



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) #069 (30-005-10586) 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) #069 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.

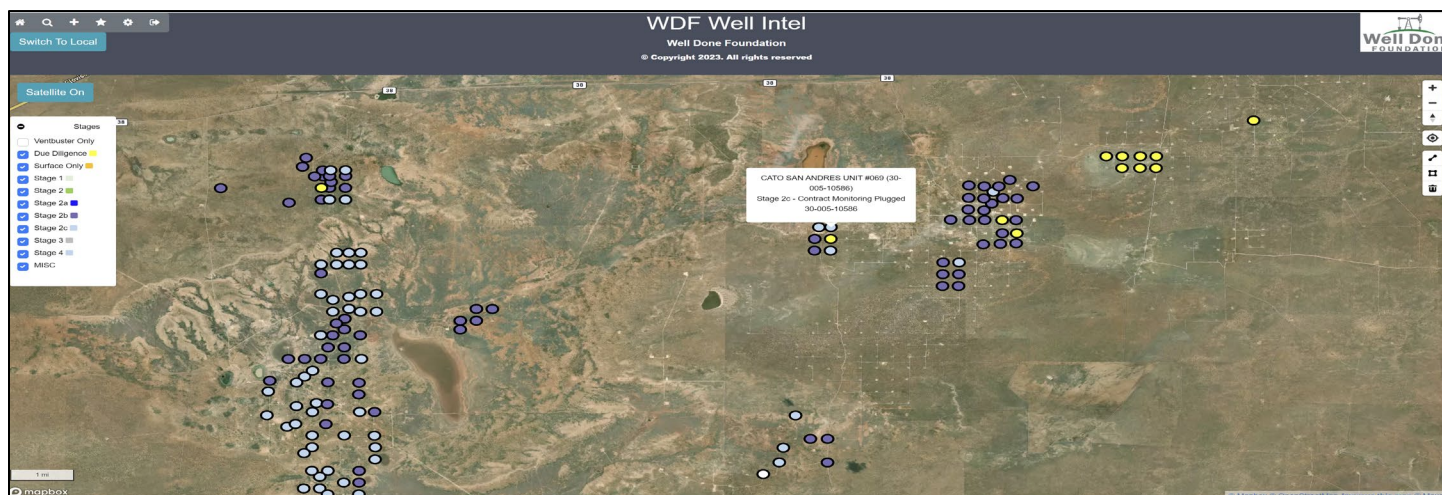


Image 1.1 – CSAU #069 (30-005-10586) Orphan Well in Chaves County, NM

The Pre-Plugging Methane Flow Calculations were conducted by the Well Done Foundation and Well Done New Mexico LLC and monitored using Ventbuster™ Instruments VB100-54 Series Ultra-Low Flow Meter with GPS on May 27, 2023. The Methane Concentration was measured at 82,430 ppm and Methane Flow was measured at 1.62 cfd. Therefore, the adjusted average methane gas emission measured at this wellhead is calculated at **1.62 grams per hour (g/hour)**.¹

The State of New Mexico used the methane flow data collected by WDF to prioritize the CSAU #069 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 #069 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: 1.62 g/hour.**

¹ Methane Calculation: 717 grams CH₄ per cubic meter (717 x 0.6597 m³/day = 473.00 g/day total /24 = 19.70 g/hour x 0.082410 (methane concentration) = **1.62 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 May 26 2023 23:36:32 GMT+0000 (Coordinated Universal Time)
 End Date: Sat May 27 2023 23:38:27 GMT+0000 (Coordinated Universal Time)
 Device: VB100-0054
 Well Licensee: EMNRD OCD
 Well Name: Cato San Andres 069
 UWI: 30-005-10586
 Well License Number: 30-005-10586
 Surface Location: CHAVES
 Bottom Hole Location: unknown

Test Operator: ces
 Authorized By: OCD
 Test Reason: IUA PRE Plug
 Scope Of Work: 12-HOUR
 AFE Number: 52100-0000073108
 GPS: 33.62529,-103.89598
 Notes: Casing
 Prepared By: Curtis Shuck

Flow / Pressure Test

Flow Duration

24 hrs 1 minutes

Duration

Average Flowrate

23.2956

cfd

Average Pressure

0.0373

psig

Average Flow Temperature

76.4854

*F

Average CH4 Mass

1.62 g/hr

Methane Calculation: 717 grams CH4 per cubic meter ($717 \text{ g/m}^3 \times 0.6597 \text{ m}^3/\text{day} = 473.00 \text{ g/day total} / 24 = 19.71 \text{ g/hour} \times 0.08239 \text{ (methane concentration)} = 1.62 \text{ g/hour CH4}$). **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

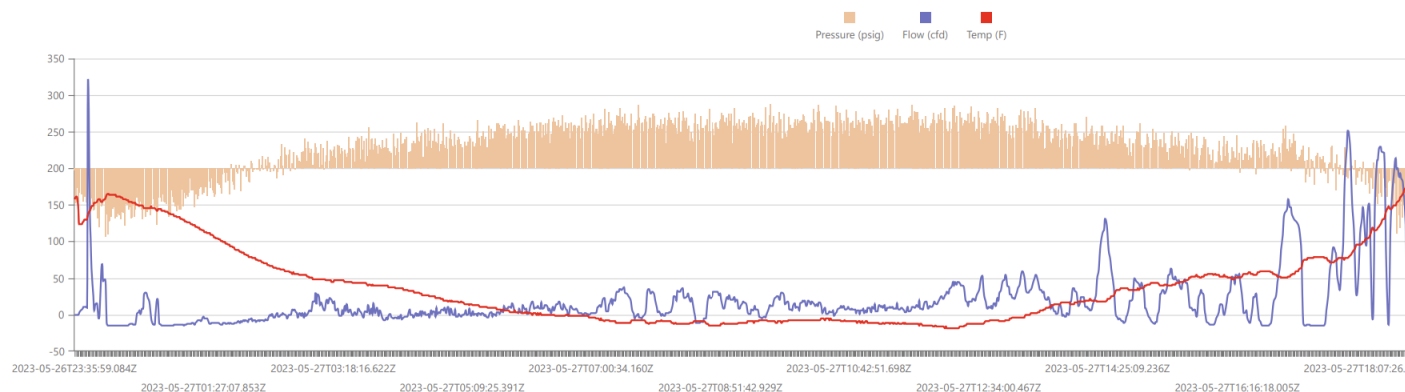


Image 2.1 – CSAU #069 Pre Plugging Test Report

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 #069 (30-005-10586)

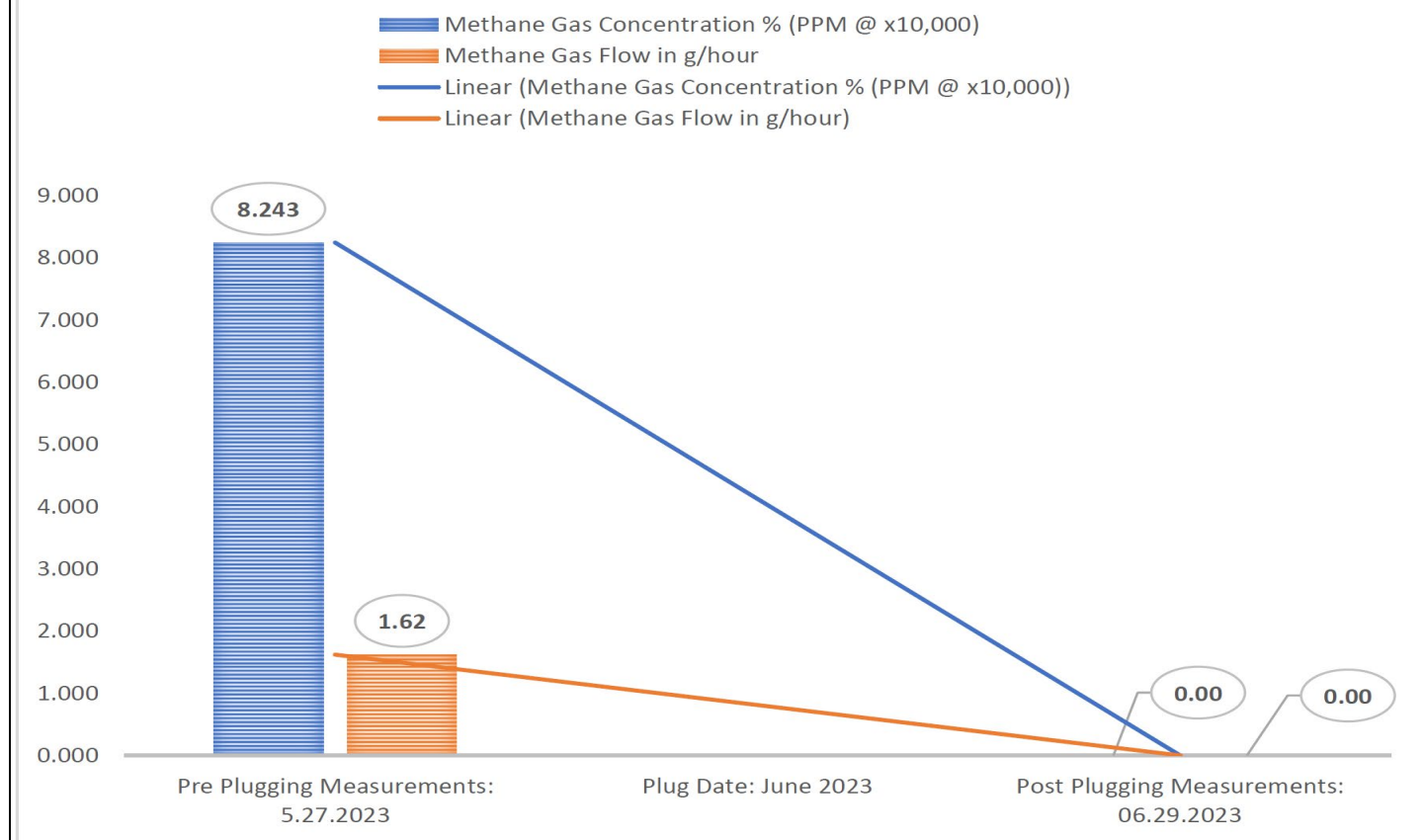


Image 3.1 – CSAU #069 (30-005-10586) Methane Gas Emissions Reduction Pre Plugging to Post Plugging

TECHNICAL FINDINGS

CSAU #069 (30-005-10586):

- Total C1 through C6 Gas Concentration: 128,270 ppm
- Total Measured Wellhead Gas Emissions: 0.66 m3/day
- Methane Gas Concentration: 82,430 ppm
- Calculated Average Wellhead Methane Gas Emissions: 1.62 g/hour
- Post Plugging Methane Gas Concentration: 0.00 ppm
- Post Plugging Methane Flow: 0.00 g/hour

CONCLUSIONS

- The CSAU #069 (30-005-10586) was emitting Methane gas pre-plugging at the average rate of 1.62 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 #069 (30-005-10586) 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 #069 (30-005-10586) Field Notes from WDF Well Intel™ Orphan Well Project Management IoT



1) CSAU #069 – Field Gas



2) CSAU #069 – Gas Sample



3) CSAU #069 – Ribbon



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

C6+ Gas Analysis Report

| | | | |
|-----------------------------|---------------------------|--------------------------|--|
| 17470G | CSA #69 Post Plug | CSA #69 Post Plug | |
| Sample Point Code | Sample Point Name | Sample Point Location | |
| Laboratory Services | 2023071237 | 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 15:50 | Jun 29, 2023 15:50 | Jul 6, 2023 09:56 | Jul 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) | 99.9120 | 99.91275 | |
| CO2 (CO2) | 0.0460 | 0.04552 | |
| 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+) | 0.0420 | 0.04174 | 0.0180 |
| TOTAL | 100.0000 | 100.0000 | 0.0180 |

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 |
| 2.2 | 3.0 | 2.2 | 3.0 |
| Calculated Total Sample Properties | | | |
| GPA2145-16 *Calculated at Contract Conditions | | | |
| Relative Density Real | | Relative Density Ideal | |
| 0.9683 | | 0.9684 | |
| Molecular Weight | | | |
| 28.0481 | | | |
| C6+ Group Properties | | | |
| Assumed Composition | | | |
| C6 - 60.000% | C7 - 30.000% | C8 - 10.000% | |
| Field H2S | | | |
| 0 PPM | | | |

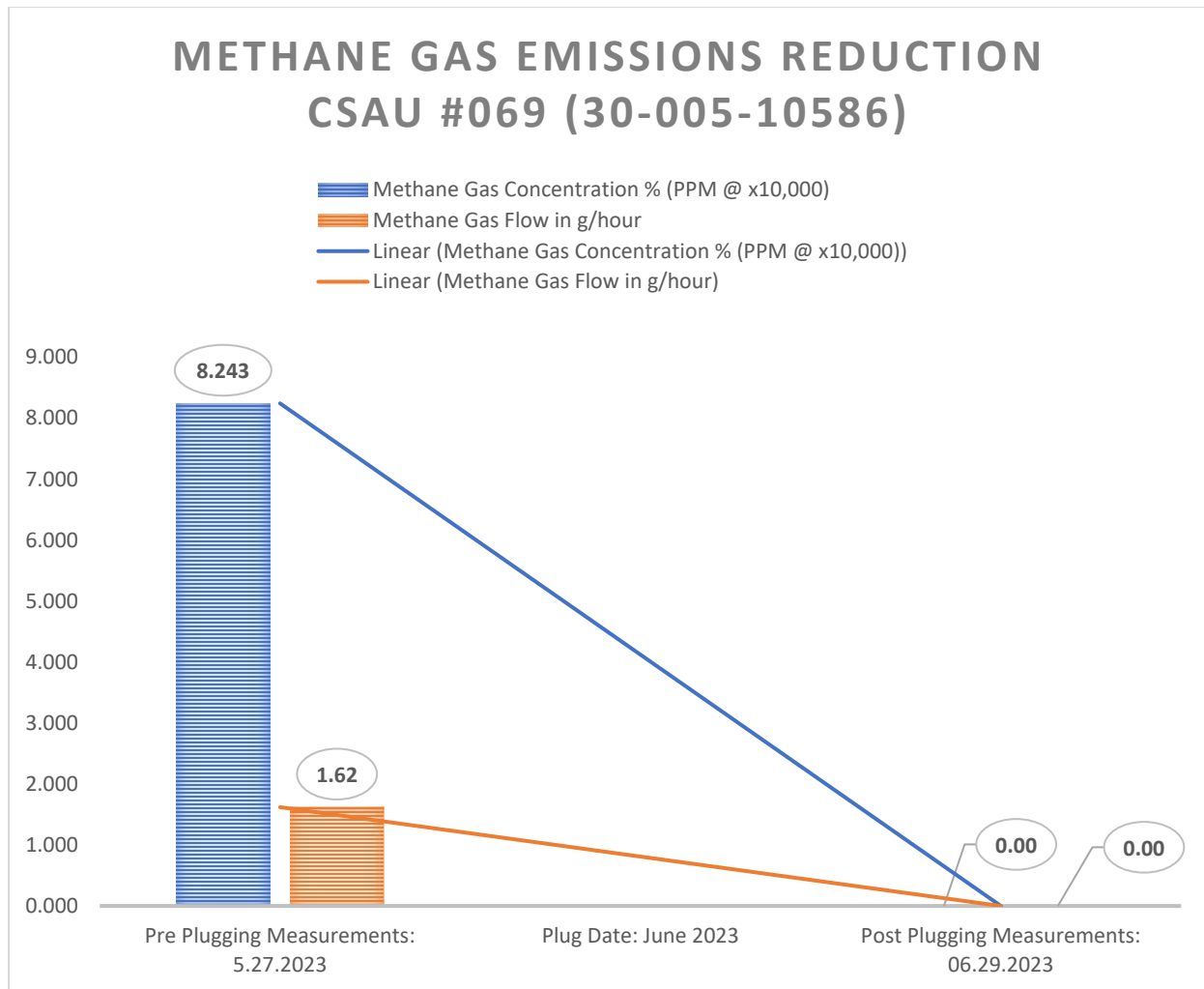
PROTREND STATUS: Passed By Validator on Jul 11, 2023
DATA SOURCE: Imported

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 243493

DEFINITIONS

| | |
|--|--|
| Operator: CANO PETRO OF NEW MEXICO, INC. 801 Cherry Street Fort Worth, TX 76102 | OGRID: 248802 |
| | Action Number: 243493 |
| | 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 243493

QUESTIONS

| | |
|--|--|
| Operator: CANO PETRO OF NEW MEXICO, INC. 801 Cherry Street Fort Worth, TX 76102 | OGRID: 248802 |
| | Action Number: 243493 |
| | 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 | [30-005-10586] CATO SAN ANDRES UNIT #069 |
| 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 | -103.8959427 |

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

| | |
|---|--------------|
| Flow rate in cubic meters per day (m³/day) | 0.66 |
| Test duration in hours (hr) | 24.0 |
| Average flow temperature in degrees Celsius (°C) | 24.0 |
| Average gauge flow pressure in kilopascals (kPag) | 0.3 |
| Methane concentration in part per million (ppm) | 82,430 |
| Methane emission rate in grams per hour (g/hr) | 1.62 |
| Testing Method | Steady State |

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

| | |
|-------------------------------|--------------------------|
| Name of monitoring contractor | Well Done New Mexico LLC |
|-------------------------------|--------------------------|