

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENTNMT OIL CONSERVATION
ARTESIA DISTRICT
NMOCDArtesia
MAR 09 2017FORM 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.***SUBMIT IN TRIPLICATE - Other instructions on page 2**

1. Type of Well ☐ Oil Well ☒ Gas Well ☐ Other		8. Well Name and No. CK 7 FEDERAL 1
2. Name of Operator CIMAREX ENERGY COMPANY OF CO		9. API Well No. 30-015-33420-00-S1
3a. Address 202 S CHEYENNE AVE SUITE 1000 TULSA, OK 74103.4346		10. Field and Pool or Exploratory Area CARLSBAD-MORROW, SOUTH <i>from</i>
3b. Phone No. (include area code) Ph: 432-620-1936		11. County or Parish, State EDDY COUNTY, NM
4. Location of Well (Footage, Sec., T., R., M., or Survey Description) Sec 7 T24S R26E SWNE 2495FNL 1415FEL <i>98224 WC-015 52426076. 4P Perm 98220 Purple Sage WC GAS</i>		

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

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Hydraulic Fracturing	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☐ Other
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☒ Plug Back	☐ 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 recomple 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 recomple 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 Energy Co. of Colorado respectfully requests approval to abandon the Morrow and plugback the CK 7 Federal 1 well to the Wildcat Strawn pool according to the attached procedure. If the Strawn is uneconomic Cimarex proposes to plugback and perf the Wildcat Cisco Canyon pool and perf the Purple Sage - Wolfcamp pool as indicated on the attached procedure.

Cimarex also requests approval to downhole commingle the Cisco Canyon and the Wolfcamp pools. The 2016 White City Area Downhole commingling Field Study included the referenced well for commingling. The field study was approved 7/6/16.

NMOCDAHC permit: pending state approval

Attachments: C102, procedure, wellbore diagrams, oil, water, & gas analysis, and DHC worksheet.

NMT OIL CONSERVATION
ARTESIA DISTRICT

MAR 09 2017

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

14. I hereby certify that the foregoing is true and correct.	
Electronic Submission #366781 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 02/14/2017 (17DLM0870SE)	
Name (Printed/Typed) TERRI STATHEM	Title MANAGER REGULATION COMPLIANCE
Signature (Electronic Submission)	Date 02/11/2017
THIS SPACE FOR FEDERAL OR STATE OFFICE USE FEB 27 2017	
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
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 **

RUP.



Appendix D: Recompletion Procedure – CK 7 Federal 1

Well Data

KB	18' above GL
TD	12,350'
PBTD	12,309'
Casing	13-3/8" 54.5# J-55 csg @ 403'. Cmt'd w/ 490 sx, cmt circ. 9-5/8" 40# J-55 & P-110 csg @ 1,899'. Cmt'd w/ 1,250 sx, 1" to surface. 5-1/2" 17# NS-110HC @ 12,150'. Cmt'd w/ 1,160 sx. DV @ 7,133'. TOC 490' by TS
Tubing	2-7/8" 6.5# L-80 8rd EOT @ 11,400'
Current Perfs	Morrow (11447'-11936')
Proposed Perfs	Wolfcamp (8,748' – 10,239') & Cisco Canyon (10,239' – 10,639')

Wildcat Strawn Procedure

Notify BLM 24 hours prior to starting operations.

1. Test anchors prior to moving in rig.
2. Move in rig up pulling unit.
3. Kill well as necessary with 4% KCl.
4. Nipple down wellhead, nipple up 5,000 psi blow out preventer stack.
5. Release Versaset pkr @ 11,635' & TOO H w/ 2-7/8" 6.5# L-80 tbg & packer. Stand back tbg. Scan tubing during TOO H.
6. TIH w/ CIBP on 2-7/8" 6.5# L-80 tbg to set CIBP at +/- 11,794'
7. Pump 25 ³⁰⁻³⁵ sacks class H cement down tubing to pump balanced plug. Abandon Morrow.
8. TOO H 1000' and reverse circulate 2 tbg volumes
9. WOC 6-8 hours
10. Test casing to 5,000 psi on chart for 30 minutes with no more than 10% leakoff.
11. RIH w/ 4.6" gauge ring and junk basket on electric line to +/- 10,900'
12. RIH with 3-1/8" casing guns on electric line and perforate Strawn from 10,639' – 10,862'
13. RIH w/ BHA described below from downhole up:
 - a. 2-7/8" WEG
 - b. 2-7/8" pump out plug pinned for 1,500 – 2,000 psi differential pressure
 - c. 2.312" XN profile nipple
 - d. 10' 2-7/8" 6.5# L-80 tbg sub
 - e. 5-1/2" x 2-7/8" Arrowset 1X packer and on-off tool stinger w/ 2.312" X profile nipple set at +/- 10,589'



CONFIDENTIAL. January 13, 2017
Production Operations – Carlsbad Region, Permian Basin
CK 7 Federal 1 - Cisco Canyon and Wolfcamp (Ciscamp) Proposed
Commingling Allocation Factors. Eddy County, NM

14. RD WL and lubricator
15. TIH w/ on/off tool overshoot, GLVs, and 2-7/8" 6.5# L-80 tbg. Hydrotest in hole to 8500 psi.
16. Latch overshoot onto on-off tool and space out tubing
17. ND BOP, NU WH
18. RDMO pulling unit
19. RU pump truck and pump out plug
20. MIRU acid company
21. Pump 15,600 total gallons of 20% NEFE HCl with 200 ball sealers down 2-7/8" tubing
22. Flush with 1 tubing volume 4% KCl
23. Put well on production. Swab well as necessary

If Strawn recompletion is unsuccessful, move forward with procedure to plugback to the Cisco Canyon and Wolfcamp and DHC the two zones

Cisco Canyon & Wolfcamp (Ciscamp) Recompletion Procedure

Proposed Perfs Wolfcamp (8,748' – 10,239') & Cisco Canyon (10,239' – 10,639')

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 2-7/8" 6.5# L-80 tbg. Lay down tubing while TOOH.
6. RU Wireline and 5k short lubricator
7. RIH w/ gauge ring/junk basket to +/- 10,674'
8. RIH w/ 5-1/2" CIBP and set at +/- 10,674'
9. RIH w/ bailer and bail 35' of cement on top of CIBP set at +/- 10,674'. Abandon Strawn.
10. RDMO Wireline and 5k short lubricator
11. RU pump truck
12. Pressure test 5-1/2" 17# NS-110HC casing to 8,500 psi (Max treating pressure, 80% of burst) for 30 minutes on a chart with no more than 10% leak off.
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.
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 +/- 10,639'
19. Perforate proposed perforations Cisco Canyon from 10,239' – 10,639'.

10,592' (minimum up 50' above top most perf)



CONFIDENTIAL. January 13, 2017

Production Operations – Carlsbad Region, Permian Basin
**CK 7 Federal 1 - Cisco Canyon and Wolfcamp (Ciscamp) Proposed
Commingling Allocation Factors. Eddy County, NM**

20. RU frac and flowback equipment.
21. Acidize and frac stage 1 Cisco Canyon perms down casing.
22. Set 10k flow through composite plug 15' uphole of top perforation
23. Test to 8,500 psi
24. Perforate Wolfcamp from 8,748' – 10,239'.
25. Acidize and frac Wolfcamp perms down casing.
26. Set 10k flow through composite plug 15' uphole of top perforation
27. Test to 8,500 psi
28. RD frac
29. MIRU 2" coiled tbg unit.
30. 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.
31. Clean out to PBDT
32. POOH w/ tri cone bit, motor & CT
33. RDMO coiled tbg unit.
34. Flow back well for 24 hours, then SI well overnight.
35. RU wireline and lubricator.
36. RIH w/ GR/JB for 5-1/2" 17# P-110 to +/- 8,698'
37. 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/ 2.312" XN profile nipple, 5-1/2" Arrowset 1X packer and on-off tool stinger w/ 2.312" X profile nipple. Set packer +/- 8,698'.
From downhole up:
 - a. 2-7/8" WEG
 - b. 2-7/8" pump out plug pinned for 1,500 – 2,000 psi differential pressure
 - c. 2.312" XN profile nipple w/ blanking plug
 - d. 10' 2-7/8" 6.5# L-80 tbg sub
 - e. 5-1/2" x 2-7/8" Arrowset 1X packer and on-off tool stinger w/ 2.312" X profile nipple
38. RD WL and lubricator
39. ND goat head and frac valve, NU BOP, MIRU Pulling Unit
40. TIH w/ on/off tool overshot, GLVs, and 2-7/8" 6.5# L-80 tbg.
41. Latch overshot onto on-off tool and space out tubing
42. ND BOP, NU WH
43. RDMO pulling unit
44. RU pump truck and pump out plug. Put well on production.
45. **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 - 18' above GL

Cimarex Energy Co. of Colorado

C K 7 Federal #1

SHL - 2495' FNL & 1415' FEL

BHL - 1275' FNL & 906' FEL

Sec. 7, T-24-S, R-26-E, Eddy Co., NM

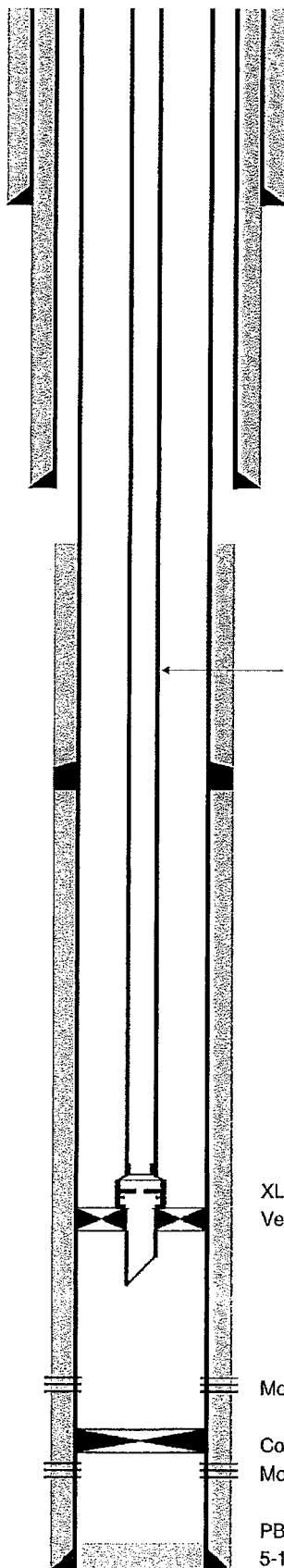
S. Gengler

05/11/2009

NATURAL CONSERVATION
ARTESIA DISTRICT

MAR 09 2017

RECEIVED



13-3/8", 54.5# J-55 csg @ 403'
cmtd w/ 490 sx, cmt circ

9-5/8", 40# J-55 & P-110 csg @ 1899'
cmtd w/ 1250 sx, 1" to surface

TOC @ 2295' by TS

368 Jts 2-7/8" 6.5# L-80 Tbg

DV Tool @ 6984'
cmtd w/ 1800 sx

XL On-off Tool w/ 2.25" F Profile nipple @ 11629'
Versa-set packer @ 11635'

Morrow perfs (11844' - 11912')

Composite BP @ 11950'
Morrow perfs (12050' - 12064')

PBD @ 12309'
5-1/2" 17# NS-110HC @ 12350' cmtd w/ 1150 sx
TD @ 12350'



Proposed WBD
KB - 18' above GL

Cimarex Energy Co. of Colorado

C K 7 Federal #1

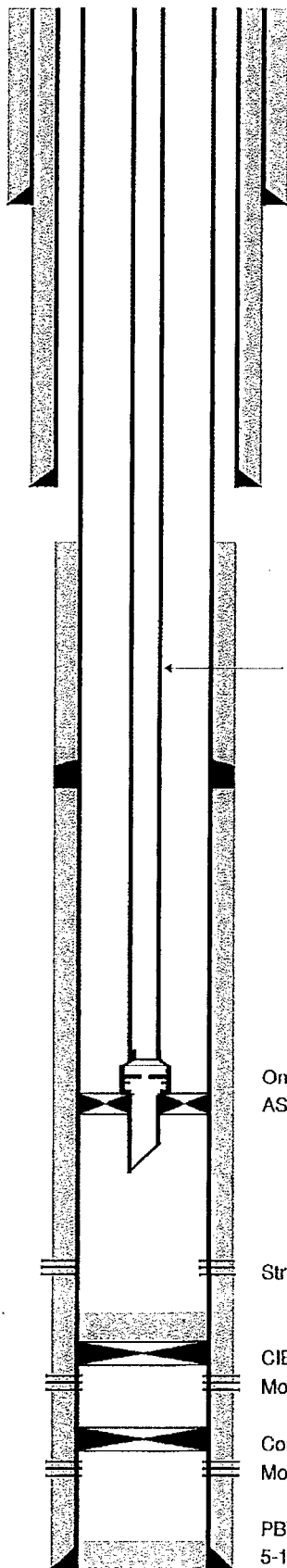
SHL - 2495' FNL & 1415' FEL

BHL - 1275' FNL & 906' FEL

Sec. 7, T-24-S, R-26-E, Eddy Co., NM

S. Gengler

05/11/2009



13-3/8", 54.5# J-55 csg @ 403'
cmtd w/ 490 sx, cmt circ

9-5/8", 40# J-55 & P-110 csg @ 1899'
cmtd w/ 1250 sx, 1" to surface

TOC @ 2295' by TS

← 368 jts 2-7/8" 6.5# L-80 Tbg

DV Tool @ 6984'
cmtd w/ 1800 sx

On-off Tool w/ 2.312" X Profile nipple @ 10,582'
AS-1X packer @ 10,589'

Strawn perms (10,639' -10,862')

CIBP set at 11,794' with ~~25~~ ^{more like 30-35sx} sx cement pumped on top
Morrow perms (11844' - 11912')

Composite BP @ 11950'
Morrow perms (12050' - 12064')

PBTD @ 12309'
5-1/2" 17# NS-110HC @ 12350' cmtd w/ 1150 sx
TD @ 12350'



Proposed WBD
KB - 18' above GL

Cimarex Energy Co. of Colorado

C K 7 Federal #1

SHL - 2495' FNL & 1415' FEL

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Sec. 7, T-24-S, R-26-E, Eddy Co., NM

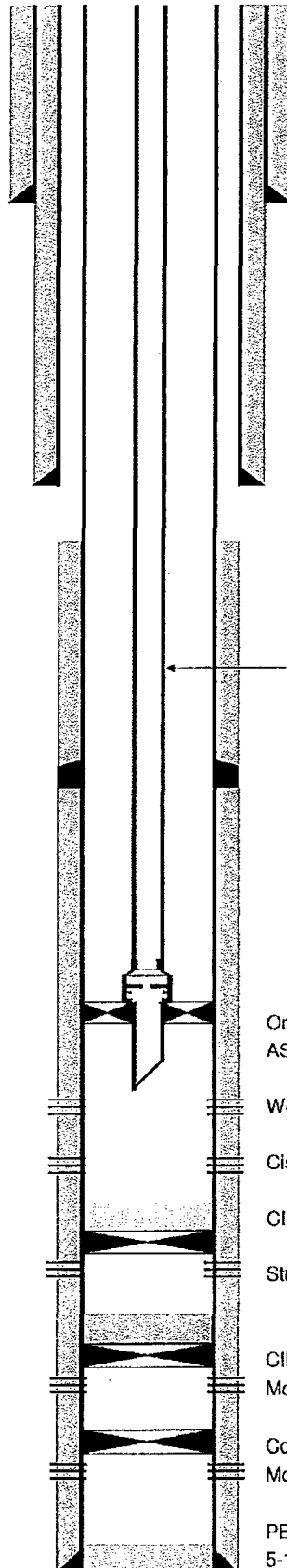
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NM OIL CONSERVATION
ARTESIA DISTRICT

MAR 09 2017

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9-5/8", 40# J-55 & P-110 csg @ 1899'
cmt'd w/ 1250 sx, 1" to surface

TOC @ 2295' by TS

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

DV Tool @ 6984'
cmt'd w/ 1800 sx

On-off Tool w/ 2.312" X Profile nipple @ 8,691'
AS-1X packer @ 8,698'

Wolfcamp perms (8,748' -10,239')

Cisco Canyon perms (10,239' -10,639')

CIBP set at +/- 10,554'

Strawn perms (10,639' -10,862')

CIBP set at 11,794' with 35' cement bailed on top
Morrow perms (11,844' - 11,912')

Composite BP @ 11,950'
Morrow perms (12,050' - 12,064')

PBTD @ 12,309'
5-1/2" 17# NS-110HC @ 12,350' cmt'd w/ 1150 sx
TD @ 12,350'

10,585' minimum 50'
above top most
perf.

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

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

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

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-015-33420		² Pool Code	³ Pool Name Wildcat Cisco Canyon
⁴ Property Code 34014	⁵ Property Name CK 7 Federal		⁶ Well Number 1
⁷ OGRID No. 162683	⁸ Operator Name Cimarex Energy Co. of Colorado		⁹ Elevation 3759'

¹⁰ Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
G	7	24S	26E		2495	North	1415	East	Eddy

¹¹ Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	7	24S	26E		1275	North	906	East	Eddy

¹² Dedicated Acres 320	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No.
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No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

	¹⁷ OPERATOR CERTIFICATION I 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. Signature: <i>[Signature]</i> Date: 2-13-2017 Printed Name: Terri Stathem E-mail Address: tstathem@cimarex.com
	¹⁸ SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief. Date of Survey: Signature and Seal of Professional Surveyor:
	Certificate Number

Downhole Commingling Worksheet

Operator: Cimarex Energy
 Lease/Well Name/API Number/Location: CK 7 Federal 1/30-015-33420/Sec. 7, T24S, R26E

Date:

Data		Bottom Formation	Upper Formation	Estimated Combined Production Data
Pool name		Wildcat Cisco Canyon	Purple Sage; Wolfcamp (Gas)	
Pool Code				
State Form C-102 with dedicated Acres Provided		320 acres	320 acres	320 acres
Formation Name		Cisco Canyon	Wolfcamp	
Top and Bottom of Pay Section (Perforated or open-hole interval)		10,239' - 10,639'	8,748' - 10,239'	8,748' - 10,639'
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: 1206.6 BTU dry / 1185.7 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 attach production estimated and supporting data)		Date: N/A Expected Rate: 23 BOPD, 577 MCFD, 146 BWPD 7% (terminal)	Date: N/A Expected Rate: 77 BOPD, 1,930 MCFD, 487 BWPD 7% (terminal)	Date: N/A Expected Rate: 100 BOPD, 2507 MCFD, 633 BWPD 7% (terminal)
Average decline % (provide back up data)		Oil: 23% Gas: 23%	Oil: 77% Gas: 77%	Oil: 100% Gas: 100%
Fixed Allocation Percentage				

Remarks:

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

Operator Signature:

Date: 4-13-17

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

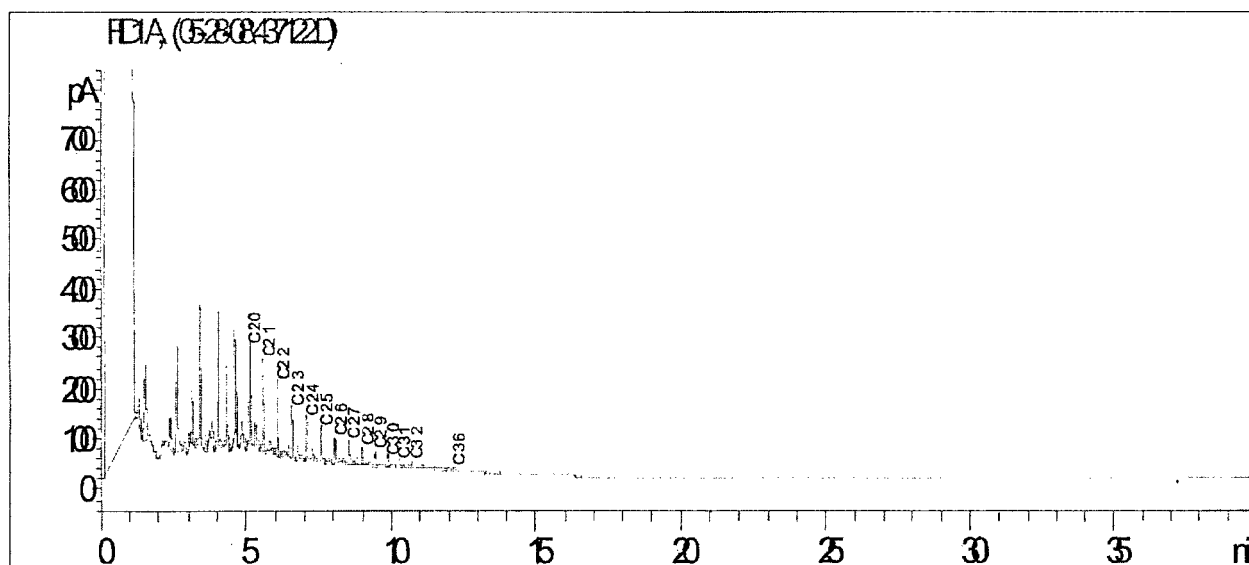
Weight Percent Paraffin (by GC)*: 1.49%

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 C₂₀H₄₂.



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

Water Analysis Report by Baker Petrolite

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

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

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

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

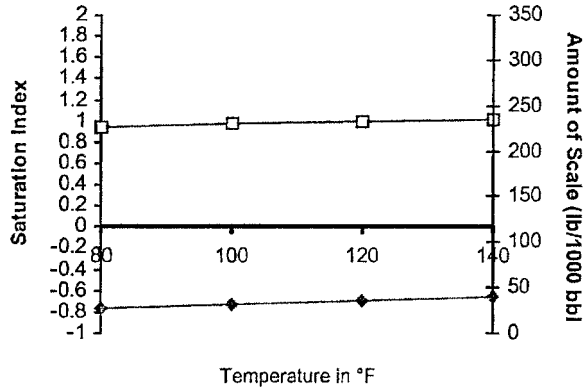
Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

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

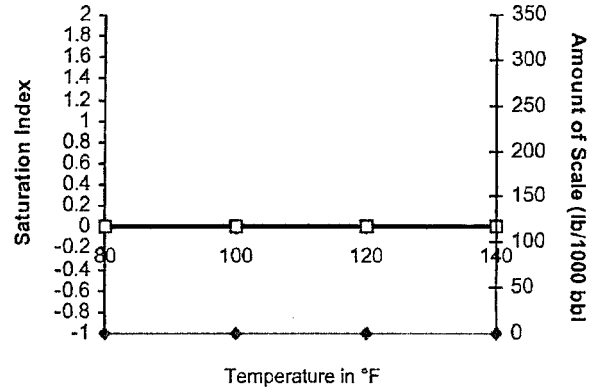
Scale Predictions from Baker Petrolite

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

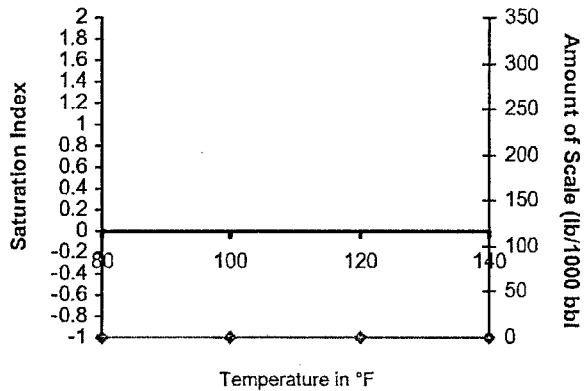
Calcite - CaCO_3



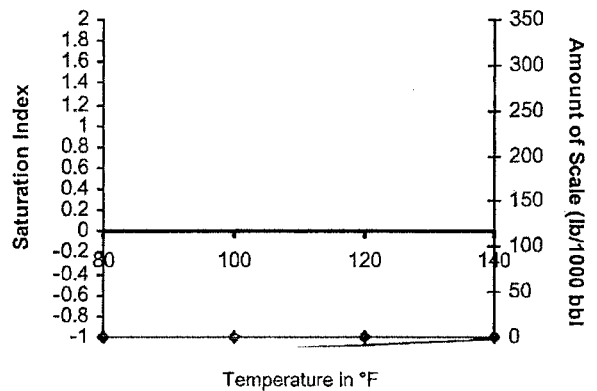
Barite - BaSO_4



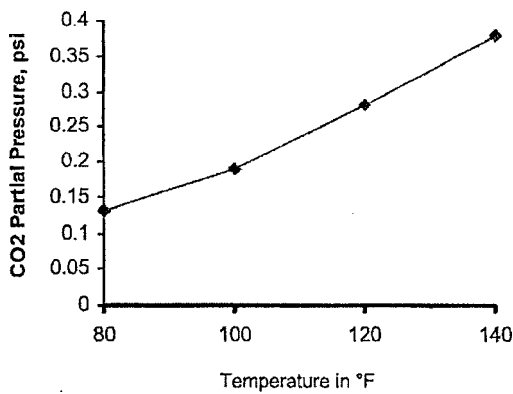
Gypsum - $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$



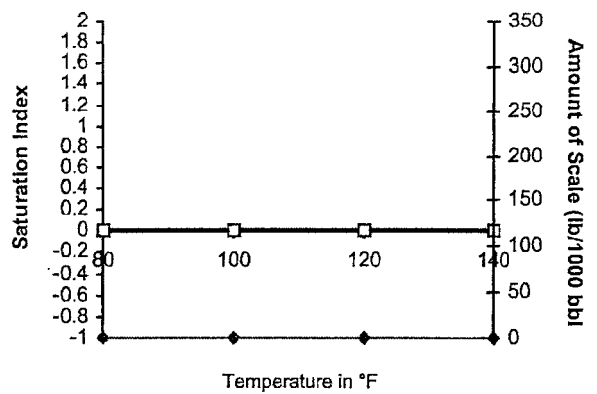
Anhydrite - CaSO_4



Carbon Dioxide Partial Pressure



Celestite - SrSO_4





LABORATORY SERVICES

Natural Gas Analysis

www.permianls.com

575.397.3713 2609 W Marland Hobbs NM 88240

For:	Cimarex Energy	Sample:	Sta. # 309588438
	Attention: Mark Cummings	Identification:	Taos Fed. #3 Sales
	600 N. Marienfeld, Suite 600	Company:	Cimarex Energy
	Midland, Texas 79701	Lease:	
		Plant:	

Sample Data:	Date Sampled	7/2/2014 10:30 AM	
	Analysis Date	7/9/2014	
	Pressure-PSIA	83	Sampled by: K. Hooten
	Sample Temp F	76.4	Analysis by: Vicki McDaniel
	Atmos Temp F	76	

H2S =

Component Analysis

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

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

North Permian Basin Region

P.O. Box 740

Sundown, TX 79372-0740

(806) 229-8121

Lab Team Leader - Sheila Hernandez

(432) 495-7240

OIL ANALYSIS

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

Cloud Point: 89 °F

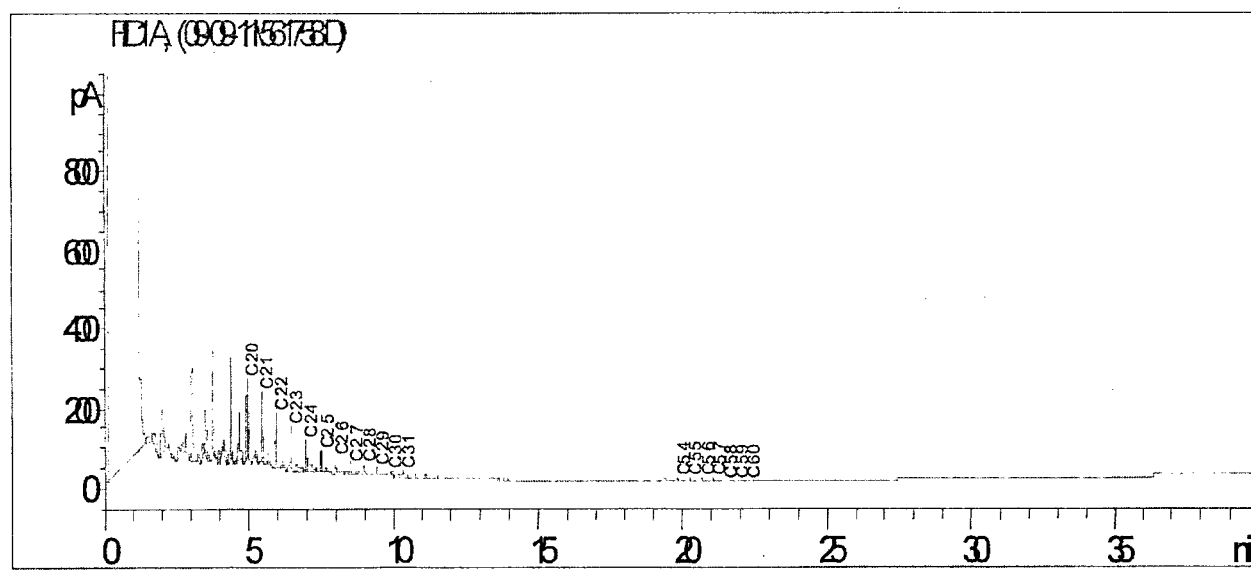
Weight Percent Paraffin (by GC)*: 1.03%

Weight Percent Asphaltenes: 0.01%

Weight Percent Oily Constituents: 98.93%

Weight Percent Inorganic Solids: 0.03%

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



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

Water Analysis Report by Baker Petrolite

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

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

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

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

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

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



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 **CK 7 Federal 1** well (API: 30-015-33420).

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 **77%** for the Wolfcamp and **23%** 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 **CK 7 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 **1,489 MMCF** of gas (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**.



CONFIDENTIAL. January 13, 2017
Production Operations – Carlsbad Region, Permian Basin
CK 7 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 **1,397 MMCF** from the Wolfcamp and **427 MMCF** from the Cisco Canyon, for a total of **1,824 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:

$$\text{Wolfcamp \% Alloc. Factor} = \frac{1,592 \text{ MMCF}}{2,046 \text{ MMCF}} = 77\%$$

$$\text{Cisco Canyon \% Alloc. Factor} = \frac{454 \text{ MMCF}}{2,046 \text{ MMCF}} = 23\%$$

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 59 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 to Date, MMCF	Remaining RGIP (RRGIP), MMCF	Initial Alloc. Factors, % (based on production)
Wolfcamp TOT:	9,549	4,154	216	10.5%	23%	17.5	1,646	85%	1,397			1,397	77%
Cisco Canyon:	10,391	4,520	43	13.9%	14%	5.1	502	85%	427		-	427	23%
Total:			259			22.7	2,148	85%	1,824			1,824	100%

In this well, the spacing for both formations is the same, as well as, public interests. 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.



CONFIDENTIAL. January 13, 2017

Production Operations – Carlsbad Region, Permian Basin
*CK 7 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

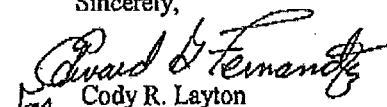
Gentlemen:

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,

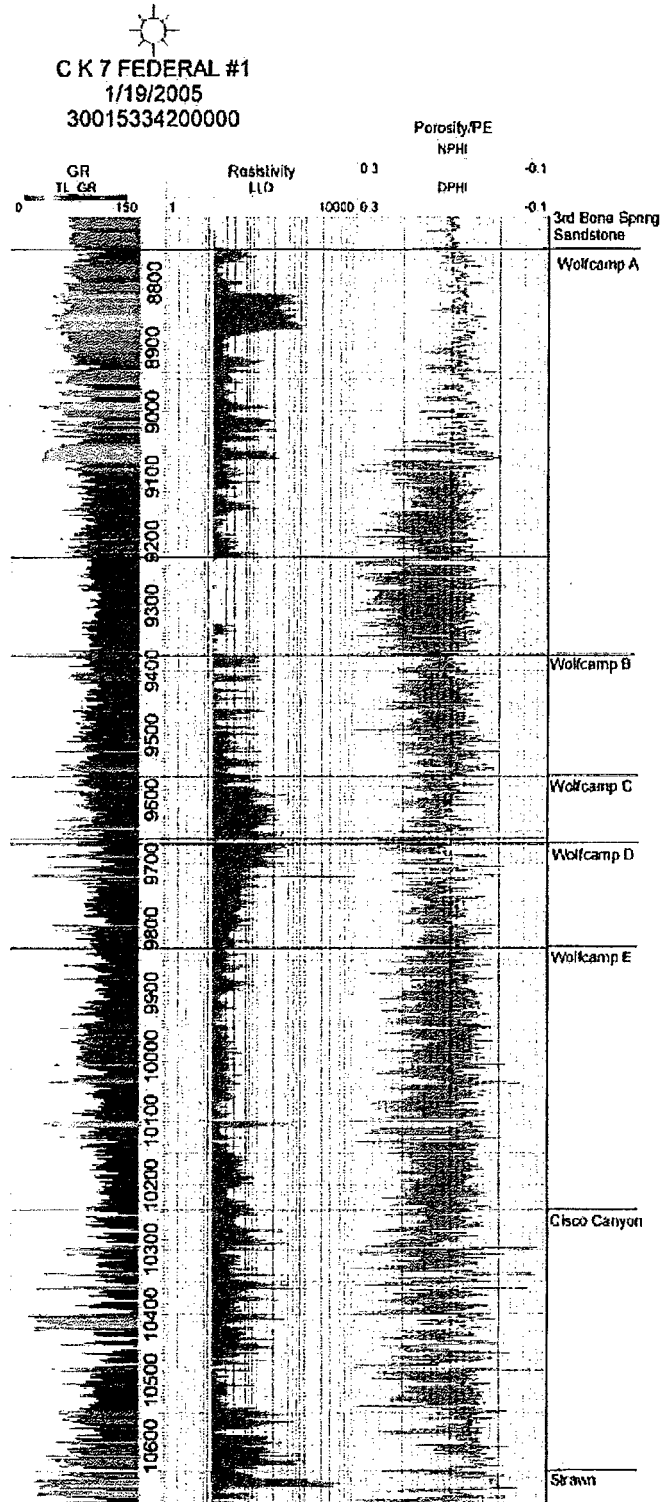

for Cody R. Layton
Assistant Field Manager,
Lands and Minerals

Enclosure
cc: NMP0220 (CFO I&E)



CONFIDENTIAL. January 13, 2017
Production Operations – Carlsbad Region, Permian Basin
CK 7 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 – CK 7 Federal 1

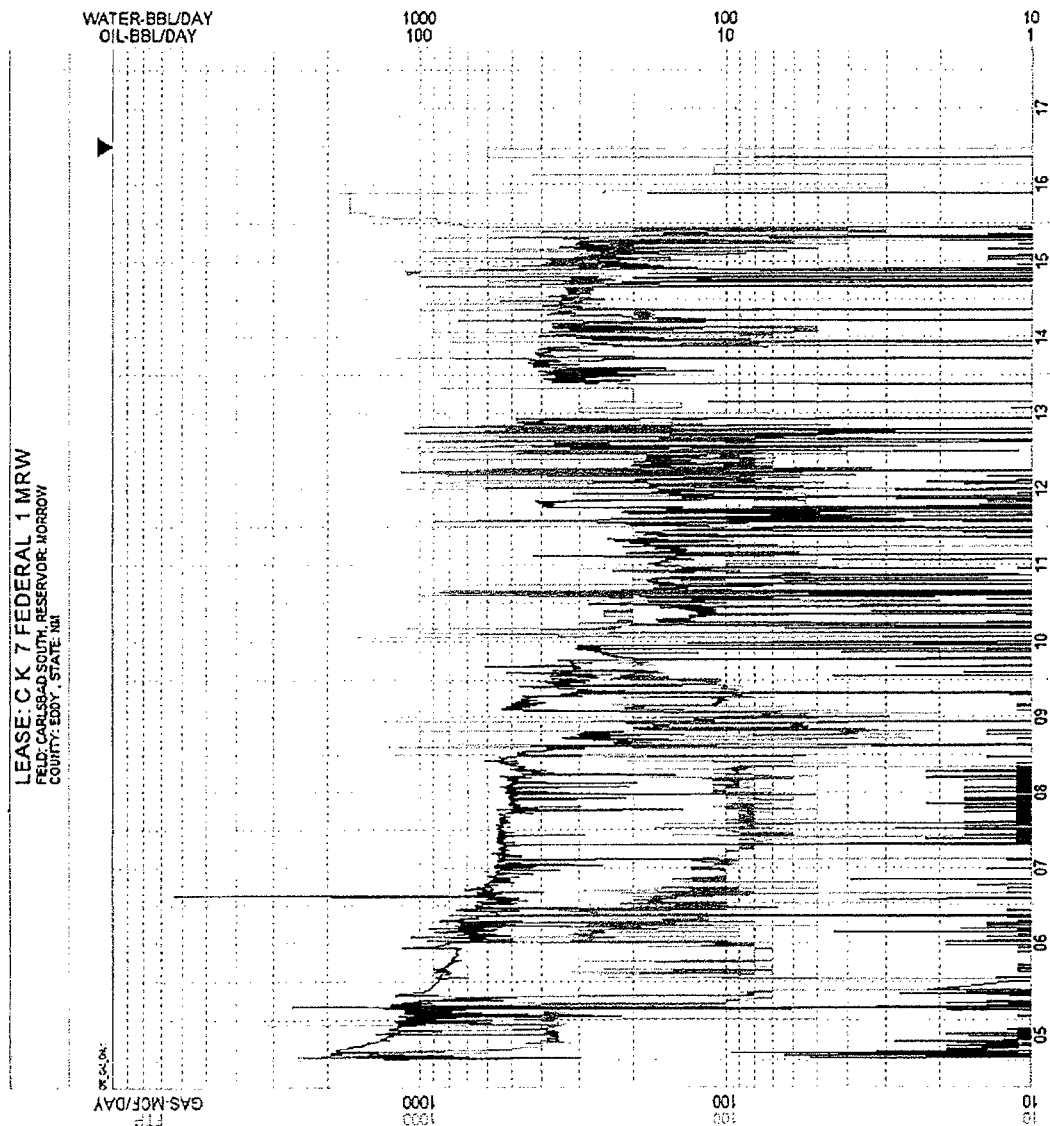




CONFIDENTIAL. January 13, 2017
Production Operations – Carlsbad Region, Permian Basin
**CK 7 Federal 1 - Cisco Canyon and Wolfcamp (Ciscamp) Proposed
Commingling Allocation Factors. Eddy County, NM**

Appendix C: Production Plot Current Zone – CK 7 Federal 1

GAS-MCF/DAY	
Ref=	1/2017
Cum=	1,489,031
FTP	
Ref=	1/2017
Cum=	1,067,243
OIL-BBL/DAY	
Ref=	1/2017
Cum=	0
WATER-BBL/DAY	
Ref=	1/2017
Cum=	13,572



**CK 7 Federal 1
30-015-33420
Cimarex Energy Company of CO
February 27, 2017
Conditions of Approval**

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

Work to be completed by May 27, 2017.

- 1. Operator shall set a CIBP at 11,794' (50' above top most perf) and place 330' Class H cement on top. Tag required at a minimum of 11,463' to seal the top of the Morrow Formation.**
- 2. 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.**
- 3. 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.**

If the Strawn is found uneconomic continue with plug back as follows:

- 4. Operator shall set a CIBP at 10,589' (50' above top most perf) and 35' Class H cement on top to isolate the Strawn Formation**
- 5. DHC approved as written by the operator.**
- 6. 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.**
- 7. Before casing or a liner is added or replaced, prior BLM approval of the design is required. Use notice of intent Form 3160-5.**

8. Surface disturbance beyond the originally approved pad must have prior approval.
9. Closed loop system required.
10. 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.
11. Operator to have H2S monitoring equipment on location.
12. 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.
13. **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.**
14. See attached for general requirements.

JAM 022717

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

General Requirements for Plug Backs

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 90th day provide this office, prior to the 90th 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.

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.**

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.