Revised March 23, 2017

RECEIVED:	REVIEWER:	TYPE:	APP NO:
9/1/17		DHC	pMAM1724448188

ABOVE THIS TABLE FOR OCD DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION
- Geological & Engineering Bureau -
1220 South St. Francis Drive, Santa Fe, NM 87505

ADMINISTRATIVE APPLICATION CHECKLIST

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE

Applicant: Cimarex Energy Co. Of Colorado **OGRID Number:** 162683
Well Name: New Mexico DD State Com #2 **API:** 30-015-33229
Pool: White City; Penn (Gas), Purple Sage, Wolfcamp (Gas) **Pool Code:** 87280, 98220

SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED BELOW

-DHC-4818

1) **TYPE OF APPLICATION:** Check those which apply for [A]
A. Location – Spacing Unit – Simultaneous Dedication
☐NSL ☐NSP(PROJECT AREA) ☐NSP(PRORATION UNIT) ☐SD

B. Check one only for [I] or [II]
[I] Commingling – Storage – Measurement
■DHC ☐CTB ☐PLC ☐PC ☐OLS ☐OLM
[II] Injection – Disposal – Pressure Increase – Enhanced Oil Recovery
☐WFX ☐PMX ☐SWD ☐IPI ☐EOR ☐PPR

FOR OCD ONLY
☐ Notice Complete
☐ Application Content Complete

2) **NOTIFICATION REQUIRED TO:** Check those which apply.
A. ☐ Offset operators or lease holders
B. ☐ Royalty, overriding royalty owners, revenue owners
C. ☐ Application requires published notice
D. ☐ Notification and/or concurrent approval by SLO
E. ☐ Notification and/or concurrent approval by BLM
F. ☐ Surface owner
G. ☐ For all of the above, proof of notification or publication is attached, and/or,
H. ■ No notice required

3) **CERTIFICATION:** I hereby certify that the information submitted with this application for administrative approval is **accurate** and **complete** to the best of my knowledge. I also understand that **no action** will be taken on this application until the required information and notifications are submitted to the Division.

Note: Statement must be completed by an individual with managerial and/or supervisory capacity.

Amithy Crawford
Print or Type Name

Amithy Crawford
Signature

8/30/2017
Date

432-620-1909
Phone Number

acrawford@cimarex.com
e-mail Address

RECEIVED OCD
2017 SEP -1 P 2:36

Cimarex Energy Co.
202 S. Cheyenne Ave.
Suite 1000
Tulsa, Oklahoma 74103-4346
PHONE: 918.585.1100
FAX: 918.585.1133

CIMAREX

Michael McMillian
Oil Conservation Division
New Mexico Department of Energy,
Minerals and Natural Resources
1220 South Saint Francis Drive
Santa Fe, New Mexico 87505

Re: New Mexico DD State Com 2
API 30-015-33229
Section 32, Township 24 South, Range 26 East, N.M.P.M.
Eddy County, New Mexico.

Dear Mr. McMillian:

The New Mexico DD State Com 2 well is located in the SW/4 of Sec. 32-24S-26E, Eddy County NM.

Cimarex is the operator of the SW/4 of Sec. 32, 24S, 26E, Eddy County, NM as to all depths from the surface of the Earth down to 11,710'. Ownership within these depths in the SW/4 are identical.

Sincerely,

Caitlin Pierce

Caitlin Pierce
Production Landman
cpierce@cimarex.com
Direct: 432-571-7862

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	[2] Pool Code	[3] Pool Name
30-015-33229	98220	Purple Sage Wolfcamp Gas

[4] Property Code	[5] Property Name	[6] Well Number
	NM DD State Com	2

[7] OGRID No.	[8] Operator Name	[9] Elevation
162683	Cimarex Energy Co of Colorado	3398'

[10] Surface Location

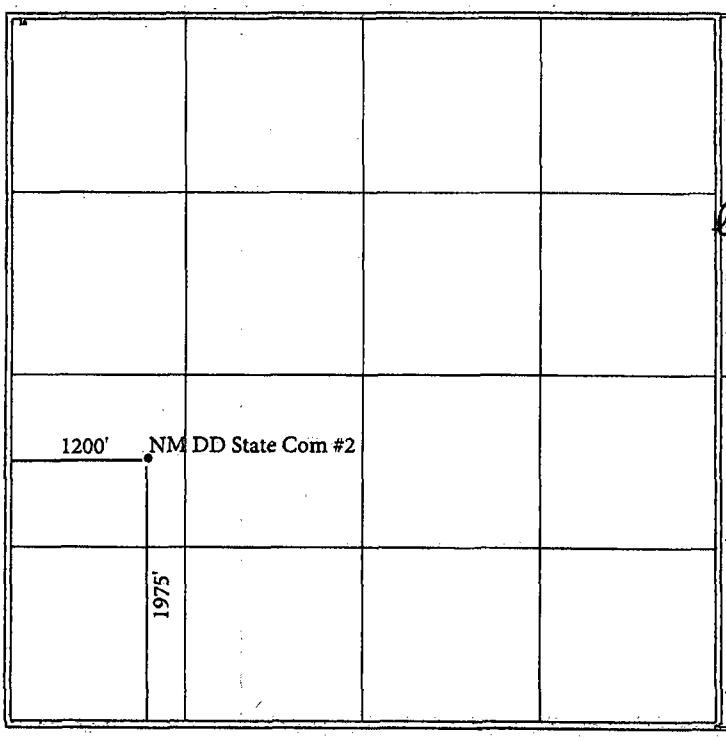
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	32	24S	26E		1975	South	1200	West	Eddy

[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

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order 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.



[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 unleased 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 — 9/1/2017 Date

Amithy Crawford
Printed Name

acrawford@cimarex.com
E-mail Address

[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

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	[2] Pool Code	[3] Pool Name
30-015-33229	87280	White City (Penn) Gas

[4] Property Code	[5] Property Name	[6] Well Number
	NM DD State Com	2

[7] OGRID No.	[8] Operator Name	[9] Elevation
162683	Cimarex Energy Co of Colorado	3398'

[10] Surface Location

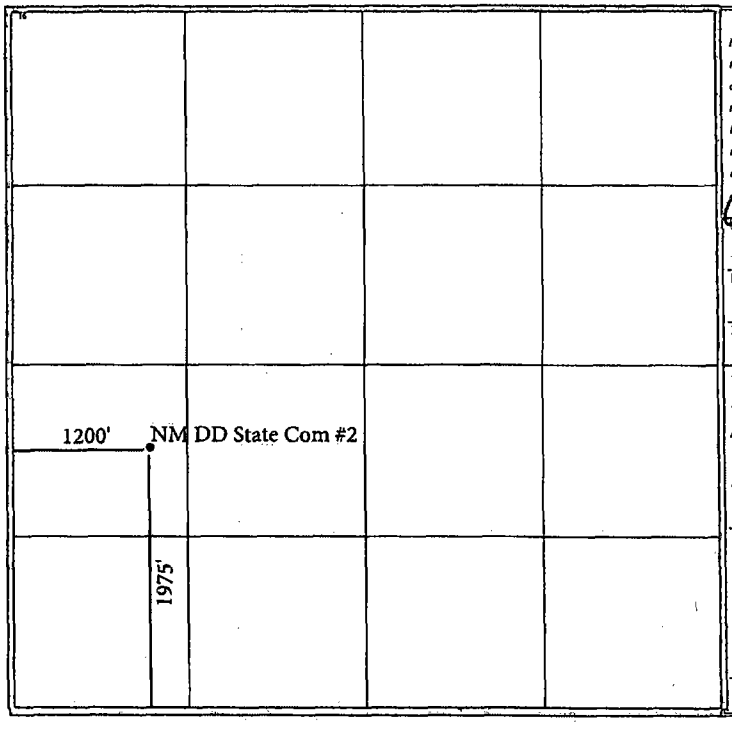
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	32	24S	26E		1975	South	1200	West	Eddy

[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

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order 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.



[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 unleased 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 — 9/1/2017 Date

Amithy Crawford
Printed Name

acrawford@cimarex.com
E-mail Address

[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

District I
1625 N. French Drive, Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources Department

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

APPLICATION FOR DOWNHOLE COMMINGLING

Form C-107A
Revised June 10, 2003

APPLICATION TYPE
__X__ Single Well
____ Establish Pre-Approved Pools
EXISTING WELLBORE
__X__ Yes ____ No

Cimarex Energy Co. of Colorado — Operator
600 N. Marienfeld St., Ste. 600; Midland, TX 79701 — Address

NM DD State Com — Lease
002 — Well No.
D-32-24S-26E — Unit Letter-Section-Township-Range
Eddy — County

OGRID No. 162683 Property Code _____ API No. 30-015-33229 Lease Type: ____Federal __X__State____ Fee

DATA ELEMENT	UPPER ZONE	LOWER ZONE
Pool Name	Purple Sage Wolfcamp(Gas)	White City Penn Gas
Pool Code	98220	87280
Top and Bottom of Pay Section (Perforated or Open-Hole Interval)	8372'-9667'	9692'-10074'
Method of Production (Flowing or Artificial Lift)	Flowing	Flowing
Bottomhole Pressure (Note: Pressure data will not be required if the bottom perforation in the lower zone is within 150% of the depth of the top perforation in the upper zone)	Within 150% of top perf	Within 150% of top perf
Oil Gravity or Gas BTU (Degree API or Gas 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
Producing, Shut-In or New Zone	New Zone	New Zone
Date and Oil/Gas/Water Rates of Last Production. (Note: For new zones with no production history, applicant shall be required to attach production estimates and supporting data.)	Date: N/A Rates: 79 BOPD, 1981 MCFPD, 500 BWPD	Date: N/A Rates: 21 BOPD, 526 MCFPD, 133 BWPD
Fixed Allocation Percentage (Note: If allocation is based upon something other than current or past production, supporting data or explanation will be required.)	Oil 79 Gas 79	Oil 21 Gas 21

ADDITIONAL DATA

Are all working, royalty and overriding royalty interests identical in all commingled zones? Yes__X__ No_____
If not, have all working, royalty and overriding royalty interest owners been notified by certified mail? Yes_____ No_____

Are all produced fluids from all commingled zones compatible with each other? Yes__X__ No_____

Will commingling decrease the value of production? Yes_____ No__X__

If this well is on, or communitized with, state or federal lands, has either the Commissioner of Public Lands or the United States Bureau of Land Management been notified in writing of this application? Yes__X__ No_____

NMOCD Reference Case No. applicable to this well: DHC-3871-A

Attachments:
C-102 for each zone to be commingled showing its spacing unit and acreage dedication.
Production curve for each zone for at least one year. (If not available, attach explanation.)
For zones with no production history, estimated production rates and supporting data.
Data to support allocation method or formula.
Notification list of working, royalty and overriding royalty interests for uncommon interest cases.
Any additional statements, data or documents required to support commingling.

PRE-APPROVED POOLS

If application is to establish Pre-Approved Pools, the following additional information will be required:

List of other orders approving downhole commingling within the proposed Pre-Approved Pools
List of all operators within the proposed Pre-Approved Pools
Proof that all operators within the proposed Pre-Approved Pools were provided notice of this application.
Bottomhole pressure data.

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE _____ TITLE Regulatory Analyst DATE 9/1/2017

TYPE OR PRINT NAME Amithy Crawford TELEPHONE NO. 432-620-1909

E-MAIL ADDRESS acrawford@cimarex.com

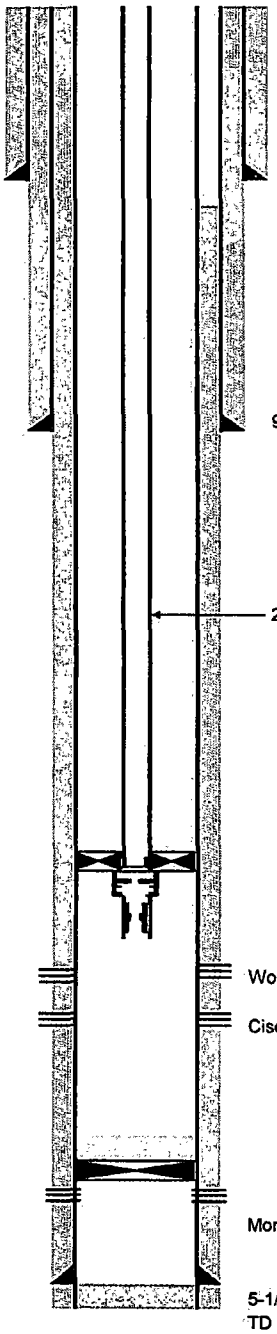
Proposed

CIMAREX

KB - 23' above GL

Cimarex Energy Co. of Colorado
New Mexico DD State Com #2
SHL - 1975' FSL & 1200' FWL

Sec. 26, T-32-S, R-26-E, Eddy Co., NM
S. Runyan 08/24/2017



13-3/8", 54.5# J-55 csg @ 361'
cmtd to surface

9-5/8", 40# P-110 csg @ 1682'
cmtd to sfc

2-3/8" 4.7#J-55 Tbg

Wolfcamp Perfs (8,372'-9,667)

Cisco Canyon Perfs (9,692-10,074)

CIBP @ 11,092 with 25 sxs of cmt

Morrow perfs (11,142' - 11,610')

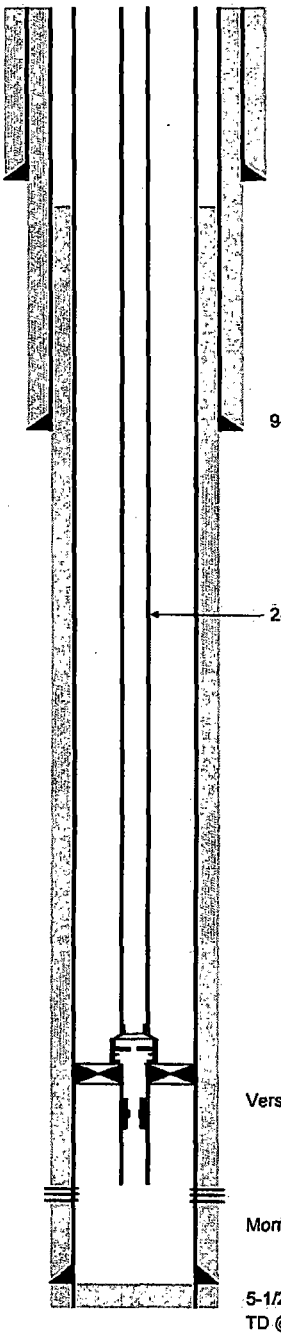
5-1/2" 17# P-110 @ 11,815'
TD @ 11,815'

Current

CIMAREX

Cimarex Energy Co. of Colorado
New Mexico DD State Com #2
SHL - 1975' FSL & 1200' FWL

Sec. 26, T-32-S, R-26-E, Eddy Co., NM
S. Runyan 08/24/2017



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 ***New Mexico DD State Com #2*** well (API: 30-015-33229).

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 ***New Mexico DD State Com #2*** 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 Morrow in this well has no remaining gas reserves. The company plans to abandon the Morrow 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 C.**

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:

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

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

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:

$$\textbf{\textit{Wolfcamp \% Alloc. Factor}} = \frac{1{,}810\ MMCF}{2{,}247\ MMCF} = 81\%$$

$$\textbf{\textit{Cisco Canyon \% Alloc. Factor}} = \frac{436\ MMCF}{2{,}247\ MMCF} = 19\%$$

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 90 MBO.*

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

New Mexico DD State Com 2

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 :	9,122	3,968	266	11.7%	20%	25.0	2,132	85%	1,810			1,810	81%
Cisco Canyon :	9,908	4,310	44	14.7%	13%	5.6	513	85%	436		-	436	19%
Total:			310			30.6	2,645	85%	2,247		-	2,247	100%

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 E. Greene
Carlsbad, New Mexico 88220-6292
www.blm.gov/nm

TAKE PRIDE IN AMERICA

3180 (P0220)

July 6, 2016

Reference:
White City Area
2016 Downhole Commingling Field Study
Eddy County, New Mexico

Cimarex Energy Co. of Colorado
600 N. Marienfeld Street, Suite 600
Midland, TX 79701

Gentlemen:

In reference to your 2016 Downhole Commingling Field Study for the White City Area; it is hereby approved, with the following conditions of approval:

1. All future NOI Sundries submitted to request approval to downhole commingle (DHC) the Lower Penn, Upper Penn and the Wolfcamp formation shall reference this Study and be mentioned in Exhibit 6A. A copy of this study does not need to be attached to the Sundry.
2. All future NOI Sundries submitted to request approval to DHC shall reference NMOCD approval order.
3. All future NOI Sundries submitted to request approval to DHC shall include the BLM's DHC worksheet.
4. All DHC approvals are subject to like approval by NMOCD.
5. The BLM may require an updated evaluation of the field study be done in the future.

Please contact Edward G. Fernandez, Petroleum Engineer at 575-234-2220 if you have any questions.

Sincerely,

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

Enclosure
cc: NMP0220 (CFO I&E)

Appendix C: Recompletion Procedure – New Mexico DD State #2

Well Data

KB	23'
TD	11,815'
PBTD	11,814'
Casing	13-3/8" 54.5# J-55 @ 361'. Cmt'd w/ 400 sx, cmt to sfc 9-5/8" 40# J-55 @ 1,682'. Cmt'd w/ 1,775 sx, cmt circ 5-1/2" 17# P-110 @ 11,734'. Cmt'd w/ 930 sx, cmt @ 580'
Tubing	2-3/8" 4.7# L-80 8rd, EOT @ 10,845'
Proposed RC Perfs	Wolfcamp (8,372' – 9,667') & Cisco Canyon (9,884' – 10,074')

PROCEDURE

1. Pull test anchors, replace as necessary before rig arrival.
2. MIRU pulling unit, rental flare, and choke manifold.
3. Hold safety meeting and perform JSA, discuss risks.
4. Kill well with FSW as needed. Observe all pressures on well and note detail in report.
    a. **NOTE: Treat all water throughout job with biocide.**
    b. Brendan McCalpin 406-498-6647
5. MIRU WSU. Ensure WSU is set and balanced on rig mats before proceeding.
    a. Everyone on location has the ability to use STOP WORK AUTHORITY to shut down operations should a problem or concern arise.
6. ND WH and flowline, NU 5,000 psi hydraulic BOPs.
7. PU tubing, release 5-1/2" versa-set packer @ 11,080' (1/4 turn right hand release).
8. POOH w/2-3/8" tubing & packer. Lay down packer and tubing.
9. MIRU WL and 5-1/2" 17# CIBP.
10. Set CIBP @ +/- 11,092'.
11. Mix 25 sxs class H cement.
12. PU RIH with dump bailor on WL and dump bail cement on top of CIBP.
13. PU 2nd CIBP and set @ +/- 10,800'.
14. RDMO WL company.

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

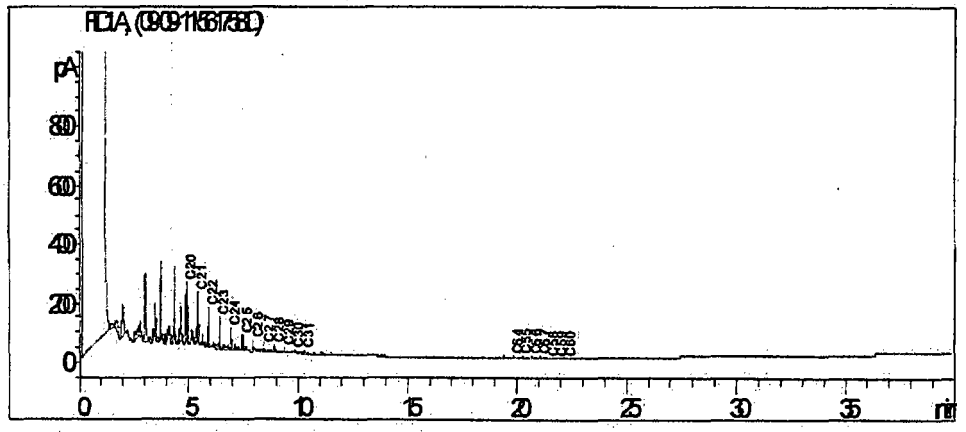
Lab Team Leader - Shella Hernandez
(432) 495-7240

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	
Sampling Date:	09/28/11
Analysis Date:	10/13/11
Analyst:	SANDRA GOMEZ
TDS (mg/l or g/m3):	86836.7
Density (g/cm3, tonne/m3):	1.053
Anion/Cation Ratio:	1
Carbon Dioxide:	150 PPM
Oxygen:	
Comments:	
RESISTIVITY 0.083 OHM-M @ 75F	

Analysis of Sample 535681 @ 75 F

Anions	mg/l	meq/l
Chloride:	52535.0	1481.82
Bicarbonate:	146.0	2.39
Carbonate:	0.0	0.
Sulfate:	83.0	1.73
Phosphate:		
Borate:		
Silicate:		
Hydrogen Sulfide:		0 PPM
pH at time of sampling:		6
pH at time of analysis:		
pH used in Calculation:		6

Cations	mg/l	meq/l
Sodium:	28338.7	1232.66
Magnesium:	417.0	34.3
Calcium:	3573.0	178.29
Strontium:	1472.0	33.6
Barium:	22.0	0.32
Iron:	34.0	1.23
Potassium:	215.0	5.5
Aluminum:		
Chromium:		
Copper:		
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 $CaSO_4 \cdot 2H_2O$		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	9.68	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.

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

TAKE PRIDE IN AMERICA

3180 (P0220)

July 6, 2016

Reference:
White City Area
2016 Downhole Commingling Field Study
Eddy County, New Mexico

Cimarex Energy Co. of Colorado
600 N. Marienfeld Street, Suite 600
Midland, TX 79701

Gentlemen:

In reference to your 2016 Downhole Commingling Field Study for the White City Area; it is hereby approved, with the following conditions of approval:

1. All future NOI Sundries submitted to request approval to downhole commingle (DHC) the Lower Penn, Upper Penn and the Wolfcamp formation shall reference this Study and be mentioned in Exhibit 6A. A copy of this study does not need to be attached to the Sundry.
2. All future NOI Sundries submitted to request approval to DHC shall reference NMOCD approval order.
3. All future NOI Sundries submitted to request approval to DHC shall include the BLM's DHC worksheet.
4. All DHC approvals are subject to like approval by NMOCD.
5. The BLM may require an updated evaluation of the field study be done in the future.

Please contact Edward G. Fernandez, Petroleum Engineer at 575-234-2220 if you have any questions.

Sincerely,

Edward G. Fernandez

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

Enclosure
cc: NMP0220 (CFO I&E)

Appendix C: Recompletion Procedure – New Mexico DD State #3

Well Data

KB	23'
TD	11,734'
PBTD	11,626'
Casing	13-3/8" 48# H-40 @ 218'. Cmt'd w/ 400 sx, cmt to sfc 9-5/8" 40# J-55 @ 1,680'. Cmt'd w/ 1,775 sx, cmt circ 5-1/2" 17# P-110 @ 11,734'. Cmt'd w/ 930 sx, cmt circ@ 1,250'
Tubing	2-3/8" 4.7# L-80 8rd, EOT @ 10,845'
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 +/- 10,816'.
8. RIH w/ WL to set CIBP at +/- 10,816'.
9. RIH w/ WL to bail 35' of cement on top of CIBP at +/- 10,816'.
   a. **Note: This will put TOC @ +/- 10,781'.**
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.
16. RIH w/ gauge ring/junk basket for 5-1/2" 17# P-110 csg to +/- 10,200'
17. Perforate Cisco Canyon from 9,710' – 9,941'.
18. RU frac and flowback equipment.

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	
Sampling Date:	05/14/08
Analysis Date:	05/15/08
Analyst:	WAYNE PETERSON
TDS (mg/l or g/m3):	90873.3
Density (g/cm3, tonne/m3):	1.062
Anion/Cation Ratio:	1
Carbon Dioxide:	150 PPM
Oxygen:	
Comments:	
TEST RAN IN THE FIELD	

Analysis of Sample 43887 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	55040.0	1552.48	Sodium:	32207.4	1400.94
Bicarbonate:	329.4	5.4	Magnesium:	268.0	22.05
Carbonate:	0.0	0.	Calcium:	2780.0	138.72
Sulfate:	225.0	4.68	Strontium:		
Phosphate:			Barium:		
Borate:			Iron:	23.5	0.85
Silicate:			Potassium:		
			Aluminum:		
Hydrogen Sulfide:		0 PPM	Chromium:		
pH at time of sampling:		7.31	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		7.31	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 \cdot 2H_2O$		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.

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+	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

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		

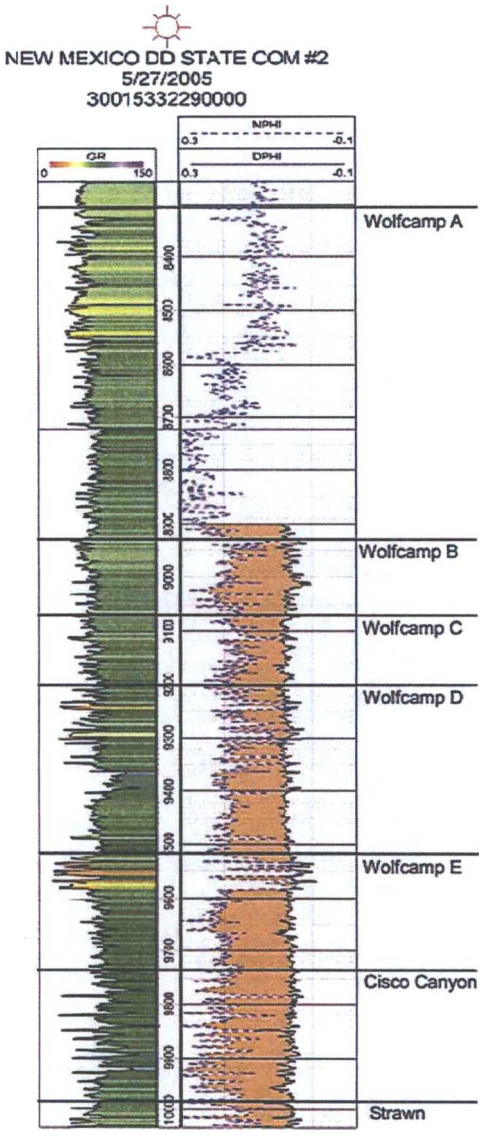
Summary	
Sampling Date:	09/28/11
Analysis Date:	10/13/11
Analyst:	SANDRA GOMEZ
TDS (mg/l or g/m3):	86836.7
Density (g/cm3, tonne/m3):	1.063
Anion/Cation Ratio:	1
Carbon Dioxide:	150 PPM
Oxygen:	
Comments:	
RESISTIVITY 0.083 OHM-M @ 75F	

Analysis of Sample 535681 @ 75 F					
Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	52535.0	1481.82	Sodium:	28338.7	1232.66
Bicarbonate:	146.0	2.39	Magnesium:	417.0	34.3
Carbonate:	0.0	0.	Calcium:	3573.0	178.29
Sulfate:	83.0	1.73	Strontium:	1472.0	33.6
Phosphate:			Barium:	22.0	0.32
Borate:			Iron:	34.0	1.23
Silicate:			Potassium:	215.0	5.5
			Aluminum:		
Hydrogen Sulfide:		0 PPM	Chromium:		
pH at time of sampling:		6	Copper:		
pH at time of analysis:			Lead:		
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 $CaCO_3$		Gypsum $CaSO_4 \cdot 2H_2O$		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.

Appendix B: Log section from top of Wolfcamp to top of Strawn – New Mexico DD State #2



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

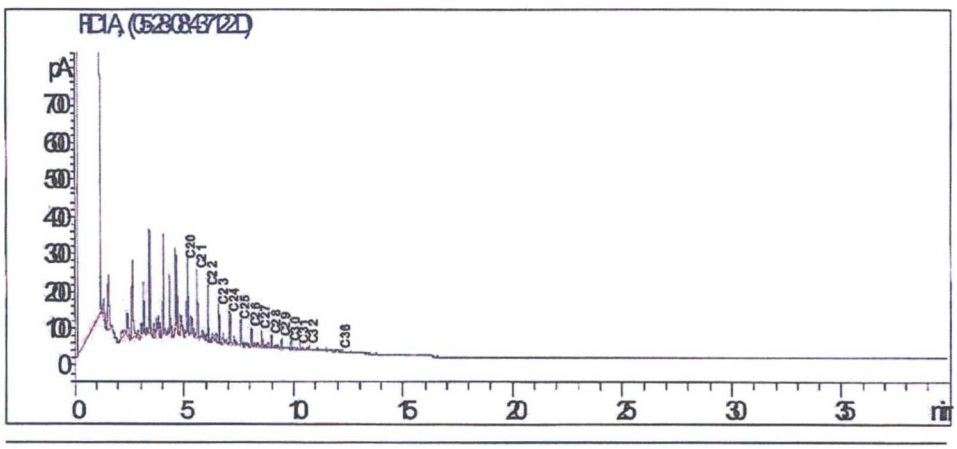
Lab Team Leader - Sheila Hernandez
(432) 495-7240

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	
Sampling Date:	05/14/08
Analysis Date:	05/15/08
Analyst:	WAYNE PETERSON
TDS (mg/l or g/m3):	90873.3
Density (g/cm3, tonne/m3):	1.062
Anion/Cation Ratio:	1
Carbon Dioxide:	150 PPM
Oxygen:	
Comments:	
TEST RAN IN THE FIELD	

Analysis of Sample 43887 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	55040.0	1552.48	Sodium:	32207.4	1400.94
Bicarbonate:	329.4	5.4	Magnesium:	268.0	22.05
Carbonate:	0.0	0.	Calcium:	2780.0	138.72
Sulfate:	225.0	4.68	Strontium:		
Phosphate:			Barium:		
Borate:			Iron:	23.5	0.85
Silicate:			Potassium:		
			Aluminum:		
Hydrogen Sulfide:		0 PPM	Chromium:		
pH at time of sampling:		7.31	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		7.31	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 * 2H_2O$		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

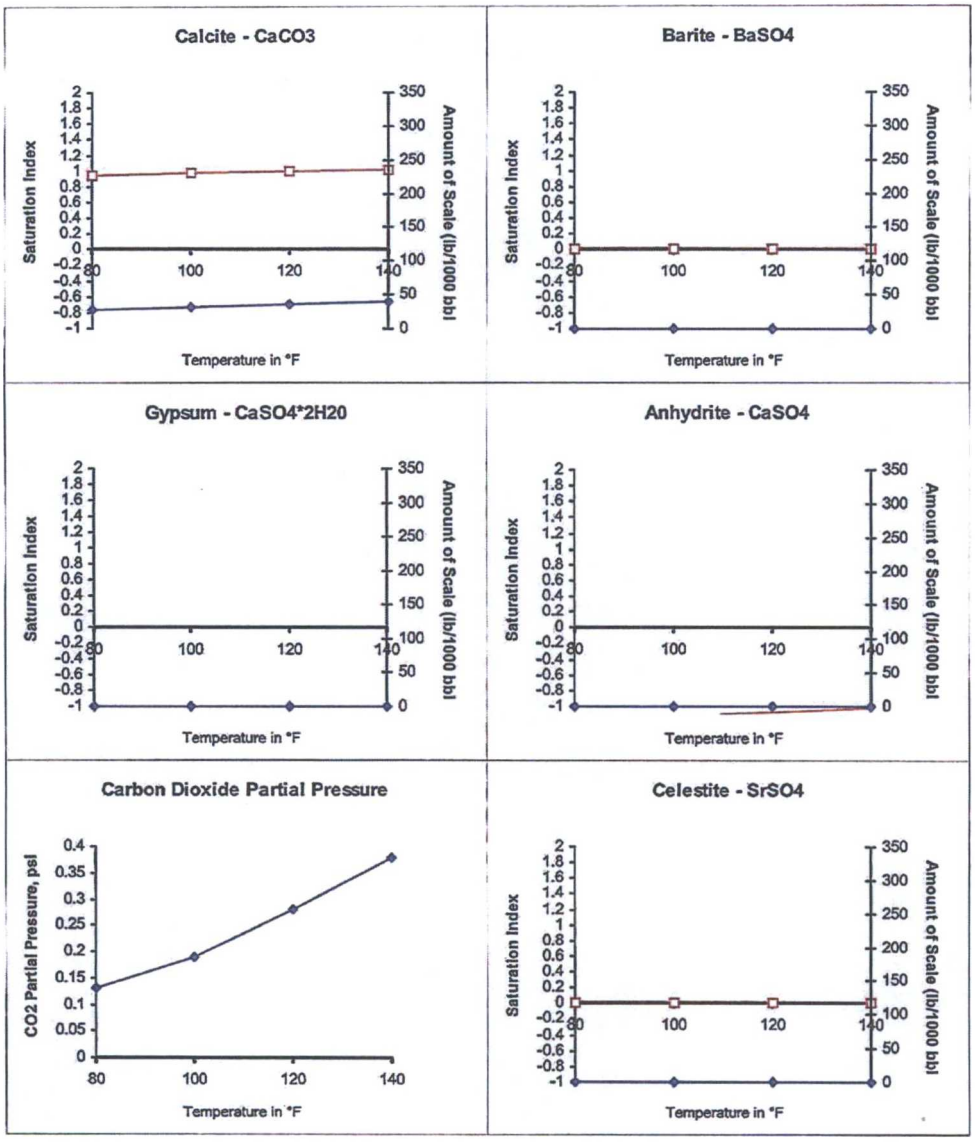
Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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



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.