

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

OCD Artesia

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.*

5. Lease Serial No. NMNM41645
6. If Indian, Allottee or Tribe Name
7. If Unit or CA/Agreement, Name and/or No. SCR330
8. Well Name and No. FEDERAL 13 COM 4
9. API Well No. 30-015-34199-00-S1
10. Field and Pool, or Exploratory WHITE CITY
11. County or Parish, and State EDDY COUNTY, NM

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

1. Type of Well <input type="checkbox"/> Oil Well <input checked="" type="checkbox"/> Gas Well <input type="checkbox"/> 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 13 T25S R26E SWNE 1620FNL 1400FEL	

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. Cimarex also proposes to downhole commingle production from the Cisco Canyon and Wolfcamp zones. Please see attached recompletion procedure for your review and approval.

**NM OIL CONSERVATION**  
ARTESIA DISTRICT

SEP 26 2016

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

DHC with the NMOCD has been submitted. NMOCD DHC-4795

Attachments:

**SEE ATTACHED FOR RECEIVED  
CONDITIONS OF APPROVAL**

14. I hereby certify that the foregoing is true and correct. Electronic Submission #351026 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 09/15/2016 (16DLM0903SE)	
Name (Printed/Typed) AMITHY E CRAWFORD	Title REGULATORY ANALYST
Signature (Electronic Submission)	Date 09/13/2016

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

Approved By <u>CHARLES NIMMER</u>	Title <u>PETROLEUM ENGINEER</u>	Date <u>09/21/2016</u>
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 <u>Carlsbad</u>

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.

**Additional data for EC transaction #351026 that would not fit on the form**

**32. Additional remarks, continued**

C102s, Recompletion and commingling Procedure, Current & Proposed wellbore Schematic, oil/water/gas analysis, and commingling worksheet form.



CONFIDENTIAL. August 18, 2016

Production Operations – Carlsbad Region, Permian Basin  
**Federal 13 Com #4 - Cisco Canyon and Wolfcamp (Ciscamp)**  
**Proposed Commingling Allocation Factors. Eddy County, NM**

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## 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 **Federal 13 Com #4** well (API: 30-015-34199).

The proposed “allocation factors” have been estimated following BLM’s approved allocation methodology submitted by Cimarex in the *2016 Downhole Commingling Field Study “Cisco Canyon and Wolfcamp (Ciscamp) Commingled Allocation Assessment in White City, Eddy County, NM”* (NMP0220), approved July 6, 2016 (Appendix A). Based on this approach and the assessment of subsurface data, the recommended initial allocation factors are **81%** for the Wolfcamp and **19%** for the Cisco Canyon.

Support evidence for this application is included herein, which include reserves estimation for each proposed formation, a log section (Appendix B), and net pay petrophysical assessment.

## Proposed Recompletion

Cimarex plans to recomplete the **Federal 13 Com #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 Field Study) and is currently completed in the Morrow formation. The well has produced approximately 926 MMCF of gas and has is reaching the end of life. The company plans to abandon the Morrow zone under a cast-iron bridge plug and 35 ft. of cement.

The proposed Ciscamp recompletion will be performed with a *3-stage frac job*, one of which will be in the Cisco Canyon. The plan is to downhole commingle both production streams immediately after completion to allow more efficient artificial lift and faster frac flowback recovery. The synergy between both Ciscamp streams has shown in analog wells to significantly improve liquid unloading by maintaining higher and more stable critical velocities for an extended period. This in turn minimizes formation damage and increases recovery by extending the life of the well.

A detailed recompletion and workover procedure is included in Appendix C.

## Proposed Initial Production Allocation Factors

Based on the referenced BLM’s approved Allocation Methodology and the assessment of reservoir rock and fluids data, the “Initial Allocation Factors” for the New Completion Zones in subject well are estimated as follows:



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

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

The Recoverable Gas in Place (RGIP) for subject well is **1,501 MMCF** from the Wolfcamp BCD and **363 MMCF** from the Cisco Canyon, for a total of **1,864 MMCF of gas** (see Table 1). In this case, the proposed commingling intervals have never been produced in this well (no prior cumulative production), therefore Remaining RGIP or RRGIP = RGIP for both formations.

The resulting proposed allocation factors are calculated as follows:

$$\text{Wolfcamp \% Alloc. Factor} = \frac{1,501 \text{ MMCF}}{1,864 \text{ MMCF}} = 81\%$$

$$\text{Cisco Canyon \% Alloc. Factor} = \frac{363 \text{ MMCF}}{1,864 \text{ MMCF}} = 19\%$$

The RGIP for each zone is estimated using the Hydrocarbon Pore Volume (HCPV) calculations and 85% recovery factor; as shown in Table 1. The implemented net pay cut-offs are Average Porosity (PHIa) > 10% and Average Sw < 25%.

**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 to Date, MMCF	Remaining RGIP (RRGIP), MMCF	Initial Alloc. Factor, % (based on RRGIP Ratio)
Wolfcamp BCD	9,503	4,134	185	13.4%	18.8%	20.1	1,766	85%	1,501		-	1,501	81%
Cisco Canyon	10,245	4,457	39	14.3%	16.3%	4.7	427	85%	363		-	363	19%
<b>Total:</b>			<b>224.0</b>			<b>24.8</b>	<b>2,193</b>	<b>85%</b>	<b>1,864</b>			<b>1,864</b>	<b>100%</b>

Total associated oil and NGL reserves are 56 MBO and nearly 100 MBbls of NGL respectively. In this case, the well spacing for both formations is the same (320 acres), as well as, public interests: 100% working interest and 77.50% net royalty 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, and field study.



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Production Operations – Carlsbad Region, Permian Basin  
**Federal 13 Com #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.

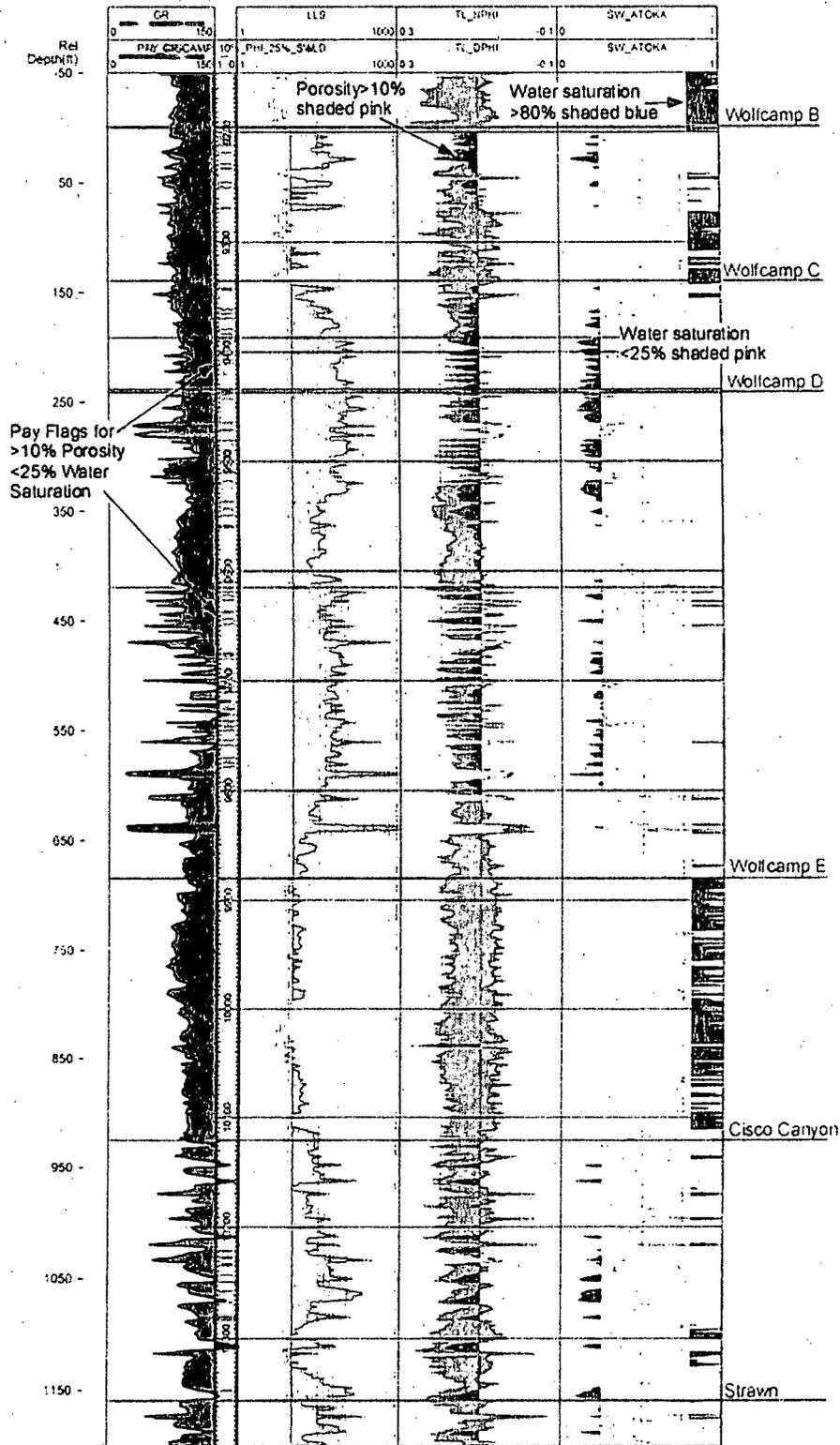
Sincerely,

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

Enclosure  
cc: NMP0220 (CFO I&E)



Appendix B: Log Section from top of Wolfcamp B to Strawn - Federal 13 Com #4





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Production Operations – Carlsbad Region, Permian Basin  
**Federal 13 Com #4 - Cisco Canyon and Wolfcamp (Ciscamp)**  
*Proposed Commingling Allocation Factors. Eddy County, NM*

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**Appendix C: Recompletion Procedure – Federal 13 Com 4**

**Well Data**

KB	19' above GL
TD	12,373'
PBTD	11,545'
Casing	13-3/8" 48# H-40 csg @ 209'. Cmt'd w/ 230 sx, cmt circ. 9-5/8" 40# J-55 csg @ 3,000'. Cmt'd w/ 940 sx, cmt circ. 5-1/2" 17# P-110 @ 12,358'. Cmt'd w/ 955 sx. 1 <sup>st</sup> stage Cmt circ. DV Tool @ 8,027' cmt'd w/ 1,230 sx, TOC in 2 <sup>nd</sup> stage @ 1,700' by CBL dated 11/30/05. CBL confirms cmt reaches DV tool in 1 <sup>st</sup> stage.
Tubing	2-7/8" 6.5# L-80 8rd @ ± 11,485' (370 jts)
Prod. Perfs	Morrow (11,493' – 11,509')
Proposed Perfs	Wolfcamp (9,362' – 9,839') & Cisco Canyon (10,143' – 10,352')

**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. TOOH w/ 2-7/8" 6.5# L-80 tbg. Stand back tubing.  
Note: No packer in well
6. RU Wireline and 5k short lubricator
7. RIH w/ gauge ring/junk basket to +/- 11,463'
8. RIH w/ 5-1/2" CIBP and set at +/- 11,443'
9. RIH w/ <sup>Tubing</sup> ~~barrier~~ and <sup>pump 250'</sup> ~~set~~ 35' of cement on top of CIBP set at +/- 11,443'
10. RDMO Wireline and 5k short lubricator
11. RU 10k Guardian stage tool and stroke through 5k wellhead to isolate wellhead.
12. RU pump truck
13. 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.
14. RD 10k Guardian stage tool and pump truck.
15. TIH w/ 2-7/8" 6.5# L-80 tbg
16. TOOH w/ 2-7/8" 6.5# L-80 tbg laying down tbg.



Production Operations – Carlsbad Region, Permian Basin  
**Federal 13 Com #4 - Cisco Canyon and Wolfcamp (Ciscamp)**  
Proposed Commingling Allocation Factors. Eddy County, NM

- 17. ND BOP, RU two 10k frac valves and flow cross, RDMO Pulling unit
- 18. MIRU water transfer with frac tanks to contain water to be pumped from frac pond
- 19. 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.
- 20. RU w frac valves, flow cross, Guardian Stage tool, goat head, and wireline lubricator. Stroke 10k Guardian stage tool through both frac valves, and flow cross. **Note: a 24" extension will be necessary for 10k stage tool to isolate B Section of 5k wellhead through both frac valves and flow cross.**
- 21. RIH w/ gauge ring/junk basket for 5-1/2" 17# P-110 csg to +/- 10,372'
- 22. Perforate stage one Cisco Canyon as per perforation design below. Correlate to Dual Spaced Neutron Spectral Gamma Ray log dated 11/6/2005.

Frac Stage	Formation	TOP	BASE	Interval, ft	No. of Shots/ft (SPF)	Number of Holes
<b>Stage 1</b>	Cisco Canyon	10,157	10,159	2	3	6
		10,207	10,209	2	3	6
		10,228	10,230	2	3	6
		10,244	10,246	2	3	6
		10,263	10,265	2	3	6
		10,306	10,308	2	3	6
		10,349	10,351	2	3	6
<b>Stage 1 Sub-Totals:</b>				<b>14</b>		<b>42</b>

**Note: Monitor 9-5/8" x 5-1/2" annulus throughout entire frac job with pressure transducer. If any unexpected pressure is seen on annulus shut down and contact office for go forward procedure.**

- 23. RU frac and flowback equipment.
- 24. Acidize and frac stage 1 Cisco Canyon perms down casing.
- 25. Set 10k flow through composite plug at 10,107'
- 26. Test to 8,500 psi



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27. Perforate stage two Wolfcamp as per perforation design below. Correlate to Dual Spaced Neutron Spectral Gamma Ray log dated 11/6/2005.

Frac Stage	Formation	TOP	BASE	Interval, ft	No. of Shots/ft (SPF)	Number of Holes
Stage 2	WOLFCAMP D	9,643	9,645	2	3	6
		9,664	9,666	2	3	6
		9,692	9,694	2	3	6
		9,712	9,714	2	3	6
		9,750	9,752	2	3	6
		9,784	9,786	2	3	6
		9,833	9,835	2	3	6
<b>Stage 2 Sub-Totals:</b>				<b>14</b>		<b>42</b>

**Note: Monitor 9-5/8" x 5-1/2" annulus throughout entire frac job with pressure transducer. If any unexpected pressure is seen on annulus shut down and contact office for go forward procedure.**

28. Acidize and frac stage 2 Wolfcamp perms down casing.  
 29. Set 10k flow through composite plug at 9,593'  
 30. Test to 8,500 psi  
 31. Perforate stage three Wolfcamp as per perforation design below. Correlate to Dual Spaced Neutron Spectral Gamma Ray log dated 11/6/2005.

Frac Stage	Formation	TOP	BASE	Interval, ft	No. of Shots/ft (SPF)	Number of Holes
Stage 3	WOLFCAMP C	9,372	9,374	2	3	6
		9,390	9,392	2	3	6
		9,415	9,417	2	3	6
		9,438	9,440	2	3	6
		9,465	9,467	2	3	6
		9,505	9,507	2	3	6
		9,524	9,526	2	3	6
<b>Stage 3 Sub-Totals:</b>				<b>14</b>		<b>42</b>



Production Operations – Carlsbad Region, Permian Basin  
**Federal 13 Com #4 - Cisco Canyon and Wolfcamp (Ciscamp)**  
Proposed Commingling Allocation Factors. Eddy County, NM

**Note: Monitor 9-5/8" x 5-1/2" annulus throughout entire frac job with pressure transducer. If any unexpected pressure is seen on annulus shut down and contact office for go forward procedure.**

- 32. Acidize and frac stage 3 Wolfcamp perms down casing.
- 33. Set 10k flow through composite plug at 9,322'
- 34. Test to 8,500 psi
- 35. Perforate stage four Wolfcamp as per perforation design below. Correlate to Dual Spaced Neutron Spectral Gamma Ray log dated 11/6/2005.

Frac Stage	Formation	TOP	BASE	Interval, ft	No. of Shots/ft (SPF)	Number of Holes
Stage 4	WOLFCAMP B	9,202	9,204	2	3	6
		9,210	9,212	2	3	6
		9,218	9,220	2	3	6
		9,223	9,225	2	3	6
		9,231	9,233	2	3	6
		9,246	9,248	2	3	6
		9,266	9,268	2	3	6
<b>Stage 4 Sub-Totals:</b>				<b>14</b>		<b>42</b>

**Note: Monitor 9-5/8" x 5-1/2" annulus throughout entire frac job with pressure transducer. If any unexpected pressure is seen on annulus shut down and contact office for go forward procedure.**

- 36. RD frac
- 37. MIRU 2" coiled tbg unit.
- 38. RIH w/ tri cone bit & extreme downhole motor on 2" CT and drill out sand and composite plugs using freshwater for circulation. Make a minimum of 2 gel sweeps while drilling out composite plugs.
- 39. Clean out to PBSD 11,408'
- 40. POOH w/ tri cone bit, motor & CT
- 41. RDMO coiled tbg unit.
- 42. Flow back well for 24 hours, then SI well overnight.
- 43. RU wireline and lubricator.
- 44. RIH w/ GR/JB for 5-1/2" 17# P-110 to +/- 9,172'
- 45. RIH w/ 2-7/8" WEG, 2-7/8" pump out plug pinned for 1,500 – 2,000 psi differential pressure, 10' 2-7/8" 6.5# 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 +/- 9,152'. From downhole up:



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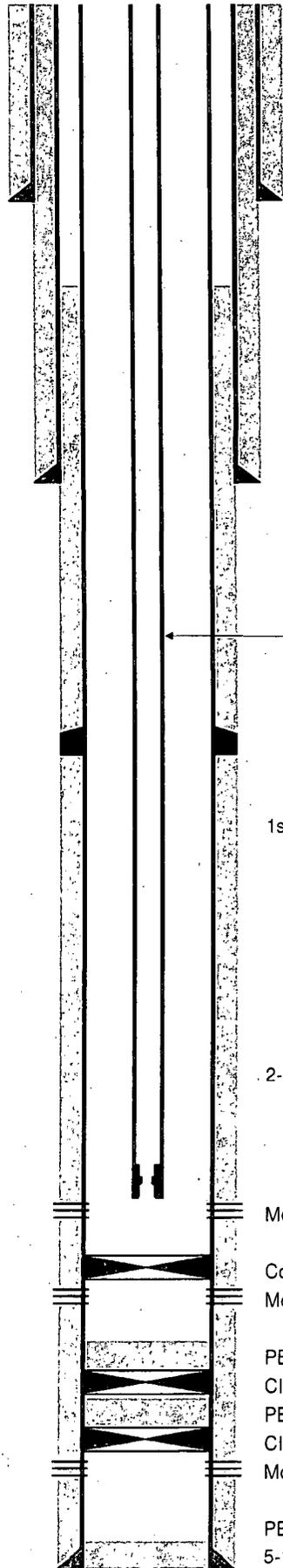
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- a. 2-7/8" WEG
  - b. 2-7/8" pump out plug pinned for 1,500 – 2,000 psi differential pressure
  - c. 1.875" XN profile nipple w/ blanking plug
  - d. 10' 2-7/8" 6.5# L-80 tbg sub
  - e. 7" x 2-7/8" Arrowset 1X packer and on-off tool stinger w/ 1.875" X profile nipple
46. RD WL and lubricator.
  47. ND goat head and frac valve, NU BOP, MIRU Pulling Unit
  48. TIH w/ on/off tool overshot, GLVs, and new 2-7/8" 6.5# L-80 tbg.
  49. Latch overshot onto on-off tool and space out tubing
  50. ND BOP, NU WH
  51. RDMO pulling unit
  52. RU pump truck and pump out plug. Put well on production.
  53. **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 - 19' above GL

Cimarex Energy Co. of Colorado  
Federal 13 Com #4  
1620' FNL & 1400' FEL  
Sec. 13, T-25-S, R-26-E, Eddy Co., NM  
M. Karner  
4/28/2016



13-3/8", 48# H-40 csg @ 209'  
cmtd w/ 230 sx, cmt circ

TOC @ 1700' by CBL

9-5/8", 40# J-55 csg @ 3000'  
cmtd w/ 940 sx, cmt circ

371 jts 2-7/8" 6.5# L-80 Tbg

DV Tool @ 8027'  
cmtd w/ 1230 sx

1st stage cmt job reaches DV tool as per CBL

2-7/8" SN @ 11,485'

Morrow perms (11493' - 11509')

Composite BP @ 11545'  
Morrow perms (11577' - 11585')

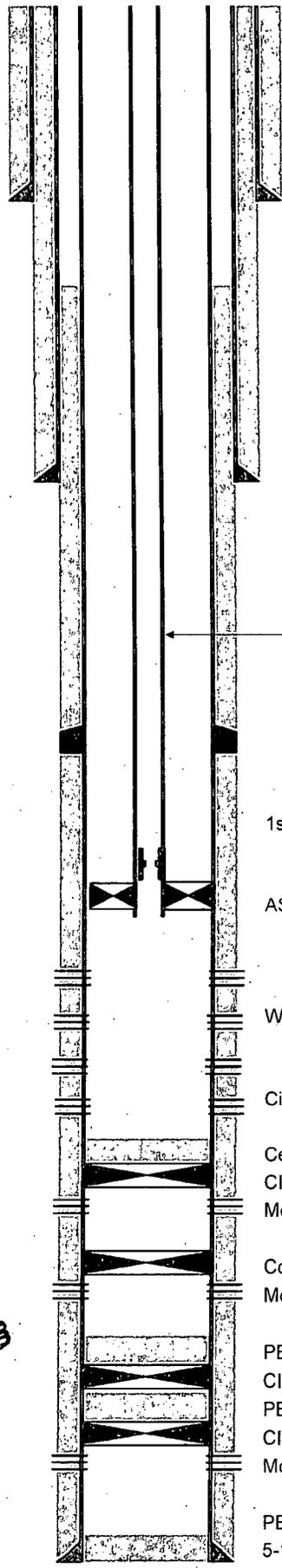
PBTD @ 11635'  
CIBP @ 11645'  
PBTD @ 11680'  
CIBP @ 11690'  
Morrow perms (11731' - 11754')

PBTD @ 12244'  
5-1/2" 17# P-110 @ 12358' cmtd w/ 955 sx, cmt circ  
TD @ 12373'



Proposed WBD  
KB - 19' above GL

Cimarex Energy Co. of Colorado  
Federal 13 Com #4  
1620' FNL & 1400' FEL  
Sec. 13, T-25-S, R-26-E, Eddy Co., NM  
M. Karner 8/21/2016



13-3/8", 48# H-40 csg @ 209'  
cmtd w/ 230 sx, cmt circ

TOC @ 1700' by CBL

9-5/8", 40# J-55 csg @ 3000'  
cmtd w/ 940 sx, cmt circ

371 jts 2-7/8" 6.5# L-80 Tbg

DV Tool @ 8027'  
cmtd w/ 1230 sx

1st stage cmt job reaches DV tool as per Radial CBL 11/30/05

AS-1X Packer @ +/- 9,152'

Wolfcamp perfs (9,202-9,268', 9,372'-9,526' & 9,643'-9,835')

Cisco Canyon perfs (10,157'-10,351')

Cement plug from 11,228'-11,443'  
CIBP set at +/- 11,443'  
Morrow perfs (11493' - 11509')

Composite BP @ 11545'  
Morrow perfs (11577' - 11585')

PBTD @ 11635'  
CIBP @ 11645'  
PBTD @ 11680'  
CIBP @ 11690'  
Morrow perfs (11731' - 11754')

PBTD @ 12244'  
5-1/2" 17# P-110 @ 12358' cmtd w/ 955 sx, cmt circ  
TD @ 12373'

Top of Morrow 11,158



# 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+	0.624	0.270
		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

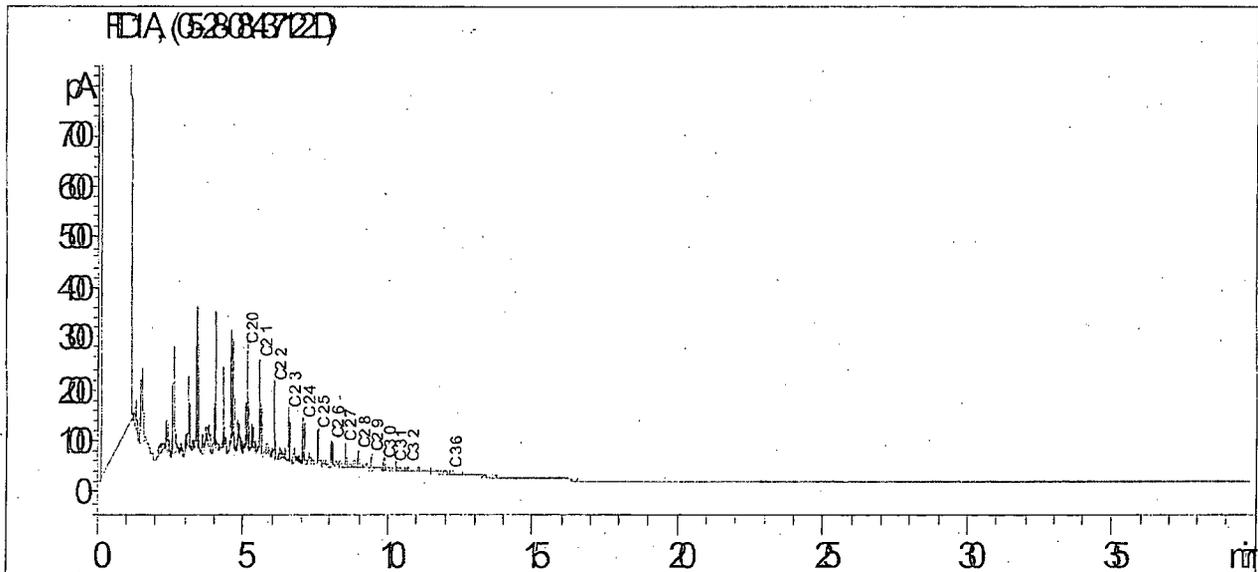
Lab Team Leader - Sheila Hernandez  
(432) 495-7240

## 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	mg/l	meq/l	Cations	mg/l	meq/l
Sampling Date:	05/14/08	Chloride:	55040.0	1552.48	Sodium:	32207.4	1400.94
Analysis Date:	05/15/08	Bicarbonate:	329.4	5.4	Magnesium:	268.0	22.05
Analyst:	WAYNE PETERSON	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:		

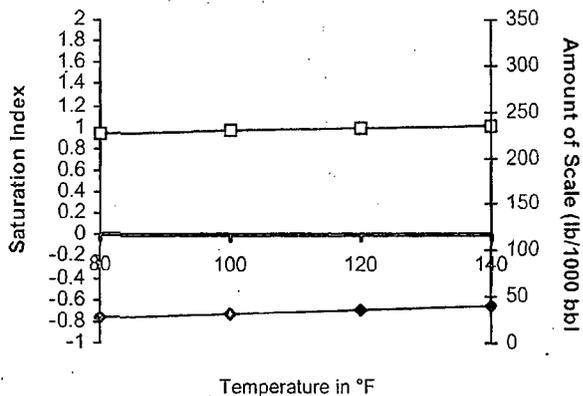
Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO <sub>3</sub>		Gypsum CaSO <sub>4</sub> ·2H <sub>2</sub> O		Anhydrite CaSO <sub>4</sub>		Celestite SrSO <sub>4</sub>		Barite BaSO <sub>4</sub>		CO <sub>2</sub> Press
		Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	
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 CO<sub>2</sub> pressure is actually the calculated CO<sub>2</sub> fugacity. It is usually nearly the same as the CO<sub>2</sub> partial pressure.

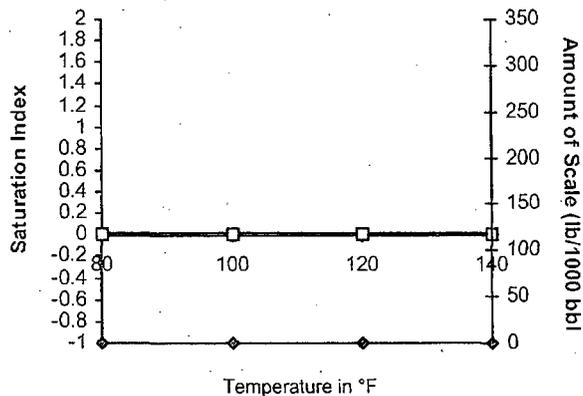
# Scale Predictions from Baker Petrolite

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

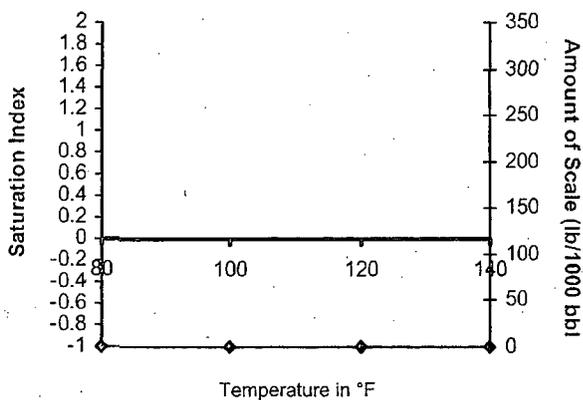
### Calcite - CaCO3



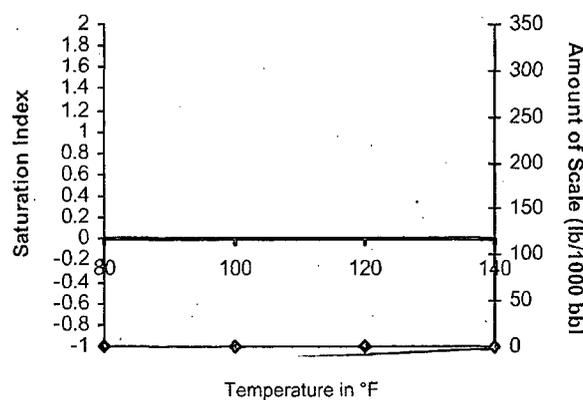
### Barite - BaSO4



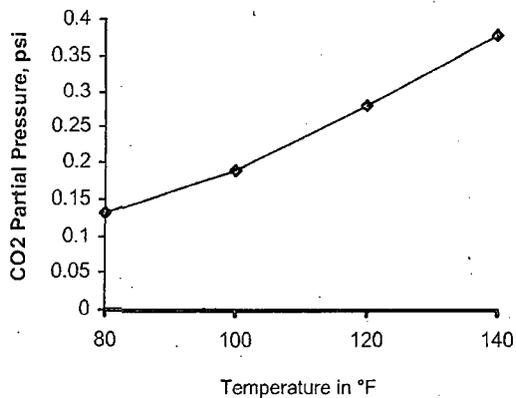
### Gypsum - CaSO4\*2H2O



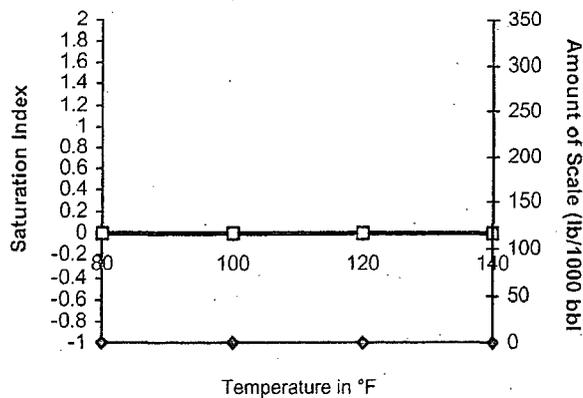
### Anhydrite - CaSO4



### Carbon Dioxide Partial Pressure



### Celestite - SrSO4





# 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+	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		

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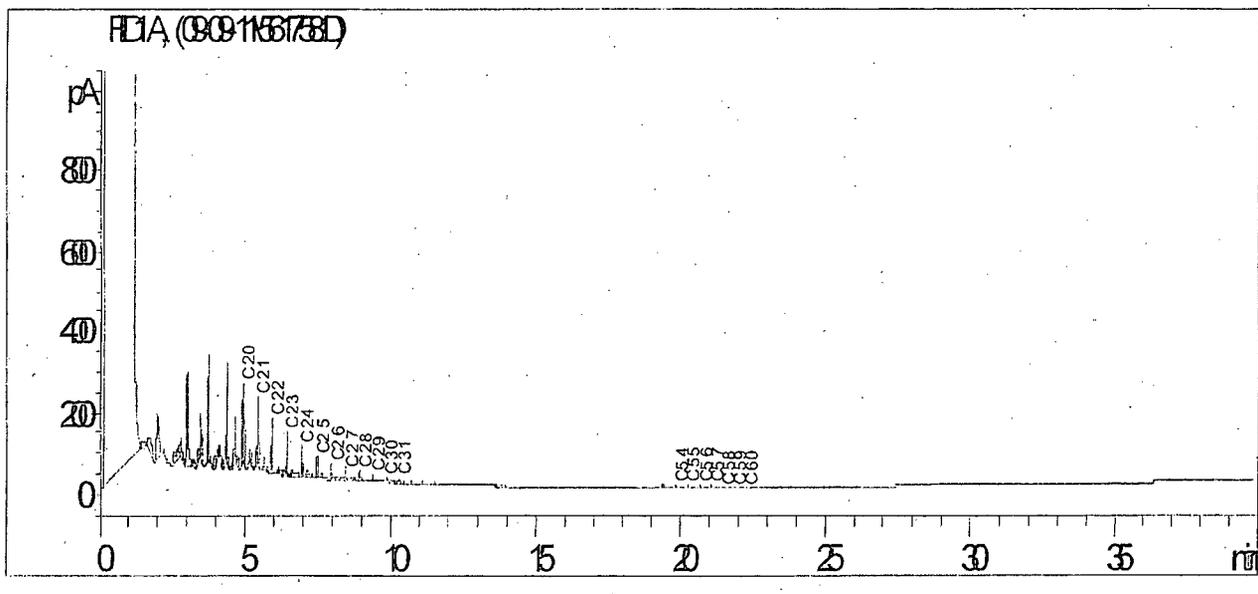
Lab Team Leader - Sheila Hernandez  
(432) 495-7240

## 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.



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## 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 GÓMEZ	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
Carbon Dioxide:	150 PPM	Silicate:			Potassium:	215.0	5.5
Oxygen:		Hydrogen Sulfide:		0 PPM	Aluminum:		
Comments:		pH at time of sampling:		6	Chromium:		
RESISTIVITY 0.083 OHM-M @ 75°F		pH at time of analysis:			Copper:		
		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	
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.

**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.