

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

FORM APPROVED  
OMB NO. 1004-0135  
Expires: July 31, 2010

**SUNDRY NOTICES AND REPORTS ON WELLS**  
*Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.*

**WATER OIL CONSERVATION**  
ARTESIA DISTRICT  
OCT 11 2016  
RECEIVED

5. Lease Serial No.  
NMNM28172

6. If Indian, Allottee or Tribe Name

7. If Unit or CA/Agreement, Name and/or No.

8. Well Name and No.  
ADRIANNE 6 FED 1

9. API Well No.  
30-015-34319-00-S1

10. Field and Pool, or Exploratory  
CHOSA DRAW-MORROW

11. County or Parish, and State  
EDDY COUNTY, NM

**SUBMIT IN TRIPLICATE - Other instructions on reverse side.**

1. Type of Well  
 Oil Well  Gas Well  Other

2. Name of Operator  
CIMAREX ENERGY COMPANY OF CO  
Contact: AMITHY E CRAWFORD  
E-Mail: acrawford@cimarex.com

3a. Address  
202 S CHEYENNE AVE SUITE 1000  
TULSA, OK 74103.4346

3b. Phone No. (include area code)  
Ph: 432-620-1909

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)  
Sec 6 T25S R26E NENW 200FNL 1700FWL

12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
<input checked="" type="checkbox"/> Notice of Intent	<input type="checkbox"/> Acidize	<input type="checkbox"/> Deepen	<input type="checkbox"/> Production (Start/Resume)	<input type="checkbox"/> Water Shut-Off
<input type="checkbox"/> Subsequent Report	<input type="checkbox"/> Alter Casing	<input type="checkbox"/> Fracture Treat	<input type="checkbox"/> Reclamation	<input type="checkbox"/> Well Integrity
<input type="checkbox"/> Final Abandonment Notice	<input type="checkbox"/> Casing Repair	<input type="checkbox"/> New Construction	<input checked="" type="checkbox"/> Recomplete	<input type="checkbox"/> Other
	<input type="checkbox"/> Change Plans	<input type="checkbox"/> Plug and Abandon	<input type="checkbox"/> Temporarily Abandon	
	<input type="checkbox"/> Convert to Injection	<input type="checkbox"/> Plug Back	<input type="checkbox"/> Water Disposal	

13. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

Cimarex Respectfully requests approval to plugback the Morrow, Perforate and recomplete into the Cisco Canyon and Wolfcamp formations. Cimarex also proposes to downhole commingle production from the Cisco Canyon and Wolfcamp Zones. Please see attached recompletion procedure for your review and approval.

The 2016 White City Area Downhole Commingling Field Study included the referenced well for the Commingling. The field study was submitted and approved by the BLM on 7/6/16.

DHC with the NMOCD has been submitted on 9/27/16.

Attachments:

C102s, Recompletion and Commingling Procedure, Current & Proposed wellbore schematic, Oil/Water/Gas

**SEE ATTACHED FOR  
CONDITIONS OF APPROVAL**

14. I hereby certify that the foregoing is true and correct.

**Electronic Submission #352693 verified by the BLM Well Information System  
For CIMAREX ENERGY COMPANY OF CO, sent to the Carlsbad  
Committed to AFMSS for processing by DEBORAH MCKINNEY on 10/04/2016 (17DLM0007SE)**

Name (Printed/Typed) AMITHY E CRAWFORD Title REGULATORY ANALYST

Signature (Electronic Submission) Date 09/27/2016

**THIS SPACE FOR FEDERAL OR STATE OFFICE USE**

Approved By CHARLES NIMMER Title PETROLEUM ENGINEER Date 10/06/2016

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Office Carlsbad

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

**\*\* BLM REVISED \*\* BLM REVISED \*\* BLM REVISED \*\* BLM REVISED \*\* BLM REVISED \*\***

**Additional data for EC transaction #352693 that would not fit on the form**

**32. Additional remarks, continued**

analysis and commingling worksheet form.

Thank you.



## 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 **Adrienne 6 Federal #1** well (API: 30-015-34319).

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 **78%** for the Wolfcamp and **22%** 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 **Adrienne 6 Federal #1** 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 well has produced **1,070 MMCF** of gas and has remaining gas reserves of approximately 250 MMCF (see **Appendix C**). The company plans to temporarily abandon the Morrow zone under a cast-iron bridge plug with cement on top, and will consider returning this zone to production and commingle with the new proposed Ciscamp formations in the future once these zones reach an equivalent reservoir pressure. 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 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**.



Production Operations – Carlsbad Region, Permian Basin  
**Adrienne 6 Federal #1 - 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:

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

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

The Recoverable Gas in Place (RGIP) for subject well is **1,592 MMCF** from the Wolfcamp and **454 MMCF** from the Cisco Canyon, for a total of **2,046 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:

$$\text{Wolfcamp \% Alloc. Factor} = \frac{1,592 \text{ MMCF}}{2,046 \text{ MMCF}} = 78\%$$

$$\text{Cisco Canyon \% Alloc. Factor} = \frac{454 \text{ MMCF}}{2,046 \text{ MMCF}} = 22\%$$

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) > 10% and Average Sw < 35%. Total estimated oil reserves are 51 MBO.

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

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, MMCF	Remaining RGIP (RRGIP), MMCF	Initial Alloc. Factor, % (based on RRGIP Ratio)
Wolfcamp	9,230	4,113	222	13.7%	19.1%	24.5	1,886	84%	1,592		-	1,592	78%
Cisco Canyon	10,135	4,917	45	15.1%	14.2%	5.8	527	86%	454		-	454	22%
<b>Total:</b>			<b>267.0</b>			<b>30.4</b>	<b>2,413</b>	<b>85%</b>	<b>2,046</b>		-	<b>2,046</b>	<b>100%</b>

In this well, the spacing for both formations is the same (320 acres), as well as, public interests: 100% working interest and 75% net royalty interest. Both formations are sweet.

Enclosed with this report are the C-107A, Downhole Commingling 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  
**Adrienne 6 Federal #1 - 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,

*Edward G. Fernandez*  
for Cody R. Layton  
Assistant Field Manager,  
Lands and Minerals

Enclosure

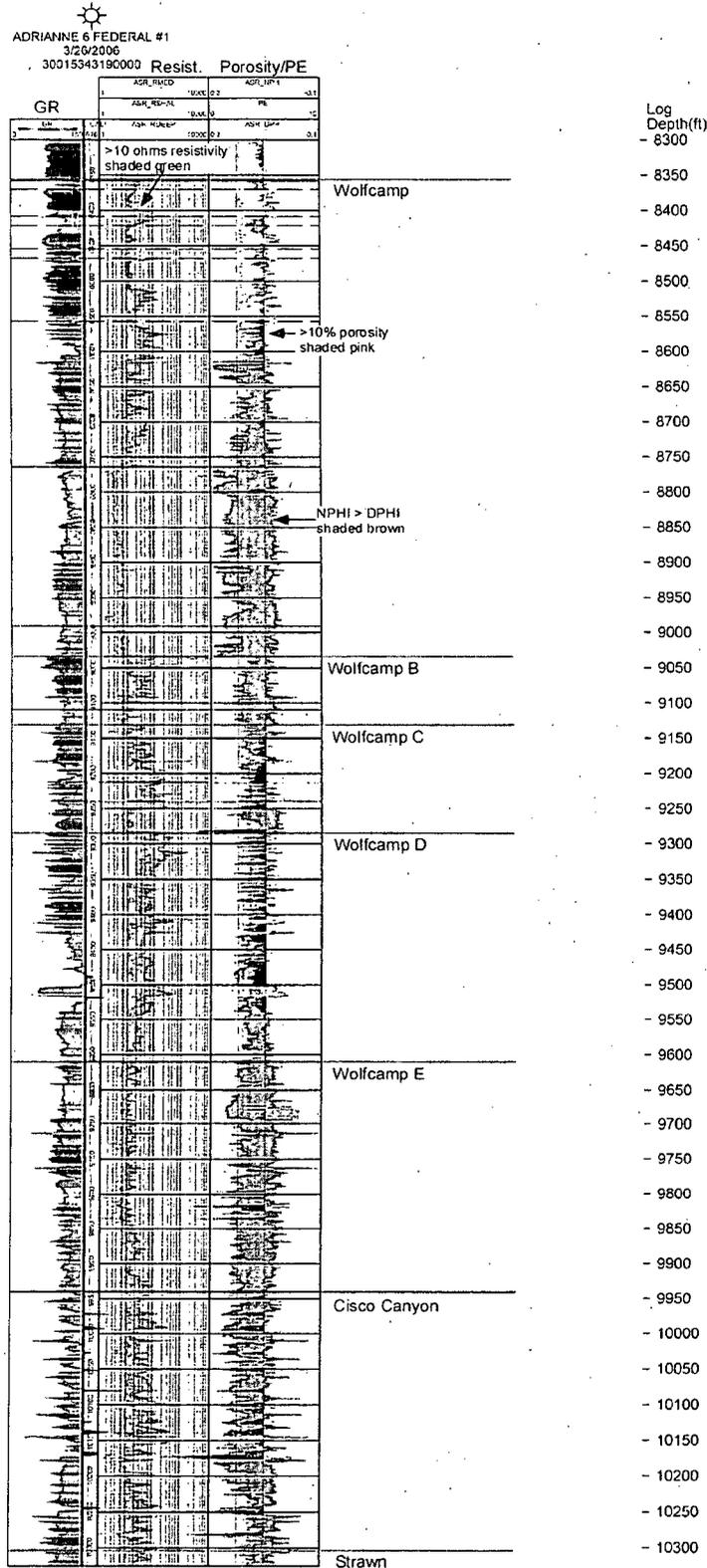
cc: NMP0220 (CFO I&E)



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Production Operations – Carlsbad Region, Permian Basin  
**Adrienne 6 Federal #1 - Cisco Canyon and Wolfcamp (Ciscamp)**  
Proposed Commingling Allocation Factors. Eddy County, NM

Appendix B: Log section from top of Wolfcamp to top of Strawn – ADRIANNE 6 FEDERAL #1



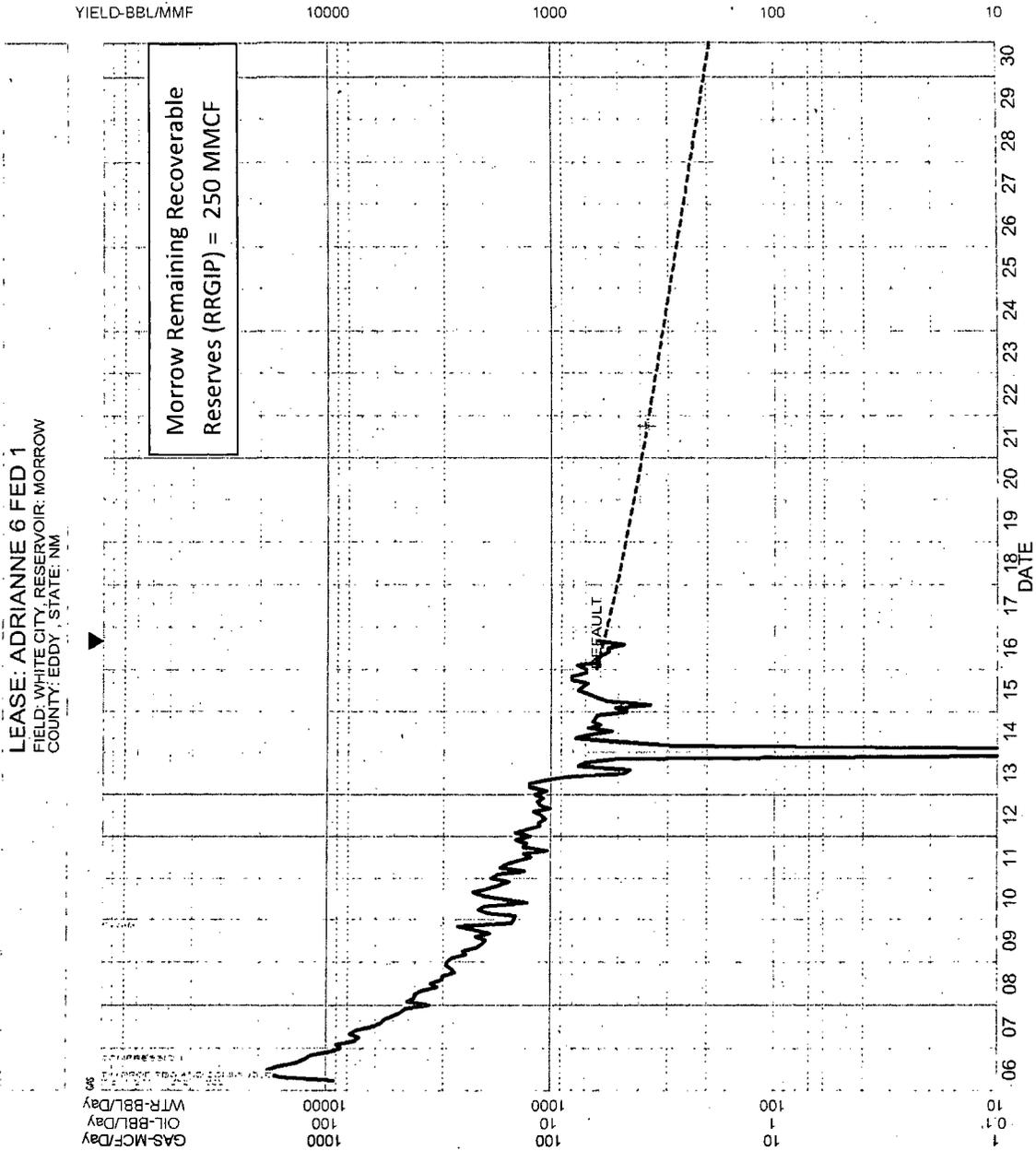


CONFIDENTIAL. September 21, 2016

Production Operations – Carlsbad Region, Permian Basin  
**Adrienne 6 Federal #1 - Cisco Canyon and Wolfcamp (Ciscamp)**  
 Proposed Commingling Allocation Factors. Eddy County, NM

**Appendix C: Recompletion Procedure – ADRIANNE 6 FEDERAL #1**

GAS-MCF	-----	DEFAULT	-----
Qval=	9/2016		
Ref=	1,070,363		
Cum=	257,043		
Rem=	1,327,407		
EUR=	38,583		
Yrs=	58.4		
Qj=	0.900000		
b=	9.827717		
De=	7.000000		
Dmin=	3.3		
Qab=			
WTR-BBL	-----	9/2016	-----
Ref=			3,074
Cum=			
OIL-BBL	-----	9/2016	-----
Ref=			0
Cum=			
YIELD-BBL/MM			●●●





**Appendix D: Recompletion Procedure – ADRIANNE 6 FEDERAL #1**

Well Data

KB	16' above GL
TD	12,235'
PBTD	12,130'
Casing	13-3/8" 48# H-40 csg @ 215'. Cmt'd w/ 260 sx, cmt circ. 9-5/8" 40# J-55 csg @ 1,915'. Cmt'd w/ 735 sx, cmt circ. 5-1/2" 17# P-110 @ 12,235'. Cmt'd w/ 1,060 sx. 1 <sup>st</sup> stage TOC 7,920' by CBL dated 3/2/2006. DV Tool @ 7,290' cmt'd w/ 980 sx, cmt circ.
Tubing	2-3/8" 4.7# L-80 8rd @ 11,250' (363 jts)
Prod. Perfs	Morrow (11,306' – 11,955')
Proposed Perfs	Wolfcamp (8,446' – 9,954') & Cisco Canyon (10,090' – 10,303')

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 5-1/2" x 2-3/8" Versa-set packer at 11,250' and TOO H w/ packer on 2-3/8" 4.7# L-80 tbg. Lay down tubing while TOO H.
6. RU Wireline and 5k short lubricator
7. RIH w/ gauge ring/junk basket to +/- 11,286'
8. RIH w/ 5-1/2" CIBP and set at +/- 11,256'
9. RIH w/ <sup>tubing</sup> bailer and <sup>pump 25sx</sup> bail 35' of cement on top of CIBP set at +/- 11,256'
10. RDMO Wireline and 5k short lubricator
11. RU pump truck
12. Pressure test 5-1/2" 17# P-110 casing to 8,500 psi (Max treating pressure, 80% of burst) for 30 minutes on a chart with no more than 10% leak off. **Note: Well has a 10k wellhead**
13. RD pump truck.
14. ND BOP, RU two 10k frac valves and flow cross, RDMO Pulling unit
15. MIRU water transfer with frac tanks to contain water to be pumped from frac pond
16. 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.



Production Operations – Carlsbad Region, Permian Basin  
**Adrienne 6 Federal #1 - Cisco Canyon and Wolfcamp (Ciscamp)**  
Proposed Commingling Allocation Factors. Eddy County, NM

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17. RU frac valves, flow cross, goat head, and wireline lubricator.
18. RIH w/ gauge ring/junk basket for 5-1/2" 17# P-110 csg to +/- 10,333'
19. Perforate stage one proposed perforations Cisco Canyon from 10,090' – 10,303'.  
Correlate to Dual Spaced Neutron Spectral Gamma Ray log dated 2/4/2006.
20. RU frac and flowback equipment.
21. Acidize and frac stage 1 Cisco Canyon perfs down casing.
22. Set 10k flow through composite plug at 10,075'
23. Test to 8,500 psi
24. Perforate stage two proposed perforations Wolfcamp from 9,738' – 9,954'.  
Correlate to Dual Spaced Neutron Spectral Gamma Ray log dated 2/4/2006.
25. Acidize and frac stage 2 Wolfcamp perfs down casing.
26. Set 10k flow through composite plug at 9,723'
27. Test to 8,500 psi
28. Perforate stage three proposed perforations Wolfcamp from 9,312' – 9,531'.  
Correlate to Dual Spaced Neutron Spectral Gamma Ray log dated 2/4/2006.
29. Acidize and frac stage 3 Wolfcamp perfs down casing.
30. Set 10k flow through composite plug at 9,297'
31. Test to 8,500 psi
32. Perforate stage four proposed perforations Wolfcamp from 9,136' – 9,244'.  
Correlate to Dual Spaced Neutron Spectral Gamma Ray log dated 2/4/2006.
33. Acidize and frac stage 4 Wolfcamp perfs down casing.
34. Set 10k flow through composite plug at 9,121'.
35. Test to 8,500 psi
36. Perforate stage five proposed perforations Wolfcamp from 8,446' – 8,641'. Correlate  
to Dual Spaced Neutron Spectral Gamma Ray log dated 2/4/2006.
37. Acidize and frac stage 5 Wolfcamp perfs down casing.
38. RD frac
39. MIRU 2" coiled tbg unit.
40. RIH w/ tri cone bit & 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.
41. Clean out to PBTB 11,221'
42. POOH w/ tri cone bit, motor & CT
43. RDMO coiled tbg unit.
44. Flow back well for 24 hours, then SI well overnight.
45. RU wireline and lubricator.
46. RIH w/ GR/JB for 5-1/2" 17# P-110 to +/- 8,426'
47. 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, 5-1/2" Arrowset  
1X packer and on-off tool stinger w/ 1.875" X profile nipple. Set packer +/- 8,396'.  
From downhole up:
  - a. 2-3/8" WEG



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Production Operations – Carlsbad Region, Permian Basin  
**Adrienne 6 Federal #1 - Cisco Canyon and Wolfcamp (Ciscamp)**  
*Proposed Commingling Allocation Factors. Eddy County, NM*

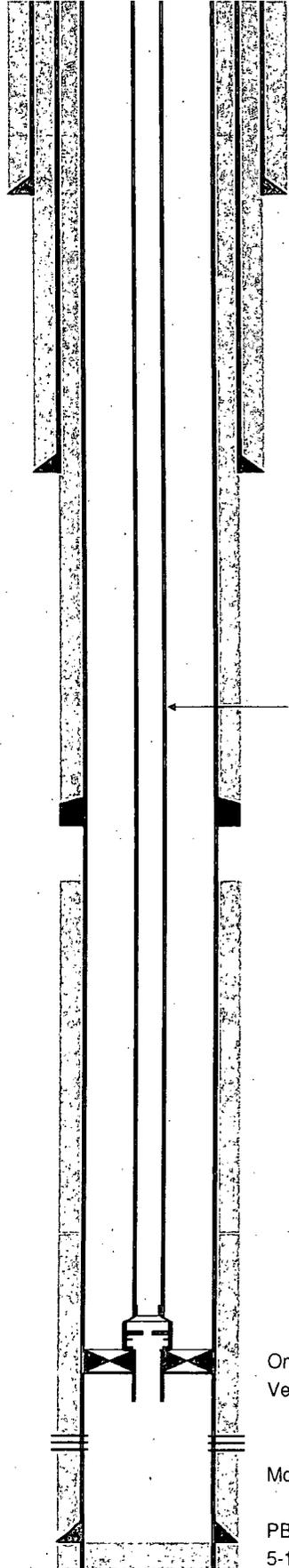
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- b. 2-3/8" pump out plug pinned for 1,500 – 2,000 psi differential pressure
  - c. 1.875" XN profile nipple w/ blanking plug
  - d. 10' 2-3/8" 4.7# L-80 tbg sub
  - e. 5-1/2" x 2-3/8" Arrowset 1X packer and on-off tool stinger w/ 1.875" X profile nipple
- 48. RD WL and lubricator.
  - 49. ND goat head and frac valve, NU BOP, MIRU Pulling Unit
  - 50. TIH w/ on/off tool overshot, GLVs, and 2-3/8" 4.7# L-80 tbg.
  - 51. Latch overshot onto on-off tool and space out tubing
  - 52. ND BOP, NU WH
  - 53. RDMO pulling unit
  - 54. RU pump truck and pump out plug. Put well on production.
  - 55. **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.**



Current WBD  
KB - 16' above GL

Cimarex Energy Co. of Colorado  
Adrienne 6 Federal #1  
SHL - 200' FNL & 1700' FWL  
BHL - 763' FNL & 863' FWL  
Sec. 6, T-25-S, R-26-E, Eddy Co., NM  
M. Karner 9/14/2016



13-3/8", 48# H-40 csg @ 215'  
cmtd w/ 260 sx, cmt circ

9-5/8", 40# J-55 csg @ 1915'  
cmtd w/ 735 sx, cmt circ

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

DV Tool @ 7290'  
cmtd w/ 980 sx, cmt circ

TOC 7,920' by CBL

On-off Tool w/ 1.81" Baker F Profile nipple @ 11243'  
Versa Set pkr @ 11250'

Morrow perfs (11,306' - 11,955')

PBTD @ 12130'  
5-1/2" 17# P-110 @ 12235' cmtd w/ 1060 sx, cmt circ  
TD @ 12235'



Proposed WBD  
KB - 16' above GL

Cimarex Energy Co. of Colorado

Adrienne 6 Federal #1

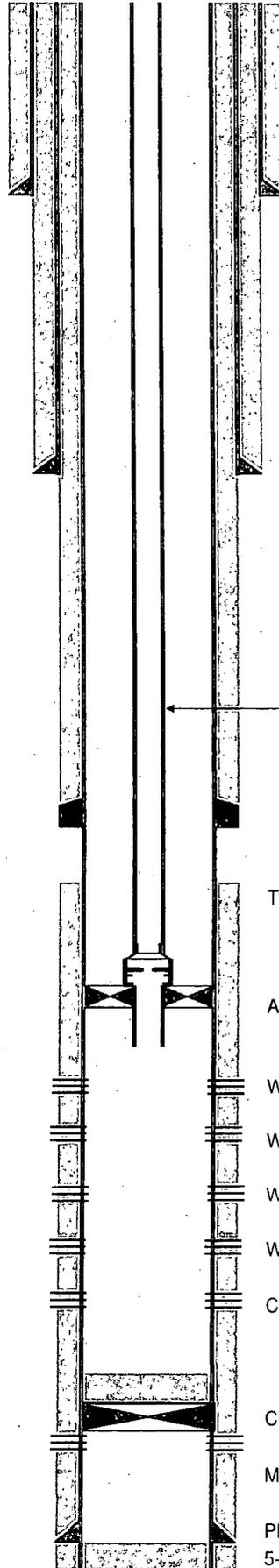
SHL - 200' FNL & 1700' FWL

BHL - 763' FNL & 863' FWL

Sec. 6, T-25-S, R-26-E, Eddy Co., NM

M. Karner

9/14/2016



13-3/8", 48# H-40 csg @ 215'  
cmtd w/ 260 sx, cmt circ

9-5/8", 40# J-55 csg @ 1915'  
cmtd w/ 735 sx, cmt circ

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

DV Tool @ 7290'  
cmtd w/ 980 sx, cmt circ

TOC 7,920' by CBL

AS-1X packer at +/- 8,396'

Wolfcamp perms (8,446 - 8,641')

Wolfcamp perms (9,136' - 9,244')

Wolfcamp perms (9,312' - 9,531')

Wolfcamp perms (9,738' - 9,954')

Cisco Canyon perms (10,090' - 10,303')

CIBP set at 11,256' with 35' of cement on top

Morrow perms (11,306' - 11,955')

PBTD @ 12130'

5-1/2" 17# P-110 @ 12235' cmtd w/ 1060 sx, cmt circ  
TD @ 12235'

Top of the Morrow  
10,815'



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.		Specific Gravity	
At 14.65 DRY	1219.2	Calculated	0.6973
At 14.65 WET	1197.9		
At 14.696 DRY	1223.0		
At 14.696 WET	1202.1	Molecular Weight	20.1966
At 14.73 DRY	1225.8		
At 14.73 Wet	1204.6		

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

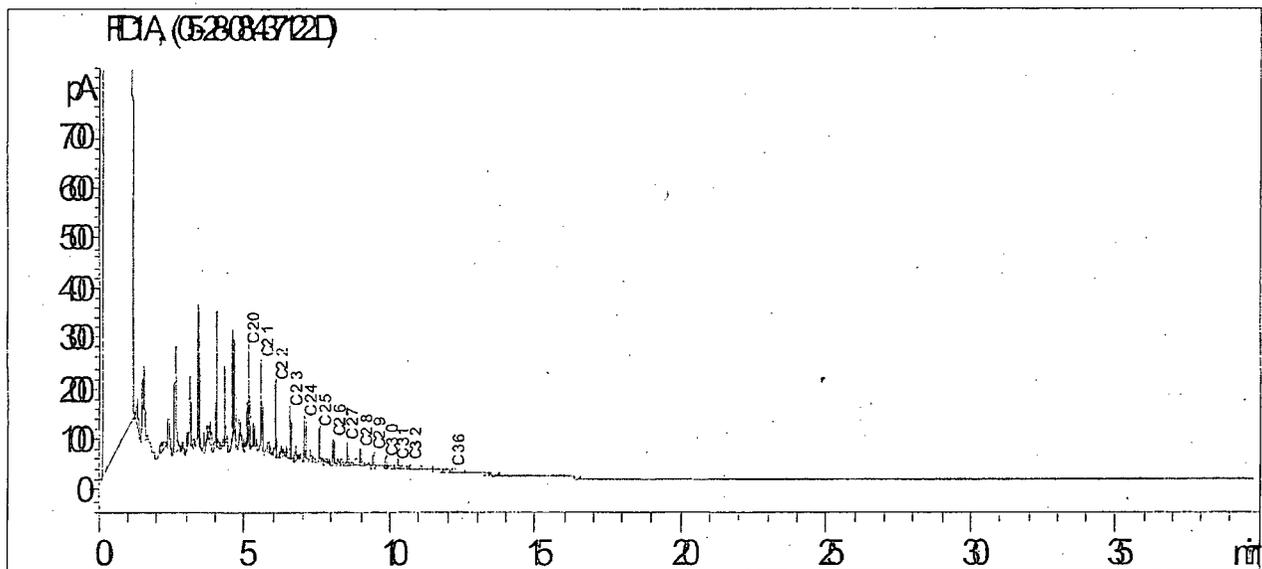
Lab Team Leader - Sheila Hernandez  
(432) 495-7240

## OIL ANALYSIS

Company:	CIMAREX ENERGY	Sales RDT:	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					
		Anions		Cations			
		mg/l	meq/l	mg/l	meq/l		
Sampling Date:	05/14/08	<b>Chloride:</b>	55040.0	1552.48	<b>Sodium:</b>	32207.4	1400.94
Analysis Date:	05/15/08	<b>Bicarbonate:</b>	329.4	5.4	<b>Magnesium:</b>	268.0	22.05
Analyst:	WAYNE PETERSON	<b>Carbonate:</b>	0.0	0.	<b>Calcium:</b>	2780.0	138.72
TDS (mg/l or g/m3):	90873.3	<b>Sulfate:</b>	225.0	4.68	<b>Strontium:</b>		
Density (g/cm3, tonne/m3):	1.062	Phosphate:			<b>Barium:</b>		
Anion/Cation Ratio:	1	Borate:			<b>Iron:</b>	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:		

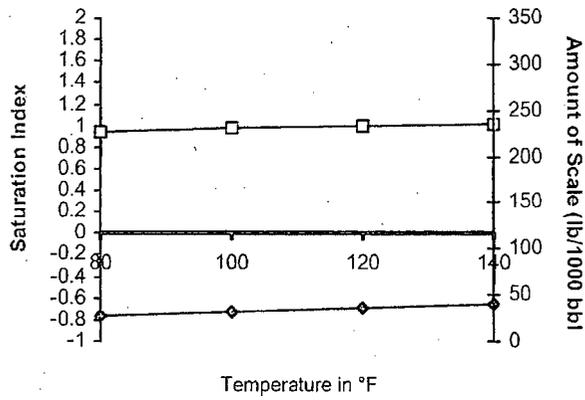
Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO <sub>3</sub>		Gypsum CaSO <sub>4</sub> ·2H <sub>2</sub> O		Anhydrite CaSO <sub>4</sub>		Celestite SrSO <sub>4</sub>		Barite BaSO <sub>4</sub>		CO <sub>2</sub> Press
		Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	
°F	psi											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.

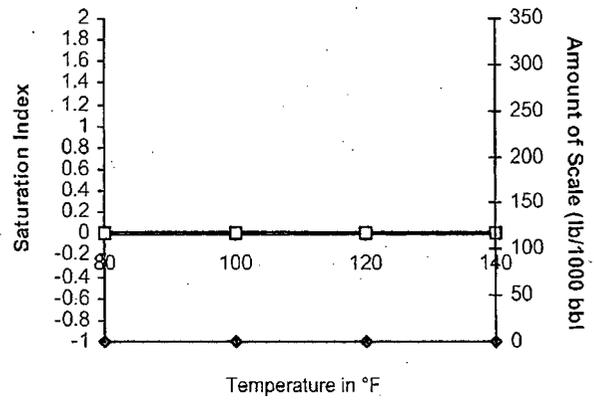
# Scale Predictions from Baker Petrolite

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

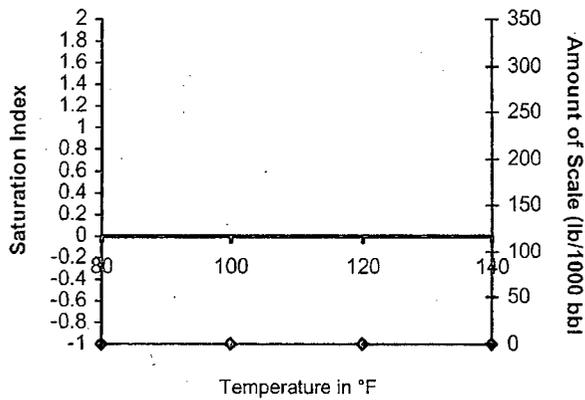
### Calcite - CaCO<sub>3</sub>



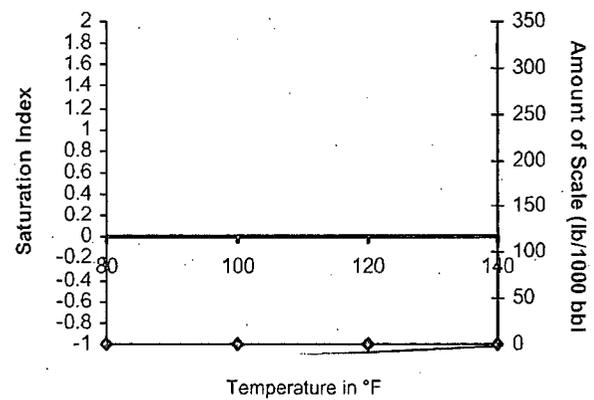
### Barite - BaSO<sub>4</sub>



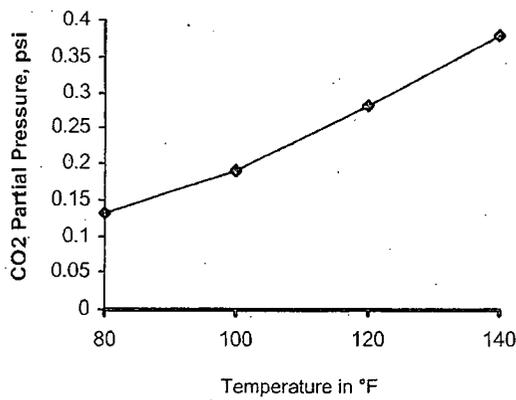
### Gypsum - CaSO<sub>4</sub>·2H<sub>2</sub>O



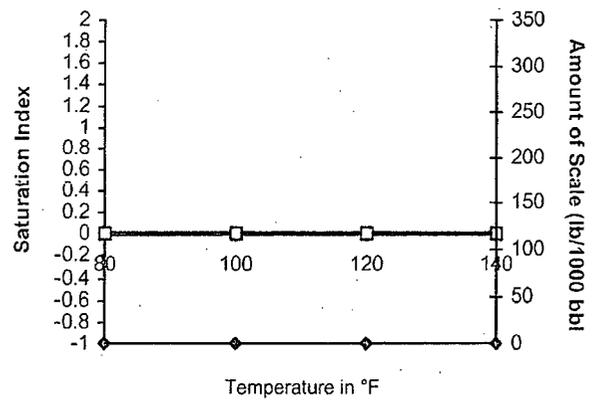
### Anhydrite - CaSO<sub>4</sub>



### Carbon Dioxide Partial Pressure



### Celestite - SrSO<sub>4</sub>





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+	0.439	0.190
		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

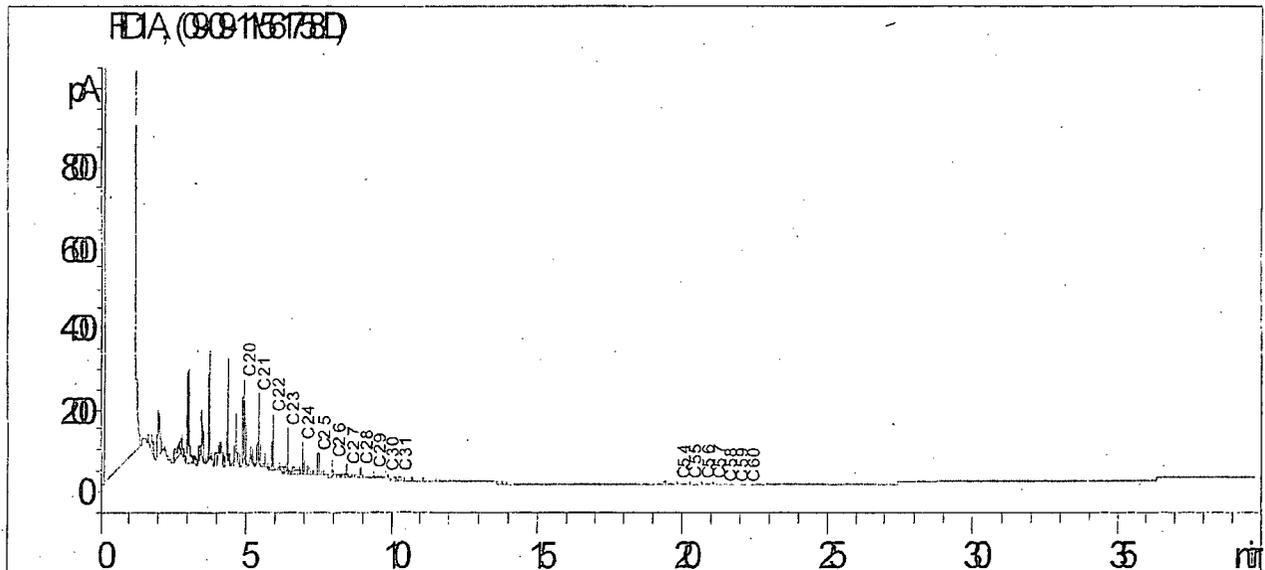
Lab Team Leader - Sheila Hernandez  
(432) 495-7240

## 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					
		Anions		Cations			
		mg/l	meq/l	mg/l	meq/l		
Sampling Date:	09/28/11	Chloride:	52535.0	1481.82	Sodium:	28338.7	1232.66
Analysis Date:	10/13/11	Bicarbonate:	146.0	2.39	Magnesium:	417.0	34.3
Analyst:	SANDRA GOMEZ	Carbonate:	0.0	0.	Calcium:	3573.0	178.29
TDS (mg/l or g/m3):	86836.7	Sulfate:	83.0	1.73	Strontium:	1472.0	33.6
Density (g/cm3, tonne/m3):	1.063	Phosphate:			Barium:	22.0	0.32
Anion/Cation Ratio:	1	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 <sub>3</sub>		Gypsum CaSO <sub>4</sub> *2H <sub>2</sub> O		Anhydrite CaSO <sub>4</sub>		Celestite SrSO <sub>4</sub>		Barite BaSO <sub>4</sub>		CO <sub>2</sub> Press
		Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	
F	psi											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.

Downhole Commingling Worksheet

Operator: Cimarex Energy Co Of Colorado  
 Lease/Well Name/API Number/Location: Adrienne 6 Fed 1/30-015-34319/Sec. 6, T25S, R26E  
 Date:

Data	Bottom Formation	Upper Formation	Estimated Combined Production Data
Pool name	White City; Penn (Gas)	Sage Draw; Wolfcamp, East (Gas)	
Pool Code	87280	96890	
State Form C-102 with dedicated Acres Provided	320 acres	320 acres	640 acres
Formation Name	Cisco Canyon	Wolfcamp	Ciscamp
Top and Bottom of Pay Section (perforated or open-hole interval)	10,090'-10,303'	8,446'-9,954'	8,446' - 10,303'
Method of production	Flowing	Flowing	Flowing
Bottom Hole Pressure	Within 150% of top perf	Within 150% of top perf	Within 150% of top perf
Reservoir Drive mechanism	Gas Drive	Gas Drive	Gas Drive
Oil gravity and/or BTU	Oil: 53.5° API Gas: 1142.4 BTU dry / 1122.6 BTU wet @ 14.73 psi	Oil: 51.8° API Gas: 1225.8 BTU dry / 1204.6 BTU wet @ 14.73 psi	Oil: 52.2° API Gas: 1207.5 BTU dry / 1186.6 BTU wet @ 14.7 psi
Average Sulfur Content (Wt. %)	0	0	0
Oil sample Analysis provided	Yes	Yes	
Gas Analysis provided	Yes	Yes	
Produce Water Analysis provided	Yes	Yes	
H2S present	No	No	No
Producing, Shut-in or New Zone	New Zone	New Zone	
Date and Oil/Gas/Water rates of Last Production (new zones or no production history Operator shall attached production estimated and supporting data)	Date: N/A Expected Rate: 12 BOPD, 406 MCFPD, 97 BWPD	Date: N/A Expected Rate: 43 BOPD, 1,439 MCFPD, 343 BWPD	Date: N/A Expected Rate: 55 BOPD, 1845 MCFD, 440 BWPD
Average decline % (provide back up data)	7% (terminal)	7% (terminal)	7% (terminal)
Fixed Allocation Percentage	Oil: 22% Gas: 22%	Oil: 78% Gas: 78%	Oil: 100% Gas: 100%

Remarks: Production history for analogs for both zones provided in field study appendix.

Operator Signature: *Anthony Crawford*  
 Date: 9/27/2016

Attached Supporting documents  
 State Form C-102 with dedicated Acres Provided  
 Oil sample Analysis provided (Must be current)  
 Gas Analysis provided (Must be current)  
 Produce Water Analysis provided (Must be current)  
 Any additional supporting data (i.e. offset well production and decline curves etc.)  
 \*Utilize weighted average.

BUREAU OF LAND MANAGEMENT  
Carlsbad Field Office  
620 East Greene Street  
Carlsbad, New Mexico 88220  
575-234-5972

**Permanent Abandonment of Production Zone Conditions of Approval**

Failure to comply with the following Conditions of Approval may result in a Notice of Incidents of Noncompliance (INC) in accordance with 43 CFR 3163.1.

1. Plug back operations shall commence within **ninety (90)** days from this approval. **If you are unable to plug back the well by the 90<sup>th</sup> day provide this office, prior to the 90<sup>th</sup> day, with the reason for not meeting the deadline and a date when we can expect the well to be plugged back. Failure to do so will result in enforcement action.**

2. **Notification: Contact the appropriate BLM office at least 24 hours prior to the commencing of any plug back operations. For wells in Eddy County, call 575-361-2822. For wells in Lea County, call 575-393-3612**

3. **Blowout Preventers:** A blowout preventer (BOP), as appropriate, shall be installed before commencing any plugging operation. The BOP must be installed and maintained as per API and manufacturer recommendations. The minimum BOP requirement is a 2M system for a well not deeper than 9,090 feet; a 3M system for a well not deeper than 13,636 feet; and a 5M system for a well not deeper than 22,727 feet.

4. **Mud Requirement:** Mud shall be placed between all plugs. Minimum consistency of plugging mud shall be obtained by mixing at the rate of 25 sacks (50 pounds each) of gel per 100 barrels of brine water. Minimum nine (9) pounds per gallon.

5. **Cement Requirement:** Sufficient cement shall be used to bring any required plug to the specified depth and length. Any given cement volumes on the proposed plugging procedure are merely estimates and are not final. Unless specific approval is received, no plug except the surface plug shall be less than 25 sacks of cement. Any plug that requires a tag will have a minimum WOC time of 4 hours.

In lieu of a cement plug across perforations in a cased hole (not for any other plugs), a bridge plug set within 50 feet to 100 feet above the perforations shall be capped with 25 sacks of cement.

**Before pumping cement on top of CIBP, tag will be required to verify depth. Based on depth, a tag of the cement may be deemed necessary.**

Unless otherwise specified in the approved procedure, the cement plug shall consist of either **Neat Class "C"**, for up to 7,500 feet of depth or **Neat Class "H"**, for deeper than 7,500 feet plugs.

6. **Subsequent Plug back Reporting:** Within 30 days after plug back work is completed, file one original and three copies of the Subsequent Report, Form 3160-5 to BLM. The report should give in detail the manner in which the plug back work was carried out, the extent (by depths) of cement plugs placed, and the size and location (by depths) of casing left in the well. **Show date work was completed.** If plugging back to a new zone submit a Completion Report, form 3160-4 with the Subsequent Report.

7. **Trash:** All trash, junk and other waste material shall be contained in trash cages or bins to prevent scattering and will be removed and deposited in an approved sanitary landfill. Burial on site is not permitted.