

DATE <u>1/3/2017</u>	SUSPENSE	ENGINEER <u>MAM</u>	LOGGED IN <u>Y23/2017</u>	TYPE <u>DHC</u>	APPROVAL <u>2017 AM 170234628</u>
----------------------	----------	---------------------	---------------------------	-----------------	-----------------------------------

ABOVE THIS LINE FOR DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION

- Engineering Bureau -

1220 South St. Francis Drive, Santa Fe, NM 87505



ADMINISTRATIVE APPLICATION CHECKLIST

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE

Application Acronyms:

[NSL-Non-Standard Location] [NSP-Non-Standard Proration Unit] [SD-Simultaneous Dedication]

[DHC-Downhole Commingling] [CTB-Lease Commingling] [PLC-Pool/Lease Commingling]

[PC-Pool Commingling] [OLS - Off-Lease Storage] [OLM-Off-Lease Measurement]

[WFX-Waterflood Expansion] [PMX-Pressure Maintenance Expansion]

[SWD-Salt Water Disposal] [IPI-Injection Pressure Increase]

[EOR-Qualified Enhanced Oil Recovery Certification] [PPR-Positive Production Response]

[1] TYPE OF APPLICATION - Check Those Which Apply for [A]

[A] Location - Spacing Unit - Simultaneous Dedication

☐ NSL ☐ NSP ☐ SD

Check One Only for [B] or [C]

[B] Commingling - Storage - Measurement

☒ DHC ☐ CTB ☐ PLC ☐ PC ☐ OLS ☐ OLM

[C] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery

☐ WFX ☐ PMX ☐ SWD ☐ IPI ☐ EOR ☐ PPR

[D] Other: Specify _____

White City Penn 28 Gas Com Unit 3 #4 30015-33862

Cimarex Energy Co. of Colorado - 162683

Pool:

87280 - White City, Penn (Gas)

97693 - Southwest Black River - Wolfcamp Gas

[2] NOTIFICATION REQUIRED TO: - Check Those Which Apply, or Does Not Apply

[A] ☐ Working, Royalty or Overriding Royalty Interest Owners

[B] ☐ Offset Operators, Leaseholders or Surface Owner

[C] ☐ Application is One Which Requires Published Legal Notice

[D] ☐ Notification and/or Concurrent Approval by BLM or SLO
U.S. Bureau of Land Management - Commissioner of Public Lands, State Land Office

[E] ☐ For all of the above, Proof of Notification or Publication is Attached, and/or,

[F] ☐ Waivers are Attached

[3] SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED ABOVE.

[4] **CERTIFICATION:** I hereby certify that the information submitted with this application for administrative approval is accurate and complete to the best of my knowledge. I also understand that no action will be taken on this application until the required information and notifications are submitted to the Division.

Note: Statement must be completed by an individual with managerial and/or supervisory capacity.

Print or Type Name Arieka Easterling

Signature Arieka Easterling

Title Regulatory Analyst

Date 1-19-2017

e-mail Address aeasterling@Cimarex.com

RECEIVED 000
2017 JAN 23 P 12:11

Terri Stathem Contact

Cimarex Energy Co.
202 S. Cheyenne Ave.
Suite 1000
Tulsa, Oklahoma 74103-4346
PHONE: 918.585.1100
FAX: 918.585.1133



Michael McMillian
Oil Conservation Division
New Mexico Department of Energy,
Minerals and Natural Resources
1220 South Saint Francis Drive
Santa Fe, New Mexico 87505

Re: White City Penn 28 Gas Com Unit 3 #4
API 30-015-33862
Section 28, Township 24 South, Range 26 East, N.M.P.M.
Eddy County, New Mexico.

Dear Mr. McMillian:

The White City Penn 28 Gas Com Unit 3 #4 well is located in the SW/4 of Sec. 28, 24S, 26E, Eddy County NM.

Cimarex is the operator of the SW/4 of Sec. 31, 24S, 26E, Eddy County, NM as to all depths from the surface of the Earth down to 11,641'. Ownership within these depths in the SW/4 are identical.

Sincerely,

A handwritten signature in cursive script that reads "Caitlin Pierce".

Caitlin Pierce
Production Landman
cpierce@cimarex.com
Direct: 432-571-7862

District I
1625 N. French Drive, Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-107A
Revised June 10, 2003

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

APPLICATION TYPE
☒ Single Well
☐ Establish Pre-Approved Pools
EXISTING WELLBORE
☒ Yes ☐ No

APPLICATION FOR DOWNHOLE COMMINGLING

Cimarex Energy Co. of Colorado 600 N. Marienfeld St., Ste. 600; Midland, TX 79701
Operator Address

White City Penn 28 GCU 3 004 K-28-24S-26E Eddy
Lease Well No. Unit Letter-Section-Township-Range County

OGRID No. 162683 Property Code 303010 API No. 30-015-33862 Lease Type: ☒ Federal ☐ State ☐ Fee

DATA ELEMENT	UPPER ZONE	LOWER ZONE
Pool Name	Southwest Black River – Wolfcamp Gas	White City;Penn (Gas)
Pool Code	97693	87280
Top and Bottom of Pay Section (Perforated or Open-Hole Interval)	8,349' – 9,680'	9,680'-9,889'
Method of Production (Flowing or Artificial Lift)	Flowing	Flowing
Bottomhole Pressure (Note: Pressure data will not be required if the bottom perforation in the lower zone is within 150% of the depth of the top perforation in the upper zone)	Within 150% of top perf	Within 150% of top perf
Oil Gravity or Gas BTU (Degree API or Gas BTU)	Oil: 51.8° API Gas: 1225.8 BTU dry / 1204.6 BTU wet @ 14.73 psi	Oil: 53.5° API Gas: 1142.4 BTU dry / 1122.6 BTU wet @ 14.73 psi
Producing, Shut-In or New Zone	New Zone	New Zone
Date and Oil/Gas/Water Rates of Last Production. (Note: For new zones with no production history, applicant shall be required to attach production estimates and supporting data.)	Date: N/A Rates: 84 BOPD, 2,106 MCFPD, 401 BWPD	Date: N/A Rates: 16 BOPD, 401 MCFPD, 101 BWPD
Fixed Allocation Percentage (Note: If allocation is based upon something other than current or past production, supporting data or explanation will be required.)	Oil 84 Gas 84	Oil 16 Gas 16

ADDITIONAL DATA

Are all working, royalty and overriding royalty interests identical in all commingled zones? Yes ☒ No ☐
If not, have all working, royalty and overriding royalty interest owners been notified by certified mail? Yes ☐ No ☐

Are all produced fluids from all commingled zones compatible with each other? Yes ☒ No ☐

Will commingling decrease the value of production? Yes ☐ No ☒

If this well is on, or communitized with, state or federal lands, has either the Commissioner of Public Lands or the United States Bureau of Land Management been notified in writing of this application? Yes ☒ No ☐

NMOCD Reference Case No. applicable to this well: DHC-3390 → wrong

- Attachments:
- C-102 for each zone to be commingled showing its spacing unit and acreage dedication.
 - Production curve for each zone for at least one year. (If not available, attach explanation.)
 - For zones with no production history, estimated production rates and supporting data.
 - Data to support allocation method or formula.
 - Notification list of working, royalty and overriding royalty interests for uncommon interest cases.
 - Any additional statements, documents required to support commingling.

PRE-APPROVED POOLS

If application is to establish Pre-Approved Pools, the following additional information will be required:

- List of other orders approving downhole commingling within the proposed Pre-Approved Pools
- List of all operators within the proposed Pre-Approved Pools
- Proof that all operators within the proposed Pre-Approved Pools were provided notice of this application.
- Bottomhole pressure data.

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE Aricka Easterling TITLE Regulatory Compliance DATE 01/19/2017
TYPE OR PRINT NAME Aricka Easterling TELEPHONE NO. 918-560-7060
E-MAIL ADDRESS aeasterling@cimarex.com

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 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 & 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 30-015-33862	² Pool Code 87280	³ Pool Name White City;Penn (Gas)
⁴ Property Code 303010	⁵ Property Name White City Penn 28 Unit 3	
⁷ OGRID No. 162683	⁸ Operator Name Cimarex Energy of Colorado	⁶ Well Number 4
		⁹ Elevation 3076'

¹⁰ Surface Location

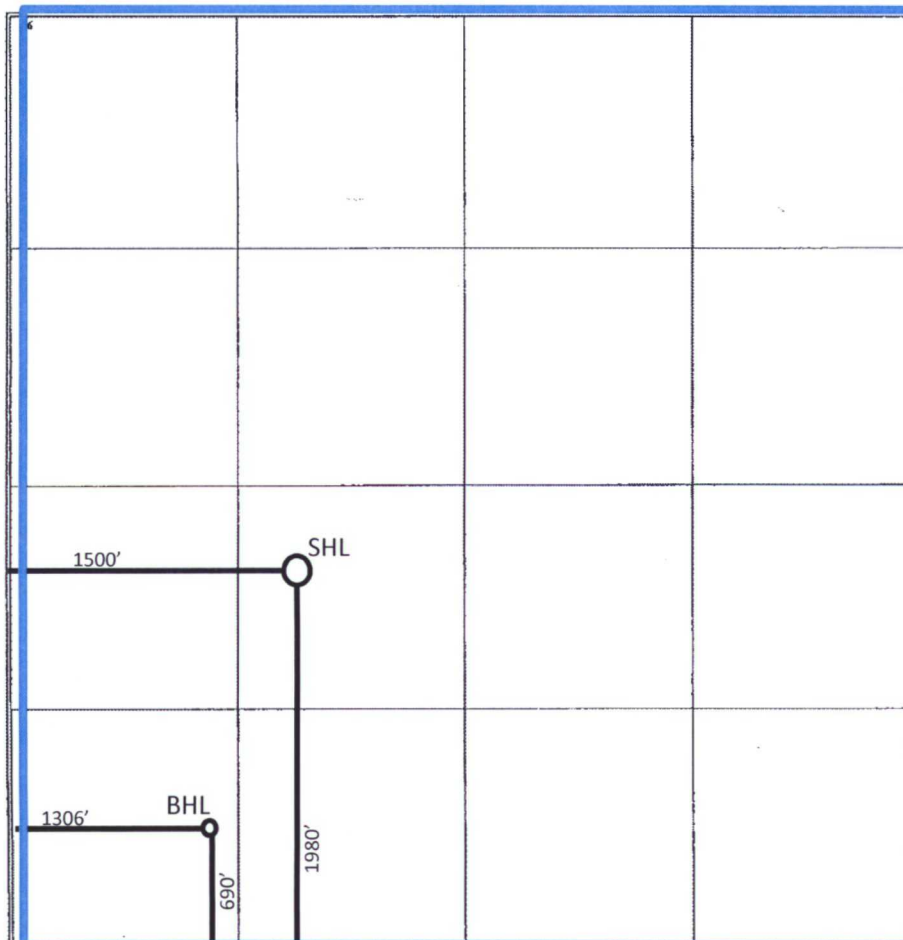
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
K	28	24S	26E		1980	South	1500	West	Eddy

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
N	28	24S	26E		690	South	1306	West	Eddy

¹² Dedicated Acres 640	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.



¹⁷ OPERATOR CERTIFICATION

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.

Aricka Easterling 1/18/16
Signature Date

Aricka Easterling

Printed Name

aeasterling@cimarex.com

E-mail Address

¹⁸ SURVEYOR CERTIFICATION

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.

Date of Survey

Signature and Seal of Professional Surveyor:

Certificate Number

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 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 & 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 30-015-33862	² Pool Code 97693	³ Pool Name Southwest Black River - Wolfcamp (Gas)
⁴ Property Code 303010	⁵ Property Name White City Penn 28 Unit 3	
⁷ OGRID No. 162683	⁸ Operator Name Cimarex Energy of Colorado	⁶ Well Number 4
		⁹ Elevation 3076'

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
K	28	24S	26E		1980	South	1500	West	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
N	28	24S	26E		690	South	1306	West	Eddy

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.

	<p>¹⁷ OPERATOR CERTIFICATION</p> <p>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.</p> <p><i>Aricka Easterling</i> 1/18/16 Signature Date</p> <p>Aricka Easterling Printed Name</p> <p>aeasterling@cimarex.com E-mail Address</p>	
	<p>¹⁸ SURVEYOR CERTIFICATION</p> <p>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.</p> <p>Date of Survey Signature and Seal of Professional Surveyor:</p>	
	<p>Certificate Number</p>	



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 **White City Penn 28 Gas Com Unit 3 #4** well (API: 30-015-33862).

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 **84%** for the Wolfcamp and **16%** 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 **White City Penn 28 Gas Com Unit 3 #4** 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 Bone Spring formation. The well has produced 932 bbls of oil and 34 MMCF of gas (see **Appendix C**). The company plans to temporarily abandon the currently producing Bone Spring perforations with a cement squeeze. The company is considering testing the Strawn formation. If the Strawn is not currently commercially viable when producing alone, the company intends to:

- 1) Temporarily abandon the Strawn
- 2) Recomplete the new proposed Ciscamp formations
- 3) Comingle the Strawn with the Wolfcamp and Cisco Canyon at a later time

In such case, the production allocations factors will be revised and re-submitted for approval following the approved Field Study methodology for “Handling of Existing Rate Contribution from Proven Developed Producing (PDP) Zone(s)”, using Eq.1.1 and Eq. 1.2; and along with the required BLM and NMOCD documentation.

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



CONFIDENTIAL. December 29, 2016

Production Operations – Carlsbad Region, Permian Basin

White City Penn 28 GCU 3 #4 - Cisco Canyon and Wolfcamp

(Ciscamp) Proposed Commingling Allocation Factors. Eddy County, NM

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 D**.

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 **1,499 MMCF** from the Wolfcamp and **292 MMCF** from the Cisco Canyon, for a total of **1,790 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:

$$\text{Wolfcamp \% Alloc. Factor} = \frac{1,499 \text{ MMCF}}{1,790 \text{ MMCF}} = 84\%$$

$$\text{Cisco Canyon \% Alloc. Factor} = \frac{292 \text{ MMCF}}{1,790 \text{ MMCF}} = 16\%$$

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 < 25-45%. *Total estimated oil reserves are 57 MBO.*

White City Penn 28 GCU 3#4

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 :	9,116	3,965	204	12.1%	20%	19.9	1,765	85%	1,499			1,499	84%
Cisco Canyon :	9,874	4,295	30	14.8%	15%	3.7	343	85%	292		-	292	16%
Total:			233			23.7	2,108	85%	1,790		-	1,790	100%

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



CONFIDENTIAL. December 29, 2016

Production Operations – Carlsbad Region, Permian Basin

White City Penn 28 GCU 3 #4 - Cisco Canyon and Wolfcamp

(Ciscamp) Proposed Commingling Allocation Factors. Eddy County, NM

In this well, the spacing for both formations is the same, as well as public interests: 100% working interest and 77.5% 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.



CONFIDENTIAL. December 29, 2016

Production Operations – Carlsbad Region, Permian Basin
White City Penn 28 GCU 3 #4 - 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

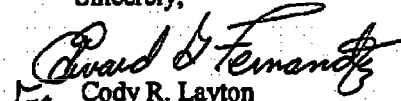
Gentlemen:

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 I&E)

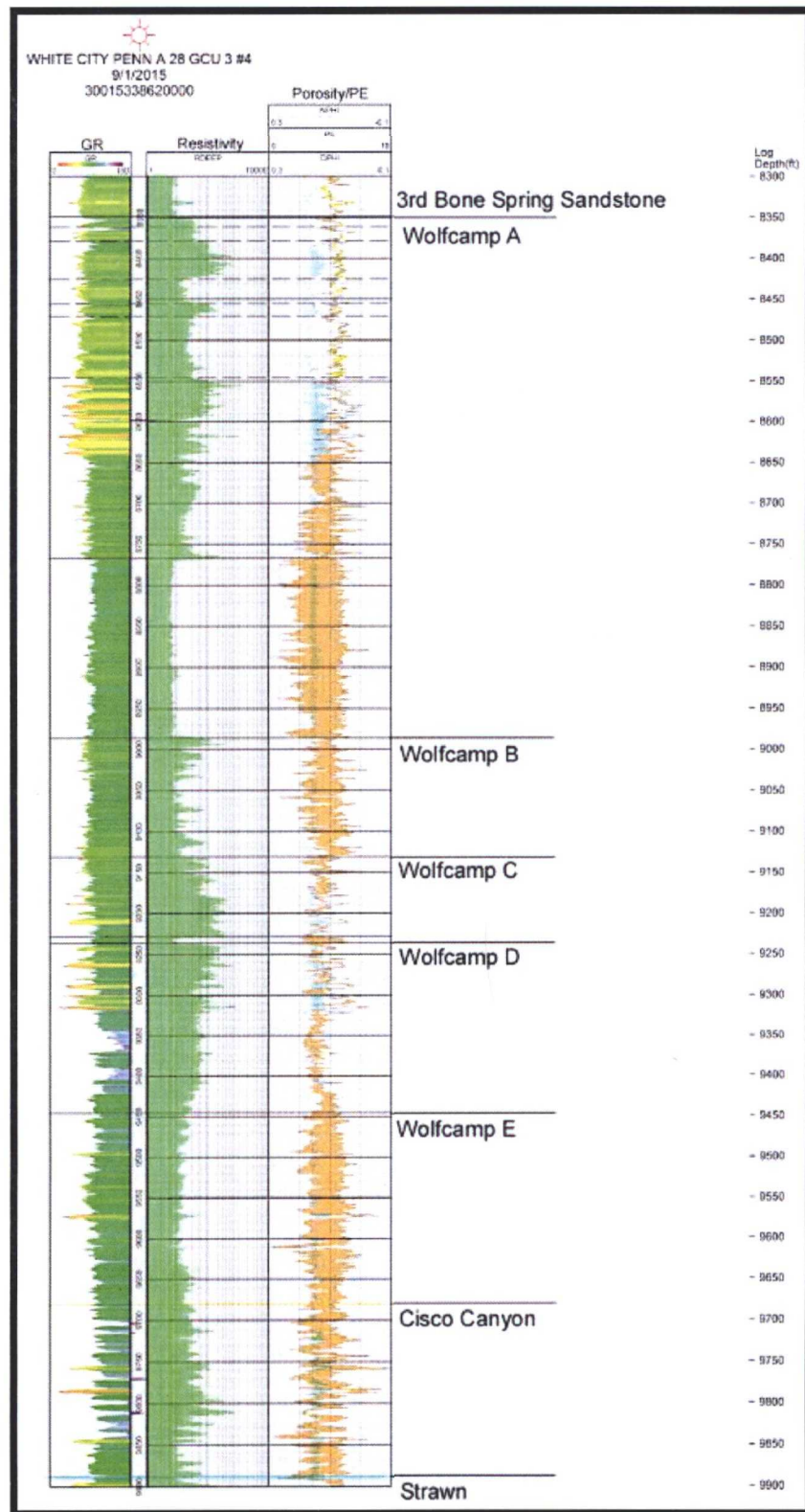


CONFIDENTIAL. December 29, 2016

Production Operations – Carlsbad Region, Permian Basin

White City Penn 28 GCU 3 #4 - Cisco Canyon and Wolfcamp
(Ciscamp) Proposed Commingling Allocation Factors. Eddy County, NM

Appendix B: Log section from top of Wolfcamp to top of Strawn – White City Penn 28 GCU 3#4





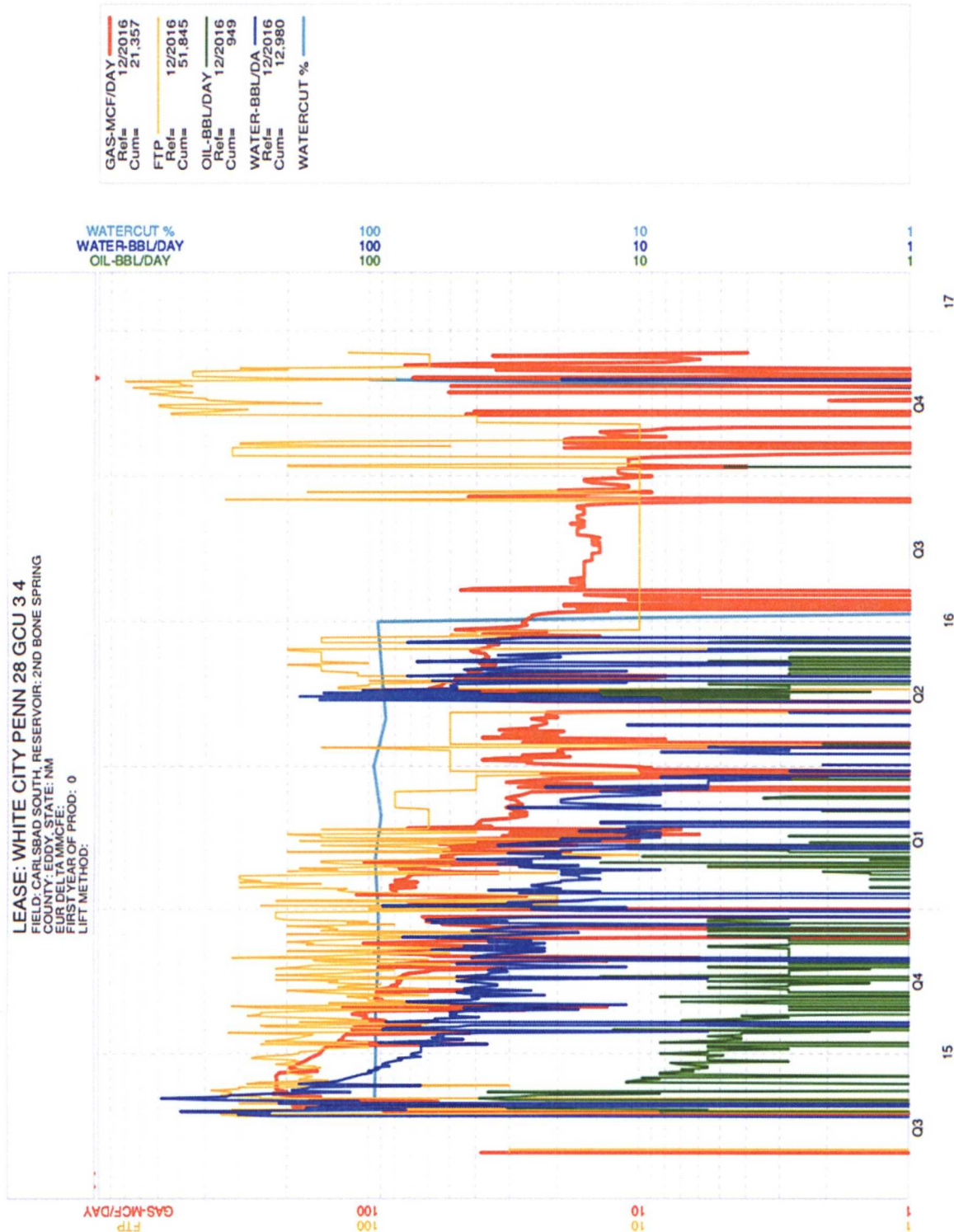
CONFIDENTIAL. December 29, 2016

Production Operations – Carlsbad Region, Permian Basin

White City Penn 28 GCU 3 #4 - Cisco Canyon and Wolfcamp

(Ciscamp) Proposed Commingling Allocation Factors. Eddy County, NM

Appendix C: Current Completion – White City Penn 28 Gas Com Unit 3 #4





CONFIDENTIAL. December 29, 2016

Production Operations – Carlsbad Region, Permian Basin
White City Penn 28 GCU 3 #4 - Cisco Canyon and Wolfcamp
(Ciscamp) Proposed Commingling Allocation Factors. Eddy County, NM

Appendix D: Recompletion Procedure – White City Penn 28 Gas Com Unit 3 #4

Well Data

KB	21'
TD	11,900'
PBTD	6,982'
Casing	13-3/8" 54.5# J-55 @ 350'. Cmt'd w/ 350 sx, cmt circ 9-5/8" 40# NS-110HC @ 1,600'. Cmt'd w/ 700 sx, cmt circ 5-1/2" 17# P-110 @ 11,900'. Cmt'd w/ 2,725 sx. DV @ 7,083'. TOC @ 2,750' by CBL
Tubing	2-3/8" 4.7# L-80 8rd, EOT @ 6,954'
Rods	3/4" Weatherford HD Steel rods and 225' of 1.5" Flexbar C
Pump	2" x 1.5" x 30' RHBC (HVR) Frac Pump
Proposed RC Perfs	Wolfcamp (8,349' – 9,680') & Cisco Canyon (9,680' – 9,889')

Procedure

Notify BLM 24 hours prior to start of workover operations.

1. Test anchors prior to MIRU PU.
2. MIRU PU, rental flare, and choke manifold.
3. Kill well with produced water if available or FW as necessary.
4. ND WH, NU 5K BOP
5. Release packer and TOOH w/ 2-3/8" 4.7# L-80 tbg. Stand back Tubing.
6. MIRU WL
7. RIH w/ CIBP and set at +/- 9,923'
8. RIH w/ WL to bail 35' of cement on top of WL set at +/- 9,923'
Note: This will place TOC at top of Strawn
9. RU Pump truck and pressure test casing to 8,500 psi on a chart for 30 minutes with no more than 10% leak off.
10. ND 5k BOP, RDMO PU
11. RU two 10k frac valves and flow cross
12. MIRU water transfer with frac tanks to contain water to be pumped from frac pond
13. Test frac valves and flow cross prior to frac job. Arrange for these items, manlift, forklift, and Pace testers to be on location the day before the frac job to test so that we do not have the frac waiting on a successful test the following day.
14. RU frac valves, flow cross, goat head, and wireline lubricator.
15. RIH w/ gauge ring/junk basket for 5-1/2" 17# P-110 csg to +/- 9,889'
16. Perforate Cisco Canyon from 9,680' – 9,889'.



CONFIDENTIAL. December 29, 2016

Production Operations – Carlsbad Region, Permian Basin

White City Penn 28 GCU 3 #4 - Cisco Canyon and Wolfcamp

(Ciscamp) Proposed Commingling Allocation Factors. Eddy County, NM

17. RU frac and flowback equipment.
18. Acidize and frac Cisco Canyon perms down casing.
19. Set 10k flow through composite plug 15' uphole of top perforation
20. Test to 8,500 psi
21. Perforate Wolfcamp from 8,349' – 9,680'.
22. Acidize and frac Wolfcamp perms down casing.
23. Set 10k flow through composite plug 15' above top perforation
24. Test to 8,500 psi
25. RD frac
26. MIRU 2" coiled tbg unit.
27. RIH w/ blade mill & downhole motor on 2" CT and drill out sand and composite plugs using freshwater for circulation. Pump sweeps each time a plug is tagged, each time a plug is drilled out, and every 60 bbls pumped.
28. Clean out to PBTD 9,888'
29. POOH w/ blade mill, motor & CT
30. RDMO coiled tbg unit.
31. Flow back well for 24 hours, then SI well overnight.
32. RU wireline and lubricator.
33. RIH w/ GR/JB for 5-1/2" 17# P-110 to +/- 8,299'
34. RIH w/ 2-3/8" WEG, 2-3/8" pump out plug pinned for 1,500 – 2,000 psi differential pressure, 10' 2-3/8" 4.7# L-80 tbg sub w/ 1.875" XN profile nipple w/ blanking plug in place, 5-1/2" Arrowset 1X packer and on-off tool stinger w/ 1.875" X profile nipple. Set packer +/- 8,299'. From downhole up:
 - a. 2-3/8" WEG
 - b. 2-3/8" pump out plug pinned for 1,500 – 2,000 psi differential pressure
 - c. 1.875" XN profile nipple
 - d. 10' 2-3/8" 4.7# L-80 tbg sub
 - e. 5-1/2" x 2-3/8" Arrowset 1X packer and on-off tool stinger w/ 1.875" X profile nipple
35. RD WL and lubricator
36. ND goat head and frac valve, NU BOP, MIRU Pulling Unit
37. TIH w/ on/off tool overshot, GLVs, and 2-3/8" 4.7# L-80 tbg.
38. Latch overshot onto on-off tool and space out tubing
39. ND BOP, NU WH
40. RDMO pulling unit
41. RU pump truck and pump out plug. Put well on production.
42. **Run Production Log for allocation purposes after recovering load. Run additional production logs if actual production varies significantly from expected performance. Send copies of these logs to BLM and file for an adjustment of allocation factor if necessary.**



CONFIDENTIAL. December 29, 2016

Production Operations – Carlsbad Region, Permian Basin

White City Penn 28 GCU 3 #4 - Cisco Canyon and Wolfcamp

(Ciscamp) Proposed Commingling Allocation Factors. Eddy County, NM



Current WBD
KB - 23' above GL

Cimarex Energy Co. of Colorado

White City Penn 28 Gas Com Unit 3 #4

SHL - 1980' FSL & 1500' FWL

BHL - 690' FSL & 1306' FWL

Sec. 28, T-24-S, R-26-E, Eddy Co., NM

M. Karner

04/5/2016

Tubing:

2-3/8" 4.7# L-80 tbg to surface (208 jts)

2-3/8" x 5-1/2" TAC @ 6,585'

10 jts 2-3/8" 4.7# L-80 tbg @ 6,588'

2-3/8" API Cup Type SN @ 6,904'

Rods:

1.5" x 30' Polished Rod at Surface

706' x 3/4" Weatherford HD Steel Rods
not guided (25 jts and one 6' pony rod)

875' x 3/4" Weatherford HD Steel Rods
with 4 molded guides per rod (35 jts)

5,000' x 3/4" Weatherford HD Steel Rods
not guided (200 jts)

225' x 1.5" Flexbar C (9 jts)

J-latch on/off tool at 6,836'

25' x 1.5" Flexbar C (1 jt)

1.3' Guided Lift Sub at 6,862'

30' length 1.5" insert pump @ 6,893'

13-3/8", 54.5# J-55 csg @ 350'
cmd w/ 350 sx, cmt circ

210 jts 2-3/8" 4.7# L-80 Tbg

9-5/8", 40# NS-110HC csg @ 1600'
cmd w/ 700 sx, cmt circ

TOC @ 2750 by CBL-DP Jan 2015

Bone Springs perms (6,622' - 6,883')

25 sx Class H cement plug from 7,197' - 6,982'
DV Tool @ 7083'
cmd w/ 1550 sx

25 sx Class H cement plug from 8,436' - 8,184'

50 sx Class H cement plug tagged at 10,492'
CIBP @ 10,910'
Morrow perms (10996' - 11541')

TD @ 11751'
5-1/2" 17# P-110 @ 11900' cmd w/ 1175 sx
TD @ 11900'

CIMAREX

"Wolfcamp / Cisco"

Proposed WBD
KB - 23' above GL

Cimarex Energy Co. of Colorado

White City Penn 28 Gas Com Unit 3 #4

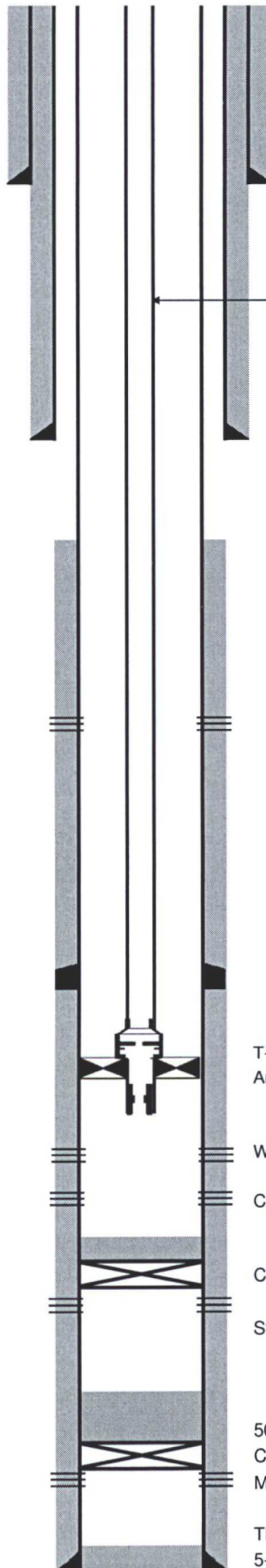
SHL - 1980' FSL & 1500' FWL

BHL - 690' FSL & 1306' FWL

Sec. 28, T-24-S, R-26-E, Eddy Co., NM

M. Karner

04/5/2016



13-3/8", 54.5# J-55 csg @ 350'
cmtd w/ 350 sx, cmt circ

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

9-5/8", 40# NS-110HC csg @ 1600'
cmtd w/ 700 sx, cmt circ

TOC @ 2750 by CBL-DP Jan 2015

Bone Springs perms (6,622' - 6,883')

DV Tool @ 7083'
cmtd w/ 1550 sx

T-2 on-off Tool w/ 1.875" X Profile nipple @ 10,149'
Arrowset 1X pkr @ 9,838'

Wolfcamp perms (8,349' - 9,680')

Cisco Canyon perms (9,680' - 9,889')

CIBP set at +/- 9,923' with 35' of cement on top

Strawn perms (9,888' - 10,121')

50 sx Class H cement plug tagged at 10,492'
CIBP @ 10,910'
Morrow perms (10996' - 11541')

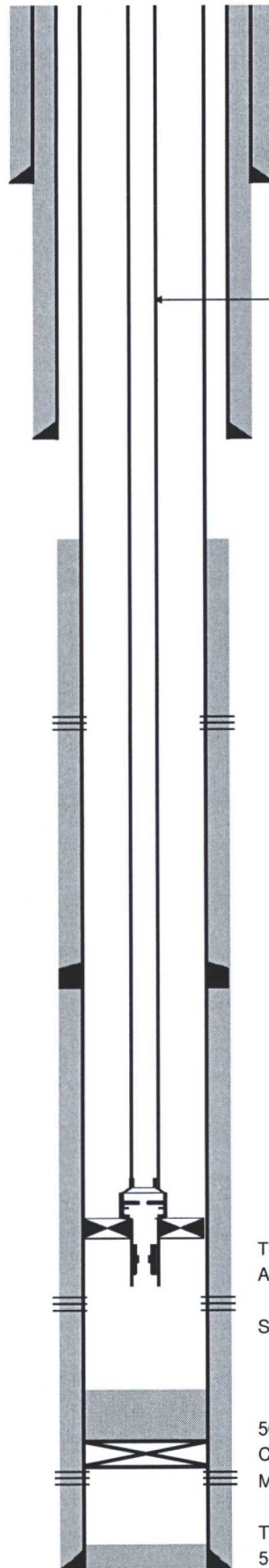
TD @ 11751'
5-1/2" 17# P-110 @ 11900' cmtd w/ 1175 sx
TD @ 11900'



Bone Springs + Strawn

Proposed WBD
KB - 23' above GL

Cimarex Energy Co. of Colorado
White City Penn 28 Gas Com Unit 3 #4
SHL - 1980' FSL & 1500' FWL
BHL - 690' FSL & 1306' FWL
Sec. 28, T-24-S, R-26-E, Eddy Co., NM
M. Karner 04/5/2016



13-3/8", 54.5# J-55 csg @ 350'
cmted w/ 350 sx, cmt circ

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

9-5/8", 40# NS-110HC csg @ 1600'
cmted w/ 700 sx, cmt circ

TOC @ 2750 by CBL-DP Jan 2015

Bone Springs perfs (6,622' - 6,883')

DV Tool @ 7083'
cmted w/ 1550 sx

T-2 on-off Tool w/ 1.875" X Profile nipple @ 10,149'
Arrowset 1X pkr @ 9,838'

Strawn perfs (9,888' - 10,121')

50 sx Class H cement plug tagged at 10,492'
CIBP @ 10,910'
Morrow perfs (10996' - 11541')

TD @ 11751'
5-1/2" 17# P-110 @ 11900' cmted w/ 1175 sx
TD @ 11900'



White City Penn 28 Gas Com Unit 3 #4

Strawn Recompletion Procedure

Michael Karner 1/27/16

Well Data

KB 21'
TD 11,900'
PBSD 10,492'

Casing 13-3/8" 54.5# J-55 @ 350'. Cmt'd w/ 350 sx, cmt circ
9-5/8" 40# N-110HC @ 1,600'. Cmt'd w/ 700 sx, cmt circ
5-1/2" 17# P-110 @ 11,900'. Cmt'd w/ 1,175 sx. TOC @ 2,750' by CBL

Tubing 2-3/8" 4.7# L-80 8rd, EOT

Current Prod. Perfs Bone Spring (6,622' – 6,883')

Proposed RC Perfs Strawn (9,888' – 10,121')

Procedure

Notify BLM 24 hours prior to starting operations.

1. Test anchors prior to moving in rig.
2. Move in rig up pulling unit.
3. Kill well as necessary with 7% KCl.
4. Nipple down wellhead, nipple up 5,000 psi blow out preventer stack.
5. TOOH w/ rods, pump, and 2-3/8" 4.7# L-80 tbg. Stand back tbg. Scan tubing during TOOH.
6. RU wireline
7. RIH w/ GR/JB to +/- 10,121'
8. RIH w/ casing guns to perforate Strawn 9,888' – 10,121'
9. RIH to set packer w/ pump out plug set to 1800 psi differential pressure at +/- 9,838'
10. RDMO Wireline
11. TIH w/ 2-3/8" tbg and gas lift valves to latch into packer
12. ND BOP, NU WH
13. RDMO pulling unit
14. RU pump truck and pump out plug
15. MIRU Propetro acid
16. Pump 19,000 total gallons of 15% NEFE HCl with 225 ball sealers down 2-3/8" tubing
17. Flush with 1 tubing volume 2% KCl
18. Put well on production. Swab well as necessary. Produce Strawn via tubing and Bone Spring via annulus.



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. Marinfeld, 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+	0.624	0.270
		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

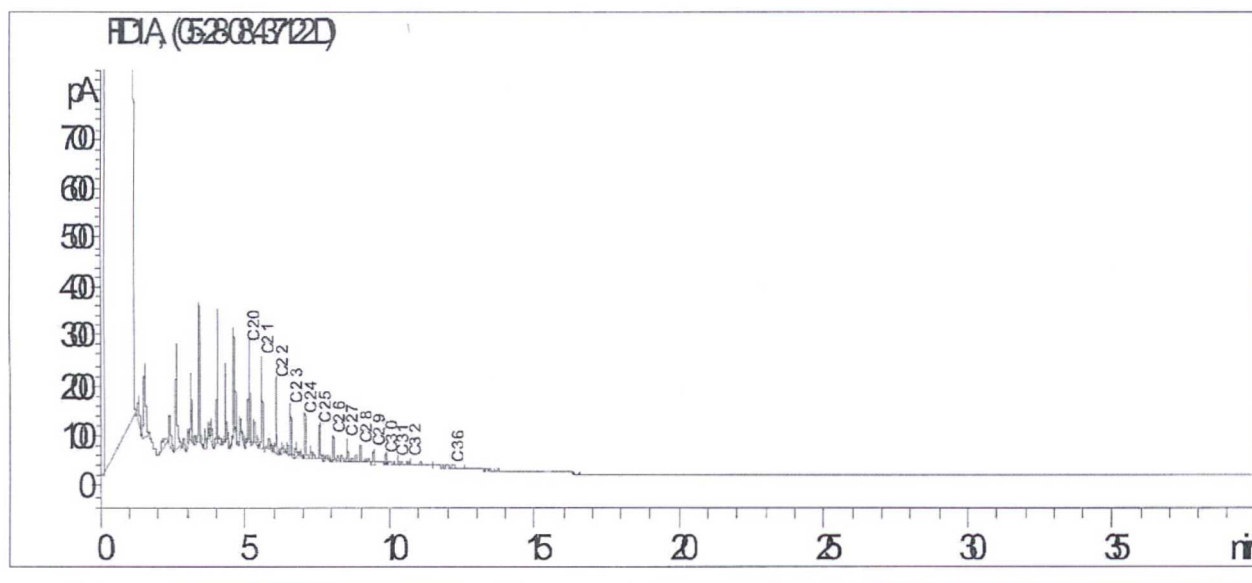
Lab Team Leader - Sheila Hernandez
(432) 495-7240

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
TDS (mg/l or g/m3):	90873.3	Carbonate:	0.0	0.	Calcium:	2780.0	138.72
Density (g/cm3, tonne/m3):	1.062	Sulfate:	225.0	4.68	Strontium:		
Anion/Cation Ratio:	1	Phosphate:			Barium:		
		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.

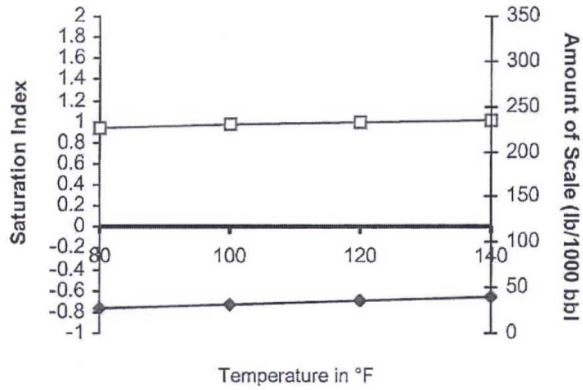
Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

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

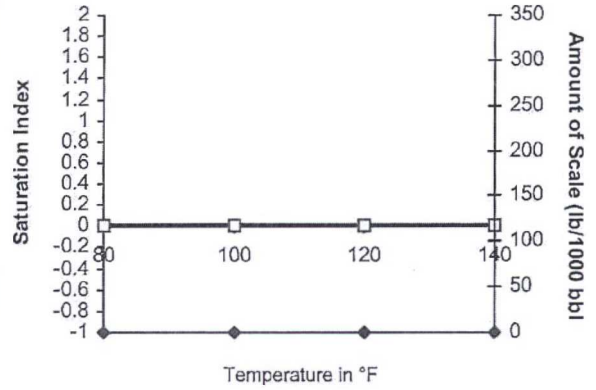
Scale Predictions from Baker Petrolite

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

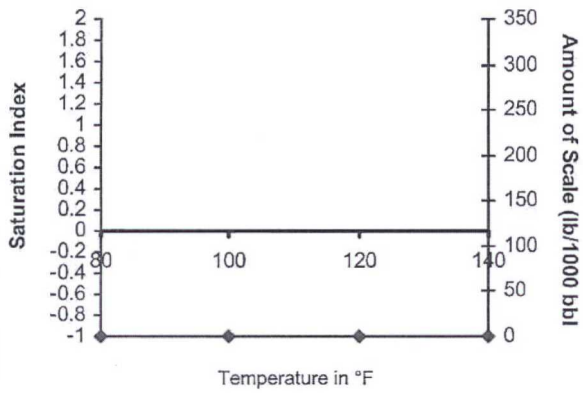
Calcite - CaCO_3



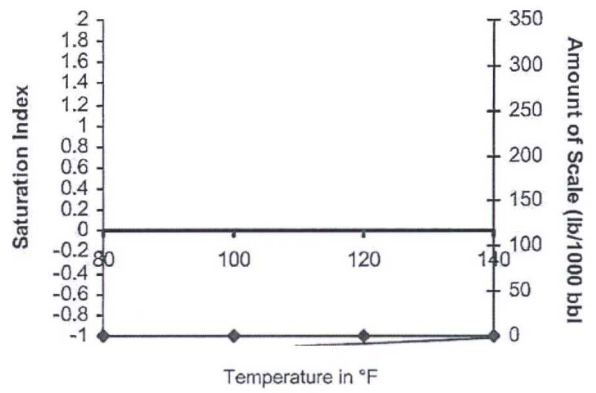
Barite - BaSO_4



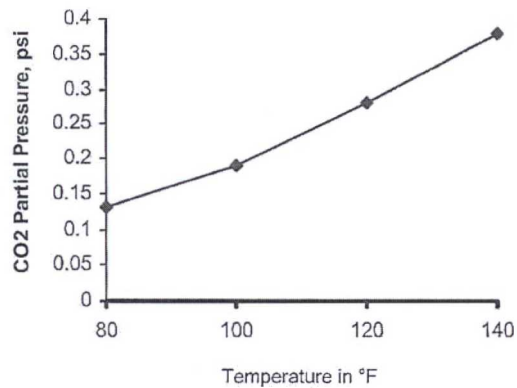
Gypsum - $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$



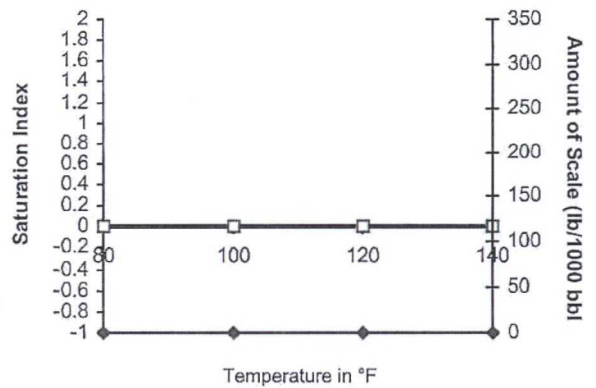
Anhydrite - CaSO_4



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. Mariefeld, 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+	0.439	0.190
		100.000	3.063

REAL BTU/CU.FT.

At 14.65 DRY	1136.2
At 14.65 WET	1116.4
At 14.696 DRY	1139.7
At 14.696 WET	1120.3
At 14.73 DRY	1142.4
At 14.73 Wet	1122.6

Specific Gravity

Calculated 0.6445

Molecular Weight

18.6673

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

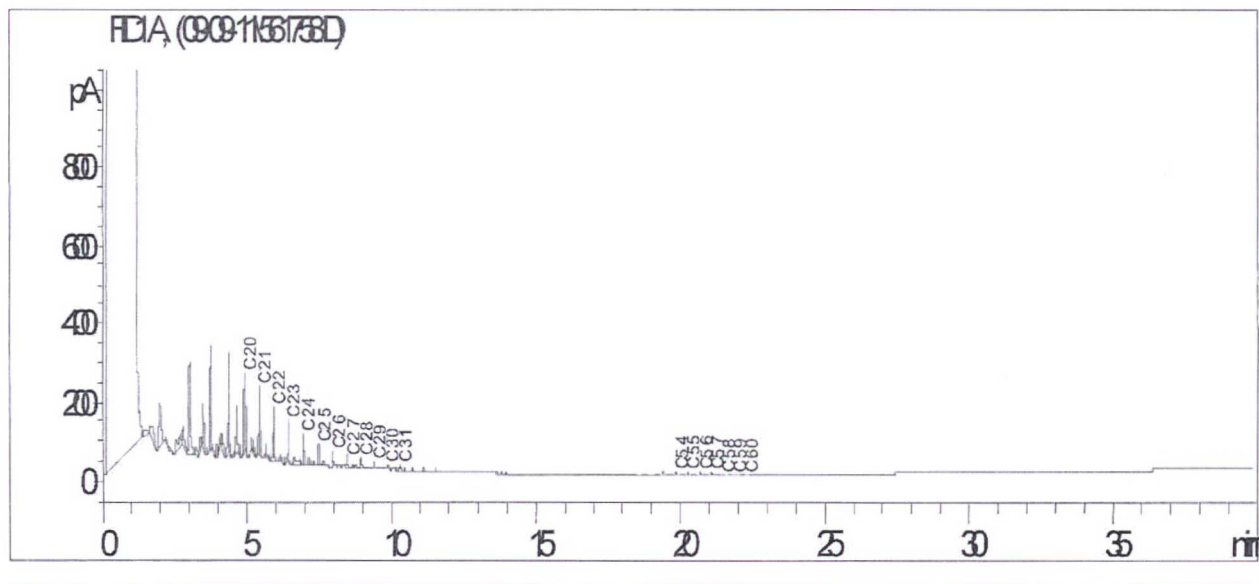
Lab Team Leader - Sheila Hernandez
(432) 495-7240

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:	52635.0	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
					Aluminum:		
Carbon Dioxide:	150 PPM	Hydrogen Sulfide:		0 PPM	Chromium:		
Oxygen:		pH at time of sampling:		6	Copper:		
Comments:		pH at time of analysis:			Lead:		
RESISTIVITY: 0.083 OHM-M @ 75°F		pH used in Calculation:		6	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.

CIMAREX*"Current"***Current WBD**

KB - 23' above GL

Cimarex Energy Co. of Colorado

White City Penn 28 Gas Com Unit 3 #4

SHL - 1980' FSL & 1500' FWL

BHL - 690' FSL & 1306' FWL

Sec. 28, T-24-S, R-26-E, Eddy Co., NM

M. Karner

04/5/2016

Tubing:

2-3/8" 4.7# L-80 tbg to surface (208 jts)

2-3/8" x 5-1/2" TAC @ 6,585'

10 jts 2-3/8" 4.7# L-80 tbg @ 6,588'

2-3/8" API Cup Type SN @ 6,904'

Rods:

1.5" x 30' Polished Rod at Surface

706' x 3/4" Weatherford HD Steel Rods
not guided (25 jts and one 6' pony rod)875' x 3/4" Weatherford HD Steel Rods
with 4 molded guides per rod (35 jts)5,000' x 3/4" Weatherford HD Steel Rods
not guided (200 jts)

225' x 1.5" Flexbar C (9 jts)

J-latch on/off tool at 6,836'

25' x 1.5" Flexbar C (1 jt)

1.3' Guided Lift Sub at 6,862'

30' length 1.5" insert pump @ 6,893'

13-3/8", 54.5# J-55 csg @ 350'
cmt d w/ 350 sx, cmt circ

210 jts 2-3/8" 4.7# L-80 Tbg

9-5/8", 40# NS-110HC csg @ 1600'
cmt d w/ 700 sx, cmt circ

TOC @ 2750 by CBL-DP Jan 2015

Bone Springs perms (6,622' - 6,883')

25 sx Class H cement plug from 7,197' - 6,982'
DV Tool @ 7083'
cmt d w/ 1550 sx

25 sx Class H cement plug from 8,436' - 8,184'

50 sx Class H cement plug tagged at 10,492'
CIBP @ 10,910'
Morrow perms (10996' - 11541')TD @ 11751'
5-1/2" 17# P-110 @ 11900' cmt d w/ 1175 sx
TD @ 11900'