

District I1625 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 Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170**District IV**1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462**State of New Mexico****Energy Minerals and Natural Resources****Oil Conservation Division****1220 South St. Francis Dr.****Santa Fe, NM 87505**Form C-101
Revised July 18, 2013☐ AMENDED REPORT**APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE**

¹ Operator Name and Address Cimarex Energy Co. of Colorado 202 S. Cheyenne AVE., Suite 1000 Tulsa OK 74103		² OGRID Number 162683
		³ API Number 30-015-29724
⁴ Property Code 21100	⁵ Property Name Mallon Bell 3 State Com	⁶ Well No. 2

7. Surface Location

UL - Lot J	Section 3	Township 24S	Range 26E	Lot Idn	Feet from 1330	N/S Line South	Feet From 1980'	E/W Line East	County Eddy
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8. Proposed Bottom Hole Location

UL - Lot	Section	Township	Range	Lot Idn	Feet from	N/S Line	Feet From	E/W Line	County
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9. Pool Information**DHC pending**

Pool Name White City Penn (Gas); Purple Sage Wolfcamp (Gas)	Pool Code 87280/98220
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Additional Well Information

¹¹ Work Type PB	¹² Well Type G	¹³ Cable/Rotary	¹⁴ Lease Type S	¹⁵ Ground Level Elevation 3329'
¹⁶ Multiple	¹⁷ Proposed Depth 10931 PBTB	¹⁸ Formation Cisco Canyon/ Wolfcamp	¹⁹ Contractor	²⁰ Spud Date
Depth to Ground water		Distance from nearest fresh water well		Distance to nearest surface water

☐ We will be using a closed-loop system in lieu of lined pits**21. Proposed Casing and Cement Program * casing previously set**

Type	Hole Size	Casing Size	Casing Weight/ft	Setting Depth	Sacks of Cement	Estimated TOC
Surface	17 1/2"	13 3/8"	48#	495'	450 sks	Surface
Intermediate	12 1/4"	9 5/8"	47#	3800'	2055 sks	Surface
Production	7 7/8"	5 1/2"	23#	11820'	575 sks	

Casing/Cement Program: Additional Comments

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22. Proposed Blowout Prevention Program

Type	Working Pressure	Test Pressure	Manufacturer

23. I hereby certify that the information given above is true and complete to the best of my knowledge and belief.I further certify that I have complied with 19.15.14.9 (A) NMAC ☒ and/or 19.15.14.9 (B) NMAC ☒, if applicable.

Signature:

*Amithy Crawford*Printed name: **Amithy Crawford**Title: **Regulatory Analyst**E-mail Address: **acrawford@cimarex.com**Date: **4/4/2018**Phone: **432-620-1909****OIL CONSERVATION DIVISION**

Approved By:

Raymond Jr. Solano

Title:

*Geologist*Approved Date: **4-4-18**Expiration Date: **4-4-20**

Conditions of Approval Attached

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State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate
District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-015-29724	² Pool Code 87280	³ Pool Name White City Penn (Gas)
⁴ Property Code 21100	⁵ Property Name Mallon Bell 3 State Com	
⁷ OGRID No. 162683	⁸ Operator Name Cimarex Energy Co. of Colorado	⁶ Well Number 2
		⁹ Elevation 3329

¹⁰ Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
J	3	24S	26E		1330	South	1980	East	Eddy

¹¹ Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County

¹² Dedicated Acres 640	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No.
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No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

	¹⁷ OPERATOR CERTIFICATION <i>I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</i> <u>Amithy Crawford</u> 4/4/2018 Signature Date <u>Amithy Crawford</u> Printed Name <u>acrawford@cimarex.com</u> E-mail Address	
	¹⁸ SURVEYOR CERTIFICATION <i>I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.</i>	
	Date of Survey Signature and Seal of Professional Surveyor:	
	Certificate Number	

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☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-015-29724	² Pool Code 98220	³ Pool Name Purple Sage Wolfcamp (Gas)
⁴ Property Code 21100	⁵ Property Name Mallon Bell 3 State Com	
⁷ OGRID No. 162683	⁸ Operator Name Cimarex Energy Co. of Colorado	⁶ Well Number 2
		⁹ Elevation 3329

¹⁰ Surface Location									
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¹¹ Bottom Hole Location If Different From Surface									
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
¹² Dedicated Acres 320	¹³ Joint or Infill	¹⁴ Consolidation Code		¹⁵ Order No.					

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

¹⁶ 	¹⁷ OPERATOR CERTIFICATION	
	<i>I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</i>	
	<i>Amithy Crawford</i> 4/4/2018 Signature Date	
	Amithy Crawford Printed Name acrawford@cimarex.com E-mail Address	
¹⁸ 	¹⁸ SURVEYOR CERTIFICATION	
	<i>I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.</i>	
	Date of Survey Signature and Seal of Professional Surveyor:	
	Certificate Number	



CONFIDENTIAL. March 15, 2018

Production Operations – Carlsbad Region, Permian Basin
Mallon Bell 3 State Com 2 - Cisco Canyon and Wolfcamp (Ciscamp)
Proposed Commingling Allocation Factors. Eddy County, NM

Objective

Cimarex is seeking approval from the U.S. Bureau of Land Management (BLM) of its proposed *commingling permit* application and the *allocation factors* for the Cisco Canyon and Wolfcamp formations in the recompletion of the ***Mallon Bell 3 State Com 2*** well (API: 30-015-29724).

The proposed “allocation factors” have been estimated following BLM’s approved allocation methodology in the *2016 Downhole Commingling Field Study “Cisco Canyon and Wolfcamp (Ciscamp) Commingled Allocation Assessment in White City, Eddy County, NM”* (NMP0220), approved by BLM on July 6, 2016 (**Appendix A**). Based on this approach and the assessment of subsurface data, the recommended initial allocation factors are 67% for the Wolfcamp and 33% for the Cisco Canyon.

The support evidence for this application includes petrophysical assessment and recoverable reserves estimation for each proposed formation (Table 1) and a log section (**Appendix B**).

Proposed Recompletion

Cimarex plans to recomplete the ***Mallon Bell 3 State Com 2*** well to the Cisco Canyon and the Wolfcamp formations. This well is located within the BLM approved White City Ciscamp Field Study Area (see Exhibit 6A of the above referenced Field Study) and is currently completed in the Morrow formation. The Morrow in this well has no remaining gas reserves. The company plans to abandon the Morrow zone under a cast-iron bridge plug with cement on top.

The proposed Ciscamp recompletion will be performed with a *multi-stage frac job*. The plan is to commingle Wolfcamp and Cisco Canyon streams downhole immediately after completion to allow faster flowback recovery and more efficient artificial lift. The synergy between both streams has shown to significantly improve liquid unloading in analog wells by maintaining higher and more stable critical gas velocities for a longer period. This in turn minimizes formation damage and increases reserves recovery by extending the life of the well.

A proposed recompletion and workover procedure is included in **Appendix C**.



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Production Operations – Carlsbad Region, Permian Basin
Mallon Bell 3 State Com 2 - Cisco Canyon and Wolfcamp (Ciscamp)
 Proposed Commingling Allocation Factors. Eddy County, NM

Proposed Initial Production Allocation Factors

Based on BLM's approved Allocation Methodology and Cimarex's assessment, the "Initial Allocation Factors" for the New Completion Zones in subject well are estimated as follows:

$$\text{Wolfcamp \% Alloc. Factor} = \frac{WC \text{ RGIP} - WC \text{ Prev. Cum Gas}}{\text{Total RGIP}}$$

$$\text{Cisco Canyon \% Alloc. Factor} = \frac{CC \text{ RGIP} - CC \text{ Prev. Cum Gas}}{\text{Total RGIP}}$$

The Recoverable Gas in Place (RGIP) for subject well is 900 MMCF from the Wolfcamp and 577 MMCF from the Cisco Canyon, for a total of **1,477 MMCF of gas** (see Table 1). In this case, the proposed commingling intervals have never produced in this well (no prior cumulative production), therefore Remaining RGIP (RRGIP) is equal to RGIP for both formations.

The resulting proposed allocation factors are calculated as follows:

$$\text{Wolfcamp \% Alloc. Factor} = \frac{900 \text{ MMCF}}{1,477 \text{ MMCF}} = 61\%$$

$$\text{Cisco Canyon \% Alloc. Factor} = \frac{577 \text{ MMCF}}{1,477 \text{ MMCF}} = 39\%$$

The RGIP for each zone is estimated using the Hydrocarbon Pore Volume (HCPV) assessment as shown in Table 1. The implemented net pay cut-offs are Average Porosity (PHI) > 6-10% and Average Sw < 25-35%. *Total estimated oil reserves are 40 MBO.*

Table 1: Summary of Reservoir Properties, Estimated Reserves and Resulting Allocation Factors

Mallon Bell 3 State Com #2

Proposed RC Zone(s)	Avg. Depth, ft	Est. Reservoir Pressure, psi	Net Pay, h (ft)	Avg. PHI	Avg. Sw	HCPV (1-Sw)*PHI*h	OGIP, MMCF	Est. Recovery Factor	RGIP @RF, MMCF	Zone Prod. Start Date	Prev. Cum. Gas to Date, MMCF	Remaining RGIP (RRGIP), MMCF	Initial Alloc. Factors, % (based on RRGIP Ratio)
Wolfcamp Total :	9,285	4,039	118	11.1%	23%	10.1	900	85%	764			764	61%
Cisco Canyon :	10,054	4,273	47	15.4%	13%	6.2	577	85%	490		-	490	39%
Total:			165			16.3	1,477	85%	1,254		-	1,254	100%

In this well, the spacing for both formations is the same, as well as, public interests: 47.7% working interest and 36.4% net revenue interest. Both formations are sweet.

Enclosed with this report are the C-107A, Downhole Commingle Worksheet, current and proposed wellbore diagrams, current gas, oil, and water analyses C-102, 3160-5.



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Production Operations – Carlsbad Region, Permian Basin
Mallon Bell 3 State Com 2 - Cisco Canyon and Wolfcamp (Ciscamp)
Proposed Commingling Allocation Factors. Eddy County, NM

Appendix A: 2016 Downhole Commingling Field Study for the White City Area



United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Pecos District
Carlsbad Field Office
620 E. Greene
Carlsbad, New Mexico 88220-6292
www.blm.gov/nm



3180 (P0220)

July 6, 2016

Reference:

White City Area
2016 Downhole Commingling Field Study
Eddy County, New Mexico

Cimarex Energy Co. of Colorado
600 N. Marienfeld Street, Suite 600
Midland, TX 79701

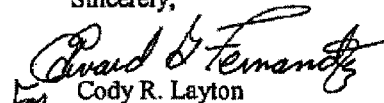
Gentlemen:

In reference to your 2016 Downhole Commingling Field Study for the White City Area; it is hereby approved, with the following conditions of approval:

1. All future NOI Sundries submitted to request approval to downhole commingle (DHC) the Lower Penn, Upper Penn and the Wolfcamp formation shall reference this Study and be mentioned in Exhibit 6A. A copy of this study does not need to be attached to the Sundry.
2. All future NOI Sundries submitted to request approval to DHC shall reference NMOCD approval order.
3. All future NOI Sundries submitted to request approval to DHC shall include the BLM's DHC worksheet.
4. All DHC approvals are subject to like approval by NMOCD.
5. The BLM may require an updated evaluation of the field study be done in the future.

Please contact Edward G. Fernandez, Petroleum Engineer at 575-234-2220 if you have any questions.

Sincerely,


for Cody R. Layton
Assistant Field Manager,
Lands and Minerals

Enclosure

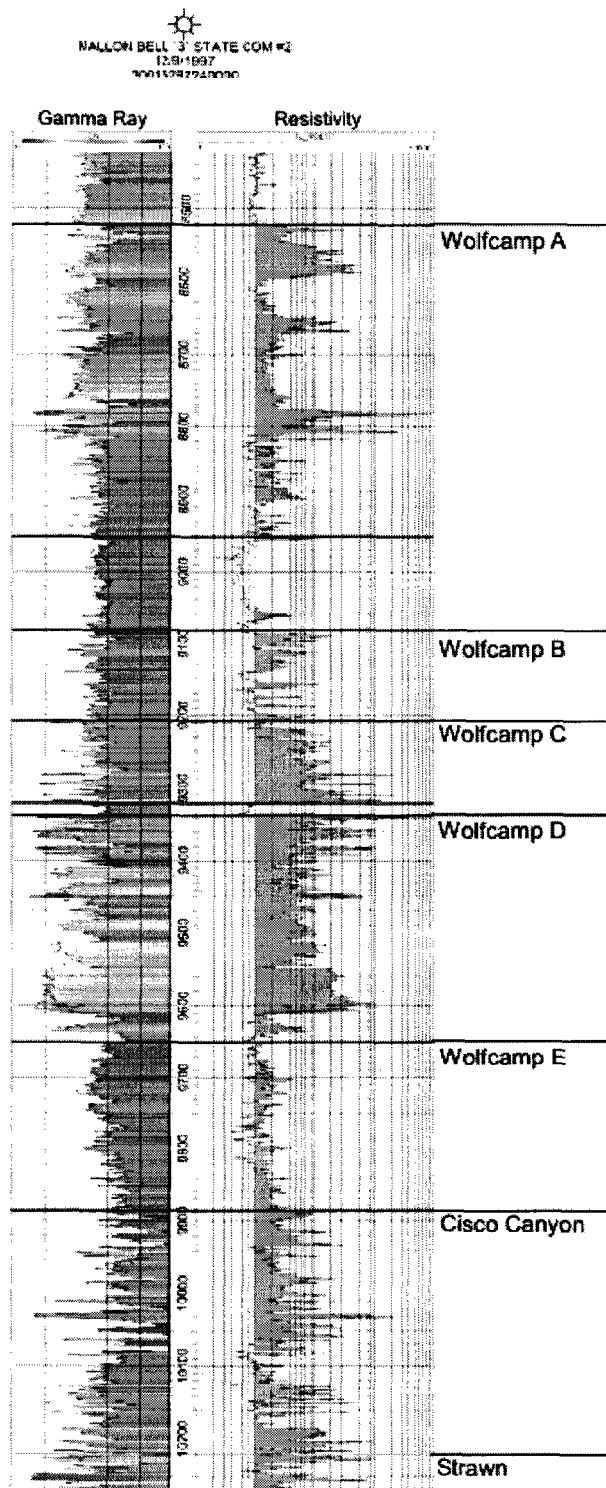
cc: NMP0220 (CFO L&E)



CONFIDENTIAL. March 15, 2018

Production Operations – Carlsbad Region, Permian Basin
Mallon Bell 3 State Com 2 - Cisco Canyon and Wolfcamp (Ciscamp)
Proposed Commingling Allocation Factors. Eddy County, NM

Appendix B: Log section from top of Wolfcamp to top of Strawn – Mallon Bell 3 State Com 2





CONFIDENTIAL. March 15, 2018

Production Operations – Carlsbad Region, Permian Basin
Mallon Bell 3 State Com 2 - Cisco Canyon and Wolfcamp (Ciscamp)
Proposed Commingling Allocation Factors. Eddy County, NM

Appendix C: Recompletion Procedure – Mallon Bell 3 State Com 2

Well Data

KB 15'
TD 11,820'
PBSD 11,777'

Casing 13-3/8" 48# H-40 @ 495'. Cmt'd w/ 950 sx, cmt to sfc
9-5/8" 47# P-110 @ 3,800'. Cmt'd w/ 2,055 sx, cmt circ
5-1/2" 20#/23# P-110 @ 11,820'. Cmt'd w/ 575 sxs,
DV tool @ 9,497' cmt with 1500 sxs

Tubing 2-3/8" 4.7# L-80 8rd, EOT @ 11,330'

Proposed RC Perfs Wolfcamp (8,554' – 9,980') & Cisco Canyon (9,990' – 10,200')

1. Pull test anchors, replace as necessary before rig arrival.
2. MIRU pulling unit, rental flare, and choke manifold.
3. Hold safety meeting and perform JSA, discuss risks.
4. Kill well with FSW as needed. Observe all pressures on well and note detail in report.
 - a. **NOTE: Treat all water throughout job with biocide.**
 - b. Chad Collins 512-413-1606
5. MIRU WSU. Ensure WSU is set and balanced on rig mats before proceeding.
 - a. Everyone on location has the ability to use STOP WORK AUTHORITY to shut down operations should a problem or concern arise.
6. ND WH and flowline, NU 5,000 psi hydraulic BOPs.
7. PU tubing, POOH w/2-3/8" tubing & packer. Lay down packer and tubing.
8. MIRU WL and 5-1/2" 20# CIBP.
9. Set CIBP @ +/- 11,000'.
10. Mix 25' class H cement.
11. PU RIH with dump bailor on WL and dump bail cement on top of CIBP.
12. PU 2nd CIBP and set @ +/- 10,900'.
13. RDMO WL company.
14. MIRU pump truck and pressure test CIBP, Cmt, and casing to 8,500 psi on a chart for thirty minutes observing leak-off.
 - a. Leak-off can be no more than 10%.



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Production Operations – Carlsbad Region, Permian Basin
Mallon Bell 3 State Com 2 - Cisco Canyon and Wolfcamp (Ciscamp)
Proposed Commingling Allocation Factors. Eddy County, NM

- b. Report pressure back to Midland office.
 - c. If pressure test is successful proceed with Ciscamp completion.
15. ND 5k BOPs.
16. NU two 10k frac valves and flow cross.
17. MIRU water transfer with frac tanks to contain water pumped from frac ponds.
- a. Test frac valves and flow cross prior to fracing to 10,000 psi.
18. MIRU WL with full lubricator for perforating the Ciscamp formation.
19. RIH with 5-1/2" gauge ring/JB to +/- 10,100'.
20. Perforate according to detailed perforation cluster sheet provided in separate document.
21. Perforate and frac the Ciscamp according to stimulation design in separate document.
- a. 10K CBP will be set in between each stage.

POST FRAC

22. RDMO frac crew.
23. MIRU 2" CTU with sufficient tubing to wash down to PBTD +/- 10,100' (CIBP)
24. MU 2.88" OD coil connector and perform pull test to 20k.
- a. Note Check weight indicator versus hydraulics and note any discrepancy
25. Fill coil and flush with 2% KCL to ensure tubing is clean
26. MU recommended BHA listed below
- a. Coil Connector
 - b. Dual BPV
 - c. Dual Hydraulic Double Acting Jars
 - d. Hydraulic Disconnect
 - e. Dual Circulating Sub
 - f. PD Motor
 - g. 4.625" OD Blade Mill
27. Verify coil company has mechanical means on location to splice coil together if coil parts across gooseneck while TOH.
28. Function test motor and mill on the surface.
29. NU BOPs and MU Injector head. Test BOPs and all lines to 4800 psi high and 500 psi low.



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Production Operations – Carlsbad Region, Permian Basin
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Proposed Commingling Allocation Factors. Eddy County, NM

30. Break circulation and RIH to first plug depth.
31. D/O composite plugs one at a time.
32. Pumping sweeps:
 - a. After each plug is tagged
 - b. After each plug is drilled out
 - c. After every 60 bbls of fluid is pumped
33. Note weights, trip speeds, pump rates, flowrates, pressures, and viscosities on Drill_IT reports while verifying return rates every 15 minutes.
34. Continue washing/milling to +/- 10,100'.
35. When clean out is complete and decision is made to POOH, pump a sweep and circulate double bottoms up.
 - a. Ensure clean returns before POOH.
36. POOH with motor, mill, and CT.
37. LD tools, close well BOP, and RD CTU.
 - a. DO NOT ND BOPs.
38. MIRU pulling unit.
39. MIRU WL unit with 5K lubricator.
40. Call Globe for AS1X (resettable) packer, on/off tool, and BHA
 - a. John Williams 432-553-0195
 - b. Daniel Ruiz 432-528-3919
41. Pickup 5-1/2" 20# AS1X packer with 1.875" X-Nipple
 - a. 2-3/8 L-80 10' PUP Joint
 - b. 2-3/8" collar with WLEG and pump out plug pinned to 3,000 psi
 - c. 2-3/8" 8rd EUE XN profile nipple w/1.791" No-Go
 - d. Wireline set 5-1/2" 23# AS1X packer
 - e. On/off tool with 2.00" X-Nipple
42. RIH and set packer @ +/- 9,582'.
43. POOH with setting tools and RDMO Wireline.
44. PU ON/OFF stinger and 2-3/8" tubing. RIH w/tbg & gas lift valves (GLV design attached).
45. With tubing above packer pump 146 bbls of corrosion inhibited biocide treated packer fluid down the tubing and displace with 34 bbls fresh water. (Annular capacity – 146 bbls & Tubing capacity – 34 bbls).



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46. Engage on/off tool. Set down 15 pts to ensure packer is set.
47. Space out tubing, PU and land tubing in 10k lbs tension.
48. ND BOP and NU wellhead.
49. RU kill truck and pressure up to break pump-out plug.
50. RD WSU.
51. Open well to frac tanks and turn well over to flowback.
52. When the well begins to make gas SWI. Notify Midland and turn production into the facility.
53. Report daily production and pressures to Midland office for 10 days.
54. Run production log for allocation purposes after recovering load. Run additional production logs if actual production varies significantly from expected performance



LABORATORY SERVICES

Natural Gas Analysis

www.permianls.com

575.397.3713 2609 W Marland Hobbs NM 88240

For: Cimarex Energy
Attention: Mark Cummings
600 N. Marienfeld, Suite 600
Midland, Texas 79701

Sample: Sta. # 309588185
Identification: Wigeon 23 Fed Com 1
Company: Cimarex Energy
Lease:
Plant:

Sample Data: Date Sampled 7/30/2013 12:25 PM
Analysis Date 7/31/2013
Pressure-PSIA 900
Sample Temp F 107
Atmos Temp F 85

Sampled by: Taylor Ridings
Analysis by: Vicki McDaniel

H2S = 0.3 PPM

Component Analysis

		Mol Percent	GPM
Hydrogen Sulfide	H2S		
Nitrogen	N2	0.677	
Carbon Dioxide	CO2	0.123	
Methane	C1	82.764	
Ethane	C2	9.506	2.536
Propane	C3	3.772	1.037
I-Butane	IC4	0.640	0.209
N-Butane	NC4	1.185	0.373
I-Pentane	IC5	0.335	0.122
N-Pentane	NC5	0.374	0.135
Hexanes Plus	C6+	<u>0.624</u>	<u>0.270</u>
		100.000	4.681

REAL BTU/CU.FT.

At 14.65 DRY 1219.2
At 14.65 WET 1197.9
At 14.696 DRY 1223.0
At 14.696 WET 1202.1
At 14.73 DRY 1225.8
At 14.73 Wet 1204.6

Specific Gravity

Calculated 0.6973

Molecular Weight

20.1966

North Permian Basin Region
P.O. Box 740
Sundown, TX 79372-0740
(806) 229-8121

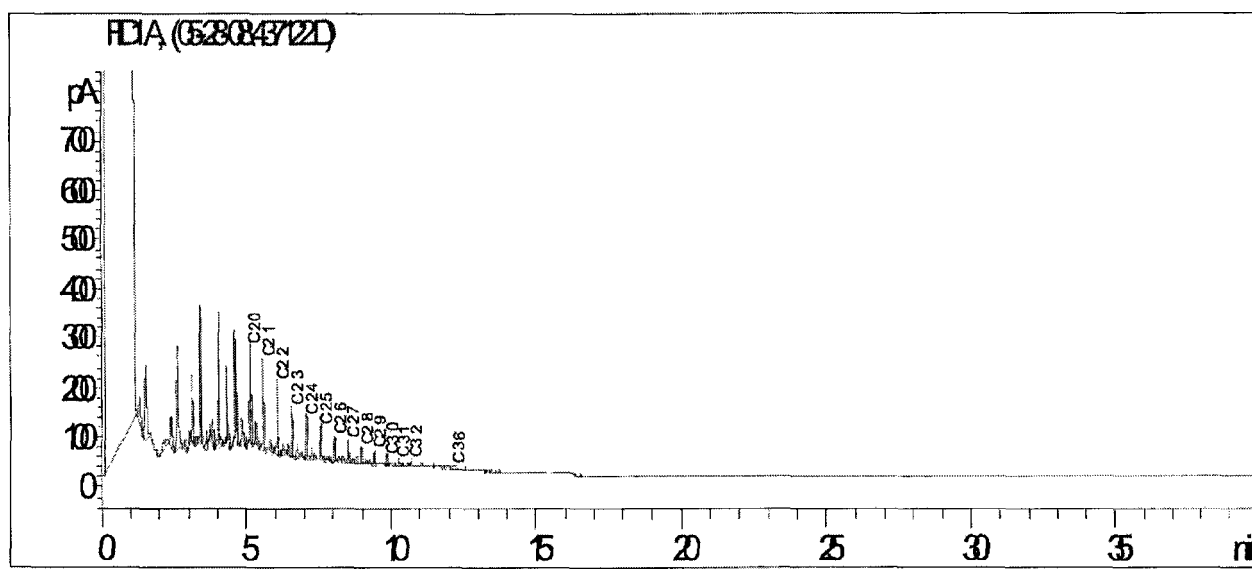
Lab Team Leader - Sheila Hernandez
(432) 495-7240

OIL ANALYSIS

Company:	CIMAREX ENERGY	Sales RDT:	44212
Region:	PERMIAN BASIN	Account Manager:	WAYNE PETERSON (575) 910-9389
Area:	CARLSBAD, NM	Analysis ID #:	3208
Lease/Platform:	WIGEON '23' FEDERAL	Sample #:	437122
Entity (or well #):	1	Analyst:	SHEILA HERNANDEZ
Formation:	WOLFCAMP	Analysis Date:	5/30/08
Sample Point:	FRAC TANK 234	Analysis Cost:	\$100.00
Sample Date:	5/13/08		

Cloud Point:	<68 °F
Weight Percent Paraffin (by GC)*:	1.49%
Weight Percent Asphaltenes:	0.03%
Weight Percent Oily Constituents:	98.41%
Weight Percent Inorganic Solids:	0.07%

*Weight percent paraffin and peak carbon number includes only n-alkanes (straight chain hydrocarbons) greater than or equal to C20H42.



North Permian Basin Region
P.O. Box 740
Sundown, TX 79372-0740
(806) 229-8121
Lab Team Leader - Sheila Hernandez
(432) 495-7240

Water Analysis Report by Baker Petrolite

Company:	CIMAREX ENERGY	Sales RDT:	44212
Region:	PERMIAN BASIN	Account Manager:	WAYNE PETERSON (505) 910-9389
Area:	CARLSBAD, NM	Sample #:	43887
Lease/Platform:	WIGEON UNIT	Analysis ID #:	82014
Entity (or well #):	23 FEDERAL 1	Analysis Cost:	\$80.00
Formation:	UNKNOWN		
Sample Point:	SEPARATOR		

Summary		Analysis of Sample 43887 @ 75 °F					
Sampling Date:	05/14/08	Anions	mg/l	meq/l	Cations	mg/l	meq/l
Analysis Date:	05/15/08	Chloride:	55040.0	1552.48	Sodium:	32207.4	1400.94
Analyst:	WAYNE PETERSON	Bicarbonate:	329.4	5.4	Magnesium:	268.0	22.05
		Carbonate:	0.0	0.	Calcium:	2780.0	138.72
TDS (mg/l or g/m3):	90873.3	Sulfate:	225.0	4.68	Strontium:		
Density (g/cm3, tonne/m3):	1.062	Phosphate:			Barium:		
Anion/Cation Ratio:	1	Borate:			Iron:	23.5	0.85
		Silicate:			Potassium:		
Carbon Dioxide:	150 PPM	Hydrogen Sulfide:		0 PPM	Aluminum:		
Oxygen:		pH at time of sampling:		7.31	Chromium:		
Comments:		pH at time of analysis:			Copper:		
TEST RAN IN THE FIELD		pH used in Calculation:		7.31	Lead:		
					Manganese:		
					Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO ₃		Gypsum CaSO ₄ ·2H ₂ O		Anhydrite CaSO ₄		Celestite SrSO ₄		Barite BaSO ₄		CO ₂ Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.94	27.24	-1.11	0.00	-1.14	0.00	0.00	0.00	0.00	0.00	0.13
100	0	0.97	31.09	-1.16	0.00	-1.12	0.00	0.00	0.00	0.00	0.00	0.19
120	0	0.99	35.26	-1.20	0.00	-1.08	0.00	0.00	0.00	0.00	0.00	0.28
140	0	1.02	39.74	-1.23	0.00	-1.02	0.00	0.00	0.00	0.00	0.00	0.38

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

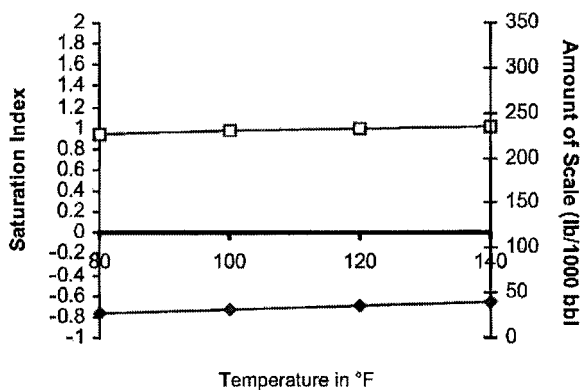
Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO₂ pressure is actually the calculated CO₂ fugacity. It is usually nearly the same as the CO₂ partial pressure.

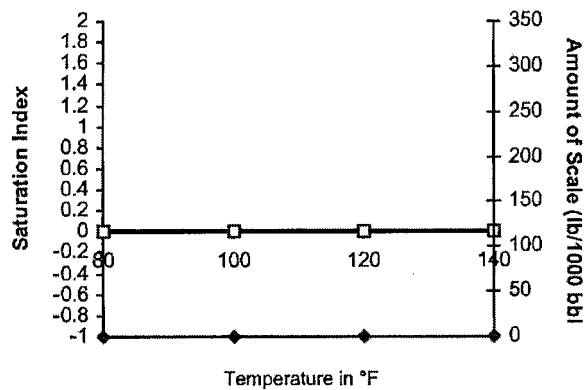
Scale Predictions from Baker Petrolite

Analysis of Sample 43887 @ 75 °F for CIMAREX ENERGY, 05/15/08

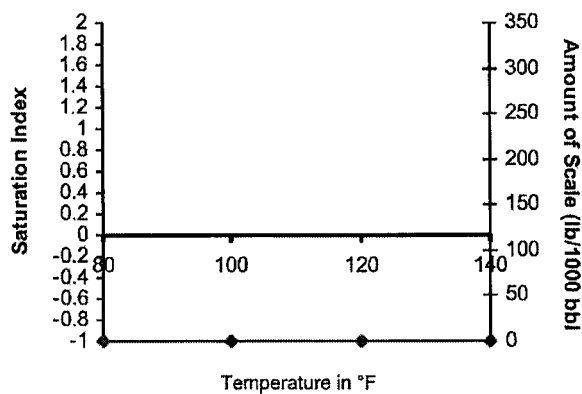
Calcite - CaCO_3



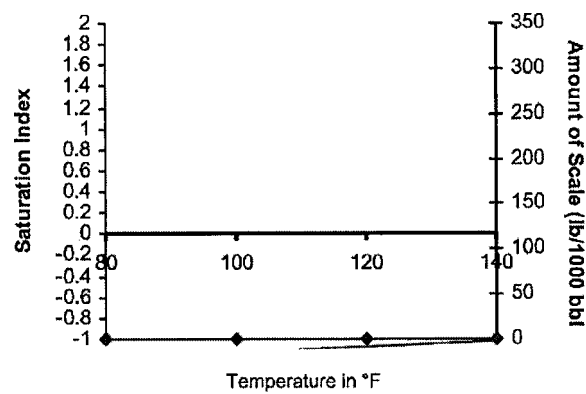
Barite - BaSO_4



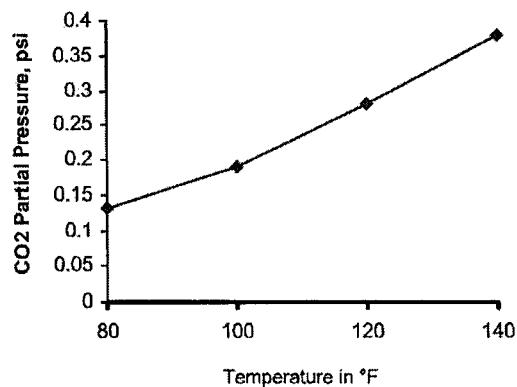
Gypsum - $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$



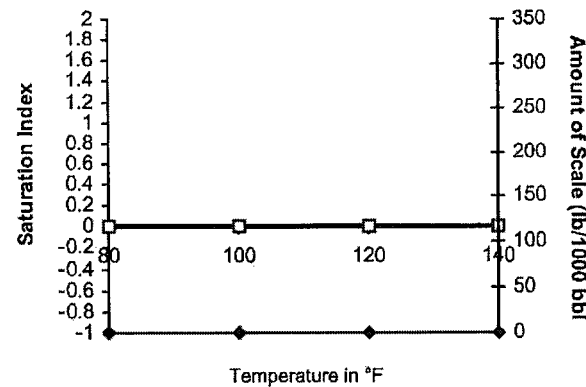
Anhydrite - CaSO_4



Carbon Dioxide Partial Pressure



Celestite - SrSO_4





LABORATORY SERVICES
Natural Gas Analysis

www.permianls.com

575.397.3713 2609 W Marland Hobbs NM 88240

For: Cimarex Energy
Attention: Mark Cummings
600 N. Marienfeld, Suite 600
Midland, Texas 79701

Sample: Sta. # 309588438
Identification: Taos Fed. #3 Sales
Company: Cimarex Energy
Lease:
Plant:

Sample Data: Date Sampled 7/2/2014 10:30 AM
Analysis Date 7/9/2014
Pressure-PSIA 83
Sample Temp F 76.4
Atmos Temp F 76

Sampled by: K. Hooten
Analysis by: Vicki McDaniel

H2S =

Component Analysis

		Mol Percent	GPM
Hydrogen Sulfide	H2S		
Nitrogen	N2	0.618	
Carbon Dioxide	CO2	0.172	
Methane	C1	88.390	
Ethane	C2	7.080	1.889
Propane	C3	1.966	0.540
I-Butane	IC4	0.355	0.116
N-Butane	NC4	0.569	0.179
I-Pentane	IC5	0.198	0.072
N-Pentane	NC5	0.213	0.077
Hexanes Plus	C6+	<u>0.439</u>	<u>0.190</u>
		100.000	3.063

REAL BTU/CU.FT.		Specific Gravity	
At 14.65 DRY	1136.2	Calculated	0.6445
At 14.65 WET	1116.4		
At 14.696 DRY	1139.7		
At 14.696 WET	1120.3	Molecular Weight	18.6673
At 14.73 DRY	1142.4		
At 14.73 Wet	1122.6		

North Permian Basin Region
P.O. Box 740
Sundown, TX 79372-0740
(806) 229-8121

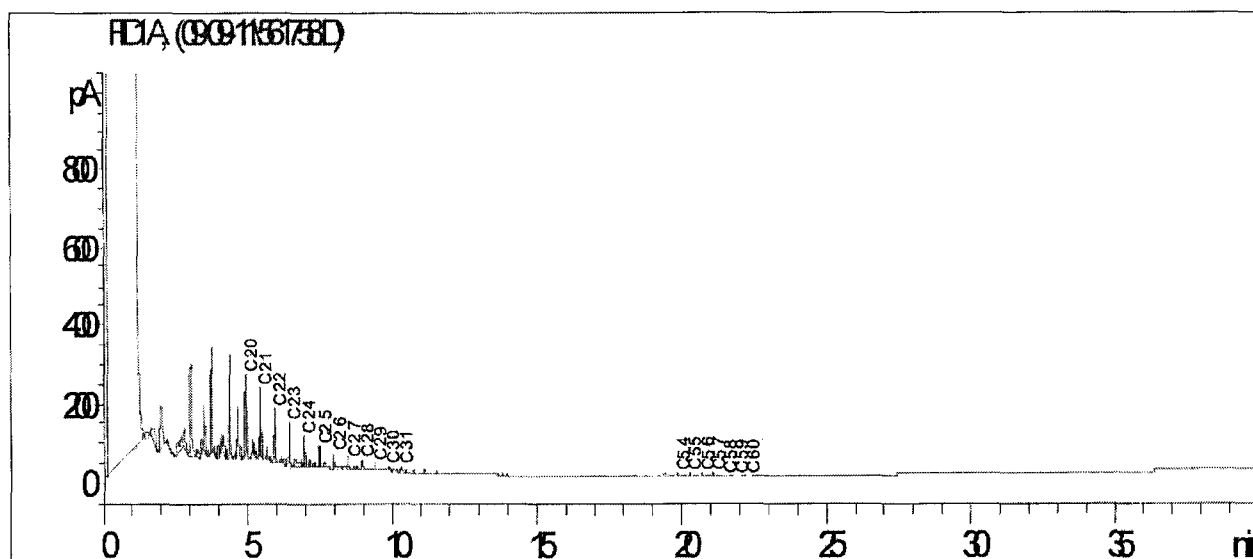
Lab Team Leader - Sheila Hernandez
(432) 495-7240

OIL ANALYSIS

Company:	CIMAREX ENERGY	Sales RDT:	33521
Region:	PERMIAN BASIN	Account Manager:	STEVE HOLLINGER (575) 910-9393
Area:	LOCO HILLS, NM	Analysis ID #:	5419
Lease/Platform:	TAOS FEDERAL LEASE	Sample #:	561758
Entity (or well #):	3	Analyst:	SHEILA HERNANDEZ
Formation:	UNKNOWN	Analysis Date:	09/13/11
Sample Point:	TANK	Analysis Cost:	\$125.00
Sample Date:	08/24/11		

Cloud Point:	89 ° F
Weight Percent Paraffin (by GC)*:	1.03%
Weight Percent Asphaltenes:	0.01%
Weight Percent Oily Constituents:	98.93%
Weight Percent Inorganic Solids:	0.03%

*Weight percent paraffin and peak carbon number includes only n-alkanes (straight chain hydrocarbons) greater than or equal to C20H42.



North Permian Basin Region
P.O. Box 740
Sundown, TX 79372-0740
(806) 229-8121
Lab Team Leader - Sheila Hernandez
(432) 495-7240

Water Analysis Report by Baker Petrolite

Company:	CIMAREX ENERGY	Sales RDT:	33521
Region:	PERMIAN BASIN	Account Manager:	STEVE HOLLINGER (575) 910-9393
Area:	CARLSBAD, NM	Sample #:	535681
Lease/Platform:	TAOS FEDERAL LEASE	Analysis ID #:	113272
Entity (or well #):	3	Analysis Cost:	\$90.00
Formation:	UNKNOWN		
Sample Point:	SEPARATOR		

Summary		Analysis of Sample 535681 @ 75 F							
Sampling Date:	09/28/11	Anions		mg/l	meq/l	Cations		mg/l	meq/l
Analysis Date:	10/13/11	Chloride:	52535.0	1481.82	Sodium:	28338.7	1232.66		
Analyst:	SANDRA GOMEZ	Bicarbonate:	146.0	2.39	Magnesium:	417.0	34.3		
TDS (mg/l or g/m3):	86836.7	Carbonate:	0.0	0.	Calcium:	3573.0	178.29		
Density (g/cm3, tonne/m3):	1.063	Sulfate:	83.0	1.73	Strontium:	1472.0	33.6		
Anion/Cation Ratio:	1	Phosphate:			Barium:	22.0	0.32		
		Borate:			Iron:	34.0	1.23		
		Silicate:			Potassium:	215.0	5.5		
Carbon Dioxide:	150 PPM	Hydrogen Sulfide:		0 PPM	Aluminum:				
Oxygen:		pH at time of sampling:		6	Chromium:				
Comments:		pH at time of analysis:			Copper:				
RESISTIVITY 0.083 OHM-M @ 75F		pH used in Calculation:		6	Lead:				
					Manganese:	1.000	0.04		
					Nickel:				

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO ₃		Gypsum CaSO ₄ *2H ₂ O		Anhydrite CaSO ₄		Celestite SrSO ₄		Barite BaSO ₄		CO ₂ Press
F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	-0.61	0.00	-1.46	0.00	-1.49	0.00	-0.05	0.00	1.22	11.59	1.14
100	0	-0.51	0.00	-1.51	0.00	-1.47	0.00	-0.07	0.00	1.04	10.94	1.44
120	0	-0.40	0.00	-1.54	0.00	-1.43	0.00	-0.07	0.00	0.89	10.30	1.76
140	0	-0.28	0.00	-1.57	0.00	-1.36	0.00	-0.06	0.00	0.75	9.66	2.07

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.



KB - 15' above GL

Cimarex Energy Co. of Colorado

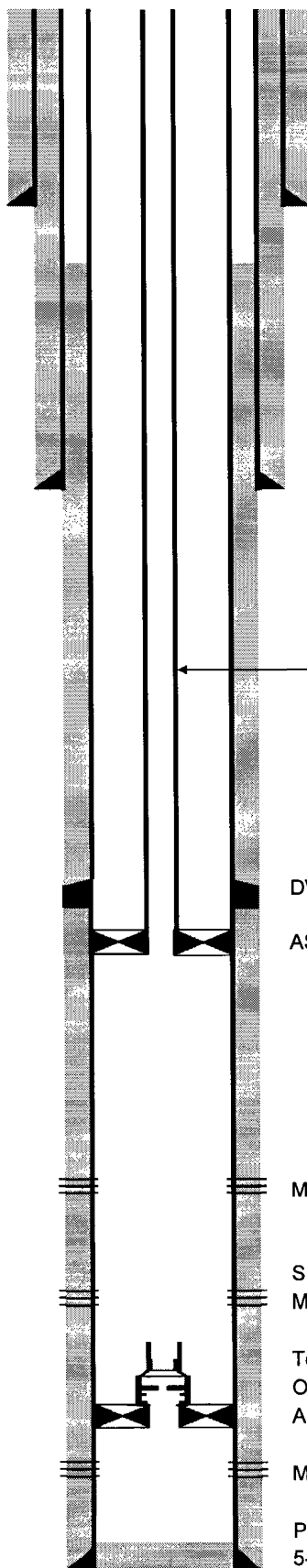
Mallon Bell 3 State Com #2

1330' FSL & 1980' FEL

Sec. 3, T-24-S, R-26-E, Eddy Co., NM

S. Runyan

03/15/2018



13-3/8", 48# H-40 csg @ 495'
cmt w/ 950 sx, 1" to surface

TOC NA

9-5/8", 47# P-110 csg @ 3800'
cmt w/ 2055 sx, cmt circ

2-3/8" 4.7# N-80 Tbg

DV Tool @ 9497' cmt w/ 1500 sx

AS1X Packer 9,582'

Morrow perfs (11056' - 11142')

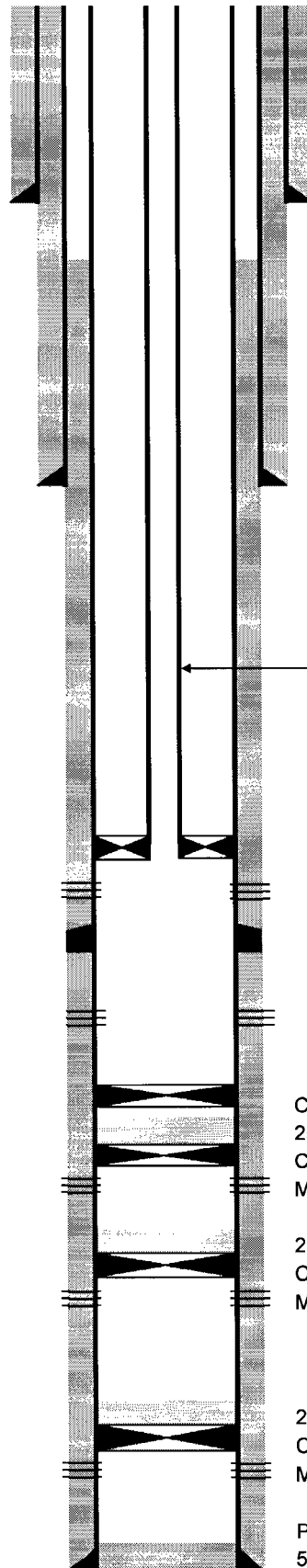
SN @ 11330'
Morrow perfs (11328' - 11440')

Top of fish @ 11603'
On-off Tool w/ 1.81" F Profile nipple @ 11605'
Arrowset 1-X pkr @ 11612'

Morrow perfs (11704' - 11734')

PBD @ 11777'
5-1/2" 20 & 23# P-110 @ 11820' cmt w/ 575 sx
TD @ 11820'

KB - 17' above GL



13-3/8", 48# H-40 csg @ 495'
cmtd w/ 950 sx, 1" to surface

TOC NA

9-5/8", 47# P-110 csg @ 3800'
cmtd w/ 2055 sx, cmt circ

363 jts 2-3/8" 4.7# N-80 Tbg

AS1X Packer 8,504')
Wolcamp (8,554' - 9,980')

DV Tool @ 9497' cmtd w/ 1500 sx

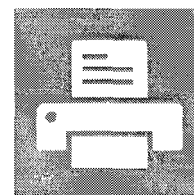
Cisco Canyon (9,990' - 10,200')

CIBP @ 10,931'
25' Cmt
CIBP @ 11,006'
Morrow perfs (11056' - 11142')

25' Cmt
CIBP @ 11,278'
Morrow perfs (11328' - 11440')

25' Cmt
CIBP @ 11,654'
Morrow perfs (11704' - 11734')

PBTD @ 11777'
5-1/2" 20 & 23# P-110 @ 11820' cmtd w/ 575 sx
TD @ 11820'



Windows Printer Test Page

You have correctly installed your Xerox Global Print Driver PS on OCART-RPODANY.

PRINTER PROPERTIES

Submitted Time: 11:08:45 AM
Date: 4/4/2018
User Name: EMNRDPROD\rpodany
Computer Name: OCART-RPODANY
Printer Name: Xerox Phaser 4600 Front PS
Printer Model: Xerox Global Print Driver PS
Color Support: No
Port Name(s): 192.168.176.20
Data Format: RAW
Printer Location:
Print Processor: winprint
Comment:
OS Environment: Windows x64

PRINT DRIVER PROPERTIES

Driver Name: Xerox Global Print Driver PS
Driver Type: Type 3 - User Mode
Driver Version: 5520.600.0.0

ADDITIONAL PRINT DRIVER FILES

C:\Windows\system32\spool\DRIVERS\x64\3\xUNIVPYZ.ini
C:\Windows\system32\spool\DRIVERS\x64\3\xUNIVPYZ.cfg
C:\Windows\system32\spool\DRIVERS\x64\3\x2UNIV.ppd
C:\Windows\system32\spool\DRIVERS\x64\3\x2upYZ.dll
C:\Windows\system32\spool\DRIVERS\x64\3\x2rpsYZ.dll
C:\Windows\system32\spool\DRIVERS\x64\3\x2wfuvYZ.dll
C:\Windows\system32\spool\DRIVERS\x64\3\x2guiYZ.dll
C:\Windows\system32\spool\DRIVERS\x64\3\x2coreYZ.dll
C:\Windows\system32\spool\DRIVERS\x64\3\x2utilYZ.dll
C:\Windows\system32\spool\DRIVERS\x64\3\x2rnutYZ.dll
C:\Windows\system32\spool\DRIVERS\x64\3\x2comsYZ.dll
C:\Windows\system32\spool\DRIVERS\x64\3\x2jobtYZ.exe
C:\Windows\system32\spool\DRIVERS\x64\3\x2ptpcYZ.dll
C:\Windows\system32\spool\DRIVERS\x64\3\x2fputYZ.dll
C:\Windows\system32\spool\DRIVERS\x64\3\x2txtYZ.cab
C:\Windows\system32\spool\DRIVERS\x64\3\x2UNIVYZ.cab
C:\Windows\system32\spool\DRIVERS\x64\3\x2JARYZ.cab
C:\Windows\system32\spool\DRIVERS\x64\3\x2fpbYZ.exe
C:\Windows\system32\spool\DRIVERS\x64\3\xlibeay1011.dll
C:\Windows\system32\spool\DRIVERS\x64\3\x2fpd02.dll
C:\Windows\system32\spool\DRIVERS\x64\3\PSCRIPT.NTF
C:\Windows\system32\spool\DRIVERS\x64\3\PS_SCHM.GDL

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