



P.O. Box 10640 Bozeman, Montana 59719

(406) 460-0903

TO: Jim Griswold, NMOCD

FROM: Curtis Shuck, Chairman

DATE: July 23, 2023

RE: Cato San Andres (CSAU) #068 (30-005-20236) 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) #068 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.

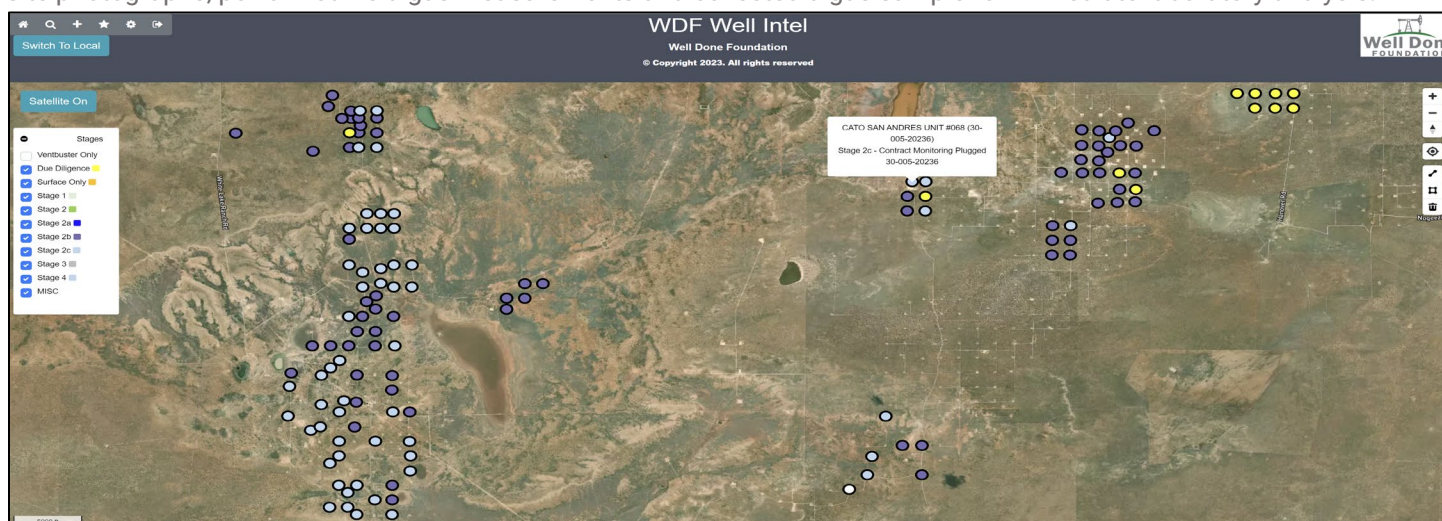


Image 1.1 – CSAU #068 (30-005-20236) Orphan Well in Chaves County, NM

The Pre-Plugging Methane Flow Calculations were conducted by the Well Done Foundation and Well Done New Mexico LLC and monitored using Ventbuster™ Instruments VB100-20 Series Ultra-Low Flow Meter with GPS on January 18, 2023. The Methane Concentration was measured at 596,410 ppm and Methane Flow was measured at 4.11 cfd. Therefore, the adjusted average methane gas emission measured at this wellhead is calculated at **2.07 grams per hour (g/hour)**.¹

The State of New Mexico used the methane flow data collected by WDF to prioritize the CSAU #068 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 #068 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: 2.07 g/hour.**

¹ Methane Calculation: 717 grams CH₄ per cubic meter (717 x 0.1163 m³/day = 83.39 g/day total /24 = 3.47 g/hour x 0.596410 (methane concentration) = **2.07 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: Wed Jan 18 2023 23:14:06 GMT+0000 (Coordinated Universal Time)
 End Date: Fri Jan 20 2023 22:52:14 GMT+0000 (Coordinated Universal Time)
 Device: VB100-0020
 Well Licensee: 30-005-20236
 Well Name: Cato San Andres Unit 68
 UWI: 30-005-20236
 Well License Number: 30-005-20236
 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: 52100-00000073108
 GPS: 33.62526,-103.89920
 Notes: 1 Inch Upper
 Prepared By: Curtis Shuck

Flow / Pressure Test

Flow Duration

47 hrs 36 minutes

Duration

Average Flowrate

4.1064

cfd

Average Pressure

0.0858

psig

Average Flow Temperature

44.9183

*F

Average CH4 Mass

2.07 g/hr

Methane Calculation: 717 grams CH4 per cubic meter ($717 \text{ g/m}^3 \times 0.1163 \text{ m}^3/\text{day} = 83.39 \text{ g/day total} / 24 = 3.47 \text{ g/hour} \times 0.59641 \text{ (methane concentration)} = 2.07 \text{ g/hour CH4}$). **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

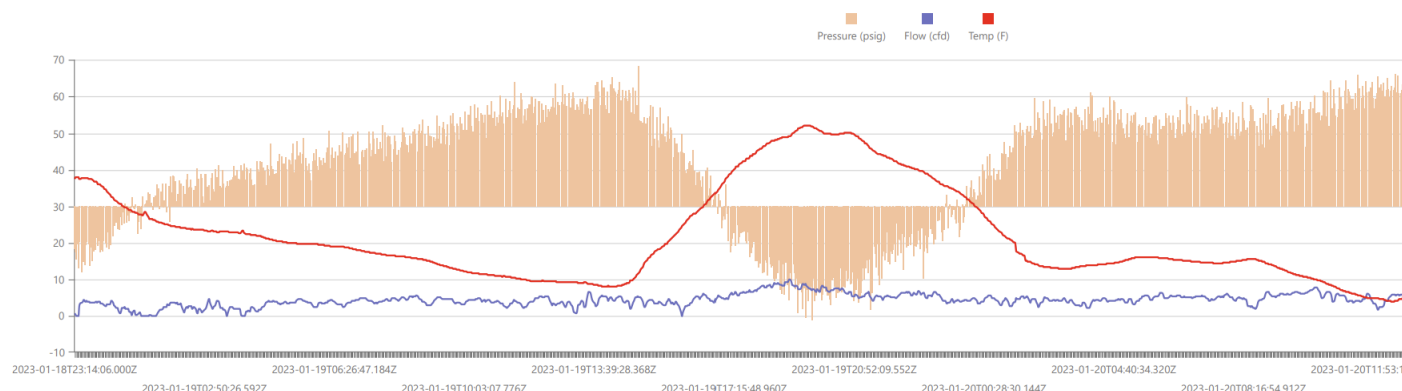


Image 2.1 – CSAU #068 Pre Plugging Test Report

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.

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).

METHANE GAS EMISSIONS REDUCTION CSAU #068 (30-005-20236)

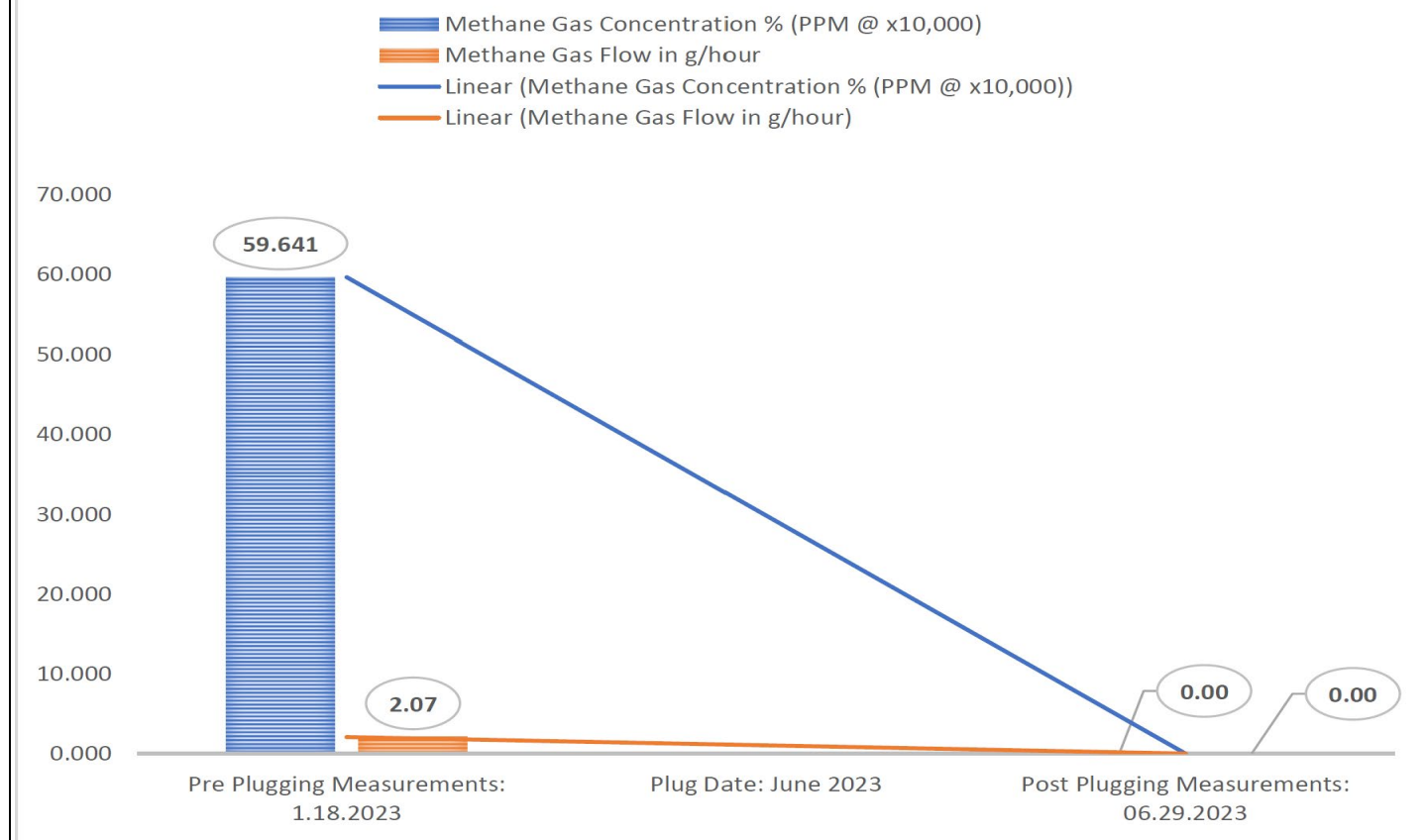


Image 3.1 – CSAU #068 (30-005-20236) Methane Gas Emissions Reduction Pre Plugging to Post Plugging

TECHNICAL FINDINGS

CSAU #068 (30-005-20236):

- Total C1 through C6 Gas Concentration: 654,310 ppm
- Total Measured Wellhead Gas Emissions: 0.12 m³/day
- Methane Gas Concentration: 596,410 ppm
- Calculated Average Wellhead Methane Gas Emissions: 2.07 g/hour
- Post Plugging Methane Gas Concentration: 0.00 ppm
- Post Plugging Methane Flow: 0.00 g/hour

CONCLUSIONS

- The CSAU #068 (30-005-20236) was emitting Methane gas pre-plugging at the average rate of 2.07 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 CSAU #068 (30-005-20236) 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 for post plugging testing. Inspect cement. Conduct field gas analysis. Collect gas sample for Laboratory analysis. Place green ribbon. Take site photos. WILDCAT OUT!
2	2023-01-20	On location to rig down VB100-020 and VB100-029. Secure location.
3	2023-01-18	Arrived on location 2:32pm January 18, 2023. Conducted field gas analysis then collected a gas sample from both the 2" the 1". Rigged VB100-020 at the 1" production head. Rigged VB100-029 at the 2" casing port. Site photos.

Image 4.1 – CSAU #068 (30-005-20236) Field Notes from WDF Well Intel™ Orphan Well Project Management IoT



1) CSAU #041 - Field Gas



2) CSAU #068 - Gas Sample



3) CSAU #068 - Ribbon



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575.397.3713 2609 W Marland Hobbs NM 88240

C6+ Gas Analysis Report

15810G	CSA #68 Post Plug	CSA #68 Post Plug	
Sample Point Code	Sample Point Name	Sample Point Location	
Laboratory Services	2023071263	Tedlar Bag	CES - Spot
Source Laboratory	Lab File No	Container Identity	Sampler
USA	USA	USA	New Mexico
District	Area Name	Field Name	Facility Name
Jun 29, 2023 16:30	Jun 29, 2023 16:30	Jul 6, 2023 12:29	Jul 6, 2023
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	Normalized Mol %	Un-Normalized Mol %	GPM
H2S (H2S)	0.0000	0	
Nitrogen (N2)	99.4730	99.473	
CO2 (CO2)	0.0430	0.043	
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)	0.0100	0.01	0.0030
I-Pentane (IC5)	0.0000	0	0.0000
N-Pentane (NC5)	0.0000	0	0.0000
Hexanes Plus (C6+)	0.4740	0.474	0.2060
TOTAL	100.0000	100.0000	0.2090

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
24.7	25.2	24.8	25.3
Calculated Total Sample Properties			
GPA2145-16 *Calculated at Contract Conditions			
Relative Density Real		Relative Density Ideal	
0.9782		0.9783	
Molecular Weight			
28.3322			
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

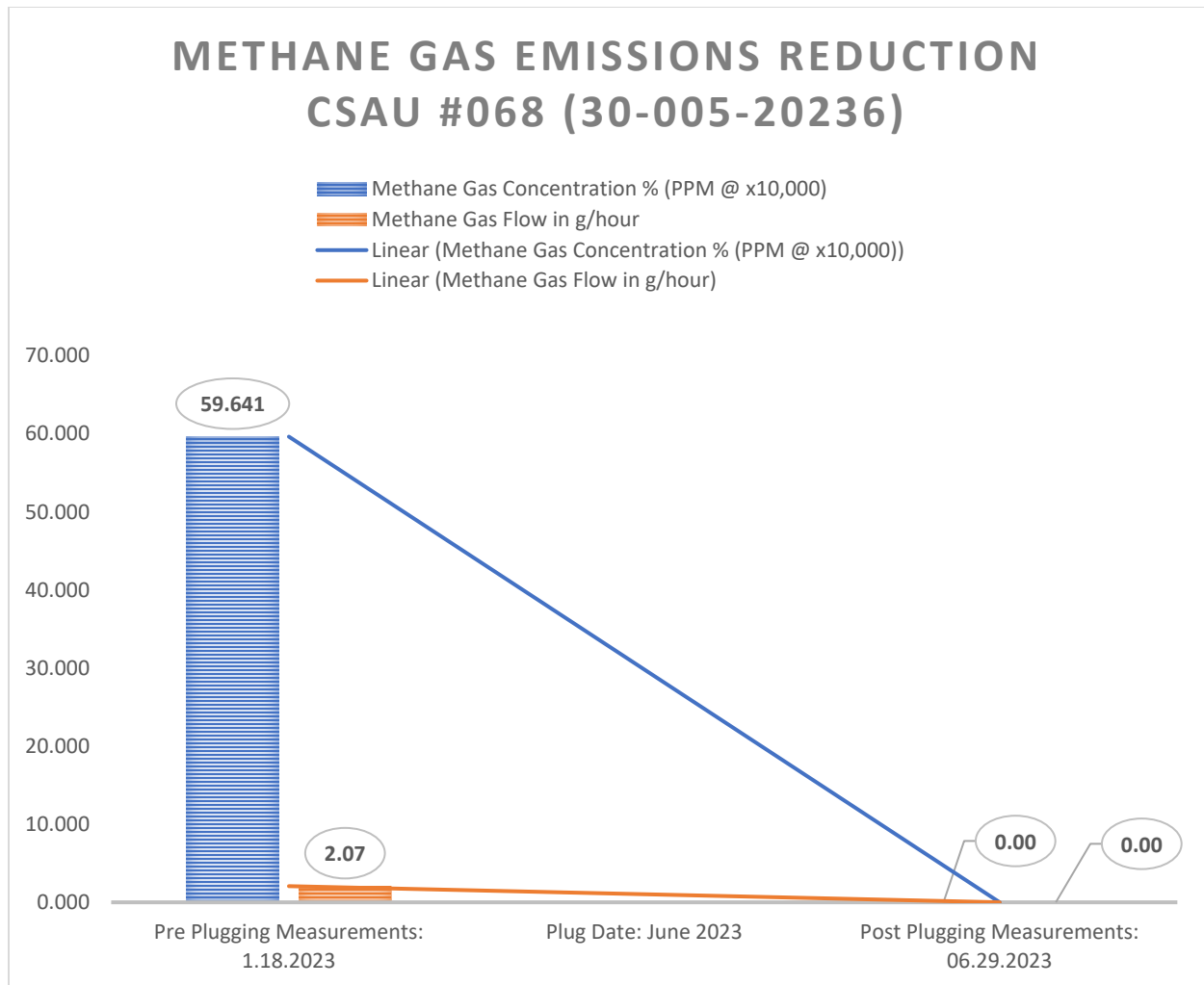
VALIDATOR:

Rush

VALIDATOR COMMENTS:

OK

Source	Date	Notes
	Jul 11, 2023 11:58 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 243489

DEFINITIONS

Operator: CANO PETRO OF NEW MEXICO, INC. 801 Cherry Street Fort Worth, TX 76102	OGRID: 248802
	Action Number: 243489
	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 243489

QUESTIONS

Operator: CANO PETRO OF NEW MEXICO, INC. 801 Cherry Street Fort Worth, TX 76102	OGRID: 248802
	Action Number: 243489
	Action Type: [UF-OMA] Post-Plug Methane Monitoring (UF-OMA-MMB)

QUESTIONS

Prerequisites	
[OGRID] Well Operator	[248802] CANO PETRO OF NEW MEXICO, INC.
[API] Well Name and Number	[30-005-20236] CATO SAN ANDRES UNIT #068
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	33.6252213
Longitude	-103.8991928

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)	37.2
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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