			NMOCI	D		
Form 3160-5 (June 2015) DE BU SUNDRY Do not use thi abandoned we	UNITED STATE PARTMENT OF THE I UREAU OF LAND MANA NOTICES AND REPO is form for proposals to II. Use form 3160-3 (AP	S NTERIOR GEMENT RTS ON W drill or to re D) for such	Artesia ELLS enter an proposals.	l	FORN OMB Expires: 5. Lease Serial No. NMLC065347 6. If Indian, Allottee	A APPROVED NO. 1004-0137 January 31, 2018
SUBMIT IN T	RIPLICATE - Other ins	tructions or	page 2		7. If Unit or CA/Ag	reement, Name and/or No.
1. Type of Well ☐ Gas Well ☐ Oth	ler		<u>,,,,,,,,,,</u> ,,,,,,,,,,,,,,,,,,,,,		8. Well Name and Ne WHITE CITY PE	NN 28 GAS COM UTI 4
2. Name of Operator CIMAREX ENERGY COMPA	Contact: NY OF CO-Mail: tstathem@	TERRI STA	THEM		9. API Well No. 30-015-33862	-00-S2
3a. Address 202 S CHEYENNE AVE SUIT TULSA, OK 74103.4346	E 1000	o. (include area code) 20-1936		10. Field and Pool o WC-015 G-04	r Exploratory Area Bone Se	
4. Location of Well (Footage, Sec., T	, R., M., or Survey Description	<u> </u>		11. County or Parish	, State	
Sec 28 T24S R26E NESW 1980FSL 1500FWL					EDDY COUNT	ΓY, NM
12. CHECK THE AF	PPROPRIATE BOX(ES)	TO INDICA	TE NATURE O	F NOT	TICE, REPORT, OR OT	HER DATA
TYPE OF SUBMISSION			TYPE OF	ACTI	ON	·
Notice of Intent	☐ Acidize	🗖 De	epen	🗖 Pr	oduction (Start/Resume)	□ Water Shut-Off
X Nonce of Intent	Alter Casing	🗖 Hy	draulic Fracturing	🗖 Re	eclamation	Well Integrity
Subsequent Report	Casing Repair	🗋 Ne	w Construction	🛛 Re	ecomplete	□ Other
Final Abandonment Notice	Change Plans	🗖 Plu	g and Abandon	🗖 Te	emporarily Abandon	
28 Gas com Unit 3 #4 well to t attached procedure. If the Str. White City Penn (Gas) pool ar procedure. Cimarex also requests approv	he White City; Penn (Ga awn is uneconomic Cima id also perf the Wolfcamp al to downhole commingl	s) pool (Stray rex proposes formation a e the Cisco (	vn formation)acco to add Cisco Ca s indicated on the Canyon and the W	ording t nyon p attach	o the erfs in the ned np pools. The	ARTESIA DISTRICT
2016 White City Area Downho The field study was approved	le commingling Field Stu 7/6/16. Bone Sprim	dy included t 5 Will k	he referenced we	ll for co Via	annulus	-REGEIVED
NMOCD DHC permit: DHC 48	305 -		TS	EE .	ATTACHED F	OR
<ol> <li>I hereby certify that the foregoing is</li> <li>Commit</li> </ol>	true and correct. Electronic Submission # For CIMAREX ENE tted to AFMSS for process	366780 verifie ERGY COMPA sing by DEBO	d by the BLM Wel NY OF CO, sent to RAH MCKINNEY o	l Inform the Ca n 02/14	nation System avisbad V2017 (17DLM0869SE)	
Name (Printed/Typed) TERRIST	ATHEM		Title MANAG		GULATORY COMPLIA	
Signature (Electronic S			Date 02/11/20		APPROVE	
Approved By Conditions of approval, if any, are attached ertify that the applicant holds legal or equ which would entitle the applicant to condu	<ol> <li>Approval of this notice does itable title to those rights in the ct operations thereon.</li> </ol>	not warrant or e subject lease	Title Office	B	MAH 3 U 201 UREAU OF VAND MANAGE	
Fitle 18 U.S.C. Section 1001 and Title 43 States any false, fictitious or fraudulent s	U.S.C. Section 1212, make it a tatements or representations as	crime for any p to any matter v	erson knowingly and rithin its jurisdiction.	willfully	to make to any departmen o	or agency of the United
(Instructions on page 2) <b>** BLM REV</b>	SED ** BLM REVISEI	D ** BLM R	EVISED ** BLM		SED ** BLM REVISE	ED **

## Additional data for EC transaction #366780 that would not fit on the form

#### 32. Additional remarks, continued

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

		JOIL CONSERV.	
District I 1625 N. French Dr., Holdos, NM \$8740	State of New Mexico	ARTESIA DISTRIC	T Form C-102
Phone: (375) 393-6164 Fax: (575) 393-6720 District II 811 S. Fist St., Artesia, NM 82210 Phone: (575) 748-1283 Fax: (575) 748-9720 District III 1000 Rio Brazos Rond, Aztee, NM 87410 Phone: (505) 334-6178 Fax: (505) 334-6170 District IV 1220 S. St. Francis Dr., Sonta Fe, NM 87505 Phone; (505) 476-3460 Fax: (505) 476-3462	Energy, Minerals & Natural Resources De OIL CONSERVATION DIVISION 1220 South St. Francis Dr. Santa Fe, NM 87505	Partmer 1 0 2017 Subn RECEIVED	Revised August 1, 2011 nit one copy to appropriate District Office
	WELL LOCATION AND ACREAGE DEDICA	ATION PLAT	
A DI Number	F Paul Cada	J Bash Marrie	

· · · ·	API Number	r 		* Poul Cude		<sup>3</sup> Pool Name				i
30-0	15-338	62	87	280		White Cit	y;Penn (Gas	)		
<sup>4</sup> Property 0 30301	Code LO	White City Penn 28 Unit 3 4						/ell Number		
'ogrid i 16268	No. 33		Cimarex Energy of Colorado 30			(Energy of Colorado				
" Surface Location										
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feel from the	East	West line	County
К	28	245	26E		1980	South	1500	W	est .	Eddy
4	" Bottom Hole Location If Different From Surface									
UL or lot no.	Section	Township	Range	Lat Idn	Fect from the	North/South line	Feet from the	East	West line	County
N	28	24S	<b>2</b> 6E		690	South	1306	We	st	Eddy
12 Dedicated Acres	s <sup>13</sup> Joint o	r Infill <sup>14</sup> C	onsolitiation	Code <sup>15</sup> Or	der No.			· · · · · · · · · · · · · · · · · · ·		
640										

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.

والمحمور ويعاولوا فتنتك ووالعدين والمترافة فكالماسات فارتجا الأمانة المصحك المحاد المتعاد والمراجع		
		" OPERATOR CERTIFICATION
		I hereby certify that the information contained herein is true and complete
		to the best of my hoowledge and helief, and that this organization either
		owns a working interest or unleased mineral interest in the land including
	}	the proposed bottom hole location or has a right to shill this well at this
	, (	location personal to a construct with an owner of such a mineral or working
·		Increst, or to a voluplary pushing agreement or a compulsory publing
		order heretofore intered by pe division.
		Signuture Terri Stathem
		Tstathem@cimarex.com
		E-mail Address
		<b>"SURVEYOR CERTIFICATION</b>
CHI		I hereby certify that the well location shown on this
1500'		plat was plotted from field notes of actual surveys
		used a huma or under no runginision and that the
		mane of the or miner me super ristor, was the the
		some is fuie and correct to the best of my belief.
		Date of Survey
		Signature and Scal of Professional Surveyor:
1306' DTL		
T S		
ч j		
69		Certificato Number

	Source Line Const	Ervat.O.
District 1 1625 N. French Dr., Hohbs, NM 88240 Phone: (373) 393-6161 Fax: (573) 393-6720 District 11 811 S. Fret St., Attecka, NM 88210 Phone: (575) 748-1283 Fax: (575) 748-9720 District 111 1000 Hin Brazos Band Avine, NM 87410	State of New Mexico ARTESIA DIS Energy, Minerals & Natural Resources DepartmARR 1 0 OIL CONSERVATION DIVISION 1220 South St. Francis Dr.	Form C-102 2017 Revised August 1, 2011 Submit one copy to appropriate District Office
1000 Rio Brazos Roud, Aztec, NM 87410 Phone: (SOS) 334-6178 Fax: (SOS) 334-6170 Distiliet IV 4220 S. St. Francis Dr., Sonta Fe, NM 87505 Phone: (SOS) 476-3460 Fax: (SOS) 476-3462	Santa Fe, NM 87505	AMENDED REPORT

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		1 11	SUP TO	CATIO	N AND ACK	EAGE DEDIC	ATIONPLA	1	
30-0	15-338	r 62		<sup>7</sup> Pool Code 98220		Purple Sage – Wolfcamp (Gas)			
<sup>•</sup> Property 0 30301	Code LO			White City Penn 28 Unit 3					Well Number
<sup>7</sup> ogrid i 16268	No, 33		Cima	Cimarex Energy of Colorado					'Elevation 3076'
" Surface Location									
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
К	28	24S	26E		1980	South	1500	West	Eddy
			" Bot	tom Hol	e Location If	Different Fron	1 Surface		
UL or lot no.	Section	Township	Range	Lot Ida	Feet from the	North/South line	Feet from the	East/West line	Conaty
N	28	24S	26E		690	South	1306	West	Eddy
11 Dedicated Acres	13 Johnt of	r Isfill 14 Cor	rsolidation C	Code 15 Or	der No.				
320									

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.

Te-				
1F				" OPERATOR CERTIFICATION
				I hereby certify that the information contained herein is true and complete
				to the bast of my knowledge and belief, and that this organization either
				onves a working interest or unleased mineral interest in the land including
				the persposed bettime hole location or lives a right to drill this well at this
				location paranent to a contract with an owner of such a mineral or working
	-1-		×	provert, or to a potentiary pooling agreement of a computency proling
			/	order hereiologe engred by the division.
				Signuture Terri Stathem
				Printed Name
				T Shath and O simona and
				I Stathem@cimarex.com
				E-mail Address
				*SURVEYOR CERTIFICATION
	SHI			I hereby certify that the well location shown on this
1500'				plat was plotted from field notes of actual surveys
	Ý I			made by me or under my supervision, and that the
				- me to ture and a survey to the best of my bolist
				same is rue and correct to the best of my belley.
		·······		Date of Survey
				Signature and Seal of Professional Surveyor:
ព្ភបា				
<u>1306'</u>	2			
Ĭ	986			
ó	Ч			
69				Certificato Number

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Downhole Commingling Worksheet

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Operator: Lease/Well Name/API Number/Location:	Cimarex Energy White City Penn 28 Gas Com Unit	t 3 #4/30-015-33862/Sec. 28, T2	4S, R26E
Date:			
	L		Estimated Combined
	Boutom Formation	Upper Formation Burnio Sano - Wolfsomo Goo	
		ruipie Jage - Wuildanip Gds	
Pool Code	8/280	98220	
State Form C-102 with dedicated Acres Provided	640 acres	320 acres	
Formation Name	Cisco Canyon	Wolfcamp	
Top and Bottom of Pay Section (Perforated or open-Hole Interval)	,596'6 ,089'6	8,349' - 9,680'	8,349' 9,969'
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: 53.5° API Gas: 1142.4 BTU	Oil: 51.8" API Gas: 1225.8 BTU	Oil: 52.1° API Gas: 1212.5
	dry / 1122.6 BTU wet @ 14.73	dry / 1204.6 BTU wet @ 14.73	BTU dry / 1191.5 BTU wet
Oil gravity and/or BTU	isa	psi	@ 14.7 psi
Average Sulfur Content (Wt %)	o	o	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: N/A Expected Rate:
Date and Oil/Gas/Water rates of Last Production (new zones or no production history Operator abolt acceleration and and compared and compared data)	Date: N/A Expected Rate: 16	Date: N/A Expected Rate: 84	100 BOPD, 2507 MCFD,
Average decline % ( provide back up data)	7% (terminal)	7% (terminal)	7% (teterminal)
Fixed Allocation Percentage	Oil: 16% Gas: 16%	Oil: 84% Gas: 84%	Oil: 100% Gas: 100%
Remarks:	Production history for analogs fo	ır both zones provided in field s	tudy appendix.
Conserver Standartures 11111 XA			
Date: 2-13-17 X WWW A A			
Attached Supporting documents	<b>[</b>		
State Form C-102 With desireated Areas Brivided	T		

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 weil production and decline curves etc..) \*Utilize weighted average.

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White City Penn 28 Gas Com Unit 3 #4 Plugback Procedure

Well Data	
КВ	21'
TD	11,900'
PBTD	10,492'
Casing	13-3/8" 54.5# J-55 @ 350'. Cmt'd w/ 350 sx, cmt circ 9-5/8" 40# N-110HC @ 1,600'. Cmt'd w/ 700 sx, cmt circ 5-1/2" 17# P-110 @ 11,900'. Cmtd w/ 1,175 sx. TOC @ 2,750' by CBL
Tubing	2-3/8" 4.7# L-80 8rd, EOT
Current Prod. Perfs	Bone Spring (6,622′ – 6,883′)
Proposed RC Perfs	Strawn (9,969' – 10,121')

### White City; Penn (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 7% KCl.
- 4. Nipple down wellhead, nipple up 5,000 psi blow out preventer stack.
- 5. TOOH w/ rods, pump, and 2-3/8" 4.7# L-80 tbg. Stand back tbg. Scan tubing during TOOH.
- 6. RU wireline
- 7. RIH w/ GR/JB to +/- 10,121'
- 8. RIH w/ casing guns to perforate Strawn 9,969' 10,121' ~
- 9. RIH to set packer w/ pump out plug set to 1800 psi differential pressure at +/- 9,919'
- 10. RDMO Wireline
- 11. TIH w/ 2-3/8" tbg and gas lift valves to latch into packer
- 12. ND BOP, NU WH
- 13. RDMO pulling unit
- 14. RU pump truck and pump out plug
- 15. MIRU Propetro acid
- 16. Pump 20,000 total gallons of 20% NEFE HCl with 225 ball sealers down 2-3/8" tubing
- 17. Flush with 1 tubing volume 2% KCl
- 18. Put well on production. Swab well as necessary. Produce Strawn via tubing and Bone Spring via annulus.

#### Page 2 White City Penn 28 Gas com Unit 3 #4

If Strawn recompletion is unsuccessful, move forward with procedure to plugback to the Cisco Canyon and Wolfcamp and DHC these two zones and continue to produce the Bone Spring via annulus.

### <u>Cisco Canyon & Wolfcamp (Ciscamp) Recompletion Procedure</u>

**Proposed RC Perfs** Wolfcamp (8,349' - 9,680') & Cisco Canyon (9,680' - 9,969')

- 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
- Release packer and TOOH w/ 2-3/8" 4.7# L-80 tbg. Stand back Tubing. 5.
- 6.
- 7.
- RIH w/ CIBP and set at +/- 10,004' topper @ 9,910', 50( IBP @ 9,919' RIH w/ WL to bail 35' of cement on tor start 8. Note: This will place TOC at top of Strawn
- 9. RU Pump truck and pressure test casing to 8,500 psi on a chart for 30 minutes with no more than 10% leak off.
- 10. ND 5k BOP, RDMO PU
- 11. RU two 10k frac valves and flow cross
- MIRU water transfer with frac tanks to contain water to be pumped from frac pond 12.
- 13. Test frac valves and flow cross prior to frac job. Arrange for these items, manlift, forklift, and Pace testers to be on location the day before the frac job to test so that we do not have the frac waiting on a successful test the following day.
- 14. RU frac valves, flow cross, goat head, and wireline lubricator.
- 15. RIH w/ gauge ring/junk basket for 5-1/2" 17# P-110 csg to +/- 9,969'
- 16. Perforate Cisco Canyon from 9,680' - 9,969'.
- 17. RU frac and flowback equipment.
- 18. Acidize and frac Cisco Canyon perfs down casing.
- 19. Set 10k flow through composite plug 15' uphole of top perforation
- 20. Test to 8,500 psi
- 21. Perforate Wolfcamp from 8,349' - 9,680'.
- 22. Acidize and frac Wolfcamp perfs down casing.
- 23. Set 10k flow through composite plug 15' above top perforation
- 24. Test to 8,500 psi
- 25. RD frac
- MIRU 2" coiled tbg unit. 26.
- 27. RIH w/ blade mill & downhole motor on 2" CT and drill out sand and composite plugs using freshwater for circulation. Pump sweeps each time a plug is tagged, each time a plug is drilled out, and every 60 bbls pumped.
- 28. Clean out to PBTD 9,969'
- POOH w/ blade mill, motor & CT 29.

#### Page 3 White City Penn 28 Gas com Unit 3 #4

- 30. RDMO coiled tbg unit.
- 31. Flow back well for 24 hours, then SI well overnight.
- 32. RU wireline and lubricator.
- 33. RIH w/ GR/JB for 5-1/2" 17# P-110 to +/- 8,299'
- 34. RIH w/ 2-3/8" WEG, 2-3/8" pump out plug pinned for 1,500 2,000 psi differential pressure, 10' 2-3/8" 4.7# L-80 tbg sub w/ 1.875" XN profile nipple w/ blanking plug in place, 5-1/2" Arrowset 1X packer and on-off tool stinger w/ 1.875" X profile nipple. Set packer +/- 8,299'. From downhole up:
  - a. 2-3/8" WEG
  - b. 2-3/8" pump out plug pinned for 1,500 2,000 psi differential pressure
  - c. 1.875" XN profile nipple
  - d. 10' 2-3/8" 4.7# L-80 tbg sub
  - e. 5-1/2" x 2-3/8" Arrowset 1X packer and on-off tool stinger w/ 1.875" X profile nipple
- 35. RD WL and lubricator
- 36. ND goat head and frac valve, NU BOP, MIRU Pulling Unit
- 37. TIH w/ on/off tool overshot, GLVs, and 2-3/8" 4.7# L-80 tbg.
- .38. Latch overshot onto on-off tool and space out tubing
- 39. ND BOP, NU WH
- 40. RDMO pulling unit
- 41. RU pump truck and pump out plug. Put well on production. Produce Ciscamp via tubing and Bone Spring via annulus.
- 42. Run Production Log for allocation purposes after recovering load. Run additional production logs if actual production varies significantly from expected performance. Send copies of these logs to BLM and file for an adjustment of allocation factor if necessary.







			I I I I I I	TRÀNH BUNN		
www.permianls.com						
575.397.3713 2609 W Marland Hobbs NM 88240						
For:	Cimarex Energy Attention: Mark 600 N. Marienfe Midland, Texas	/ Cummings eld, Suite 600 79701	Sample: Identification: Company: Lease: Plant:	Sta. <b>#</b> 309588185 Wigeon 23 Fed Com 1 Cimarex Energy		
Sample Data:	Date Sampled Analysis Date Pressure-PSIA Sample Temp F Atmos Temp F	7/30/2013 12:25 7/31/2013 900 107 85	5 PM Sampled by: Analysis by:	Taylor Ridings Vicki McDaniel		
H2S =	0.3 PPM					
	Co	mponent Analysis				
Hydrogen Sulfide	H2S	Mol Percent	GPM			
Nitrogen Carbon Dioxide Methane	N2 CO2 C1	0.677 0.123 82.764				
Ethane Propane I-Butane N-Butane I-Pentane	C2 C3 IC4 NC4 IC5	9.506 3.772 0.640 1.185 0.335	2.536 1.037 0.209 0.373 0.122			
N-Pentane Hexanes Plus	NC5 C6+	0.374 0.624	0.135 0.270			
		100.000	4.681			
REAL BTU/CU.FT. At 14.65 DRY At 14.65 WET At 14.696 DRY	1219.2 1197.9 1223.0	Specific Gravity Calculated	0.6973			
At 14.696 WET At 14.73 DRY At 14.73 Wet	1202.1 1225.8 1204.6	Molecular Weight	20,1966			

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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 <sup>°</sup> 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		

	s	ummary		Analysis of Sample 43887 @ 75 °F									
Sampl	ing Date:		05/14/08	Anions		mg/	m	eq/l	Cations		m	g/l	meq/l
Analys	is Date:		05/15/08	Chloride	9:	55040.0	1552	.48	Sodium	:	32207	<b>7.4</b>	1400.94
Analys	st:	WAYNE	PETERSON	Bicarbo	nate:	329.4		5.4	Magnes	lum:	268	3.0	22.05
TDS (r	na/l or a/m	13):	90873.3	Carbona	ate:	0.0	1	0.	Calcium	1:	2780	0.0	138.72
Densit	v (a/cm3	tonne/m3	1.062	Sulfate:		225.0	4	.68	Strontiu	im:			
Anion	Cation Ra	tia:	<b>,</b>	Phospha	ate:				Barium:	:			
Anon	Gabon Na	uo.		Borate:					Iron:		23	1.5	0.85
1				Silicate:					Potassiu	ım:			
									Aluminu	m:			
Carbo	1 Dioxide:		150 PPM	Hydrogen Sulfide:				M	Chromium:				
Oxyge	n:			nLl at tim	o of complia		7	24	Copper:				
Comm	ents:			pri at un	le or sampling	3:	/	.31	Lead:				
				pH at tim	e of analysis	:			Mangan	ese;			
TEST	RAN IN TH	E FIELD		pH used	l in Calculati	on:	7	.31	Nickel:				
Cond	itions		Values C	alculated	at the Give	n Conditic	ns - Amou	nts	of Scale	in lb/10	00 bbl		
<u> </u>	Caunc	Ca	alcite	Gvp	sum .	Anhy	drite		Celesti	te	Ba	rite	CO2
Temp	Press.	C	aCO <sub>3</sub>	CaSO	42H2 0	Ca	so4		SrSC	4	Ba	SO4	Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	jr	ndex A	mount	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

-1.02

0.00

0.00

0.00

0.00

0.00

0.38

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

-1.23

140

0

1.02

39,74

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



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	Sampled by: K. Hooten	
	Sample Temp F	76.4	Analysis by: Vicki McDaniel	
	Atmos Temp F	76		

H2S =

### **Component Analysis**

		Mol	GPM
		Percent	
Hydrogen Sulfide	H2S		
Nitrogen	N2	0.618	
Carbon Dioxide	CO2	0.172	
Methane	C1	88.390	
Ethane	C2	7.080	1.889
Propane	C3	1.966	0.540
I-Butane	IC4	0.355	0.116
N-Butane	NC4	0.569	0.179
I-Pentane	IC5	0.198	0.072
N-Pentane	NC5	0.213	0.077
Hexanes Plus	C6+	0.439	0.190
		100.000	3.063
REAL BTU/CU.FT.		Specific Gravity	
At 14.65 DRY	1136.2	Calculated	0.6445
At 14.65 WET	1116.4		
At 14.696 DRY	1139.7		
At 14.696 WET	1120.3	Molecular Weight	18.6673
At 14.73 DRY	1142.4		
At 14.73 Wet	1122.6		

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

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

## OIL ANALYSIS

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

Cloud Point:	89 <sup>°</sup> 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 C201142.



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

Cond	itions	ons Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Ca I C	alcite CaCO <sub>3</sub>	Gyp CaSC	sum 042H20	Ani C	nydrite CaSO <sub>4</sub>	Cel S	estite rSO <sub>4</sub>	Ba Ba	arite aSO <sub>4</sub>	CO <sub>2</sub> Press
۴	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	<b>0</b> .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 *White City Penn 28 Gas Com Unit 3 #4* well (API: 30-015-33862).

The proposed "allocation factors" have been estimated following BLM's approved allocation methodology in the 2016 Downhole Commingling Field Study "Cisco Canyon and Wolfcamp (Ciscamp) Commingled Allocation Assessment in White City, Eddy County, NM" (NMP0220), approved by BLM on July 6, 2016 (Appendix A). Based on this approach and the assessment of subsurface data, the recommended initial allocation factors are 84% for the Wolfcamp and 16% for the Cisco Canyon.

The support evidence for this application includes petrophysical assessment and recoverable reserves estimation for each proposed formation (Table 1) and a log section (Appendix B).

### **Proposed Recompletion**

Cimarex plans to recomplete the *White City Penn 28 Gas Com Unit 3 #4* well to the Cisco Canyon and the Wolfcamp formations. This well is located within the BLM approved White City Ciscamp Field Study Area (see Exhibit 6A of the above referenced Field Study) and is currently completed in the Bone Spring formation. The well has produced 932 bbls of oil and 34 MMCF of gas (see **Appendix C**). The company plans to temporarily abandon the currently producing Bone Spring perforations with a cement squeeze. The company is considering testing the Strawn formation. If the Strawn is not currently commercially viable when producing alone, the company intends to:

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

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

The proposed Ciscamp recompletion will be performed with a *multi-stage frac job*. The plan is to commingle Wolfcamp and Cisco Canyon streams downhole immediately after completion to allow faster flowback recovery and more efficient artificial lift. The synergy between both



White City Penn 28 GCU 3#4

CONFIDENTIAL. December 29, 2016 Production Operations – Carlsbad Region, Permian Basin White City Penn 28 GCU 3 #4 - Cisco Canyon and Wolfcamp (Ciscamp) Proposed Commingling Allocation Factors. Eddy County, NM

streams has shown to significantly improve liquid unloading in analog wells by maintaining higher and more stable critical gas velocities for a longer period. This in turn minimizes formation damage and increases reserves recovery by extending the life of the well.

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

## **Proposed Initial Production Allocation Factors**

Based on BLM's approved Allocation Methodology and Cimarex's assessment, the "Initial Allocation Factors" for the New Completion Zones in subject well are estimated as follows:

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

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

The Recoverable Gas in Place (RGIP) for subject well is **1,499 MMCF** from the Wolfcamp and **292 MMCF** from the Cisco Canyon, for a total of **1,790 MMCF of gas** (see Table 1). In this case, the proposed commingling intervals have never produced in this well (no prior cumulative production), therefore Remaining RGIP (RRGIP) is equal to RGIP for both formations.

The resulting proposed allocation factors are calculated as follows:

$$Wolf camp \% Alloc. Factor = \frac{1,499 MMCF}{1,790 MMCF} = 84\%$$
  
Cisco Canyon % Alloc. Factor =  $\frac{292 MMCF}{1,790 MMCF} = 16\%$ 

The RGIP for each zone is estimated using the Hydrocarbon Pore Volume (HCPV) assessment as shown in Table 1. The implemented net pay cut-offs are Average Porosity (PHI) > 6-10% and Average Sw < 25-45%. Total estimated oil reserves are 57 MBO.

Proposed RC Zone(S)	Avg. Depth, ft	Est. Reservoir Pressure, psi	Net Pay, h (ft)	Avg. PHI	Avg. Sw	HCPV (1-Sw)*PHI*h	OGIP, MMCF	Est. Recovery Factor	RGIP @RF, MMCF	Zone Prod. Start Date	Prev. Cum. Gas to Date, MMCF	Remaining RGIP (RRGIP), MMCF	Initial Alloc. Factors, % (based on RRGIP Ratio)
Wolfcamp Total :	9,116	3,965	204	12.1%	20%	19.9	1,765	85%	1,499			1,499	84%
Cisco Canyon :	9,874	4,295	30	14.8%	15%	3.7	343	85%	292		-	292	16%
Total:			233			23.7	2,108	85%	1,790			1,790	100%

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



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.



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 B. 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 Cody R. Layton

Assistant Field Manager, Lands and Minerals

Enclosure cc: NMP0220 (CFO I&E)

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



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**CONFIDENTIAL. December 29, 2016** 

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

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



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White City Penn 28 Gas Com UTI 4 30-015-33862 Cimarex Energy Company of CO March 30, 2017 Conditions of Approval

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

Work to be completed by June 30, 2017.

- 1. Approved to drill out the DV tool plug and the Wolfcamp plug.
- 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 9,919' (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.

**<u>NOTE</u>**: The Bone Spring production shall remain completely separate from the Strawn (if successful) and the Cisco Canyon and Wolfcamp production.

- 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 033017

### 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 <u>ninety (90)</u> 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. <u>Notification:</u> 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. <u>Blowout Preventers</u>: 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. <u>Mud Requirement:</u> 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. <u>Cement Requirement</u>: 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. <u>Subsequent Plug back Reporting</u>: 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. <u>Show date work was completed.</u>

7. <u>Trash</u>: 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.