

DATE IN 12/05/2016	SUSPENSE	ENGINEER MAM	LOGGED IN 12/05/2016	TYPE DHC	APP NO. PM4M1634054132
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ABOVE THIS LINE FOR DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION

- Engineering Bureau -

1220 South St. Francis Drive, Santa Fe, NM 87505



2016 DEC - 5

RECEIVED

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

Application Acronyms:

[NSL-Non-Standard Location] [NSP-Non-Standard Proration Unit] [SD-Simultaneous Dedication]
 [DHC-Downhole Commingling] [CTB-Lease Commingling] [PLC-Pool/Lease Commingling]
 [PC-Pool Commingling] [OLS - Off-Lease Storage] [OLM-Off-Lease Measurement]
 [WFX-Waterflood Expansion] [PMX-Pressure Maintenance Expansion]
 [SWD-Salt Water Disposal] [IPI-Injection Pressure Increase]
 [EOR-Qualified Enhanced Oil Recovery Certification] [PPR-Positive Production Response]

[1] TYPE OF APPLICATION - Check Those Which Apply for [A]

- [A] Location - Spacing Unit - Simultaneous Dedication
☐ NSL ☐ NSP ☐ SD

-DHC 4801
 Estill AD Federal #2
 Cimarex Energy Co. of Colorado
 30-015-33336 162683

Check One Only for [B] or [C]

- [B] Commingling - Storage - Measurement
☒ DHC ☐ CTB ☐ PLC ☐ PC ☐ OLS ☐ OLM

- [C] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery
☐ WFX ☐ PMX ☐ SWD ☐ IPI ☐ EOR ☐ PPR

- [D] Other: Specify _____

Row
 - White City
 PENN (GAS)
 87280
 W. 13LACK
 River, Wolfcamp
 SUG (GAS)
 97693

[2] NOTIFICATION REQUIRED TO: - Check Those Which Apply, or ☐ Does Not Apply

- [A] ☐ Working, Royalty or Overriding Royalty Interest Owners
 [B] ☐ Offset Operators, Leaseholders or Surface Owner
 [C] ☐ Application is One Which Requires Published Legal Notice
 [D] ☐ Notification and/or Concurrent Approval by BLM or SLO
U.S. Bureau of Land Management - Commissioner of Public Lands, State Land Office
 [E] ☐ For all of the above, Proof of Notification or Publication is Attached, and/or,
 [F] ☐ Waivers are Attached

[3] SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED ABOVE.

[4] **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

Signature

Regulatory Analyst
 Title

12/1/2016
 Date

acrawford@cimarex.com
 e-mail Address



CIMAREX ENERGY COMPANY
600 N. Marienfeld Street
Suite 600
Midland, TX 79701

12/1/2016

Attn: New Mexico Oil Conservation Division
1220 S. St. Francis Dr.
Santa Fe, NM 87505

Subject: Application for Downhole Commingle
Estill AD Federal #2
30-015-33336

To Whom It May Concern:

Enclosed is the original Form C-107A (Application for Downhole Commingle) for the well mentioned above. The well is currently producing out of the Cisco Canyon formation. Cimarex proposes to add perforations in the Wolfcamp and downhole commingle the Cisco Canyon and Wolfcamp.

Please contact me if you have any questions or need any additional information.

Thank you,

A handwritten signature in black ink, appearing to read "Amy Crawford", is positioned above the typed name.

Amy Crawford
Regulatory Analyst
432-620-1909
acrawford@cimarex.com

Cimarex Energy Co.

202 S. Cheyenne Ave.

Suite 1000

Tulsa, Oklahoma 74103-4346

PHONE: 918.585.1100

FAX: 918.585.1133



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: Estill AD Federal 2
API 30-015-33336
Section 19, Township 24 South, Range 26 East, N.M.P.M.
Eddy County, New Mexico.

Dear Mr. McMillian:

The Estill AD Federal 2 well is located in the NE/4 of Sec. 19, 24S, 26E, Eddy County NM.

Cimarex is the operator of the NE/4 of Sec. 19, 24S, 26E, Eddy County, NM as to all depths from the surface of the earth to 12,068'. Ownership within these depths in the NE/4 are identical.

Sincerely,

A handwritten signature in cursive script that reads "Caitlin Pierce".

Caitlin Pierce

Production Landman

cpierce@cimarex.com

Direct: 432-571-7862

District I
1625 N. French Drive, Hobbs, NM 88240

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-107A
Revised June 10, 2003

District II
1301 W. Grand Avenue, Artesia, NM 88210

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

APPLICATION TYPE

District III
1000 Rio Brazos Road, Aztec, NM 87410

☒ Single Well

District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

APPLICATION FOR DOWNHOLE COMMINGLING

Establish Pre-Approved Pools

EXISTING WELLBORE
☒ Yes ☐ No

Cimarex Energy Co. of Colorado
Operator

600 N. Marienfeld St., Ste. 600; Midland, TX 79701

Estill AD Fed
Lease

002

Well No.

Address
H-9-24S-26E

H-9-24S-26E

Unit Letter Section Township-Range

Eddy
County

OGRID No. _____ Property Code _____ API No. 30-015-33336 Lease Type: ☒ Federal ☐ State ☐ Fee

DATA ELEMENT	UPPER ZONE	LOWER ZONE
Pool Name	Black River; Wolfcamp, Southwest (Gas)	White City; Penn (Gas)
Pool Code	97693	87280
Top and Bottom of Pay Section (Perforated or Open-Hole Interval)	8,358' - 9,921'	9,921' - 10,245'
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: 51.8° API Gas: 1225.8 BTU dry / 1204.6 BTU wet @ 14.73 psi	Oil: 53.5° API Gas: 1142.4 BTU dry / 1122.6 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: 74 BOPD, 1,855 MCFPD, 468 BWPD	Date: N/A Rates: 26 BOPD, 652 MCFPD, 165 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 Gas 74 74	Oil Gas 26 26

ADDITIONAL DATA

Are all working, royalty and overriding royalty interests identical in all commingled zones?

Yes ☒ 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 ☒ No ☐

Will commingling decrease the value of production?

Yes ☐ No ☒

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 ☒ No ☐

NMOCD Reference Case No. applicable to this well: DHC-3390

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 Amithy Crawford TITLE Regulatory Analyst DATE 11-30-16

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

E-MAIL ADDRESS acrawford@cimarex.com

DISTRICT I
P.O. Box 1980, Hobbs, NM 88241-1980

State of New Mexico
Energy, Minerals and Natural Resources Department

FORM U-102
Revised February 10, 1994
Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies

DISTRICT II
P.O. Drawer DD, Artesia, NM 88211-0719

DISTRICT III
1000 Rio Brazos Rd., Artesia, NM 87410

DISTRICT IV
P.O. Box 2088, Santa Fe, N.M. 87504-2088

OIL CONSERVATION DIVISION

P.O. Box 2088
Santa Fe, New Mexico 87504-2088

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-015-33336	Pool Code 87280	Pool Name White City; Penn (Gas)
Property Code	Property Name ESTILL AD FEDERAL	Well Number 2
OGRID No. 162683	Operator Name CIMAREX ENERGY CO. OF COLORADO	Elevation 3430'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	19	24 S	26 E		2270	NORTH	380	EAST	EDDY

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	19	24 S	26 E		1588	NORTH	957	EAST	EDDY
Dedicated Acres 640	Joint or Infill	Consolidation Code	Order No.						

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

<p>NAD 27 NME GEODETIC COORDINATES Y-437862.0-N X-502567.6-E LAT.= 32°12'13.68" N LONG.= 104°19'29.07" W</p>	<p>3440.6' 3427.1' 600' 3437.6' 3421.4' 600'</p>	<p>2270'</p>	<p>Estill AD Fed #2 SHL</p>
<p>1682' 1939'</p>	<p>BHL</p>	<p>SHL</p>	<p>1650'</p>
<p>Estill AD Fed #3</p>	<p>1470' 1550'</p>	<p>10591'</p>	<p>Estill AD Fed #1</p>

OPERATOR CERTIFICATION

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

Amithy Crawford
Signature
Amithy Crawford
Printed Name
Regulatory Analyst
Title
11/30/2016
Date

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.

JANUARY 26, 2004

Date Surveyed LMP
Signature & Seal of Professional Surveyor
Gary E. Edson 2/2/04
04.11.0008
Certificate No. GARY EDSON 12641

DISTRICT 1
P.O. Box 1980, Hobbs, NM 88241-1980

State of New Mexico
Energy, Minerals and Natural Resources Department

Revised February 10, 1994
Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies

DISTRICT II
P.O. Drawer DD, Artesia, NM 88211-0719

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

OIL CONSERVATION DIVISION
P.O. Box 2088
Santa Fe, New Mexico 87504-2088

DISTRICT IV
P.O. BOX 2088, SANTA FE, N.M. 87504-2088

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-015-33336	Pool Code 97693	Pool Name Black River ; Wolfcamp, Southwest (Gas)
Property Code	Property Name ESTILL AD FEDERAL	Well Number 2
OGRID No. 162683	Operator Name CIMAREX ENERGY CO. OF COLORADO	Elevation 3430'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	19	24 S	26 E		2270	NORTH	380	EAST	EDDY

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	19	24 S	26 E		1588	NORTH	957	EAST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order 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

**NAD 27 NME
GEODETIC COORDINATES**

Y-437862.0-N
X-502567.6-E
LAT.= 32°12'13.68" N
LONG.= 104°19'29.07" W

3440.6' 3427.1'
600'
600'
3437.6' 3421.4'

2270'
380'
SHL

Estill AD Fed #2

1682' 1939' BHL SHL
1470' 1550'

Estill AD Fed #3

1650' 1650'

Estill AD Fed #1

OPERATOR CERTIFICATION

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

Amithy Crawford
Signature
Amithy Crawford
Printed Name
Regulatory Analyst
Title
11/30/2016
Date

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.

JANUARY 26, 2004

Date Surveyed LMP
Signature & Seal of Professional Surveyor
Gary Edson 2/2/04
04110008
Certificate No. GARY EDSON 12641



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 **Estill AD Federal #2** well (API: 30-015-33336).

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 **74%** for the Wolfcamp and **26%** 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 **Estill AD Federal #2** well to the Cisco Canyon and Wolfcamp (Ciscamp) 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 upper part of the Cisco Canyon formation. The well has produced 85 MMCF of gas from this zone since November 2007 (see **Appendix C**). The company plans to add the Wolfcamp and the lower part of the Cisco Canyon to the current producing zone and downhole commingle all intervals. Within the first six months of commingling and frac load recovery, a Production Log Survey (PLS) will be conducted to further validate or adjust the initially established production allocation factors. These factors will be revised, if necessary, following the approved Field Study methodology for “Further Validation and Adjustment of Allocation Factors and Zonal Flowrates” described in Figure 2 of such field study, and will be re-submitted for approval 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**.



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:

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

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

The Recoverable Gas in Place (RGIP) for subject well is **1378 MMCF** from the Wolfcamp and **563 MMCF** from the Cisco Canyon, for a total of 1,941 MMCF of gas (see Table 1). In this case, the Cisco Canyon has produced 85 MMCF, therefore Remaining RGIP (RRGIP) is equal to **1,856 MMCF** (1,941 – 85).

The resulting proposed allocation factors are calculated as follows:

$$\text{Wolfcamp \% Alloc. Factor} = \frac{1,378 - 0 \text{ MMCF}}{1,856 \text{ MMCF}} = 74\%$$

$$\text{Cisco Canyon \% Alloc. Factor} = \frac{563 - 85 \text{ MMCF}}{1,856 \text{ MMCF}} = 26\%$$

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 62 MBO.*

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

Estill AD Federal #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 TOT:	9,199	4,002	178	10.7%	25%	14.4	1,623	85%	1,378			1,378	74%
Cisco Canyon:	10,083	4,386	57	14.9%	14%	7.3	662	85%	563	11/2007	85	478	26%
Total:			235			21.7	2,285	85%	1,941		85	1,856	100%

In this well, the spacing for both formations is the same (160 acres), as well as, public interests: 50% working interest and 40% 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



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

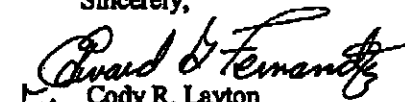
Gentlemen:

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,

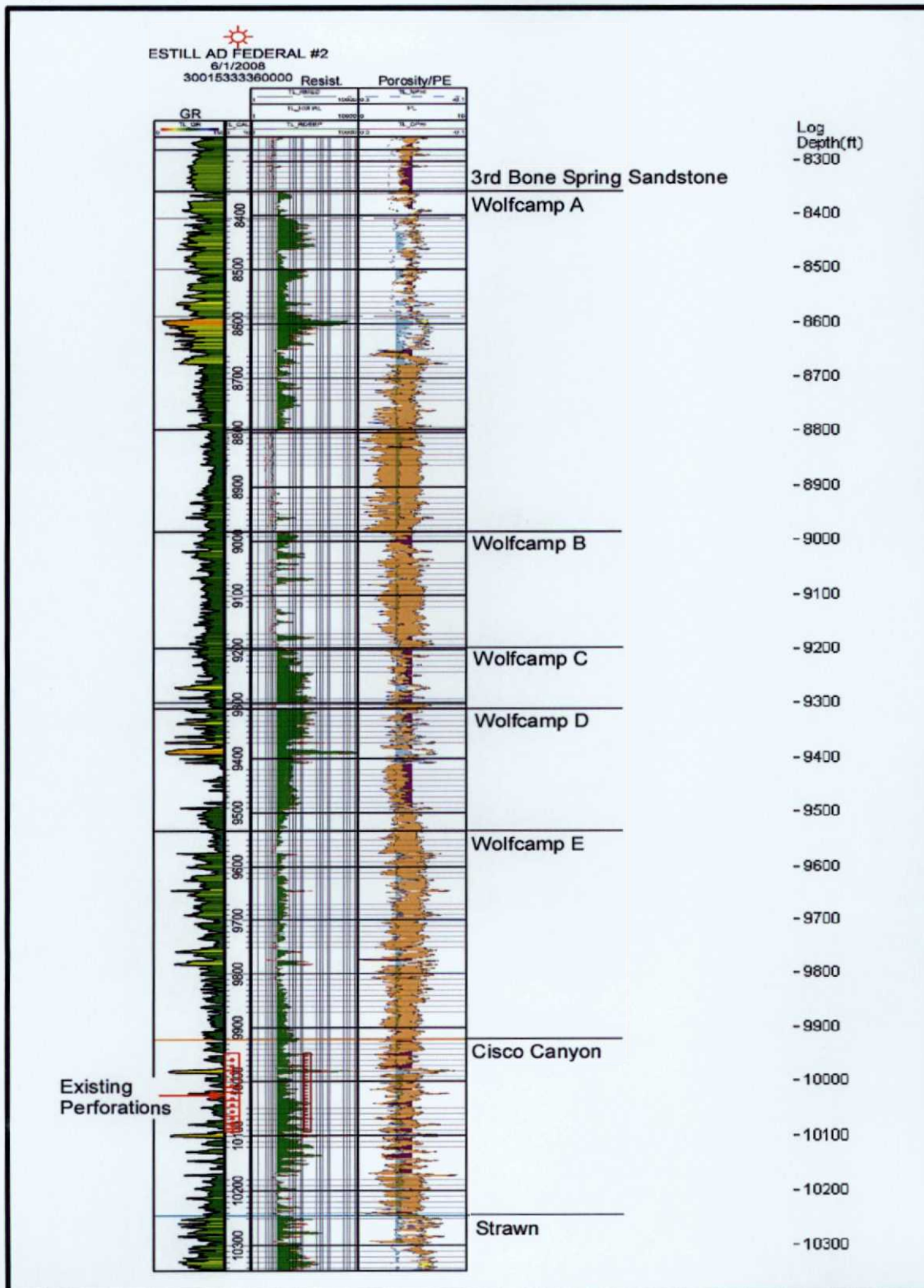

for Cody R. Layton
Assistant Field Manager,
Lands and Minerals

Enclosure

cc: NMP0220 (CFO I&E)

Production Operations – Carlsbad Region, Permian Basin
Estill AD Federal #2 - Cisco Canyon and Wolfcamp (Ciscamp)
 Proposed Commingling Allocation Factors. Eddy County, NM

Appendix B: Log section from top of Wolfcamp to top of Strawn – Estill AD Federal #2

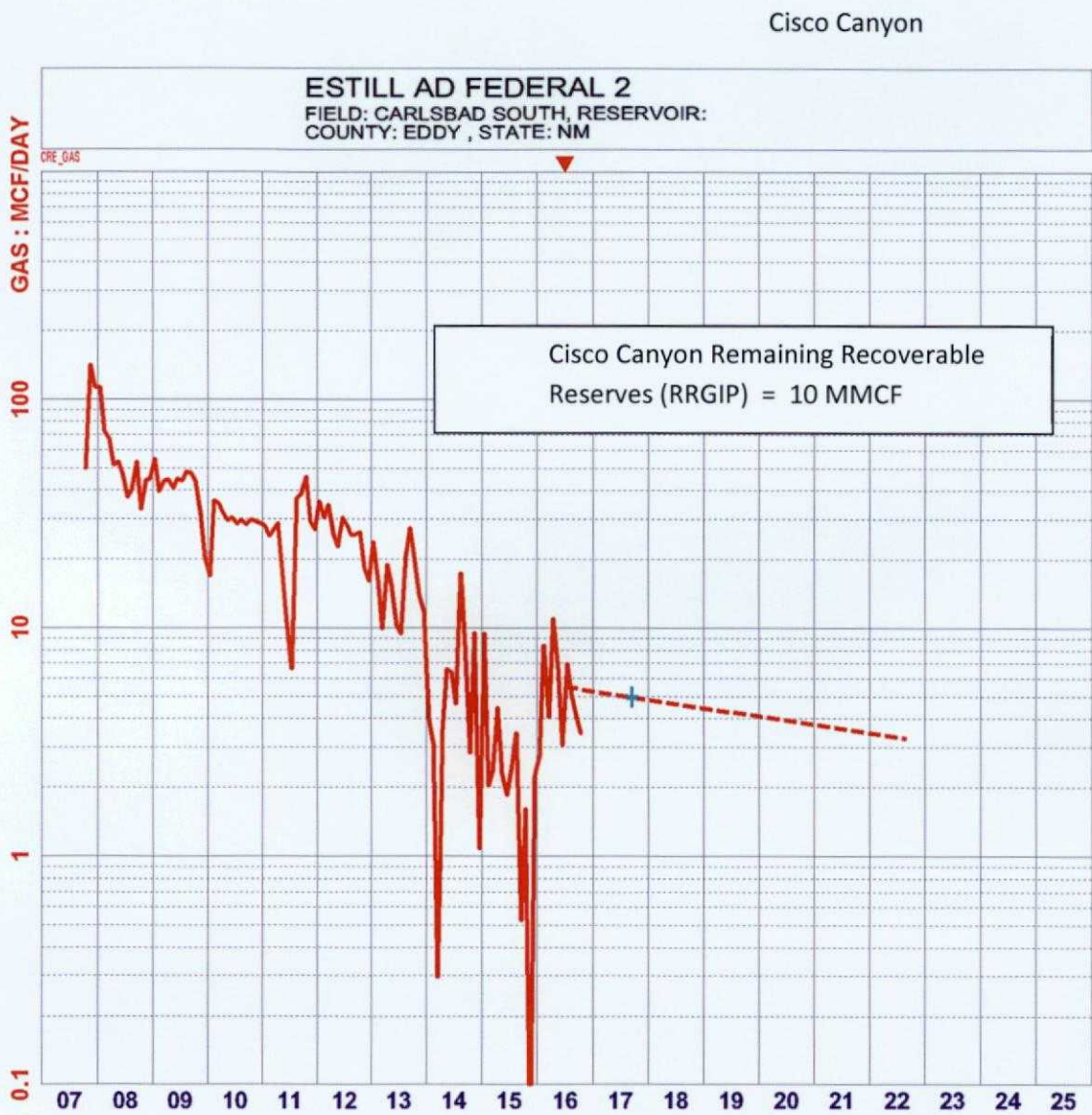




Production Operations – Carlsbad Region, Permian Basin
Estill AD Federal #2 - Cisco Canyon and Wolfcamp (Ciscamp)
Proposed Commingling Allocation Factors. Eddy County, NM

Appendix C: Current Completion – Estill AD Federal #2

GAS : MCF/DA	-----
Qual=	DEFAULT
Ref=	7/2016
Cum=	84936
Rem=	9584
EUR=	94520
Yrs=	6.167
Qi=	5.5
b=	1.500000
De=	8.676950
Dmin=	8.000000
Qab=	3.3



Production Operations – Carlsbad Region, Permian Basin
Estill AD Federal #2 - Cisco Canyon and Wolfcamp (Ciscamp)
Proposed Commingling Allocation Factors. Eddy County, NM

Appendix D: Recompletion Procedure – Estill AD Fed 2**Well Data**

Age of Wellbore	May 2004
KB	23' above GL
TD	12,300'
PBTD	10,365'
Casing	13-3/8" 54.5# J-55 csg @ 352'. Cmt'd w/ 450 sx, cmt circ. 9-5/8" 40# NS-110HC csg @ 1,567'. Cmt'd w/ 170 sx, cmt circ. 7" 23# NS-110HC csg @ 8,012'. 1 st stage cmt'd w/ 400 sx, cmt circ. DV Tool @ 4,809'. 2 nd stage cmt'd w/ 575 sx, cmt circ. 4-1/2" 11.6# HCP-110 FJ @ 12,300'. Cmt'd w/ 475 sx. Liner top @ 7,247'
Tubing	2-3/8" 4.7# L-80 8rd @ 9,858' (315 jts)
Prod. Perfs	Cisco Canyon (9,947' – 10,093')
Proposed Perf Intervals	Cisco Canyon (9,921' – 10,245') & Wolfcamp (8,358' – 9,921')

Procedure

Notify BLM 24 hours prior to start of workover operations.

1. Test anchors prior to MIRU PU.
2. MIRU PU, rental flare, and choke manifold.
3. Kill well with produced water if available or FW as necessary.
4. ND WH, NU 5K BOP
5. TOOH w/ 2-3/8" 4.7# L-80 tbg. Stand back Tubing.
Note: No packer in well
6. PU 4-1/2" AS-1X packer on 2-3/8" 4.7# L-80 tbg and TIH to set packer at +/- 9,897'
7. RU Pump truck and pressure test annulus behind 2-3/8" 4.7# L-80 tbg to 8,500 psi on a chart for 30 minutes with no more than 10% leak off.
8. TOOH w/ 2-3/8" 4.7# L-80 tbg and lay down tubing.
9. ND 5k BOP, RDMO PU
10. RU two 10k frac valves and flow cross
11. MIRU water transfer with frac tanks to contain water to be pumped from frac pond
12. 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.
13. RU frac valves, flow cross, goat head, and wireline lubricator.
14. RIH w/ gauge ring/junk basket for 4-1/2" 11.6# P-110 csg to +/- 10,260'

Production Operations – Carlsbad Region, Permian Basin
Estill AD Federal #2 - Cisco Canyon and Wolfcamp (Ciscamp)
Proposed Commingling Allocation Factors. Eddy County, NM

15. Perforate Cisco Canyon from 9,921' – 10,245'.
16. RU frac and flowback equipment.
17. Acidize and frac Cisco Canyon perfs down casing.
18. Set 10k flow through composite plug 15' uphole of top perforation
19. Test to 8,500 psi
20. Perforate Wolfcamp from 8,358' – 9,921'.
21. Acidize and frac Wolfcamp perfs down casing.
22. Set 10k flow through composite plug 15' above top perforation
23. Test to 8,500 psi
24. RD frac
25. MIRU 2" coiled tbg unit.
26. RIH w/ blade mill & downhole motor on 2" CT and drill out sand and composite plugs using freshwater for circulation. Pump sweeps each time a plug is tagged, each time a plug is drilled out, and every 60 bbls pumped.
27. Clean out to PBTD 10,365'
28. POOH w/ blade mill, motor & CT
29. RDMO coiled tbg unit.
30. Flow back well for 24 hours, then SI well overnight.
31. RU wireline and lubricator.
32. RIH w/ GR/JB for 4-1/2" 11.6# P-110 to +/- 8,323'
33. 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, 4-1/2" Arrowset 1X packer and on-off tool stinger w/ 1.875" X profile nipple. Set packer +/- 8,308'. 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. 4-1/2" x 2-3/8" Arrowset 1X packer and on-off tool stinger w/ 1.875" X profile nipple
34. RD WL and lubricator
35. ND goat head and frac valve, NU BOP, MIRU Pulling Unit
36. TIH w/ on/off tool overshot, GLVs, and 2-3/8" 4.7# L-80 tbg.
37. Latch overshot onto on-off tool and space out tubing
38. ND BOP, NU WH
39. RDMO pulling unit
40. RU pump truck and pump out plug. Put well on production.
41. **Run Production Log for allocation purposes after recovering load. Run additional production logs if actual production varies significantly from expected performance. Send copies of these logs to BLM and file for an adjustment of allocation factor if necessary.**



Current WBD
KB - 23' above GL

Cimarex Energy Co. of Colorado

Estill AD Federal #2

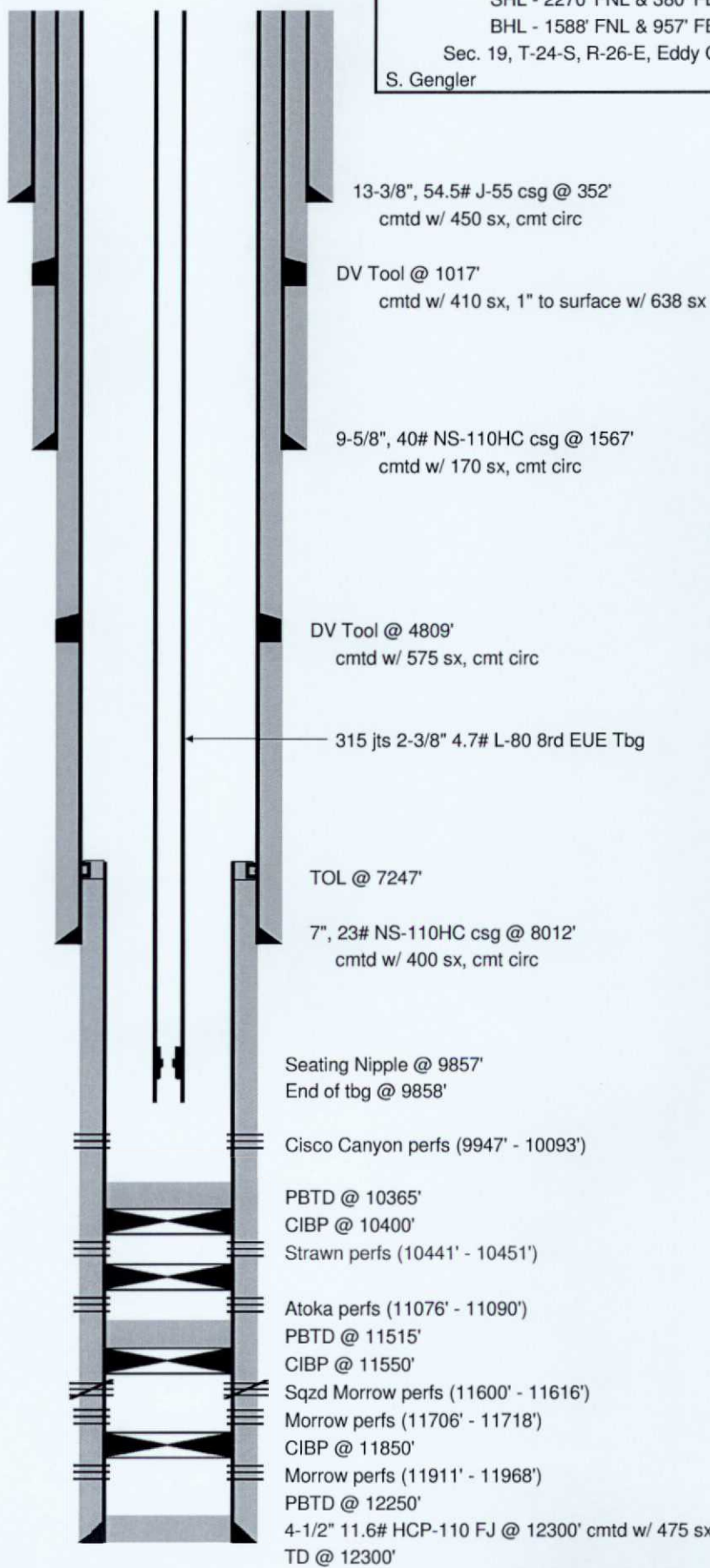
SHL - 2270' FNL & 380' FEL

BHL - 1588' FNL & 957' FEL

Sec. 19, T-24-S, R-26-E, Eddy Co., NM

S. Gengler

02/21/2012





Proposed WBD
KB - 23' above GL

Cimarex Energy Co. of Colorado

Estill AD Federal #2

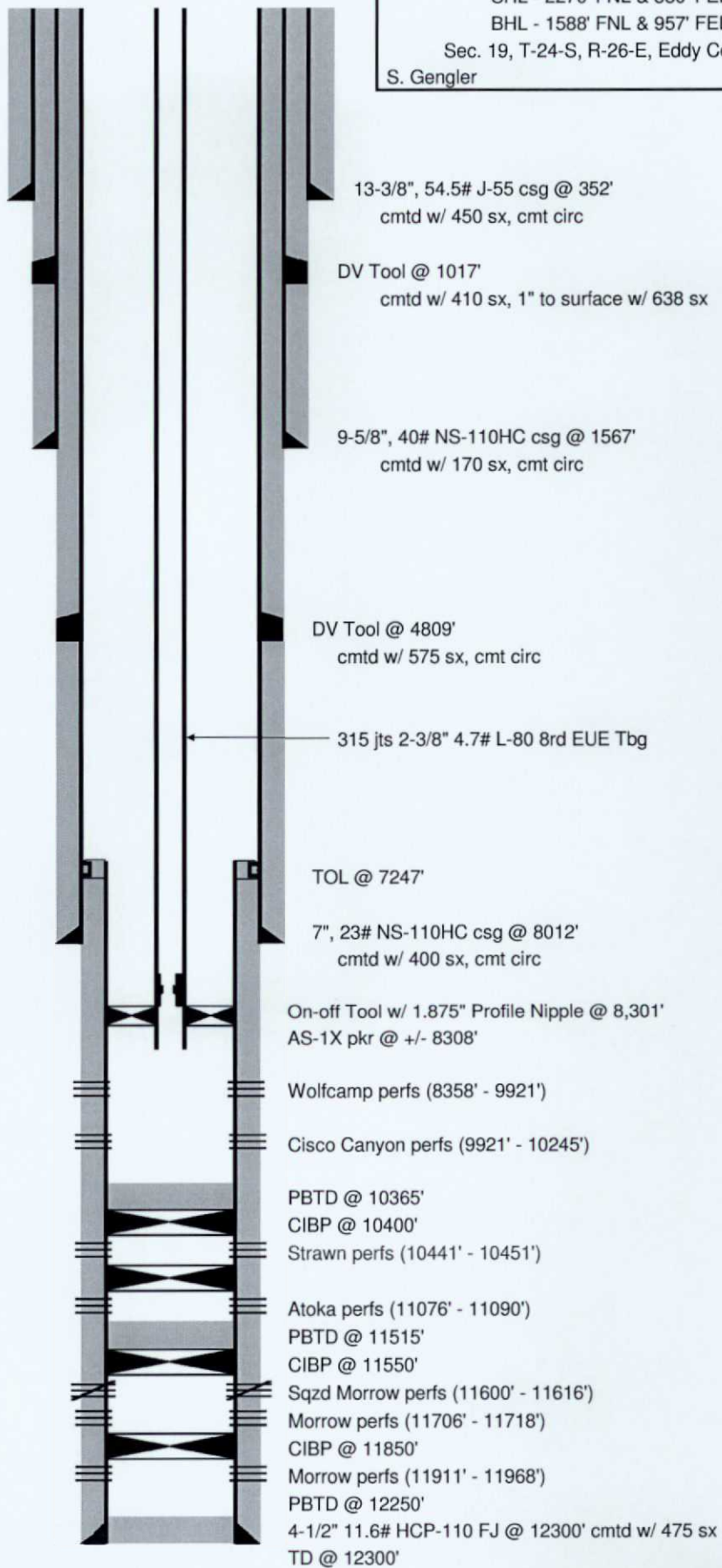
SHL - 2270' FNL & 380' FEL

BHL - 1588' FNL & 957' FEL

Sec. 19, T-24-S, R-26-E, Eddy Co., NM

S. Gengler

02/21/2012





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+	0.624	0.270
		100.000	4.681

REAL BTU/CU.FT.		Specific Gravity	
At 14.65 DRY	1219.2	Calculated	0.6973
At 14.65 WET	1197.9		
At 14.696 DRY	1223.0		
At 14.696 WET	1202.1	Molecular Weight	20.1966
At 14.73 DRY	1225.8		
At 14.73 Wet	1204.6		

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

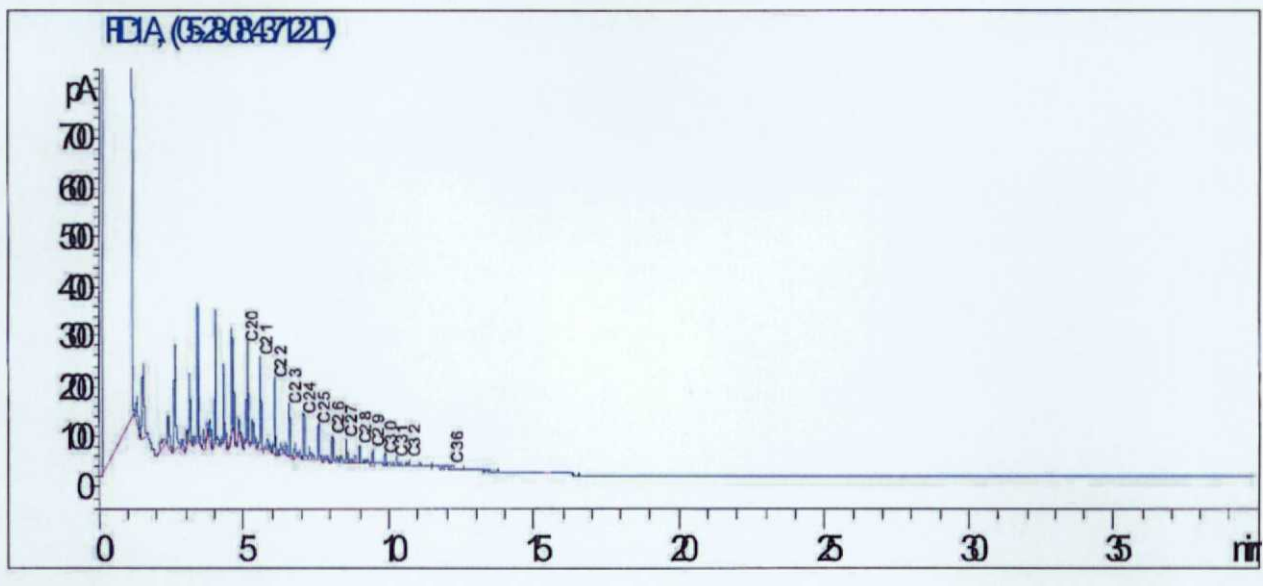
Lab Team Leader - Sheila Hernandez
(432) 495-7240

OIL ANALYSIS

Company:	CIMAREX ENERGY	Sales RDT:	44212
Region:	PERMIAN BASIN	Account Manager:	WAYNE PETERSON (575) 910-9389
Area:	CARLSBAD, NM	Analysis ID #:	3208
Lease/Platform:	WIGEON '23' FEDERAL	Sample #:	437122
Entity (or well #):	1	Analyst:	SHEILA HERNANDEZ
Formation:	WOLFCAMP	Analysis Date:	5/30/08
Sample Point:	FRAC TANK 234	Analysis Cost:	\$100.00
Sample Date:	5/13/08		

Cloud Point:	<68 °F
Weight Percent Paraffin (by GC)*:	1.49%
Weight Percent Asphaltenes:	0.03%
Weight Percent Oily Constituents:	98.41%
Weight Percent Inorganic Solids:	0.07%

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



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

Water Analysis Report by Baker Petrolite

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

Summary		Analysis of Sample 43887 @ 75 °F					
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

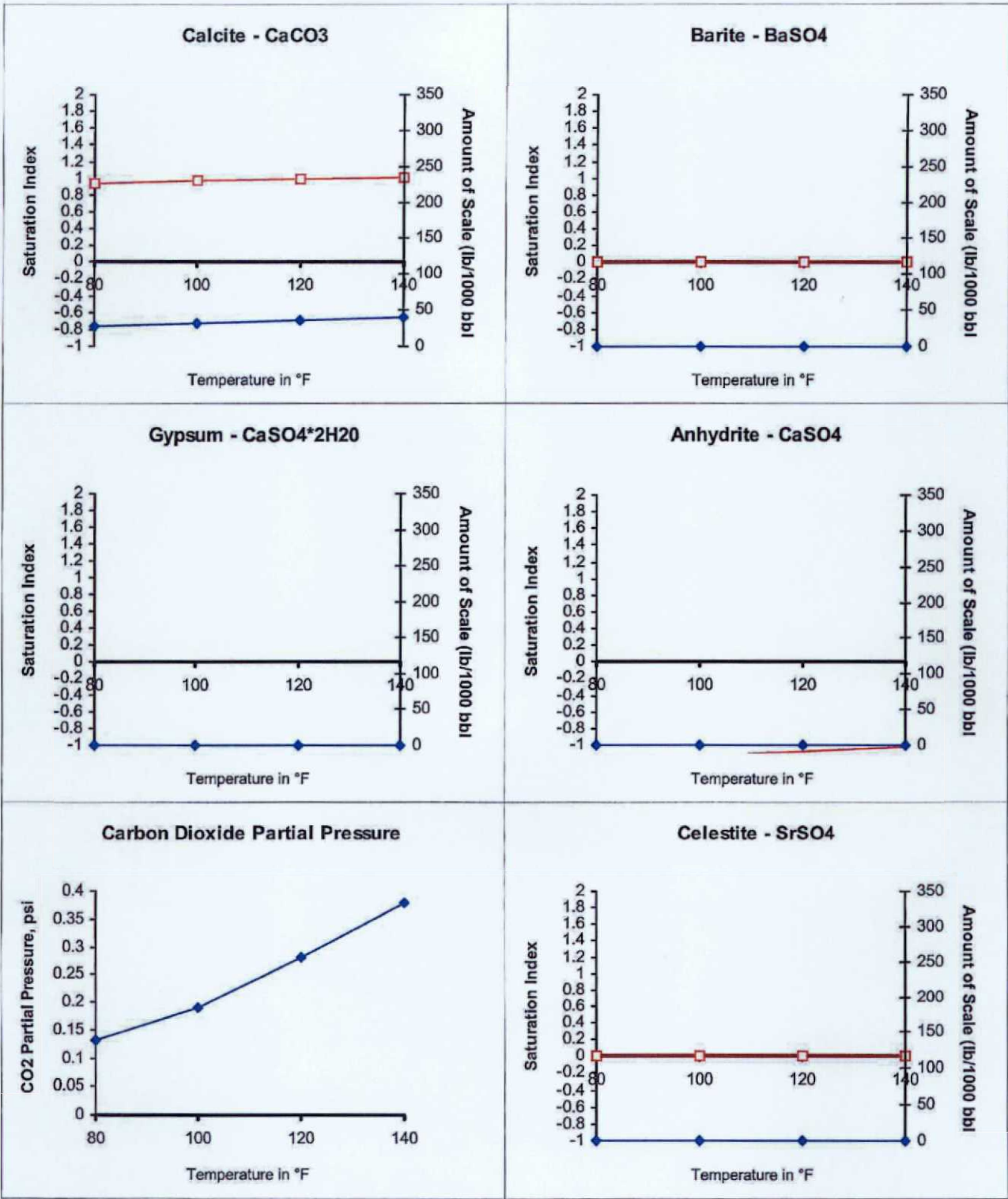
Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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





LABORATORY SERVICES
Natural Gas Analysis

www.permianls.com

575.397.3713 2609 W Marland Hobbs NM 88240

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

Sample Data:	Date Sampled 7/2/2014 10:30 AM Analysis Date 7/9/2014 Pressure-PSIA 83 Sample Temp F 76.4 Atmos Temp F 76	Sampled by: K. Hooten Analysis by: Vicki McDaniel
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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
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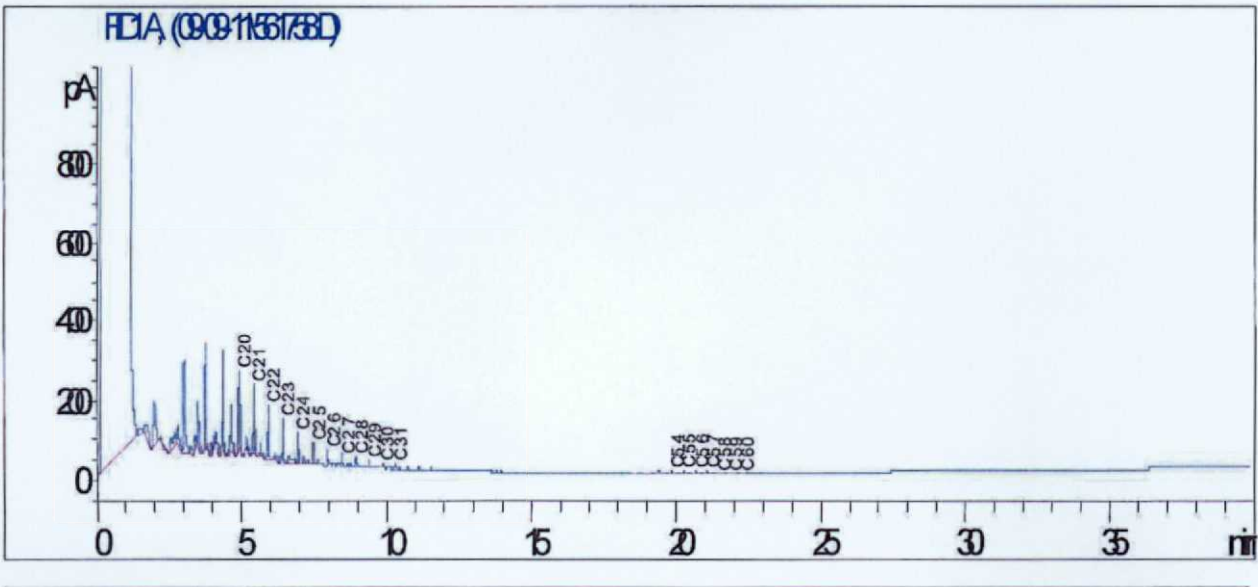
Lab Team Leader - Sheila Hernandez
(432) 495-7240

OIL ANALYSIS

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

Cloud Point:	89 °F
Weight Percent Paraffin (by GC)*:	1.03%
Weight Percent Asphaltenes:	0.01%
Weight Percent Oily Constituents:	98.93%
Weight Percent Inorganic Solids:	0.03%

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



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Sundown, TX 79372-0740
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(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			
		Anions		Cations	
		mg/l	meq/l	mg/l	meq/l
Sampling Date:	09/28/11	Chloride:	52535.0	Sodium:	28338.7
Analysis Date:	10/13/11	Bicarbonate:	146.0	Magnesium:	417.0
Analyst:	SANDRA GOMEZ	Carbonate:	0.0	Calcium:	3573.0
TDS (mg/l or g/m3):	86836.7	Sulfate:	83.0	Strontium:	1472.0
Density (g/cm3, tonne/m3):	1.063	Phosphate:		Barium:	22.0
Anion/Cation Ratio:	1	Borate:		Iron:	34.0
		Silicate:		Potassium:	215.0
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 @ 75F		pH used in Calculation:	6	Lead:	
				Manganese:	1.000
				Nickel:	0.04

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.

McMillan, Michael, EMNRD

From: McMillan, Michael, EMNRD
Sent: Wednesday, August 31, 2016 3:40 PM
To: 'acrawford@cimarex.com'
Subject: FW: Cimarex Federal 13 Com Well No. 4

Here is Paul Kautz response
Mike

From: Kautz, Paul, EMNRD
Sent: Wednesday, August 31, 2016 3:38 PM
To: McMillan, Michael, EMNRD <Michael.McMillan@state.nm.us>
Subject: RE: Cimarex Federal 13 Com Well No. 4

White City;Penn (GAS) pool includes Cisco, Canyon, Strawn, Atoka and Morrow formations. This pool was prior to the mandatory requirement in the Delaware Basin that the Penn be subdivided.

Paul Kautz
Hobbs District Geologist
NM Oil Conservation Div.
1625 N French Dr.
Hobbs, NM 88240
575-393-6161 Ext. 104

From: McMillan, Michael, EMNRD
Sent: Wednesday, August 31, 2016 3:20 PM
To: Kautz, Paul, EMNRD
Subject: Cimarex Federal 13 Com Well No. 4

Paul:
I got a DHC application from Cimarex Energy of Co. for the Federal 13 Com Well No. 4. API 30-015-34199
Cimarex stated the pools involved are the Sage Draw; Wolfcamp (East) Pool code 96890 and the White City; Penn (Gas)
Pool. Pool code 87280.
Is the Cisco Canyon considered part of the White City Pool or is it part of Cotton Draw; Upper Penn Pool code 97354.
See the WBD to get an idea of the perfs
Thanks
Mike

MICHAEL A. MCMILLAN
Engineering Bureau, Oil Conservation Division
1220 south St. Francis Dr., Santa Fe NM 87505
O; 505.476.3448
Michael.McMillan@state.nm.us