

TO: Randy Pancheco, APWS; Jim Griswold, NMOCD

FROM: Curtis Shuck, Chairman

DATE: October 17, 2022

RE: Double L Queen #007 (30-005-60099) Orphan Well Pre-Plugging Methane Monitoring

TECHNICAL MEMORANDUM

The Well Done Foundation, Inc. (WDF) performing contract professional services methane monitoring for A-Plus Well Services, Inc. (APWS) for the State of New Mexico Energy, Minerals and Natural Resources Department – Oil Conservation Division (OCD) under Purchase Order #1000002000038AA for Orphan Oil & Gas Wells at the Double L Queen Field in Chavez County, New Mexico.

The site conditions found at Double L Queen #007 by the WDF Measure 1 Team on September 1, 2022, at 2:30 P.M. revealed a leaking wellhead with high concentrations of flammable (LEL) gas present and leaking by the production valve at the 2-3/8" tubing and from the 4" casing. The WDF Team performed field gas measurements, collected gas samples and performed two Methane Emissions Flow Monitoring Tests using Ventbuster™ Instruments VB100-003 Ultra-Low Flow Meter with GPS for site location verification. The test selected was completed September 2, 2022 and was 25.2 hours in duration.

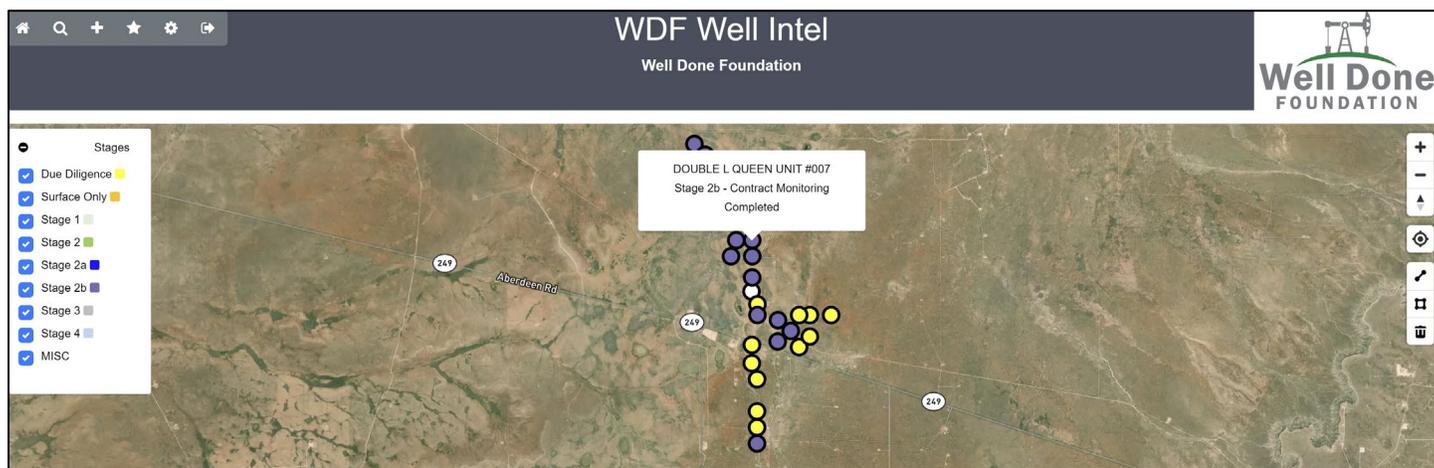


Image 1.1 – Double L Queen Field in Chavez County, NM

The findings from the Pre-Plugging Methane Flow Monitoring Test, using Ventbuster™ Instruments VB100-003 Ultra-Low Flow Meter with GPS, resulted in less than <0.00 cubic meters per day of total measured wellhead emissions over the 25.2-hour period. A composite gas sample was collected at the wellhead by WDF during the initial flow test beginning on September 1, 2022, and at the end of the flow test #2 on September 2, 2022, approximately 25.2-hours later. Methane gas concentration levels were measured at <0.00 ppm, pursuant to Test ID 2022057690 performed by Laboratory Services of Hobbs, NM on September 7, 2022, at 7:51 A.M. however, total explosive gas was measured at 216,650. Therefore, the adjusted average methane gas emission measured at this wellhead is calculated at **0.00 grams per hour (g/hour)**.¹ The peak explosive gas emission was recorded at 10:26 P.M. on September 2, 2022 (Image 4.1) and would indicate that this orphan well has a much higher emission rate potential.

¹ Methane Calculation: 554 grams CH₄ per cubic meter (554 x 0.00 = 0.00 g/day total /24 = 0.00 g/hour x 0.220038 (methane concentration) = **0.00 g/hour CH₄**). **Methane, gas** weighs 0.000554 gram per cubic centimeter or 0.554 kilogram per cubic meter, i.e. density of methane, gas is equal to 0.554 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 0.0346 pound per cubic foot [lb/ft³], or 0.0003202 ounce per cubic inch [oz/inch³].

This orphan well does 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.



Test Report

Start Date: Thursday, September 1st, 2022, 2:50 PM MDT	Test Operator: ces
End Date: Friday, September 2nd, 2022, 4:06 PM MDT	Authorized By: NMOCD
Device: VB100-0003	Test Reason: IJJA
Well Licensee: NMOCD	Scope Of Work: 12-Hour
Well Name: Double L Queen 007	AFE Number: NMOCD038AA / APWS22.001
UWI: 30-005-60099	GPS: 33.06413,-103.97520
Well License Number: 30-005-60099	Notes: GTG
Surface Location: Bogle	
Bottom Hole Location: unknown	

Flow Test

Average Flowrate 0.00 m3/d 0.00 g/ hour	Average Flow Temperature 25.0 °C	Average Flow Pressure -0.7 kPag	Flow Duration 25.2 hours
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Image 2.1 – Double L Queen #007 (30-005-60099) Methane Monitoring Dashboard

BACKGROUND

The Double L Queen #007 (30-005-60099) Orphan Well is located in Chavez County, NM at Latitude 33.0641327, Longitude -103.975174 was measured and monitored by the WDF Field Team on 9/1/2022 - 9/2/2022 following a Safety Briefing. Per the WDF protocol, the well was photographed from four (4) compass point aspects and closeups capturing the wellhead, field gas analysis results and gas sampling and uploaded to the WDF Well Intel™ IoT site. A Field Gas Analysis was conducted to detect Methane and H2s gas presence and concentration levels using a Honeywell BW Quattro Multi Gas Meter, serial number: QA121-012211.

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).

WDF Well Intel

Well Site							
Info	Well File	Images	Well Data	Regulatory	Field Notes	Access	Remove Well
Name	DOUBLE L QUEEN UNIT #007						
Stage	Stage 2b - Contract Monitoring Completed						⌵
GPS	33.0641327	✓	-103.975174	✓			
API #	30-005-60099						
Contract ID:	100002000038AA						

Image 3.1 – WDF Well Intel™ Orphan Well Project Management IoT

The WDF Field Team collected Gas Sample #1 using a 1 Liter Tedlar/TO-Plus Gas Sampling Bag from the 2-3/8" production tubing which was flowing gas past the valve at the beginning of the Flow Test at approximately 2:50 P.M MDT on 9.1.2022 as the well was being prepared for the initial Flow Measurement. Gas Sample #2 was collected in the same 1 Liter Tedlar Bag on 9.2.2022 before the Flow Test was concluded 4:06 P.M. MDT.

WDF rigged up the Ventbuster™ Instruments VB100-003 Continuous Ultra-Low Flow Meter with GPS for testing site confirmation for a minimum 12-Hour Methane Emission Test and began Test ID: 66d75a7b, verifying a cellular signal, cloud link and GPS coordinates. WDF collected Gas Sample #2 in the same Tedlar/TO Plus Gas Sample Bag prior to the VB Test being concluded on 9.2.2022 to ensure the Methane Emission Flow was normalized. The collected Gas Sample was secured and placed in a storage cooler for transport to Laboratory Services, Inc. in Hobbs, NM.

WDF returned to location on 9.2.2022 (approximately 25.2 hours) to conclude the Pre-Plugging Methane Emission Flow Test and rig the VB100-003 down and secure the wellhead. A "Green Ribbon" was placed at the Wellhead indicating that WDF had concluded the Pre-Plugging Methane Flow testing.

TECHNICAL FINDINGS

Double L Queen #007 (30-005-60099):

- **Total C1 through C6 Gas Concentration: 216,650 ppm**
- **Total Measured Wellhead Gas Emissions: <0.00 m3/day**
- **Methane Gas Concentration: 0.00 ppm**
- **Calculated Average Wellhead Methane Gas Emissions: 0.00 g/hour**
- **Peak Gas Flow Measured at: 0.01267 m3/day**

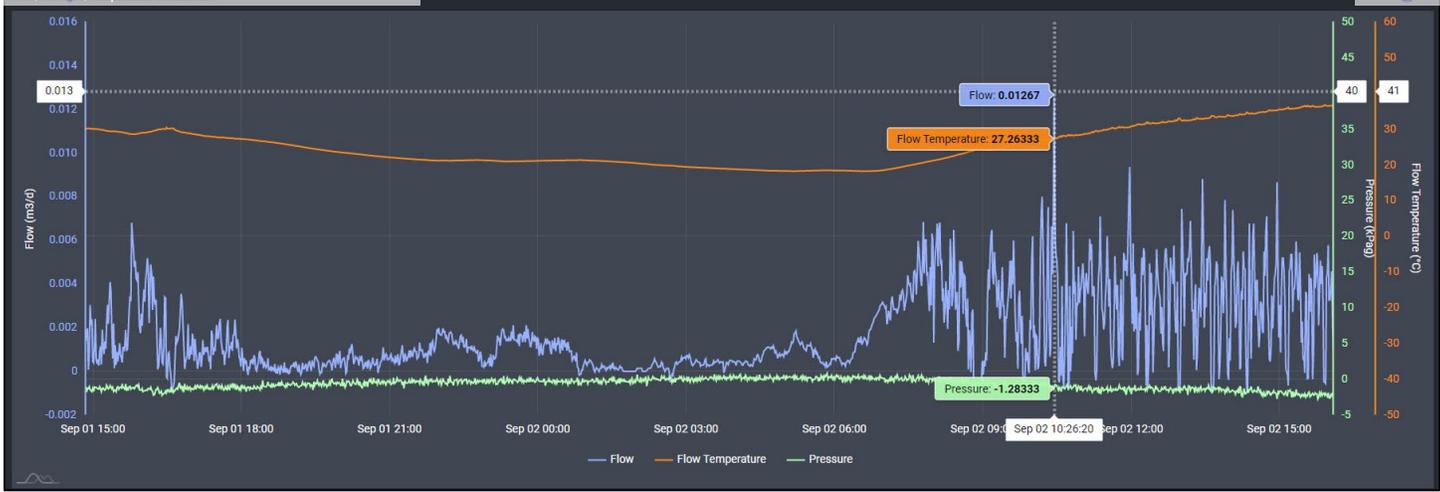


Image 4.1 – Double L Queen #007 (30-005-60099) Methane Flow/Pressure/Temperature Timeseries & Peak Flow

CONCLUSIONS

- The Double L Queen #007 (30-005-60099) is currently emitting Methane at the average rate of 0.00 g/hour, which is 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.
- WDF did capture a Peak Flow of mixed explosive gasses at 0.01267 m3/day recorded at 10:26 P.M on September 2, 2022, which indicates a much higher potential for mixed explosive gas emissions, therefore plugging of this well however should be a priority in the NMOCD schedule.

FIELD NOTES

#	Date	Note
1	2022-09-01	ces: Rig up VB100-003 for Methane Flow Monitoring. Collect gas sample for Lab Analysis. Photo document & GPS update.
2	2022-09-02	ces: Rig down VB100-003 from Methane Flow Monitoring at 2-3/8" tubing.

Image 4.2 – Double L Queen #007 (30-005-60099) Field Notes from WDF Well Intel™ Orphan Well Project Management IoT



1) DLQ #007 (30-005-60099) - North Facing



2) DLQ #007 (30-005-60099) - Wellhead



3) DLQ #007 (30-005-60099) - Wellhead & Gas Sample



4) DLQ #097 (30-005-60099) - Field Gas Monitoring



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575.397.3713 2609 W Marland Hobbs NM 88240

C6+ Gas Analysis Report

14855G	Double L Queen #007	Double L Queen #007	
Sample Point Code	Sample Point Name	Sample Point Location	
Laboratory Services	2022057690	Tedlar Bag	Stacy - Spot
Source Laboratory	Lab File No	Container Identity	Sampler
USA	USA	USA	New Mexico
District	Area Name	Field Name	Facility Name
Sep 1, 2022 14:30	Sep 1, 2022 14:30	Sep 6, 2022 09:39	Sep 6, 2022
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)	77.3270	77.32731	
CO2 (CO2)	0.5040	0.50382	
Methane (C1)	0.0000	0	
Ethane (C2)	2.9120	2.9117	0.7790
Propane (C3)	8.6700	8.66999	2.3880
I-Butane (IC4)	1.9390	1.93948	0.6340
N-Butane (NC4)	4.6890	4.68878	1.4780
I-Pentane (IC5)	1.3700	1.36986	0.5010
N-Pentane (NC5)	1.3970	1.39692	0.5060
Hexanes Plus (C6+)	1.1920	1.19213	0.5170
TOTAL	100.0000	100.0000	6.8030

Gross Heating Values (Real, BTU/ft³)			
14.696 PSI @ 60.00 Å°F		14.73 PSI @ 60.00 Å°F	
Dry	Saturated	Dry	Saturated
660.00	649.6	661.5	651.1

Calculated Total Sample Properties	
GPA2145-16 *Calculated at Contract Conditions	
Relative Density Real	Relative Density Ideal
1.1605	1.1581
Molecular Weight	
33.5419	

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

Field H2S 0 PPM

PROTREND STATUS: Passed By Validator on Sep 7, 2022
DATA SOURCE: Imported

PASSED BY VALIDATOR REASON: Close enough to be considered reasonable.

VALIDATOR: Luis Cano

VALIDATOR COMMENTS: ok

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:	Aug 14, 2022

Source	Date	Notes
Luis Cano	Sep 7, 2022 7:51 am	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 300539

DEFINITIONS

Operator: CANYON E & P COMPANY 251 O'Connor Ridge Blvd. Irving, TX 75038	OGRID: 269864
	Action Number: 300539
	Action Type: [UF-OMA] Pre-Plug Methane Monitoring (UF-OMA-MMA)

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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1220 S. St Francis Dr.
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QUESTIONS

Action 300539

QUESTIONS

Operator: CANYON E & P COMPANY 251 O'Connor Ridge Blvd. Irving, TX 75038	OGRID: 269864
	Action Number: 300539
	Action Type: [UF-OMA] Pre-Plug Methane Monitoring (UF-OMA-MMA)

QUESTIONS

Prerequisites	
[OGRID] Well Operator	[269864] CANYON E & P COMPANY
[API] Well Name and Number	[30-005-60099] DOUBLE L QUEEN UNIT #007
Well Status	Reclamation Fund Approved

Monitoring Event Information	
<i>Please answer all the questions in this group.</i>	
Reason For Filing	Pre-Plug Methane Monitoring
Date of monitoring	09/01/2022
Latitude	33.0641327
Longitude	-103.975174

Monitoring Event Details	
<i>Please answer all the questions in this group.</i>	
Flow rate in cubic meters per day (m³/day)	0.00
Test duration in hours (hr)	25.2
Average flow temperature in degrees Celsius (°C)	25.0
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	
<i>Please answer all the questions in this group.</i>	
Name of monitoring contractor	Well Done New Mexico LLC