

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENTNMOCD  
ArtesiaFORM APPROVED  
OMB NO. 1004-0137  
Expires: January 31, 2018**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.  
NMNM19423

6. If Indian, Allottee or Tribe Name

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

**SUBMIT IN TRIPLICATE - Other instructions on page 2**

1. Type of Well

☐ Oil Well ☒ Gas Well ☐ Other8. Well Name and No.  
WHITE CITY 14 1

2. Name of Operator

CIMAREX ENERGY COMPANY OF CO

Contact: AMITHY CRAWFORD

E-Mail: acrawford@cimarex.com

9. API Well No.

30-015-24865-00-S1

3a. Address

202 S CHEYENNE AVE SUITE 1000  
TULSA, OK 74103.4346

3b. Phone No. (include area code)

Ph: 432.620.1909

10. Field and Pool or Exploratory Area  
WHITE CITY WOLFCAMP

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)

Sec 14 T25S R26E SWNE 1650FNL 1650FEL

11. County or Parish, State

EDDY COUNTY, NM

**12. CHECK THE 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"/> Hydraulic Fracturing	<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 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 checked="" 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 recompleat 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 must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompleat in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must 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 Atoka formation and recompleat into the Cisco Canyon and Wolfcamp formation. Cimarex also proposes to downhole commingle production from the Cisco Canyon and Wolfcamp Zones. Please see attached recompleat procedure for your review and approval.

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

DHC with the NMOCD is pending.

Attachments:

C102s, Recompleat and Commingling Procedure, Current and Proposed Wellbore Schematics

NM OIL CONSERVATION  
ARTESIA DISTRICT

SEP 13 2017

Accepted for record - NMOCD

SEE ATTACHED FOR  
CONDITIONS OF APPROVAL

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

Electronic Submission #381860 verified by the BLM Well Information System  
For CIMAREX ENERGY COMPANY OF CO, sent to the Carlsbad  
Committed to AFMSS for processing by PRISCILLA PEREZ on 07/20/2017 (17PP0736SE)

Name (Printed/Typed) AMITHY CRAWFORD

Title REGULATORY ANALYST

Signature (Electronic Submission)

Date 07/19/2017

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

Approved By

Title

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

BUREAU OF LAND MANAGEMENT  
CARLSBAD FIELD OFFICE

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.

(Instructions on page 2)

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

RUF 9-27-17

**Additional data for EC transaction #381860 that would not fit on the form**

**32. Additional remarks, continued**

Oil/Water/Gas analysis and commingling worksheet form.



## 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 14 Federal #1** well (API: 30-015-24865).

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 14 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 Atoka formation. The well has produced 68.3 MMCF of gas and has no remaining gas reserves (see **Appendix C**). The company plans to abandon the Atoka zone under a cast-iron bridge plug with cement on top.

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

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



CONFIDENTIAL. June 21, 2017

Production Operations – Carlsbad Region, Permian Basin  
**White City 14 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:

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

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

The Recoverable Gas in Place (RGIP) for subject well is **1,584 MMCF** from the Wolfcamp and **554 MMCF** from the Cisco Canyon, for a total of **2,139 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:

$$\text{Wolfcamp \% Alloc. Factor} = \frac{1,636 \text{ MMCF}}{1,939 \text{ MMCF}} = 84\%$$

$$\text{Cisco Canyon \% Alloc. Factor} = \frac{303 \text{ MMCF}}{1,939 \text{ MMCF}} = 16\%$$

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 < 25-35%. *Total estimated oil reserves are 61 MBO.*

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

White City 14 Federal #1

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 :	9,430	4,102	228	11.9%	21%	21.7	1,926	85%	1,636			1,636	84%
Cisco Canyon :	9,864	4,291	55	9.6%	26%	3.9	357	85%	303			303	16%
<b>Total:</b>			<b>283</b>			<b>25.6</b>	<b>2,283</b>	<b>85%</b>	<b>1,939</b>		<b>-</b>	<b>1,939</b>	<b>100%</b>

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. June 21, 2017

Production Operations – Carlsbad Region, Permian Basin  
**White City 14 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

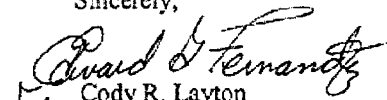
Gentlemen:

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,

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

Enclosure  
cc: NMP0220 (CFO I&E)

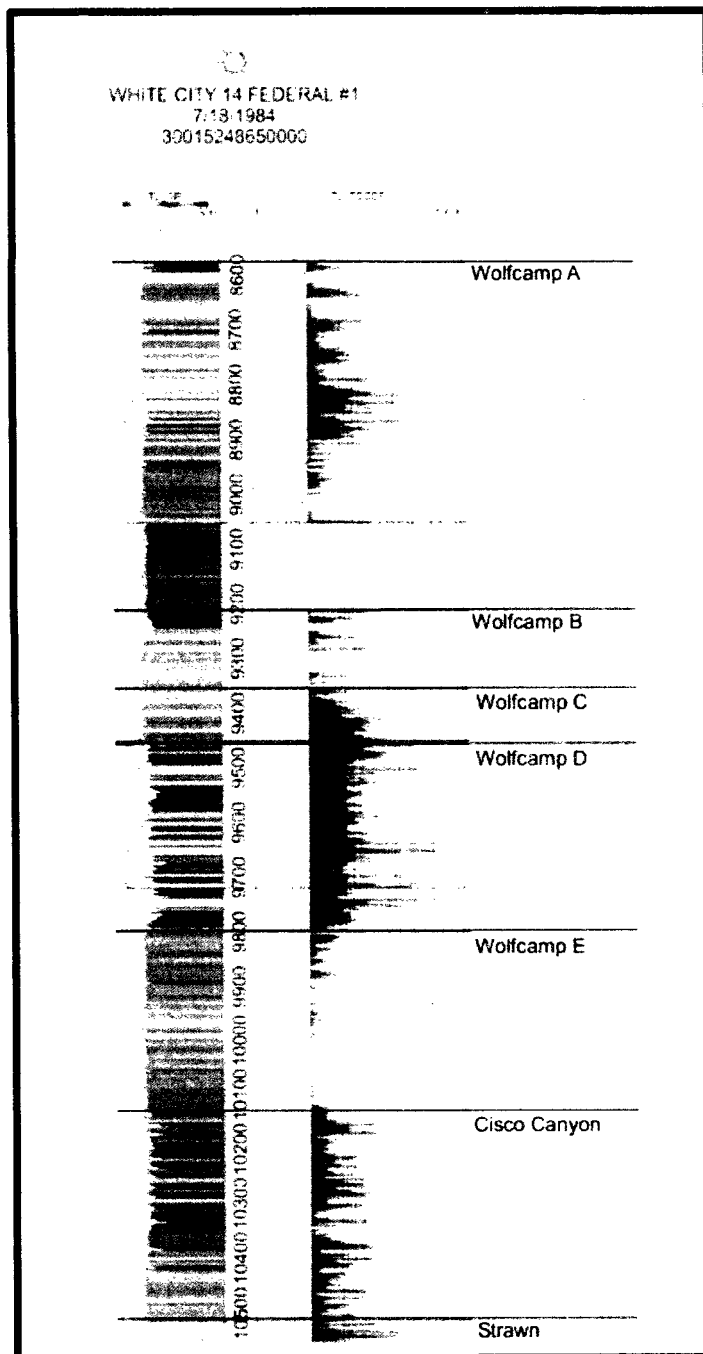


CONFIDENTIAL. June 21, 2017

Production Operations – Carlsbad Region, Permian Basin  
**White City 14 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 – White City 31 Federal #4

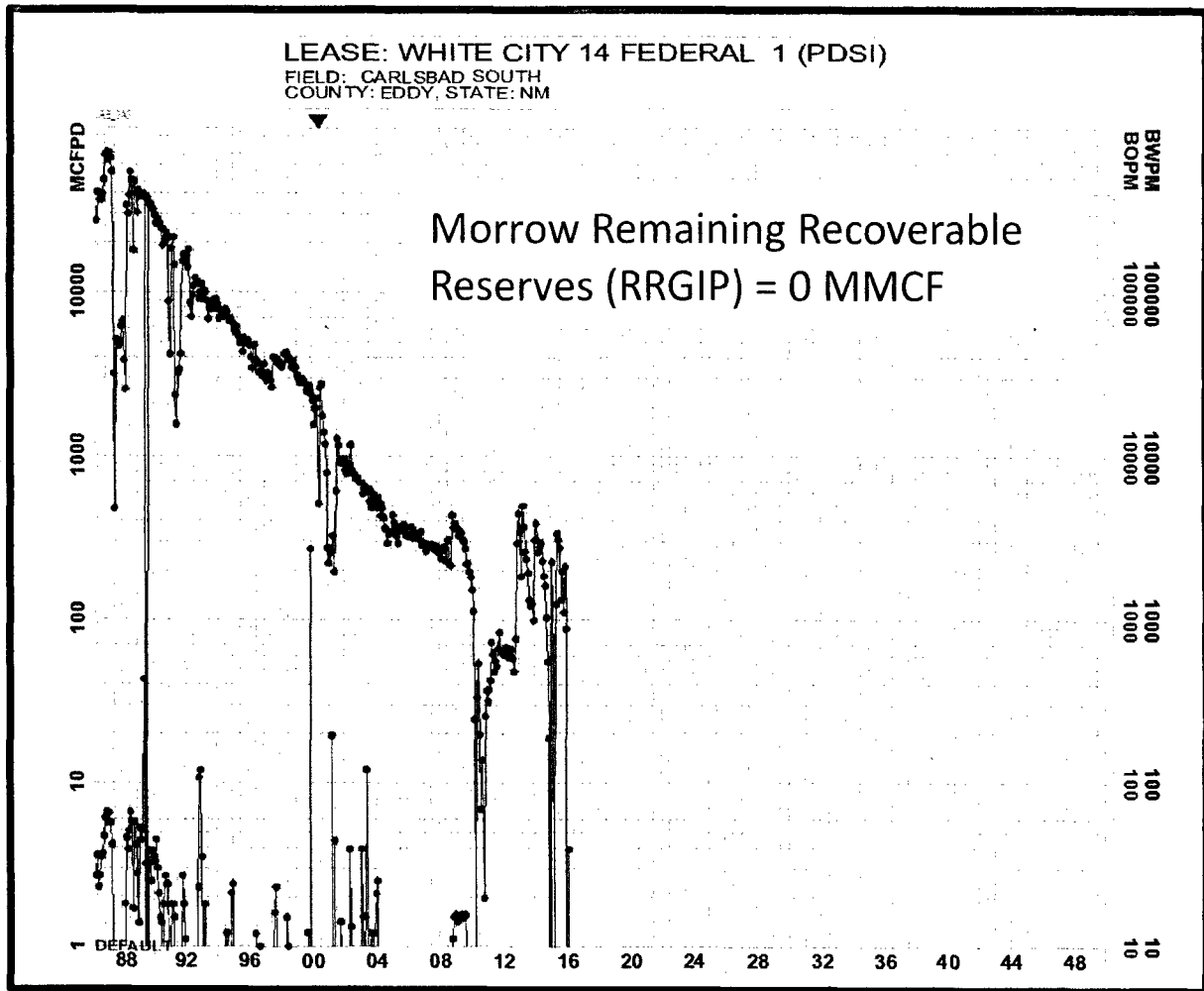
**Appendix C: Current Completion – White City 14 Federal #1**





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Production Operations – Carlsbad Region, Permian Basin  
**White City 14 Federal #1 - Cisco Canyon and Wolfcamp (Ciscamp)**  
Proposed Commingling Allocation Factors. Eddy County, NM





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Production Operations – Carlsbad Region, Permian Basin  
**White City 14 Federal #1 - Cisco Canyon and Wolfcamp (Ciscamp)**  
*Proposed Commingling Allocation Factors. Eddy County, NM*

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**Appendix D: Recompletion Procedure – White City 14 Federal #1**

Well Data

KB	20'
TD	11,875'
PBTD	11,852'
Casing	13-3/8" 54.5# K-55 @ 400'. Cmt'd w/ 465 sx, cmt circ 9-5/8" 36#/40# K-55 @ 1,859'. Cmt'd w/ 1,200 sx, cmt circ 7" 23#/26# N-80/S-95/P-110 @ 9,250'. Cmt'd w/ 1,175 sx, TOC @ 1,250'
Liner	4-1/2" 13.5# N-80/S-95 @ 9,007'-11,875'. Cmt'd w/ 450 sx. DV @ 7,904'.
Tubing	2-3/8" 4.7# L-80/N-80 8rd, EOT @ 10,711'
Proposed RC Perfs	Wolfcamp (8,570' – 9,506') & Cisco Canyon (9,864' – 10,100')

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 Halliburton PLS packer with ¼ RH turn and POOH w/339 jts 2-3/8" 4.7# L-80/N-80 tbg standing back.
6. MIRU WL.
7. RIH w/ GR/JB to +/- 10,786'.
8. RIH w/ WL to set CIBP at +/- 10,786'. *10,771' (50' above top most perf.)*
9. RIH w/ WL to bail 35' of cement on top of CIBP at +/- 10,786'.
  - a. **Note: This will put TOC @ +/- 10,746'.**
10. RU Pump truck and pressure test casing to 8,500 psi on a chart for 30 minutes with no more than 10% leak off.
11. ND 5k BOP, RDMO PU.
12. RU two 10k frac valves and flow cross.
13. MIRU water transfer with frac tanks to contain water to be pumped from frac pond
14. Test frac valves and flow cross prior to frac job.
  - a. 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.
15. RU frac valves, flow cross, goat head, and wireline lubricator.



Production Operations – Carlsbad Region, Permian Basin  
**White City 14 Federal #1 - Cisco Canyon and Wolfcamp (Ciscamp)**  
*Proposed Commingling Allocation Factors. Eddy County, NM*

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16. RIH w/ gauge ring/junk basket for 4-1/2" 13.5# S-95/N-80 csg to +/- 10,200'
17. Perforate Cisco Canyon from 9,864' – 10,100'.
18. RU frac and flowback equipment.
19. Acidize and frac Cisco Canyon perfs down casing.
20. Set 10k flow through composite plug 15' uphole of top perforation
21. Test to 8,500 psi
22. Perforate Wolfcamp from 8,570' – 9,854'.
23. Acidize and frac Wolfcamp perfs down casing.
24. RD frac
25. MIRU 2" coiled tbg unit.
26. 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.
27. Clean out to PBTD 10,700'
28. POOH w/ blade mill, motor & CT
29. RDMO coiled tbg unit.
30. Flow back well for 24 hours, then SI well overnight.
31. RU wireline and lubricator.
32. RIH w/ GR/JB for 7" 26# P-110 to +/- 9,000'
33. RIH w/ 2-7/8" WEG, 2-7/8" 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, 7" Arrowset 1X packer and on-off tool stinger w/ 1.875" X profile nipple. Set packer +/- 8,520'. 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. 7" x 2-3/8" Arrowset 1X packer and on-off tool stinger w/ 1.875" X profile nipple
34. RD WL and lubricator
35. ND goat head and frac valve, NU BOP, MIRU Pulling Unit
36. TIH w/ on/off tool overshot, GLVs, and 2-3/8" 4.7# L-80 tbg.
37. Latch overshot onto on-off tool and space out tubing
38. ND BOP, NU WH
39. RDMO pulling unit
40. RU pump truck and pump out plug. Put well on production.
41. **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.**

# Downhole Commingling Worksheet

Operator: Cimarex Energy Co. Of Colorado  
 Lease/Well Name/API Number/Location: White City 14 Fed 1/30-015-24865/Sec. 14, T25S R26E

Date:

Data		Bottom Formation	Upper Formation	Estimated Combined Production Data
Pool name		White City; Penn (Gas)	Purple Sage Wolfcamp, (Gas)	
Pool Code		87280	98220	
State Form C-102 with dedicated Acres Provided		320 acres	320 acres	640 acres
Formation Name		Cisco Canyon	Wolfcamp	
Top and Bottom of Pay Section (Perforated or open-hole interval)		10,157'-10,451'	8,570'-9,800'	9,202'-10,451'
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: 52.1° API Gas: 1209.9 BTU dry / 1189.0 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: 21 BOPD, 525 MCFD, 133 BWPD	Date: N/A Expected Rate: 79 BOPD, 1,981 MCFD, 500 BWPD	Date: N/A Expected Rate: 91 BOPD, 2399 MCFD, 606 BWPD
Average decline % ( provide back up data)		7% (terminal)	7% (terminal)	7% (terminal)
Fixed Allocation Percentage		Oil: 21% Gas: 21%	Oil: 79% Gas: 79%	Oil: 100% Gas: 100%

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

Operator Signature: *Christy Crawford*

Date: 07/19/2017

## 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.



**LABORATORY SERVICES**  
Natural Gas Analysis

www.permianls.com

575.397.3713 2609 W Marland Hobbs NM 88240

For:	Cimarex Energy	Sample:	Sta. # 309588185
	Attention: Mark Cummings	Identification:	Wigeon 23 Fed Com 1
	600 N. Marienfeld, Suite 600	Company:	Cimarex Energy
	Midland, Texas 79701	Lease:	
		Plant:	

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

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

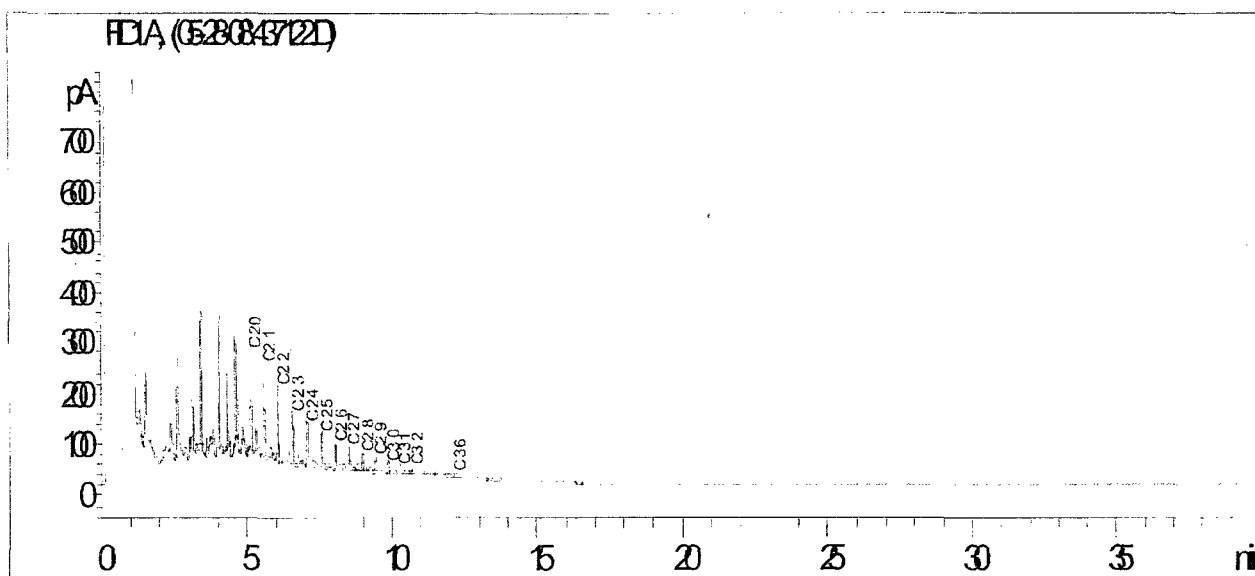
Lab Team Leader - Sheila Hernandez  
(432) 495-7240

## 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 C<sub>20</sub>H<sub>42</sub>.



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 <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
°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.

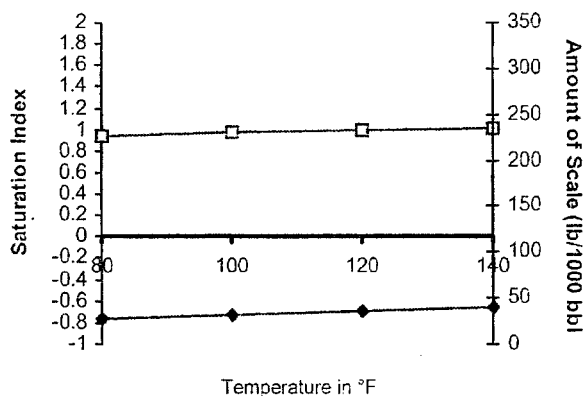
Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported 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.

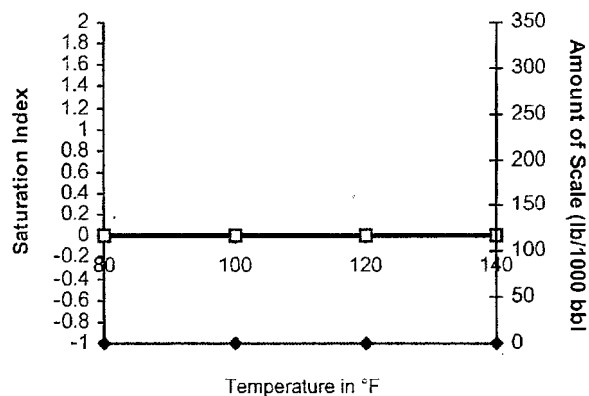
# Scale Predictions from Baker Petrolite

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

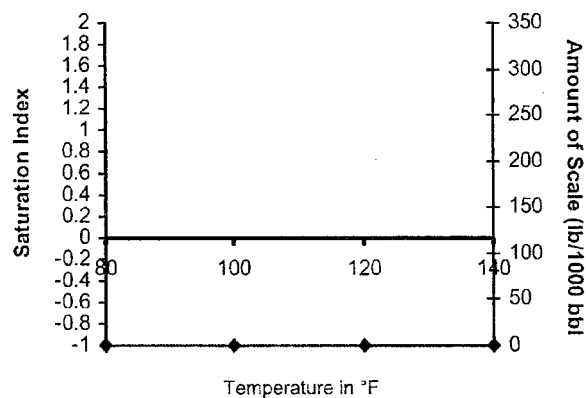
Calcite -  $\text{CaCO}_3$



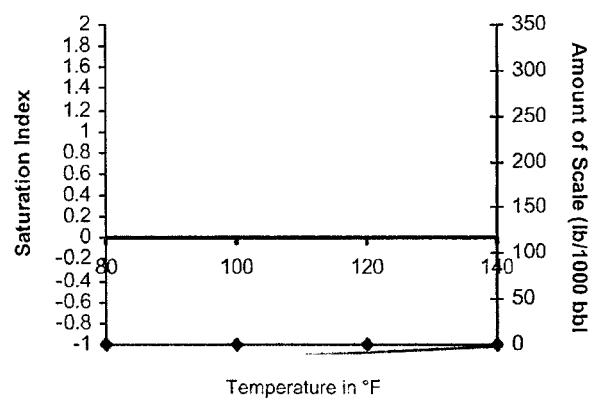
Barite -  $\text{BaSO}_4$



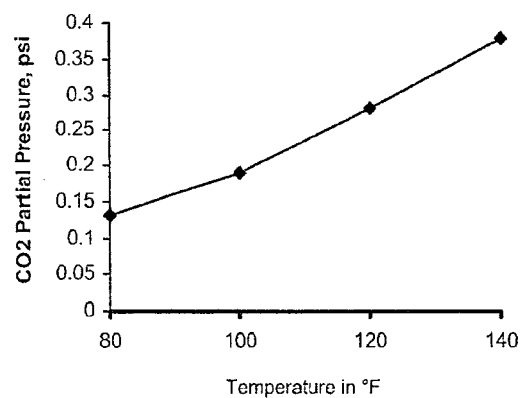
Gypsum -  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$



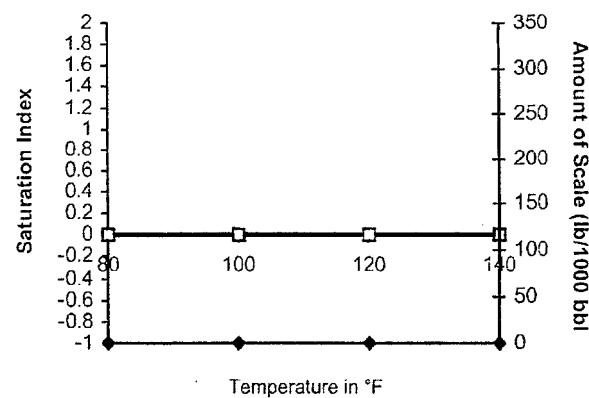
Anhydrite -  $\text{CaSO}_4$



Carbon Dioxide Partial Pressure



Celestite -  $\text{SrSO}_4$





**LABORATORY SERVICES**  
Natural Gas Analysis

www.permianls.com

575.397.3713 2609 W Marland Hobbs NM 88240

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

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

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

Sampled by: K. Hooten  
Analysis by: Vicki McDaniel

H2S =

#### Component Analysis

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

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

North Permian Basin Region

P.O. Box 740

Sundown, TX 79372-0740

(806) 229-8121

Lab Team Leader - Sheila Hernandez

(432) 495-7240

## OIL ANALYSIS

Company: CIMAREX ENERGY

Region: PERMIAN BASIN

Area: LOCO HILLS, NM

Lease/Platform: TAOS FEDERAL LEASE

Entity (or well #): 3

Formation: UNKNOWN

Sample Point: TANK

Sample Date: 08/24/11

Sales RDT: 33521

Account Manager: STEVE HOLLINGER (575) 910-9393

Analysis ID #: 5419

Sample #: 561758

Analyst: SHEILA HERNANDEZ

Analysis Date: 09/13/11

Analysis Cost: \$125.00

Cloud Point: 89 ° F

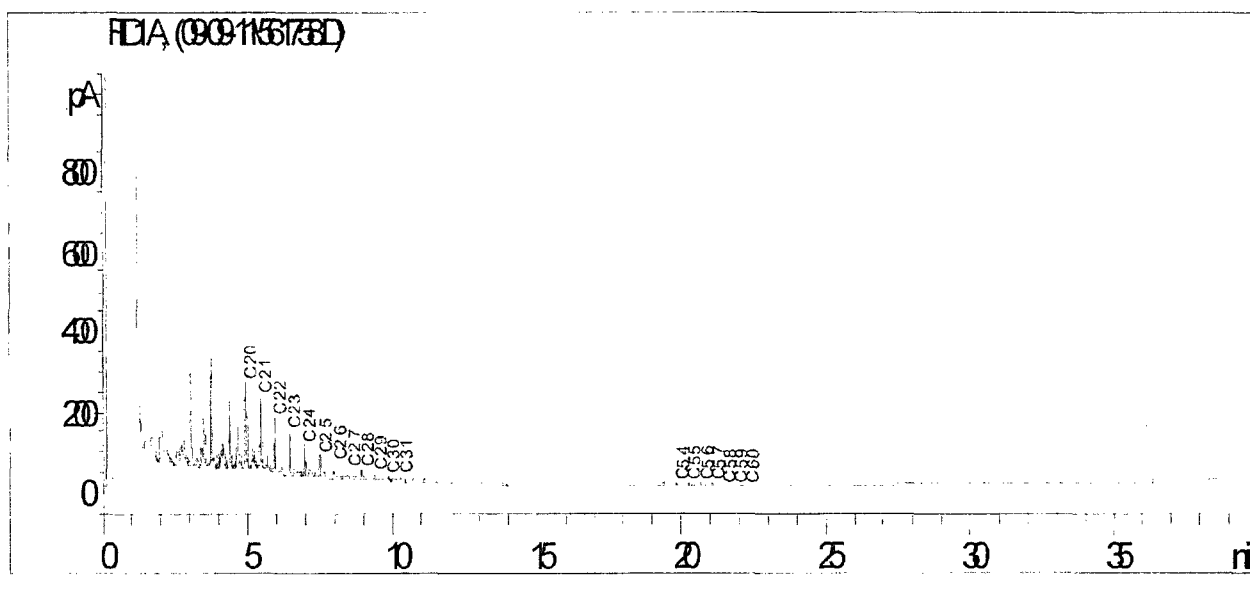
Weight Percent Paraffin (by GC)\*: 1.03%

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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P.O. Box 740  
Sundown, TX 79372-0740  
(806) 229-8121  
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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					
Sampling Date:	09/28/11	Anions	mg/l	meq/l	Cations	mg/l	meq/l
Analysis Date:	10/13/11	Chloride:	52535.0	1481.82	Sodium:	28338.7	1232.66
Analyst:	SANDRA GOMEZ	Bicarbonate:	146.0	2.39	Magnesium:	417.0	34.3
TDS (mg/l or g/m3):	86836.7	Carbonate:	0.0	0.	Calcium:	3573.0	178.29
Density (g/cm3, tonne/m3):	1.063	Sulfate:	83.0	1.73	Strontium:	1472.0	33.6
Anion/Cation Ratio:	1	Phosphate:			Barium:	22.0	0.32
		Borate:			Iron:	34.0	1.23
		Silicate:			Potassium:	215.0	5.5
					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 @ 75F		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 <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					
F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	-0.61	0.00	-1.46	0.00	-1.49	0.00	-0.05	0.00	1.22	11.59	1.14
100	0	-0.51	0.00	-1.51	0.00	-1.47	0.00	-0.07	0.00	1.04	10.94	1.44
120	0	-0.40	0.00	-1.54	0.00	-1.43	0.00	-0.07	0.00	0.89	10.30	1.76
140	0	-0.28	0.00	-1.57	0.00	-1.36	0.00	-0.06	0.00	0.75	9.66	2.07

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

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

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



KB - 20' above GL

**Cimarex Energy Co. of Colorado**

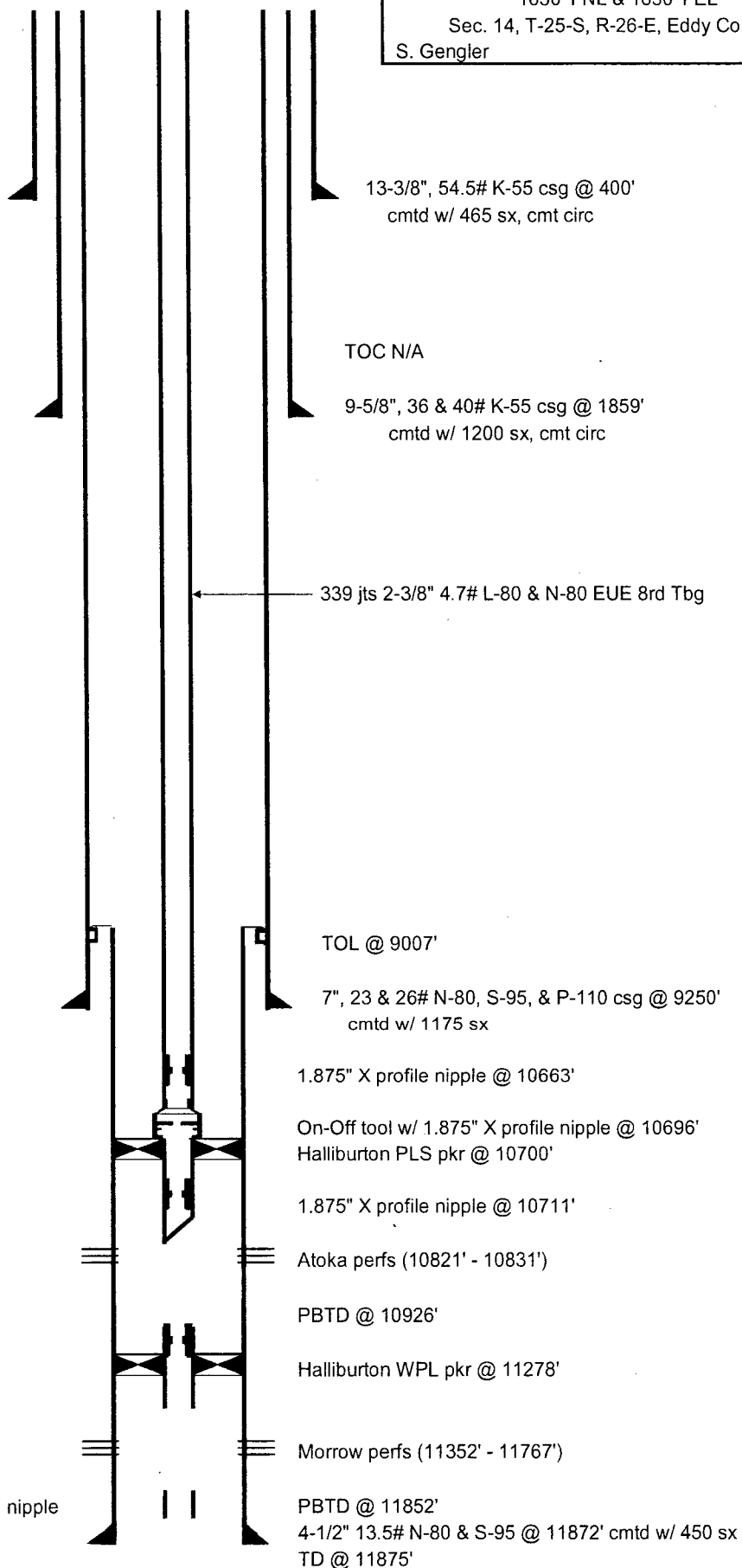
White City 14 Federal #1

1650' FNL & 1650' FEL

Sec. 14, T-25-S, R-26-E, Eddy Co., NM

S. Gengler

06/05/2012





# Proposed Ciscamp WBD

KB - 20' above GL

Cimarex Energy Co. of Colorado

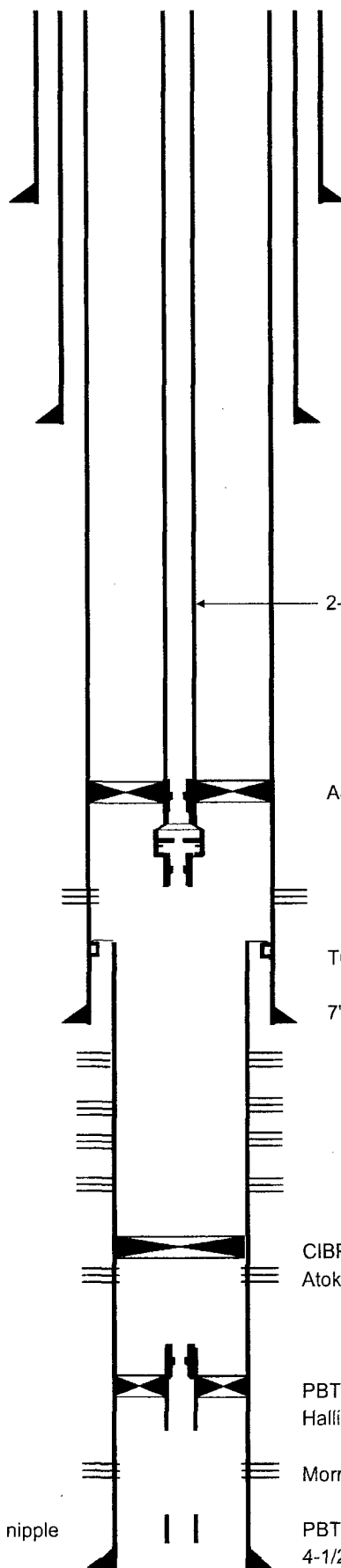
White City 14 Federal #1

1650' FNL & 1650' FEL

Sec. 14, T-25-S, R-26-E, Eddy Co., NM

S. Runyan

06/21/2017



13-3/8", 54.5# K-55 csg @ 400'  
cmtd w/ 465 sx, cmt circ

TOC N/A

9-5/8", 36 & 40# K-55 csg @ 1,859'  
cmtd w/ 1,200 sx, cmt circ

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

AS1X pkr @ 8,520'

TOL @ 9,007'

7", 23 & 26# N-80, S-95, & P-110 csg @ 9,250'  
cmtd w/ 1,175 sx

Wolfcamp (8,570' - 9,506')

Cisco Canyon (9,864' - 10,100')

CIBP + 35' CMT @ 10,746'  
Atoka perms (10,821' - 10,831')

PBTD @ 10,926'  
Halliburton WPL pkr @ 11278'

Morrow perms (11,352' - 11,767')

PBTD @ 11,852'  
4-1/2" 13.5# N-80 & S-95 @ 11,872' cmtd w/ 450 sx  
TD @ 11,875'

Fish in hole: 3' cut tbg sub, 1.875" XN nipple  
& chem cutting tools @ 11,852'

**White City 14 1**  
**30-015-24865**  
**Cimarex Energy Company of CO**  
**August 29, 2017**  
**Conditions of Approval**

**Notify BLM at 575-361-2822 a minimum of 24 hours prior to commencing work.**

**Work to be completed by November 29, 2017.**

- 1. Operator shall set a CIBP at 10,771' (50' above top most perf) and place 35' Class H cement on top. Tag required.**
- 2. DHC approved as written by the operator.**
- 3. Must conduct a casing integrity test before perforating and fracturing. Submit results to BLM. The CIT is to be performed on the production casing to max treating pressure. Notify BLM if test fails.**
- 4. Before casing or a liner is added or replaced, prior BLM approval of the design is required. Use notice of intent Form 3160-5.**
- 5. Surface disturbance beyond the originally approved pad must have prior approval.**
- 6. Closed loop system required.**
- 7. All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of work over operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area. Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.**
- 8. Operator to have H2S monitoring equipment on location.**
- 9. A minimum of a 5000 (5M) BOP to be used. All blowout preventer (BOP) and related equipment (BOPE) shall comply with reasonable well control requirements. A two ram system with a blind ram and a pipe ram designed for the size of the work string shall be adequate. Tapered work strings will require an additional pipe ram. The manifold shall comply with Onshore Oil and Gas Order #2 Attachment I (5M Diagrams of Choke Manifold Equipment). The accumulator system shall have an immediately available power source to close the rams and retain 200 psi above pre-charge. The pre-charge test shall follow requirements in Onshore Order #2.**

10. Subsequent sundry required detailing work done and completion report for the new formations. Operator to include well bore schematic of current well condition when work is complete.

11. See attached for general requirements.

**JAM 082917**

**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. Plugging 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. If a bailer is used to cap this plug, 35 feet of cement shall be sufficient. **Before pumping or bailing cement on top of CIBP, tag will be required to verify depth.**

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.**

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.

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, Artec, 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

<sup>1</sup> API Number 30-15-24865	<sup>2</sup> Pool Code 87280	<sup>3</sup> Pool Name White City; Penn (Gas)
<sup>4</sup> Property Code 300600	<sup>5</sup> Property Name White City 14 Federal	<sup>6</sup> Well Number 1
<sup>7</sup> OGRID No. 162683	<sup>8</sup> Operator Name Cimarex Energy Co. of Colorado	<sup>9</sup> Elevation 3296.6'

" Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
G	14	25S	26E		1650'	North	1650'	East	Eddy

" 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

<sup>10</sup> Dedicated Acres 320	<sup>11</sup> Joint or Infill	<sup>12</sup> Consolidation Code	<sup>13</sup> 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><b>" OPERATOR CERTIFICATION</b> 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 undivided 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/consent entered by the division.</p> <p>Signature: <i>Amithy Crawford</i> Date: 7/17/2017</p> <p>Printed Name: Amithy Crawford</p> <p>E-mail Address: acrawford@cimarex.com</p>
	<p><b>"SURVEYOR CERTIFICATION</b> 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:</p> <p>Signature and Seal of Professional Surveyor:</p> <p>Certificate Number:</p>



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

Form C-102  
Revised August 1, 2011  
Submit one copy to appropriate  
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☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

<sup>1</sup> API Number 30-15-24865	<sup>2</sup> Pool Code 98220	<sup>3</sup> Pool Name Purple Sage (Wolfcamp)
<sup>4</sup> Property Code 300600	<sup>5</sup> Property Name White City 14 Federal	<sup>6</sup> Well Number 1
<sup>7</sup> OGRID No. 162683	<sup>8</sup> Operator Name Cimarex Energy Co. of Colorado	<sup>9</sup> Elevation 3296.6'

<sup>10</sup> Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
G	14	25S	26E		1650'	North	1650'	East	Eddy

<sup>11</sup> 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
<sup>12</sup> Dedicated Acres 320	<sup>13</sup> Joint or Infill	<sup>14</sup> Consolidation Code	<sup>15</sup> 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><b><sup>16</sup> OPERATOR CERTIFICATION</b> 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 undivided 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>Signature: <i>Amithy Crawford</i> Date: 7/17/2017</p> <p>Printed Name: Amithy Crawford</p> <p>E-mail Address: acrawford@cimarex.com</p>	
	<p><b><sup>17</sup> SURVEYOR CERTIFICATION</b> 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:</p> <p>Signature and Seal of Professional Surveyor:</p>	
	<p>Certificate Number</p>	