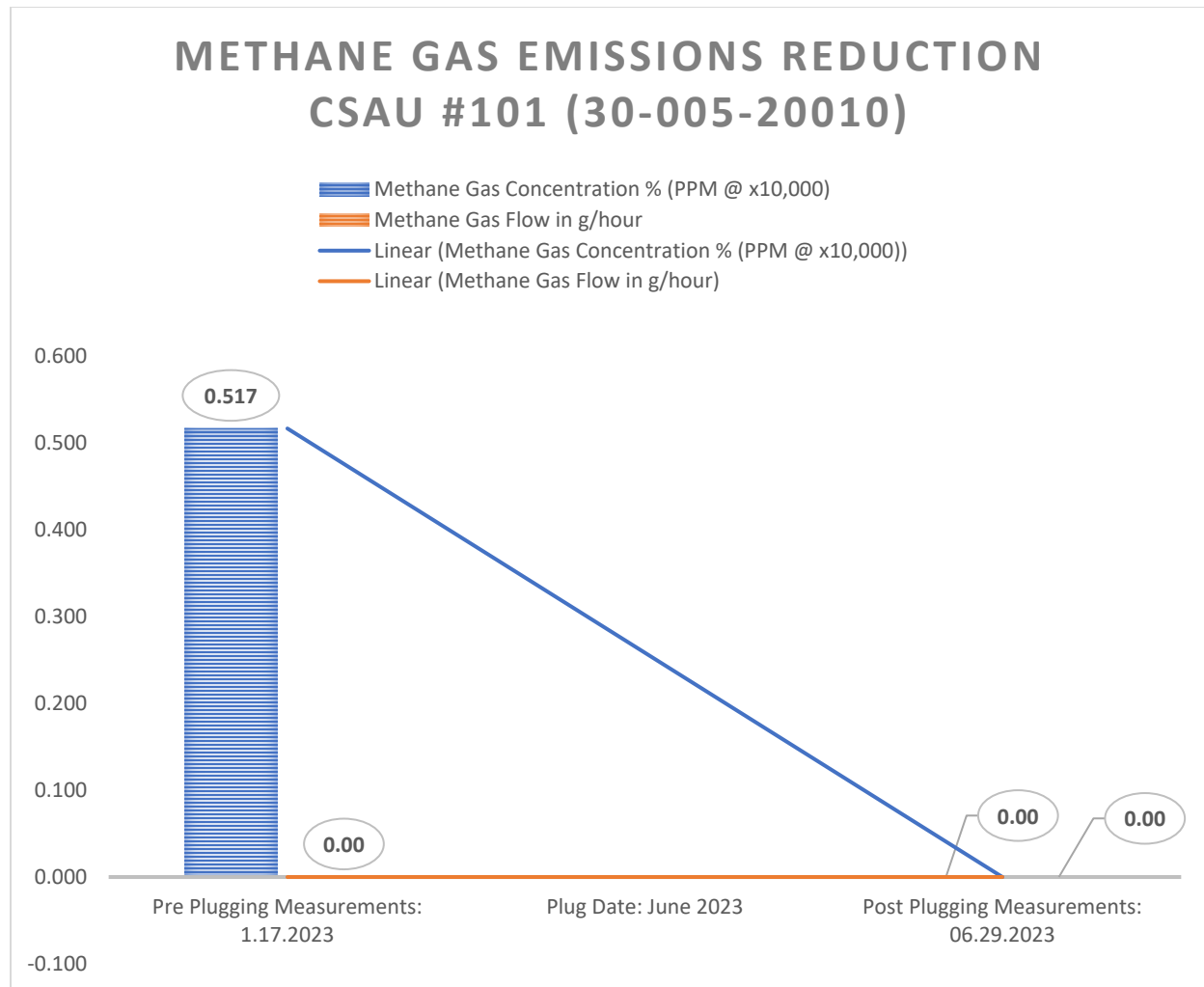
**VALIDATOR:**

Rush

**VALIDATOR COMMENTS:**

OK

Source	Date	Notes
	Jul 11, 2023 11:57 am	Methane 0







**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 243506

DEFINITIONS

Operator:  CANO PETRO OF NEW MEXICO, INC. 801 Cherry Street Fort Worth, TX 76102	OGRID:  248802
	Action Number:  243506
	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 243506

**QUESTIONS**

Operator: CANO PETRO OF NEW MEXICO, INC. 801 Cherry Street Fort Worth, TX 76102	OGRID: 248802
	Action Number: 243506
	Action Type: [UF-OMA] Post-Plug Methane Monitoring (UF-OMA-MMB)

**QUESTIONS**

<b>Prerequisites</b>	
[OGRID] Well Operator	[248802] CANO PETRO OF NEW MEXICO, INC.
[API] Well Name and Number	[30-005-20010] CATO SAN ANDRES UNIT #101
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	06/29/2023
Latitude	33.6179962
Longitude	-103.8960495

**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)	28.8
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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