DATE IN	SUSPENSE	ENGINEER	LOGGED IN	TYPE	APP NO.
9/27/2016		MAM	9/27/2016	DHC	pMAM1627733682

ABOVE THIS LINE FOR DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION
- 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

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

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 _____

-DHC-4797
-Cimarex Energy of Colorado
16283
-W ell
-Adrienne 6 Fed #1
30-015-34319
Pool
-Whitecity;Penn (GAS)
87280
-Scg c Draw; Wolfcamp, East (GAS)
96850

[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	Amithy Crawford	Regulatory Analyst	9/27/2016
Print or Type Name	Signature	Title	Date

acrawford@cimarex.com
e-mail Address

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

9/27/2016

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

Subject: Application to Downhole Commingle
Adrianne 6 Federal #1
30-015-34319

Enclosed is the original from C-107A (Application to Downhole Commingle) for the well mentioned above. The well was originally drilled to the Morrow Formation. Cimarex proposes to set a CIPB above the Morrow formation and recomplete and commingle the well in the Cisco Canyon and Wolfcamp Formations.

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

Thank you!

Amithy 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: Adrianne 6 Federal 1
API 30-015-34319
Section 6, Township 25 South, Range 26 East, N.M.P.M.
Eddy County, New Mexico.

Dear Mr. McMillian:

The Adrianne 6 Federal 1 well is located in the NW/4 of Sec. 6, 25S, 26E, Eddy County NM.

Cimarex is the operator of the NW/4 of Sec. 6, 25S, 26E, Eddy County, NM as to all depths from the surface of the earth to the base of the Morrow formation. Ownership in the W/2 is common as to all depths from the surface of the earth to the base of the Morrow formation.

Sincerely,

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

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

Adrianne 6 Federal — Lease
001 — Well No.
C/D-6-25S-26E — Unit Letter-Section-Township-Range
Eddy — County

OGRID No.____ Property Code____ API No.__30-015-34319__ Lease Type: __X__ Federal ____ State____ Fee

DATA ELEMENT	UPPER ZONE	LOWER ZONE
Pool Name	Sage Draw; Wolfcamp, East (Gas)	White City; Penn (Gas)
Pool Code	96890	87280
Top and Bottom of Pay Section (Perforated or Open-Hole Interval)	8,446' – 9,954'	10,090'-10,303'
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: 43 BOPD, 1,439 MCFPD, 343 BWPD	Date: N/A Rates: 12 BOPD, 406 MCFPD, 97 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 78 Gas 78	Oil 22 Gas 22

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-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 9/27/16

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

E-MAIL ADDRESS acrawford@cimarex.com

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
30-015-34319	96890	Sage Draw; Wolfcamp, East (Gas)

[4] Property Code	[5] Property Name	[6] Well Number
35072	Adrianne 6 Federal	1

[7] OGRID No.	[8] Operator Name	[9] Elevation
162683	Cimarex Energy of Colorado	3454'

[10] Surface Location

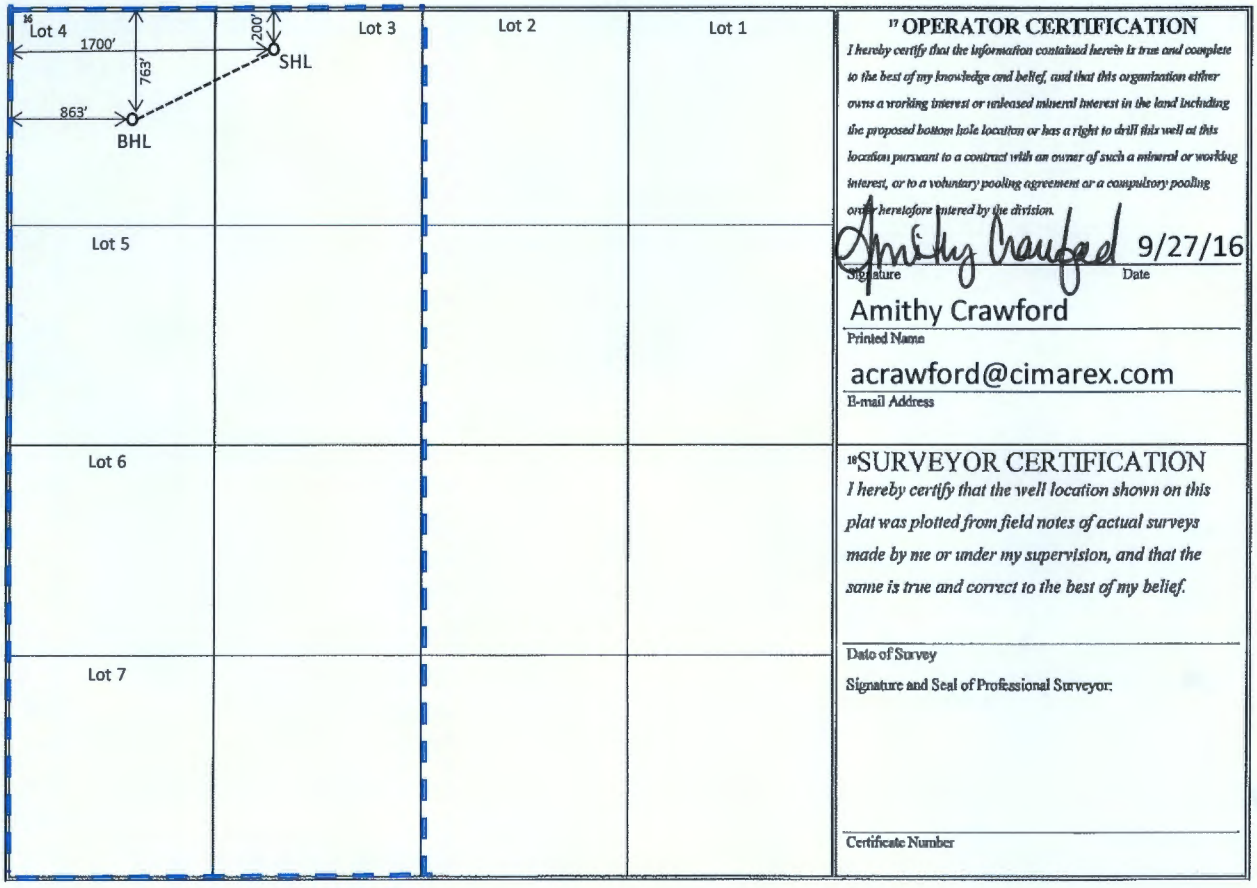
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
3	6	25S	26E		200	North	1700	West	Eddy

[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
4	6	25S	26E		763	North	863	West	Eddy

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
320	N		

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.

Amithy Crawford 9/27/16
Signature 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
30-015-34319	87280	White City; Penn (Gas)

[4] Property Code	[5] Property Name	[6] Well Number
35072	Adrianne 6 Federal	1

[7] OGRID No.	[8] Operator Name	[9] Elevation
162683	Cimarex Energy of Colorado	3454'

[10] Surface Location

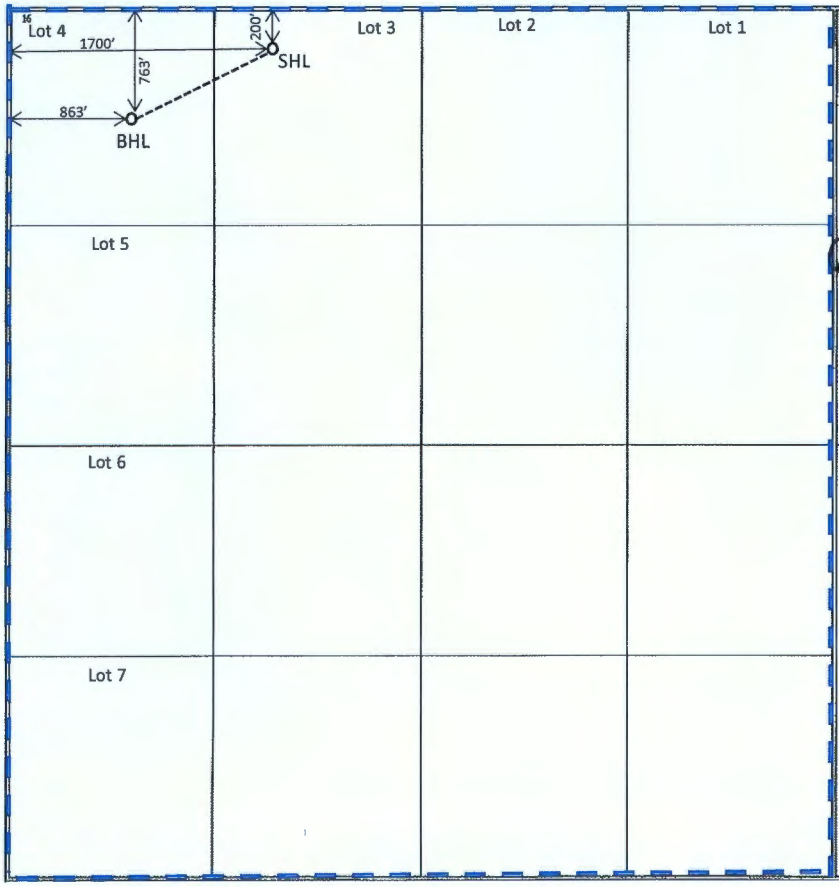
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
3	6	25S	26E		200	North	1700	West	Eddy

[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
4	6	25S	26E		763	North	863	West	Eddy

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
640	N		

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.



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Amithy Crawford 9/27/16
Signature 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

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

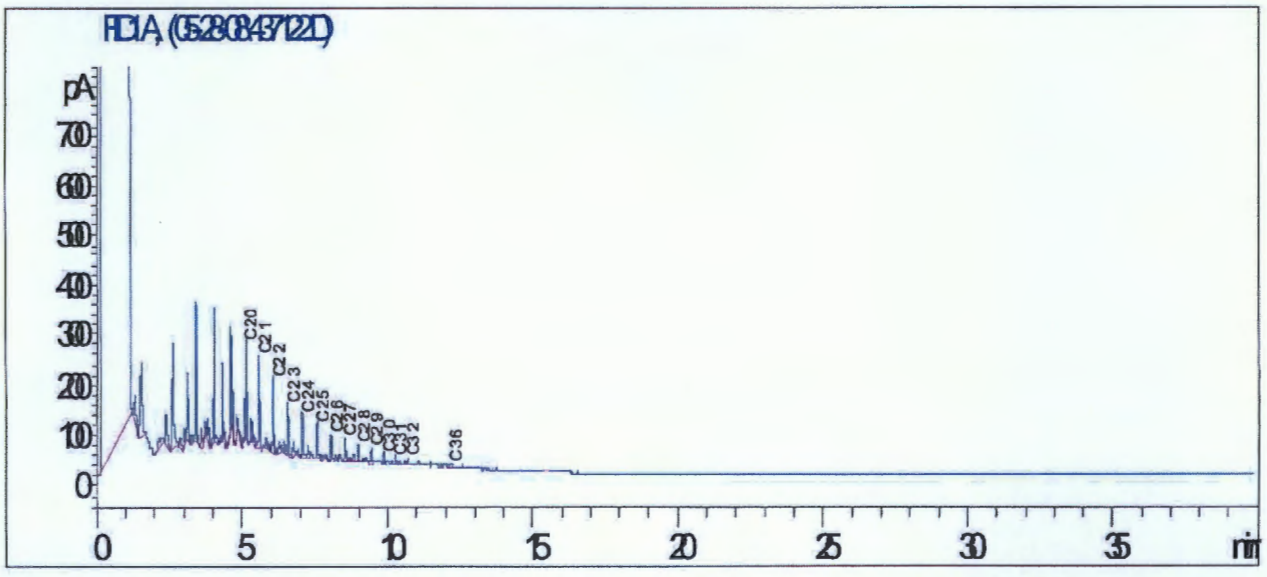
Lab Team Leader - Sheila Hernandez
(432) 495-7240

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	
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.

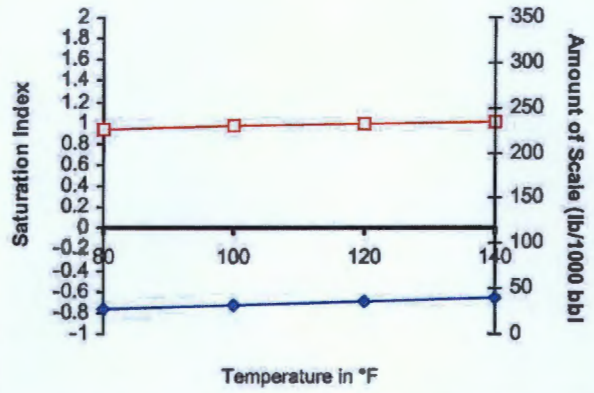
Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

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

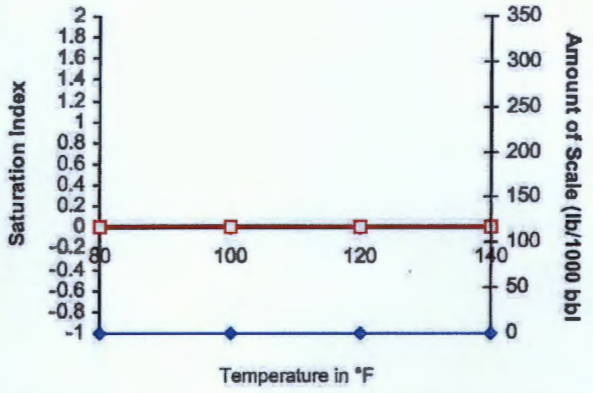
Scale Predictions from Baker Petrolite

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

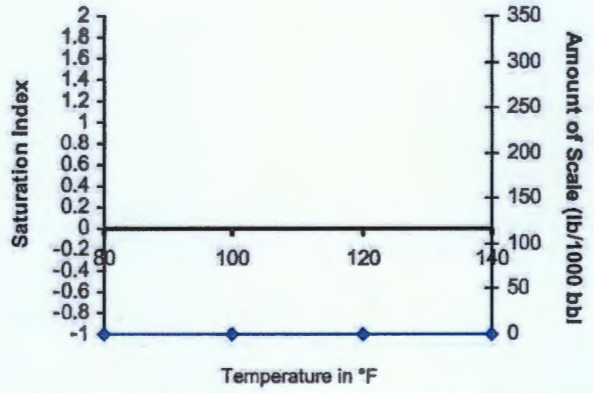
Calcite - CaCO3



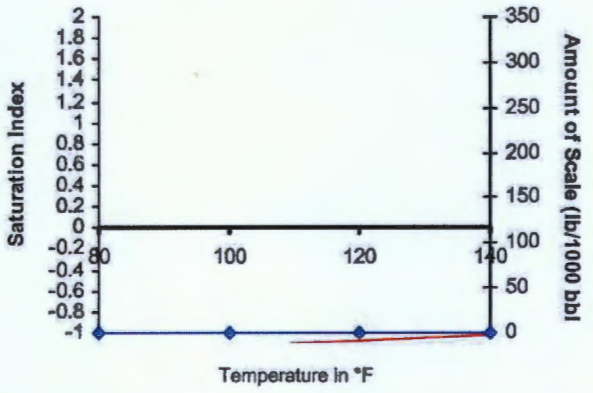
Barite - BaSO4



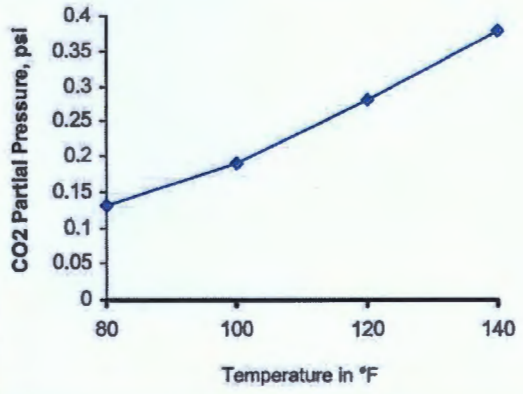
Gypsum - CaSO4*2H20



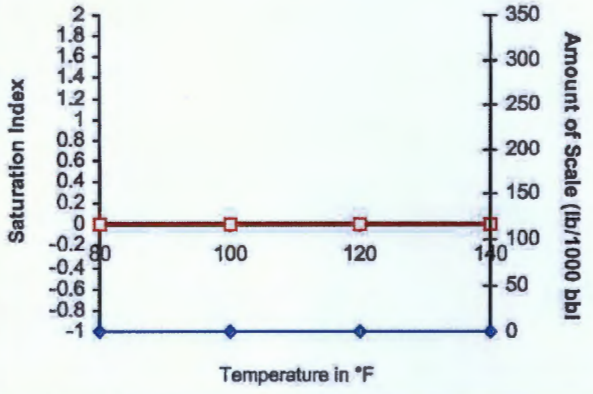
Anhydrite - CaSO4



Carbon Dioxide Partial Pressure



Celestite - SrSO4



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

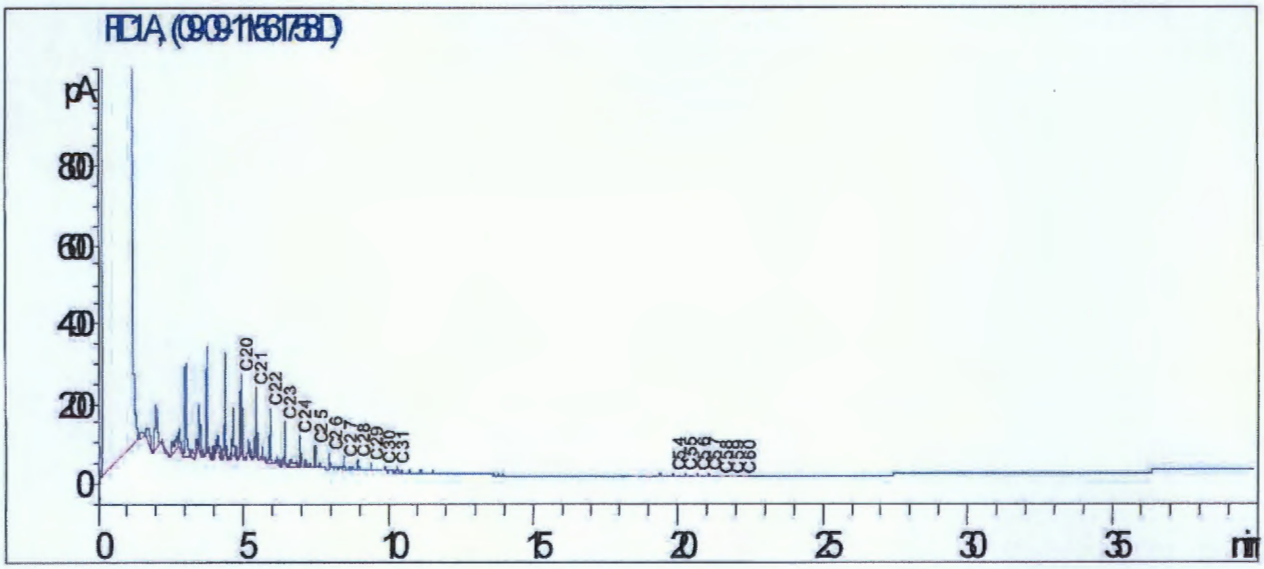
Lab Team Leader - Sheila Hernandez
(432) 495-7240

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):	1.063
Anion/Cation Ratio:	1
Carbon Dioxide:	150 PPM
Oxygen:	
Comments:	
RESISTIVITY 0.083 OHM-M @ 75℉	

Analysis of Sample 535681 @ 75 ℉

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
℉	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.

Current WBD

KB - 16' above GL

Cimarex Energy Co. of Colorado

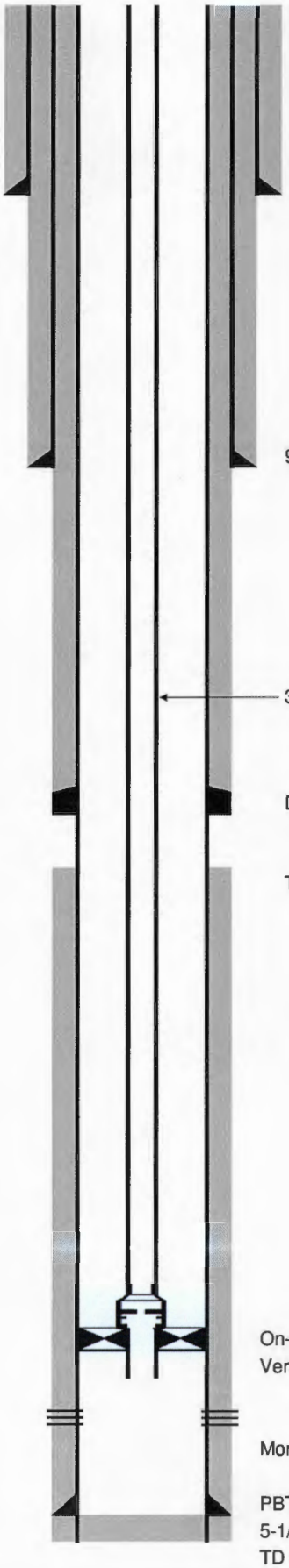
Adrianne 6 Federal #1

SHL - 200' FNL & 1700' FWL

BHL - 763' FNL & 863' FWL

Sec. 6, T-25-S, R-26-E, Eddy Co., NM

M. Karner 9/14/2016



13-3/8", 48# H-40 csg @ 215'
cmtd w/ 260 sx, cmt circ

9-5/8", 40# J-55 csg @ 1915'
cmtd w/ 735 sx, cmt circ

363 jts 2-3/8" 4.7# L-80 Tbg

DV Tool @ 7290'
cmtd w/ 980 sx, cmt circ

TOC 7,920' by CBL

On-off Tool w/ 1.81" Baker F Profile nipple @ 11243'
Versa Set pkr @ 11250'.

Morrow perfs (11,306' - 11,955')

PBTD @ 12130'
5-1/2" 17# P-110 @ 12235' cmtd w/ 1060 sx, cmt circ
TD @ 12235'

CIMAREX

Proposed WBD

KB - 16' above GL

Cimarex Energy Co. of Colorado

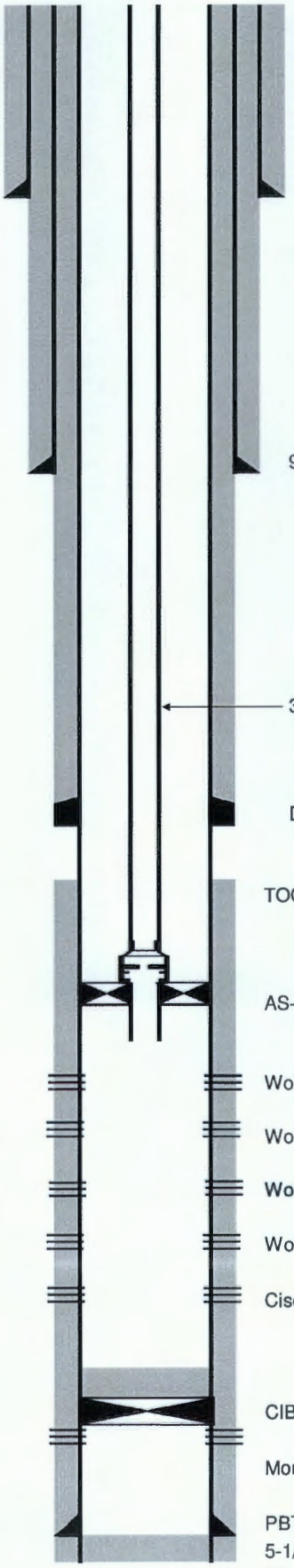
Adrianne 6 Federal #1

SHL - 200' FNL & 1700' FWL

BHL - 763' FNL & 863' FWL

Sec. 6, T-25-S, R-26-E, Eddy Co., NM

M. Karner 9/14/2016



13-3/8", 48# H-40 csg @ 215'
cmtd w/ 260 sx, cmt circ

9-5/8", 40# J-55 csg @ 1915'
cmtd w/ 735 sx, cmt circ

363 jts 2-3/8" 4.7# L-80 Tbg

DV Tool @ 7290'
cmtd w/ 980 sx, cmt circ

TOC 7,920' by CBL

AS-1X packer at +/- 8,396'

Wolfcamp perfs (8,446 - 8,641')

Wolfcamp perfs (9,136' - 9,244')

Wolfcamp perfs (9,312' - 9,531')

Wolfcamp perfs (9,738' - 9,954')

Cisco Canyon perfs (10,090' - 10,303')

CIBP set at 11,256' with 35' of cement on top

Morrow perfs (11,306' - 11,955')

PBTD @ 12130'
5-1/2" 17# P-110 @ 12235' cmtd w/ 1060 sx, cmt circ
TD @ 12235'

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CIMAREX

Field Study: Cisco Canyon and Wolfcamp (Ciscamp) Commingled Allocation Assessment

Exhibits and Appendix

White City Area, Eddy County, NM

Prepared for the U.S. Bureau of Land Management

June, 2016

EXHIBIT 1: Area Map

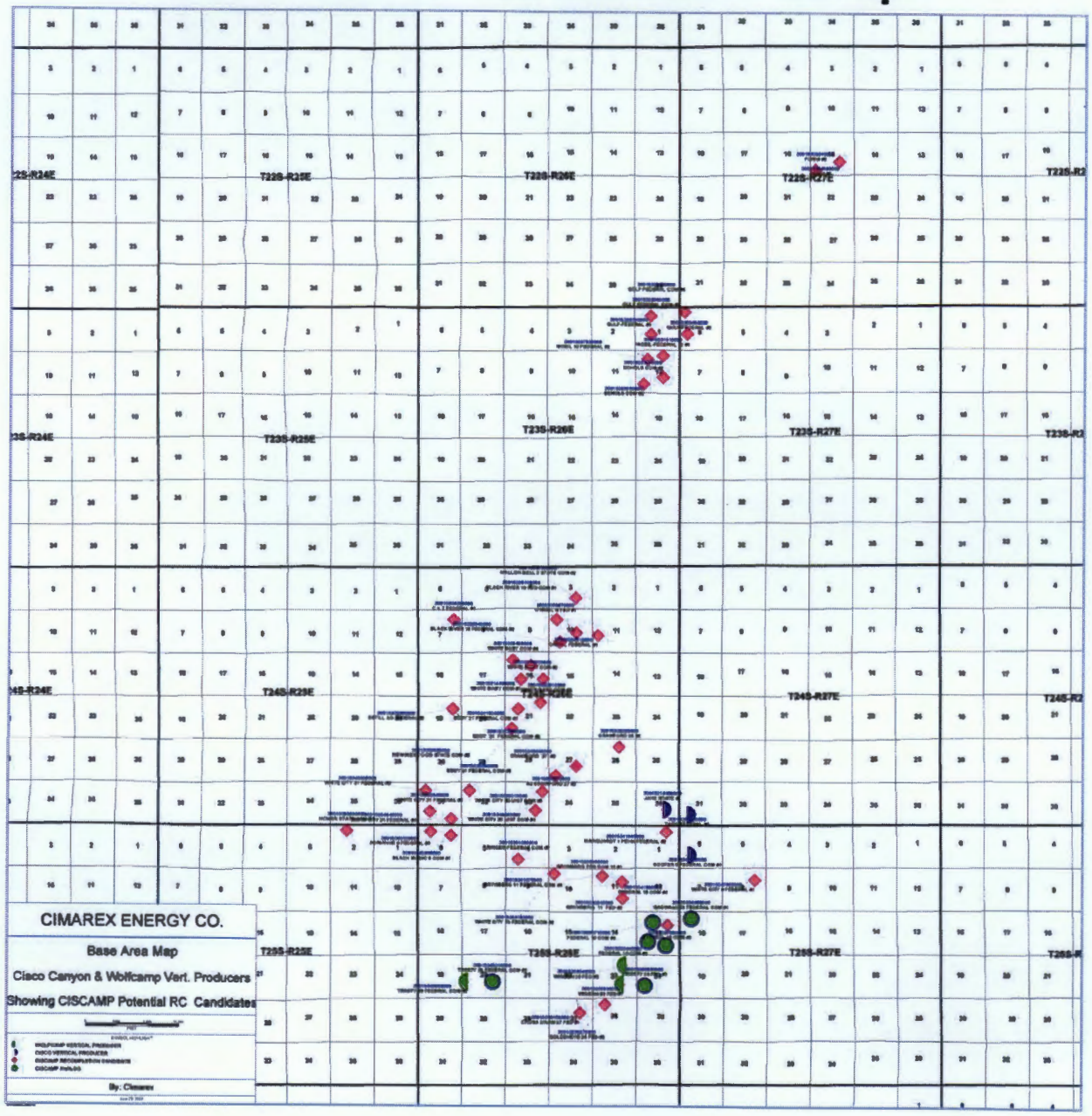

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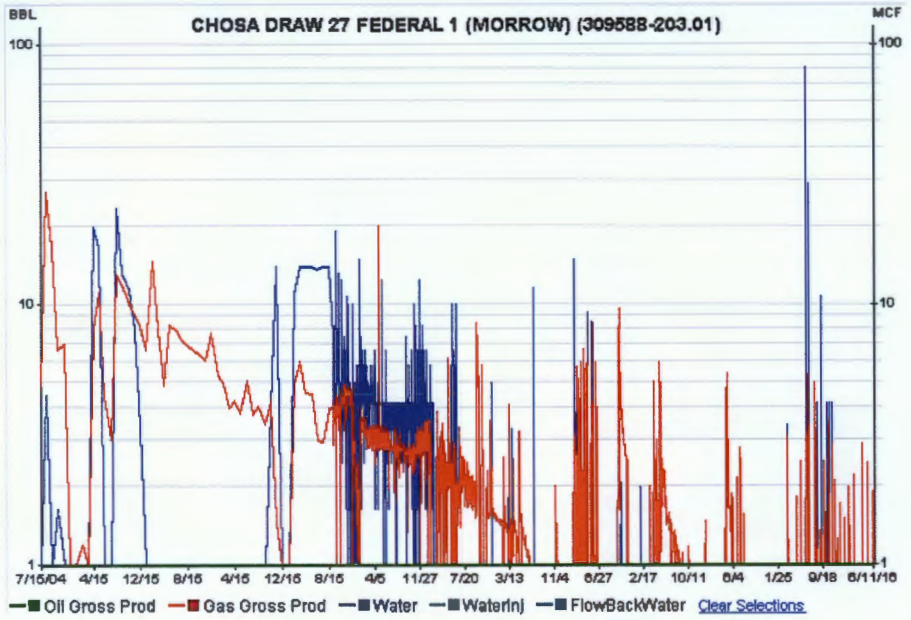
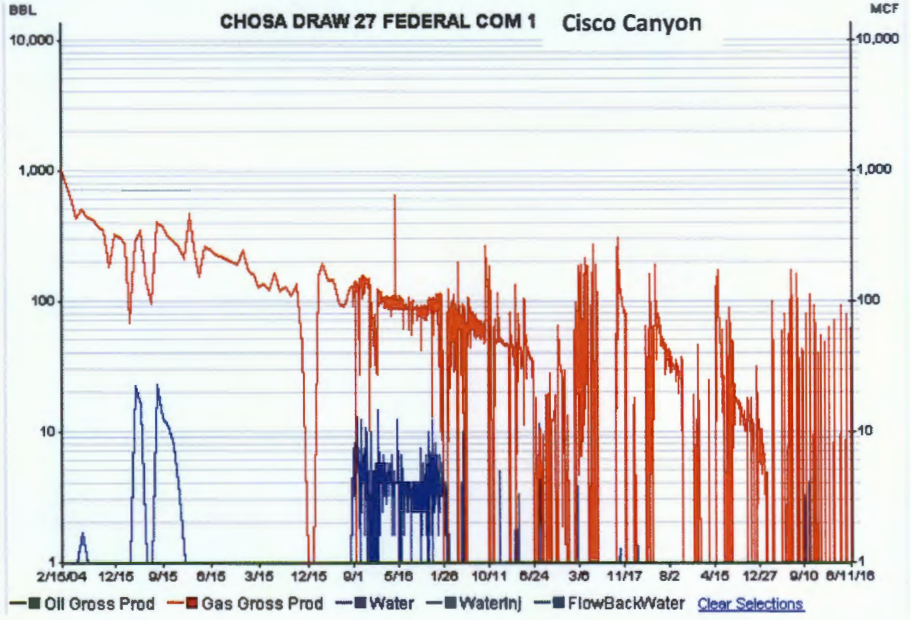
EXHIBIT 2: Chosa Draw 27 Federal #1 Production (Morrow & Cisco Canyon)





30-015-32918	COTTONWOOD DRAW; UPPER PENN (G)	COTTONWOOD DRAW; UPPER PENN (G)		Cisco Gas	COTTONWOOD DRAW; MORROW (G)	COTTONWOOD DRAW; MORROW (G)		CUM TO-DATE	CUM TO-DATE
CHOSA DRAW 27 FED COM 1	OIL	GAS			OIL	GAS		OIL	GAS
2004	0	112,272		112,272				0	112,272
2005	0	97,506		97,506	0	2,482		0	99,988
2006	0	87,125		87,125	0	2,694		0	89,819
2007	0	42,949		42,949	0	1,328		0	44,277
2008	0	43,423		43,423	0	1,347		0	44,770
2009	0	33,484		33,484	0	1,042		0	34,526
2010	0	24,953		24,953	0	773		0	25,726
2011	0	9,109		9,109	0	283		0	9,392
2012	0	15,401		15,401	0	477		0	15,878
2013	0	9,792		9,792	0	303		0	10,095
2014	0	5,953		5,953	0	184		0	6,137
2015	0	2,265		2,265	0	72		0	2,337
2016	0	267		267	0	8		0	275
CUM TO-DATE	*0*	***484,499***		***484,499***	*0*	***10,993***		*0*	***495,492***

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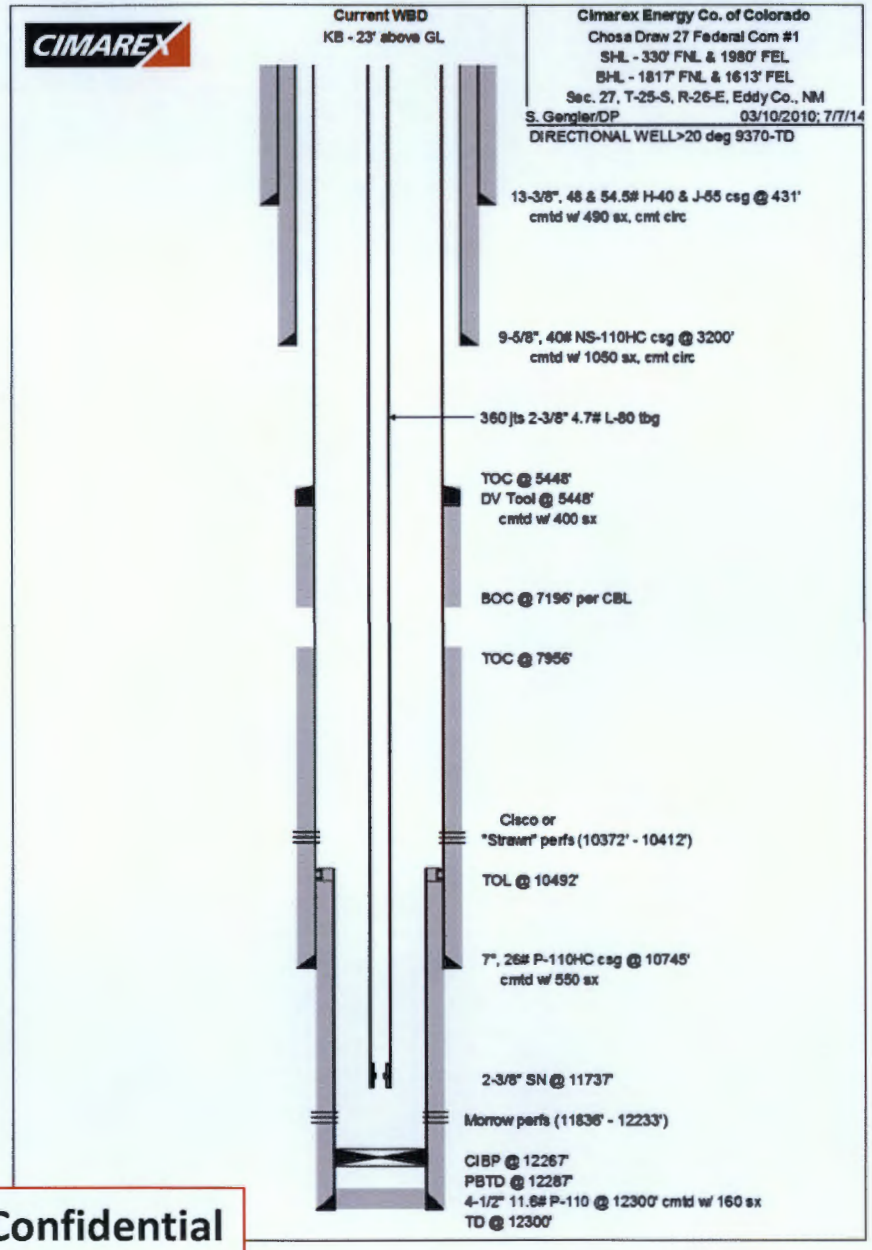
EXHIBIT 3: Chosa Draw 27 Fed Com 1 Wellbore Diagrams



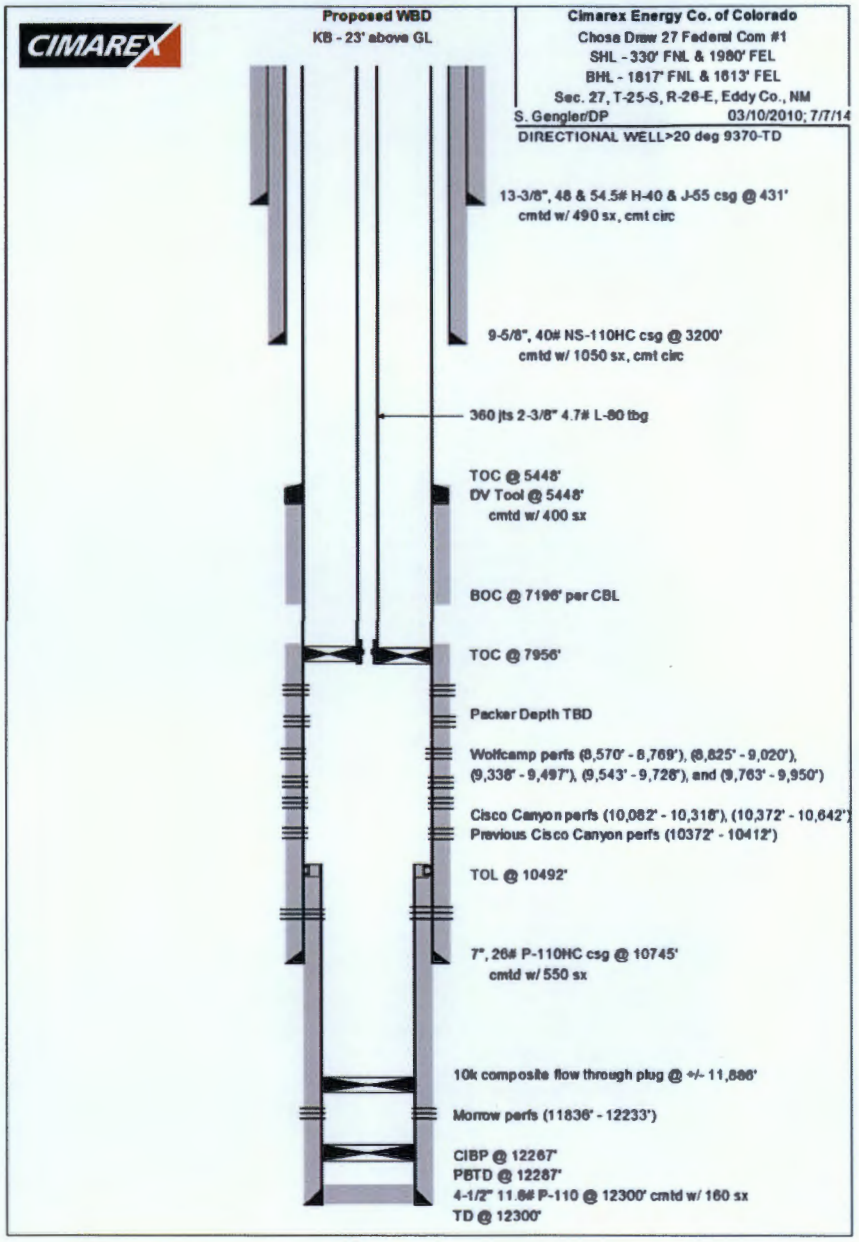


EXHIBIT 4: Coleman Equation For Critical Loading Rate

1. Density:

$$\rho_g = \frac{2.699\,\gamma_g\,P}{T\,z}$$

2. Critical Velocity:

Coleman's

$$U = 1.59\,\frac{\sigma^{1/4}\left(\rho_L - \rho_g\right)^{1/4}}{\rho_g^{1/2}}$$

	Hydraulic Diameter in	Cross Sectional Area ft^2
2-3/8" 4.7# L-80 Tbg	1.995	0.087
2-7/8" 6.5# L-80 Tbg	2.441	0.130
4.5" 11.6# L-80 x 2-3/8" 4.7# L-80	3.219	0.226
7" 26# P-110 x 2-3/8" 4.7# L-80	5.809	0.736

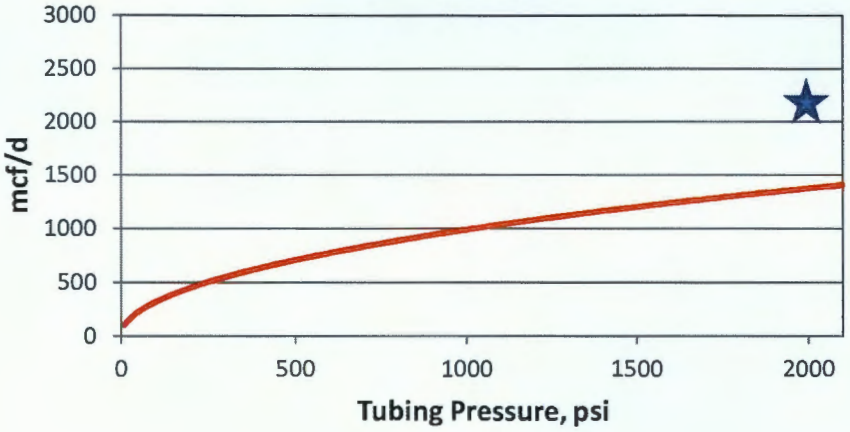
3. Gas Flowrate:

$$Q = \frac{P\,T_{sc}\,A\,U}{1000\,P_{sc}\,z\,T} \times 3600 \times 24$$

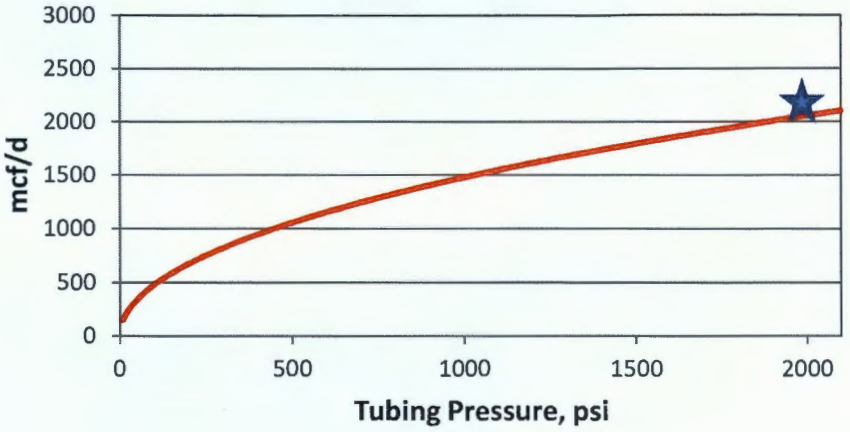
Expected IP 2.096 MMCFD at ~2,100 psi

EXHIBIT 5: Critical Flow Rate - Coleman Equation Results

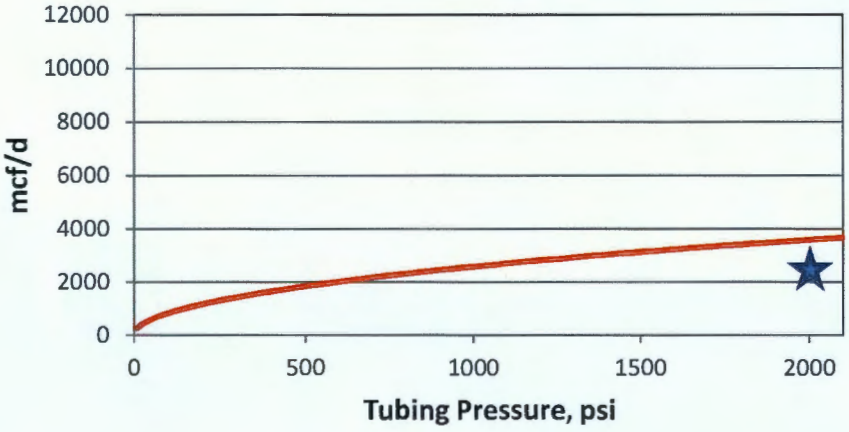
2.375" Tbg



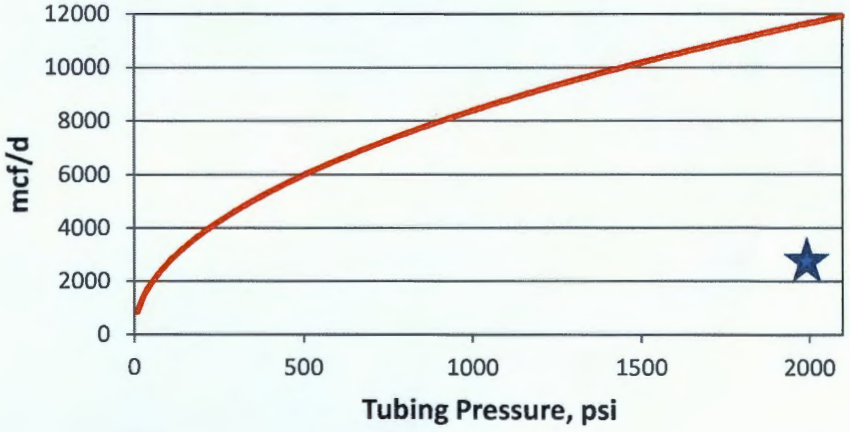
2.875" Tbg



4.5" Csg x 2.375" Tbg



7" Csg x 2.375" Tbg



Expected IP 2.096 MMCFD at ~2,100 psi

EXHIBIT 6A: White City Area - Potential Ciscamp Recompletion Candidates

Well Name	Current Producing Formation
1.Adrianne 6 Fed 1	Morrow
2.Black Magic 6 Com 1	Atoka and Morrow
3.Black River 10 Fed Com 1	Morrow
4.Black River 10 Fed Com 2	Morrow
5.Chosa Draw 27 Fed #1 (PROPOSED)	Morrow and Cisco Canyon
6.Ck 7 Fed 1	Morrow
7.Crawford 26 – 2	Morrow
8.Crawford 27 – 2	Morrow
9.Crawford 27 - 3	Strawn
10.Echols Com 1J	Morrow
11.Echols Com 2	Atoka
12.Eddy 21 Fed Com 1	Strawn
13.Eddy 21 Fed Com 2	Morrow
14.Eddy 21 Fed Com 3	Strawn, Atoka, and Morrow
15.Estill AD Fed 2	Cisco Canyon
16.Federal 13 Com 4	Morrow
17.Forni 2	Morrow
18.Forni 5	Atoka and Morrow
19.Goldeneye 26 Fed 2	Atoka
20.Grynberg 11 Fed Com 1	Morrow
21.Grynberg 11 Fed Com 2	Strawn and Atoka
22.Grynberg 11 Fed Com 4	Morrow
23.Gulf Fed Com 1	Morrow

Well Name	Current Producing Formation
24.Gulf Fed Com 2	Strawn and Atoka
25.Gulf Fed Com 3	Morrow
26.Gulf Fed Com 4	Morrow
27.Homer State Com 1	Atoka and Morrow
28.Mallon Bell 3 State Com 2	Morrow
29.Marquardt 1 Penn Fed 2	Morrow
30.Mobil 12 Fed 1B	Cisco Canyon and Strawn
31.Mobil 12 Fed 2	Morrow
32.New Mexico DD State Com 3	Morrow
33.O'Neill B Com 1	Morrow
34.O'Neill Fed 1	Morrow
35.Ringer Fed Com 7	Morrow
36.White Baby 1	Morrow and Strawn
37.White Baby 2	Strawn, Atoka, and Morrow
38.White Baby 3	Morrow
39.White Baby 4	Morrow
40.White City 10 Fed 2	Morrow
41.White City 31 Fed 2	Morrow
42.White City 31 Fed 3	Morrow
43.White City 31 Fed 4	Morrow
44.White City 33 Unit Com 3	Morrow
45.White City 33 Unit Com 4	Morrow
46.White City 8 Federal Well 1	Morrow

Total: 46 Candidates
(36 in Immediate Analogous Area)

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Listed in alphabetical order

EXHIBIT 6B: White City Base Area Map Showing 46 Potential Ciscamp Recompletion Candidates

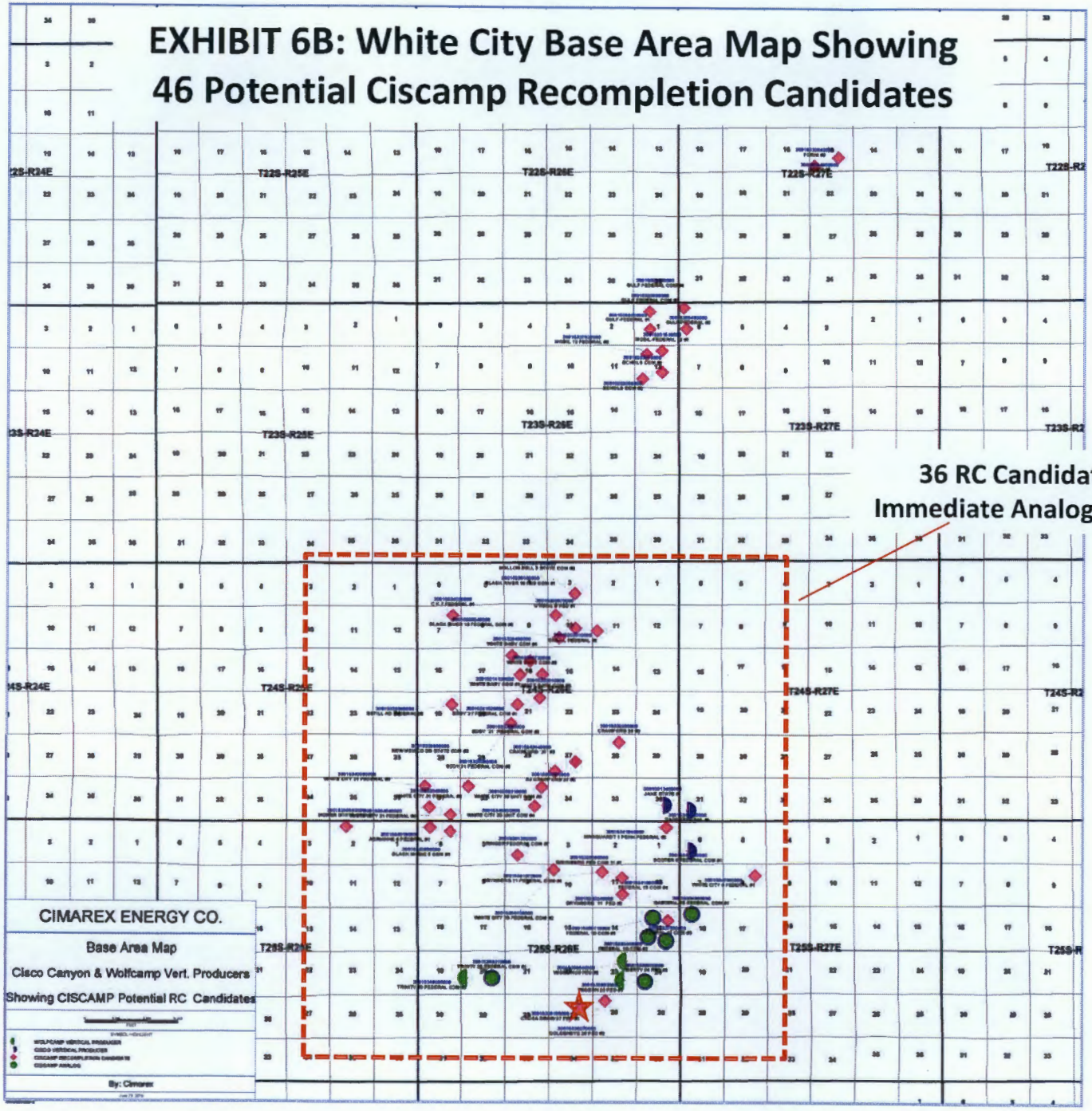

EXHIBIT 6C: White City Base Area Map Showing 36 Potential Ciscamp Recompletion Candidates

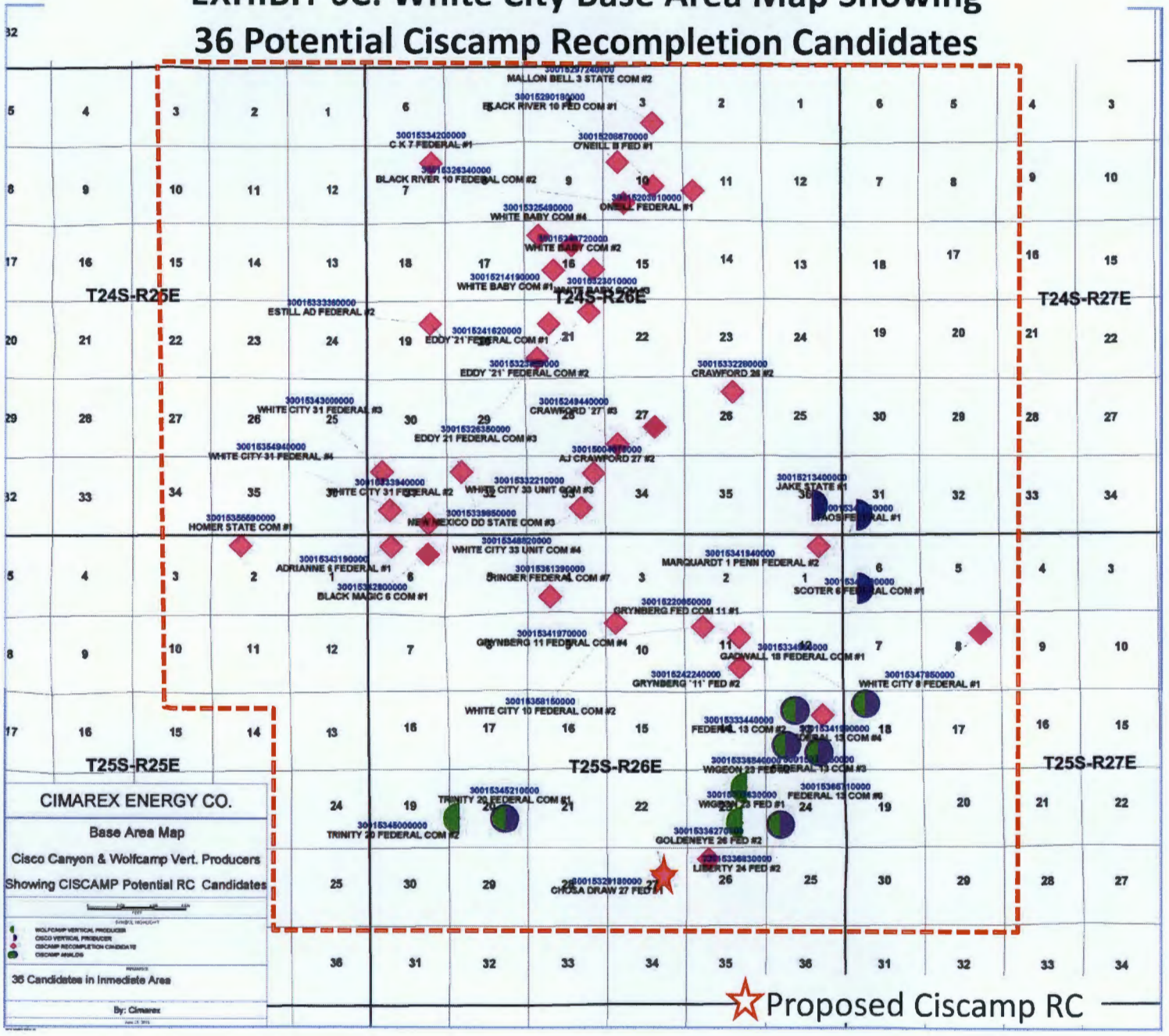

EXHIBIT 7: Cisco Canyon – Hydrocarbon Pore Volume Map

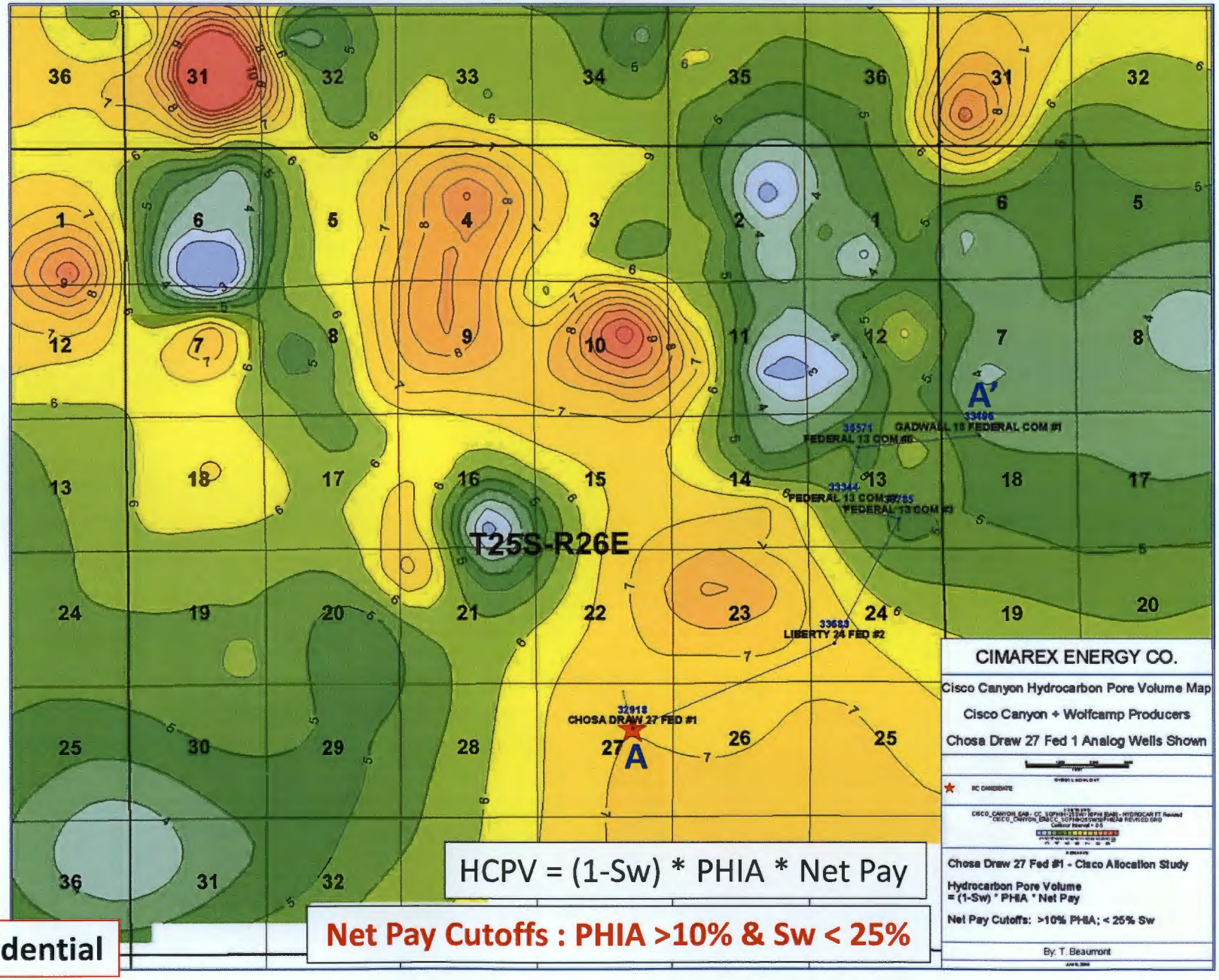

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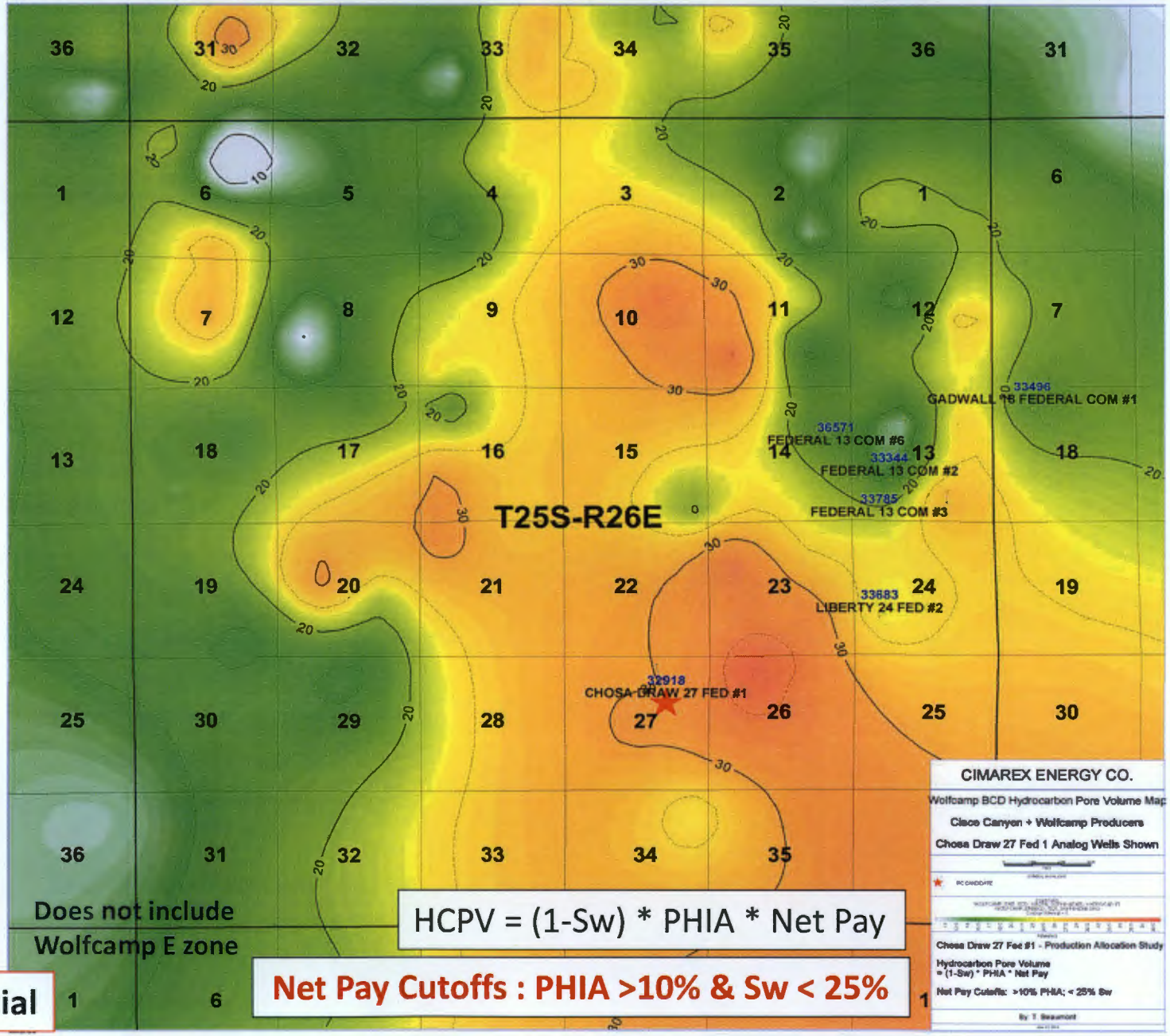
EXHIBIT 8: Wolfcamp BCD – Hydrocarbon Pore Volume Map



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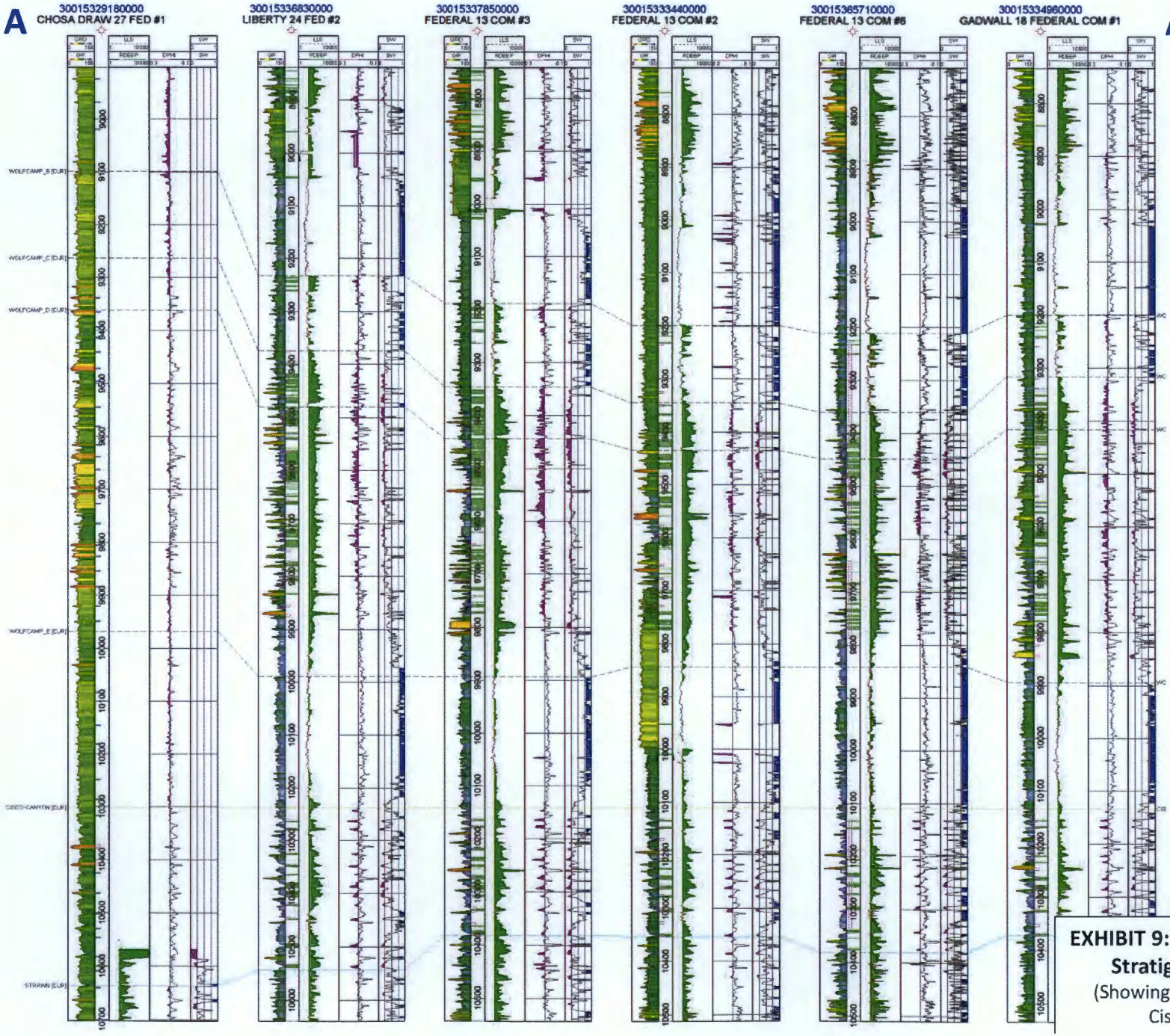

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EXHIBIT 9: Wolfcamp to Strawn Stratigraphic X-Section
(Showing Chosa Draw 27 Fed 1 Ciscamp Analogs)

EXHIBIT 10: Cisco Canyon – Stratigraphic X-Section

(Showing Chosa Draw 27 Fed 1 Ciscamp Analogs)

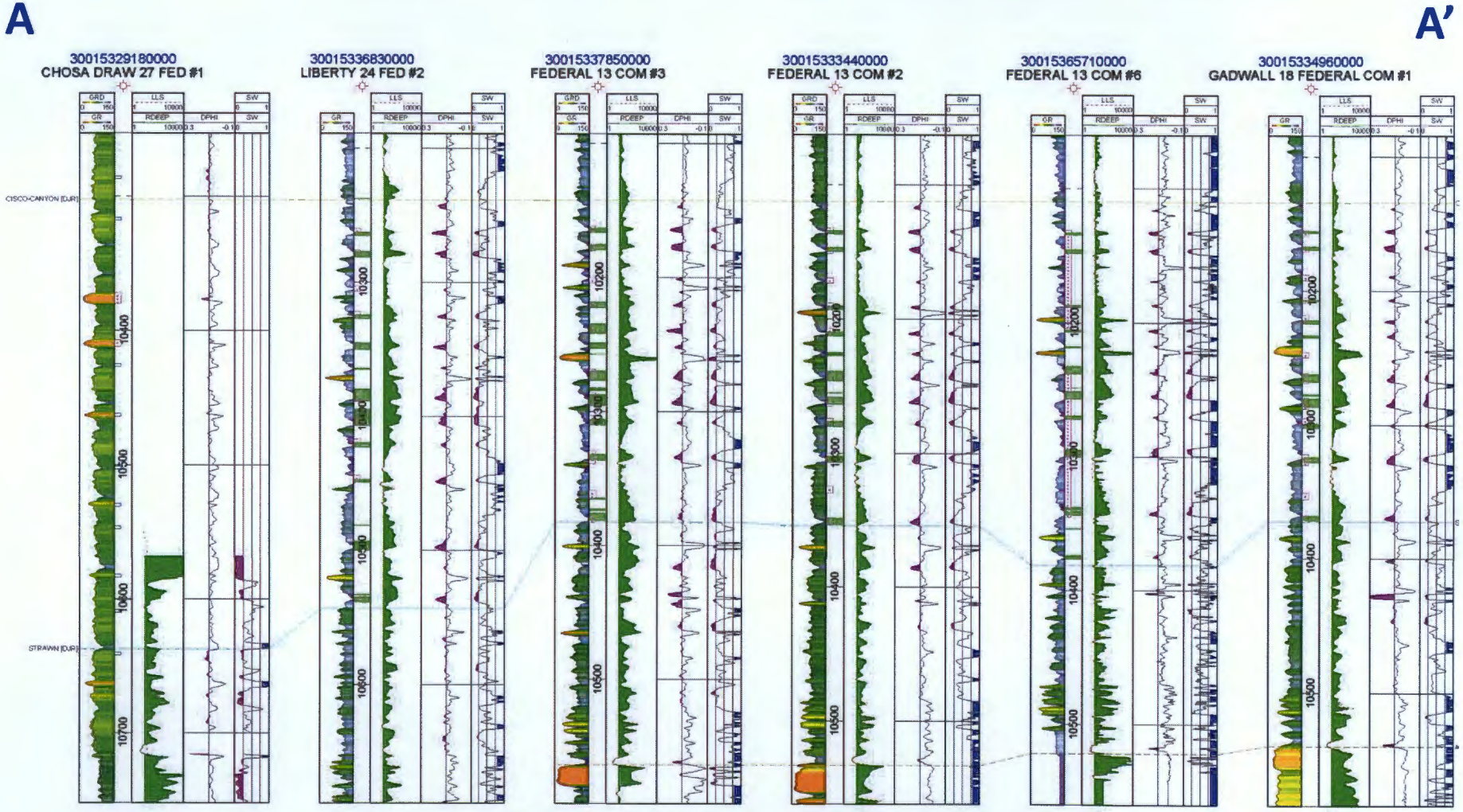

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EXHIBIT 11: Cumulative Allocated Production, Cum. Prod. Allocation Factors & EUR's from Ciscamp Analogs

UWI (APINum)	Well / Lease Name	Current Completed Zone(S)	Prod. Start Date	Cum. Gas: Cisco, MCF	Cum. Gas: Wolfcamp, MCF	Total Cum Gas: Cisco + Wolfcamp MCF	Cisco, Cum Prod. % Allocation Factor	Wolfcamp BCD, Cum Prod. % Allocation Factor	Tot Gas EUR, MMCF	Tot Oil EUR, MBO
30015337850000	FEDERAL 13 COM 3	Cisco + Wolfcamp BCD	Dec-09	157,493	409,237	**566,730**	**28%**	**72%**	**1,461**	**33.7**
30015333440000	FEDERAL 13 COM 2	Cisco + Wolfcamp BCD	Apr-10	153,167	330,804	**483,971**	**32%**	**68%**	**1,092**	**23.3**
30015365710000	FEDERAL 13 COM 6	Cisco + Wolfcamp BCD	Aug-10	128,211	313,898	**442,109**	**29%**	**71%**	**975**	**33.0**
30015334960000	GADWALL 18 FEDERAL COM 1	Cisco + Wolfcamp BCD	Jun-11	191,011	492,849	**683,860**	**28%**	**72%**	**1,808**	**92.8**
30015336830000	LIBERTY 24 FEDERAL COM 2	Cisco + Wolfcamp BCD	Oct-13	90,179	167,025	**257,204**	**35%**	**65%**	**890**	**30.4**
30015329180000	**CHOSA DRAW 27 FED #1**	Cisco Canyon	Feb-04	484,499	0	**484,499**				

Note: EUR's are estimated using Decline Curve Analysis from these Ciscamp Analogs. Performance plots are included in the Appendix

EXHIBIT 12: Cisco Canyon Volumetric Reserves Estimation from HCPV Map – Ciscamp Analogs

UWI (APINum)	Well / Lease Name	Cisco Prod. Start Date	Cum. Gas: Cisco, MCF	Cisco OGIP, MMCF [1]	Cisco RGIP @ 85% RF, MMCF	Cisco Remaining Reserves, MMCF	Cisco, % Allocated Cum Gas Volumes	CISCO Net Pay, h (ft)	CISCO Avg. PHI	CISCO Avg. Sw	CISCO HCPV (1-Sw)*PHI*h	
30015337850000	FEDERAL 13 COM 3	Dec-09	157,493	713	606	449	28%	42.8	0.134	0.160	4.82	
30015333440000	FEDERAL 13 COM 2	Apr-10	153,167	784	666	513	32%	43.5	0.147	0.159	5.38	
30015365710000	FEDERAL 13 COM 6	Aug-10	128,211	692	588	460	29%	38.5	0.134	0.155	4.36	
30015334960000	GADWALL 18 FEDERAL COM 1	Jun-11	191,011	652	554	363	28%	37.2	0.144	0.169	4.45	
30015336830000	LIBERTY 24 FEDERAL COM 2	Oct-13	90,179	974	828	738	35%	56.0	0.141	0.150	6.73	
30015329180000	**CHOSA DRAW 27 FED #1**	Feb-04	484,499	1,003	852	368	23.5%	58.5	0.141	0.150	7.01	[2]

[1] Based on 10-acre drainage and Pay cut-offs @ PHI >10% & Sw < 25%

[2] Estimated from HCPV Map interpretation (No Resistivity or Density Open hole logs Available for most of the interval)

Reservoir Parameters Used To Compute Recoverable Gas In Place (RGIP):

- Gas Compressibility Factor (Z).....: 0.81
- Recovery Factor (%).....: 85.00
- Estimated Drainage Area (acres)..: 10
- **Net Pay Cut-offs .....: PHIA >10% & SW < 25%**
- HCPV Map/Grid: based on extensive well control and geologic interpretation

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EXHIBIT 13: Cisco Canyon Analogs – Plot of % Cum. Production Allocation vs. Hydrocarbon Pore Volume (HCPV)

(data as shown in Exhibit 12)

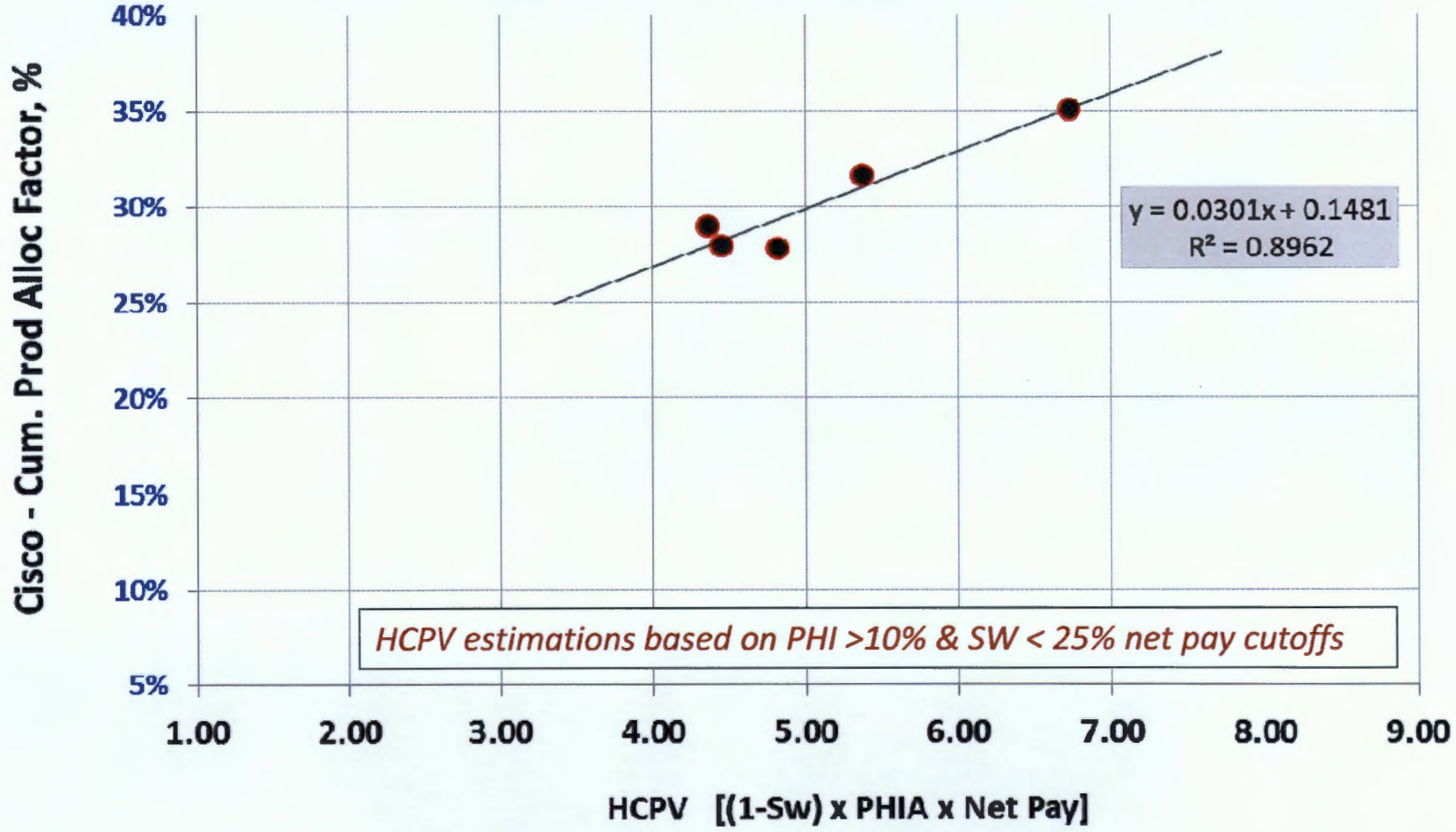
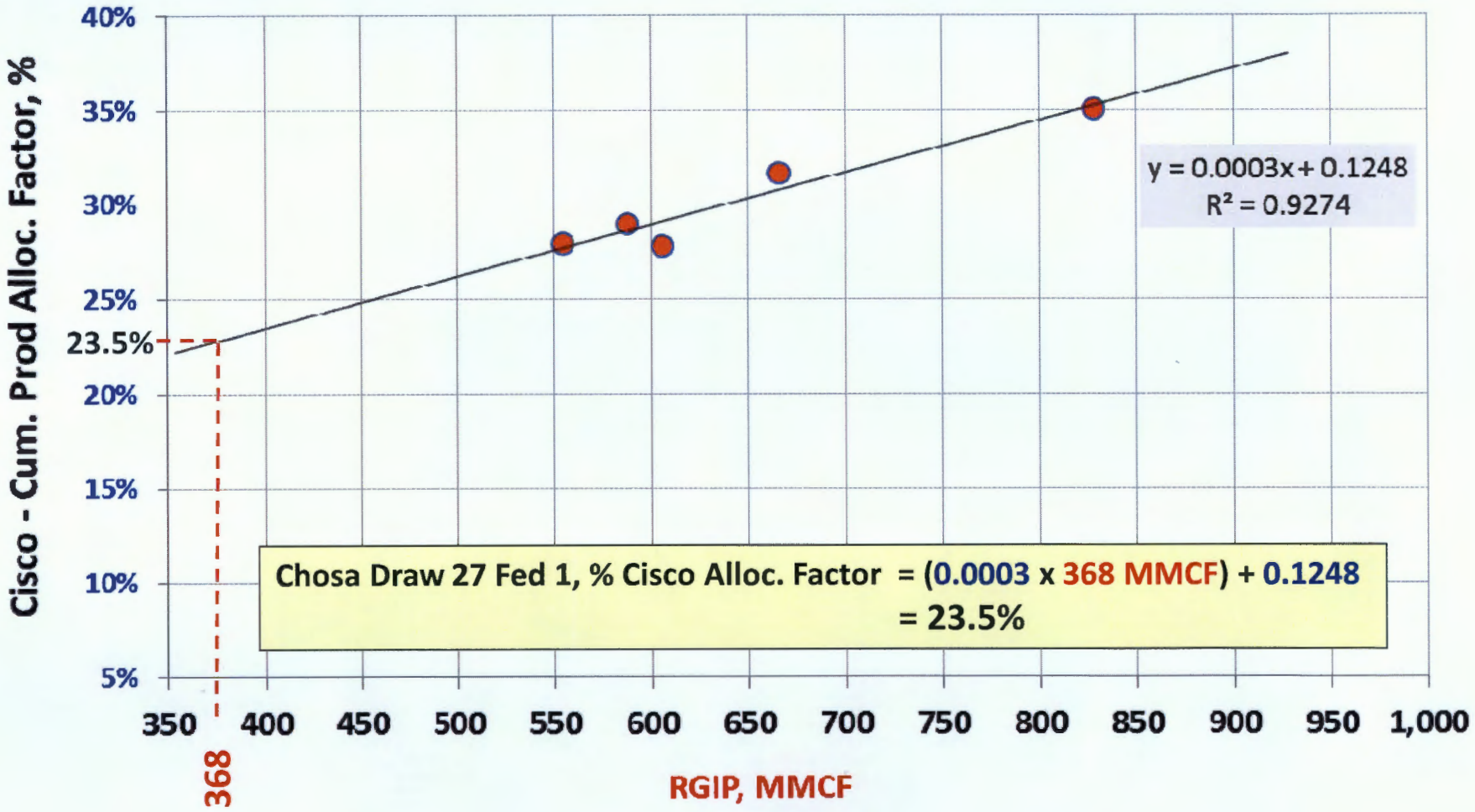


EXHIBIT 14: Cisco Canyon Analogs – Plot of % Cum. Production Allocation vs. Recoverable Gas in Place (RGIP)



*Cisco Canyon Estimated **Remaining** Recoverable Gas reserves In Place, MMCF **(from Exhibit 12)***

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EXHIBIT 15: Wolfcamp BCD Volumetric Reserves Estimation from HCPV Map – Ciscamp Analogs

UWI (APINum)	Well / Lease Name	Prod. Start Date	Cum. Gas: Wolfcamp, MCF	Wolfcamp BCD, % Allocated Cum Gas Volumes	Wolfcamp BCD OGIP, MMCF [1]	Wolfcamp BCD RGIP @ 85% RF, MMCF	Wolfcamp BCD Remaining Reserves, MMCF	WC BCD Net Pay, h @10% PHI; 25% Sw	WC BCD Avg. PHI @10% PHI; 25% Sw	WC BCD Avg. Sw @10% PHI; 25% Sw	WC BCD SOPHIh @10% PHI; 25% Sw	
30015337850000	FEDERAL 13 COM 3	Dec-09	409,237	72%	1,516	1,289	880	245.5	0.145	0.170	29.55	
30015333440000	FEDERAL 13 COM 2	Apr-10	330,804	68%	872	741	410	135.0	0.125	0.184	13.77	
30015365710000	FEDERAL 13 COM 6	Aug-10	313,898	71%	746	634	320	113.0	0.129	0.190	11.81	
30015334960000	GADWALL 18 FEDERAL COM 1	Jun-11	492,849	72%	989	840	348	164.5	0.134	0.201	17.61	
30015336830000	LIBERTY 24 FEDERAL COM 2	Oct-13	167,025	65%	1,300	1,105	938	206.0	0.137	0.184	23.03	
30015329180000	**CHOSA DRAW 27 FED #1**	Feb-04	0	79%	1,658	1,409	1,409	260.0	0.140	0.175	30.02	[2]

[1] Based on 5-acre drainage and Pay cut-offs @ PHI >10% & Sw < 25%

[2] Estimated from HCPV Map interpretation (No Resistivity or Density Open hole logs Available for most of the interval)

Remaining Recoverable Reserves (RRGIP):

- Cisco Canyon = 368 MMCF (21%)
- Wolfcamp = 1,409 MMCF (79%)
- Total = **1,777 MMCF**

Reservoir Parameters Used To Compute Recoverable Gas In Place (RGIP):

- Gas Compressibility Factor (Z).....: 0.81
- Recovery Factor (%).....: 85.00
- Estimated Drainage Area (acres)..: 5
- **Net Pay Cut-offs .....: PHIA >10% & SW < 25%**
- HCPV Map/Grid: based on extensive well control and geologic interpretation

EXHIBIT 16A: Production Performance during Stand Alone vs. Commingled Periods in the Trinity 20 Federal Com 1 Ciscamp Producer

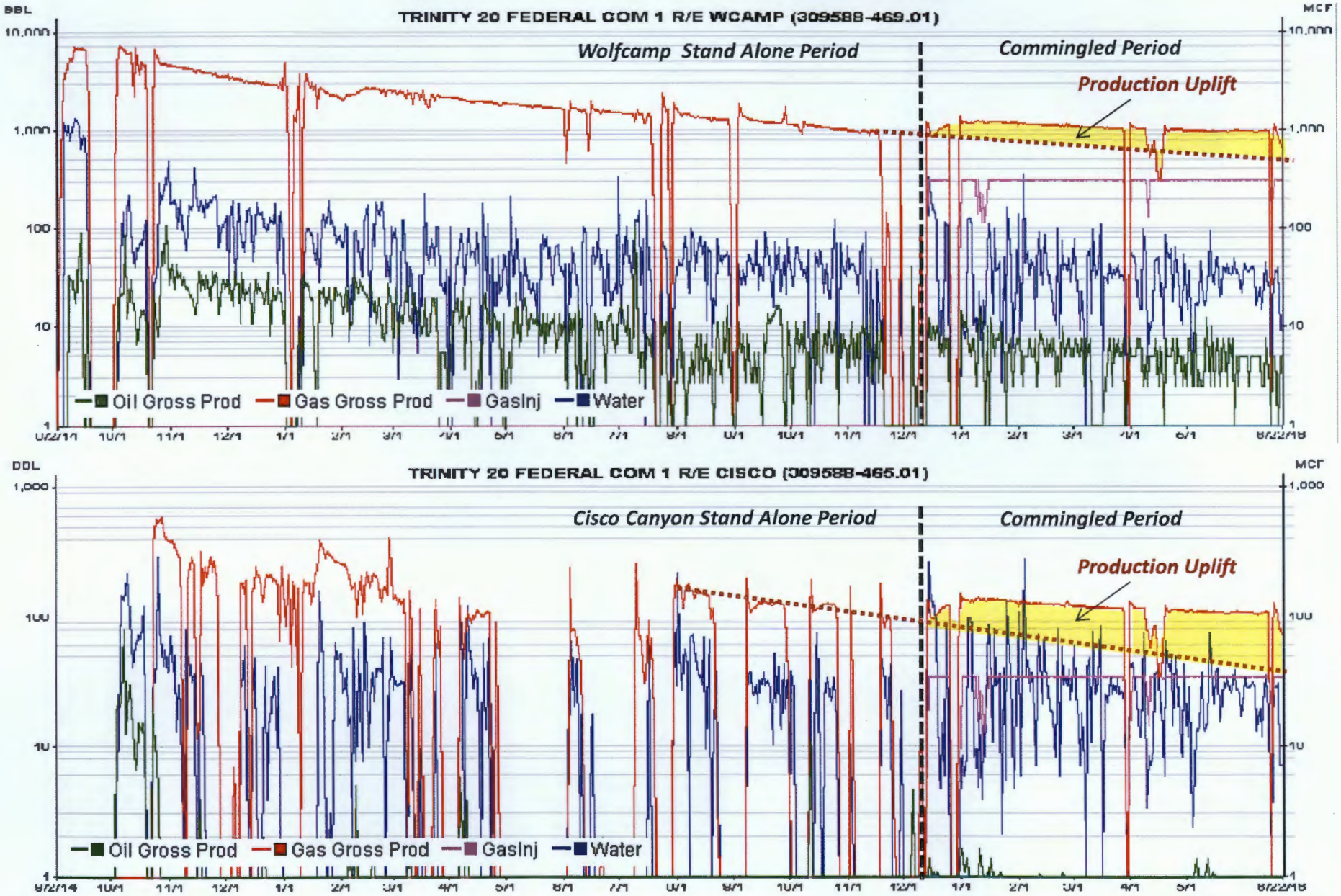
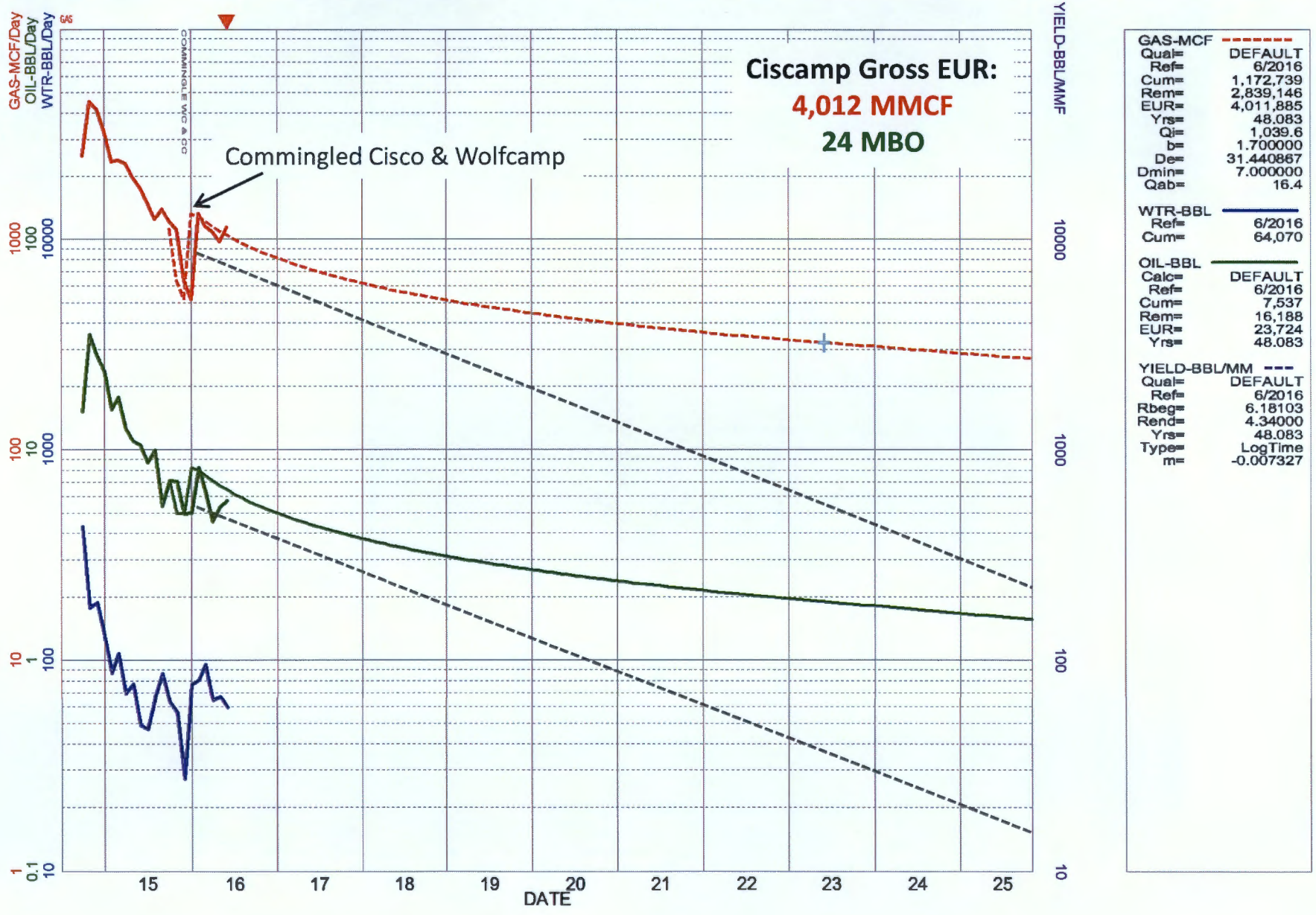


EXHIBIT 16B:

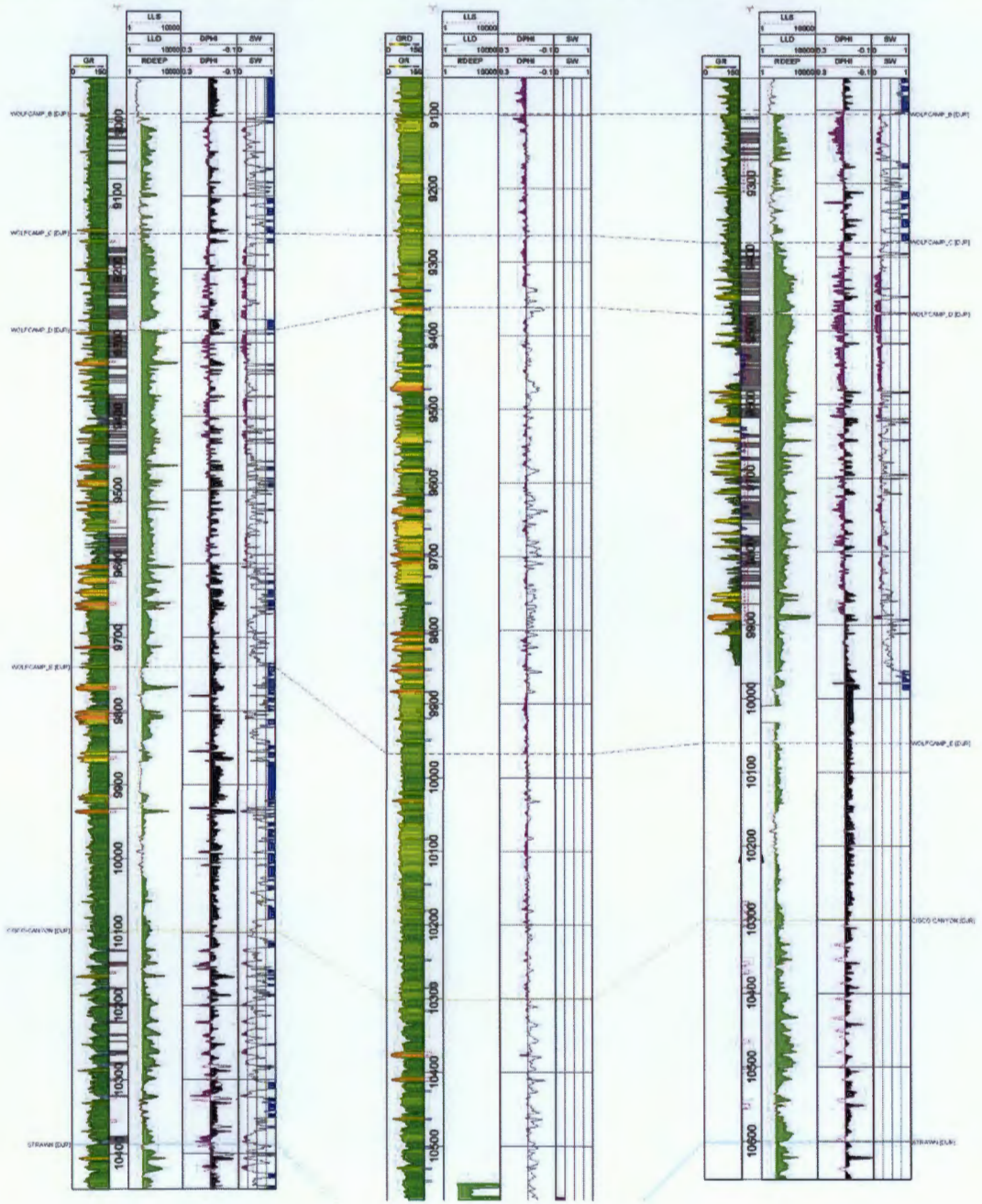
TRINITY 20 FED COM NO. 1
FIELD: CHOSA DRAW, RESERVOIR: CISCO CANYON/WOLFCAMP
COUNTY: EDDY , STATE: NM

Recent Ciscamp RC



GAS-MCF	
Qual=	DEFAULT
Ref=	6/2016
Cum=	1,172,739
Rem=	2,839,146
EUR=	4,011,885
Yrs=	48.083
Qi=	1,039.6
b=	1.700000
De=	31.440867
Dmin=	7.000000
Qab=	16.4
WTR-BBL	
Ref=	6/2016
Cum=	64,070
OIL-BBL	
Calc=	DEFAULT
Ref=	6/2016
Cum=	7,537
Rem=	16,188
EUR=	23,724
Yrs=	48.083
YIELD-BBL/MM	
Qual=	DEFAULT
Ref=	6/2016
Rbeg=	6.18103
Rend=	4.34000
Yrs=	48.083
Type=	LogTime
m=	-0.007327

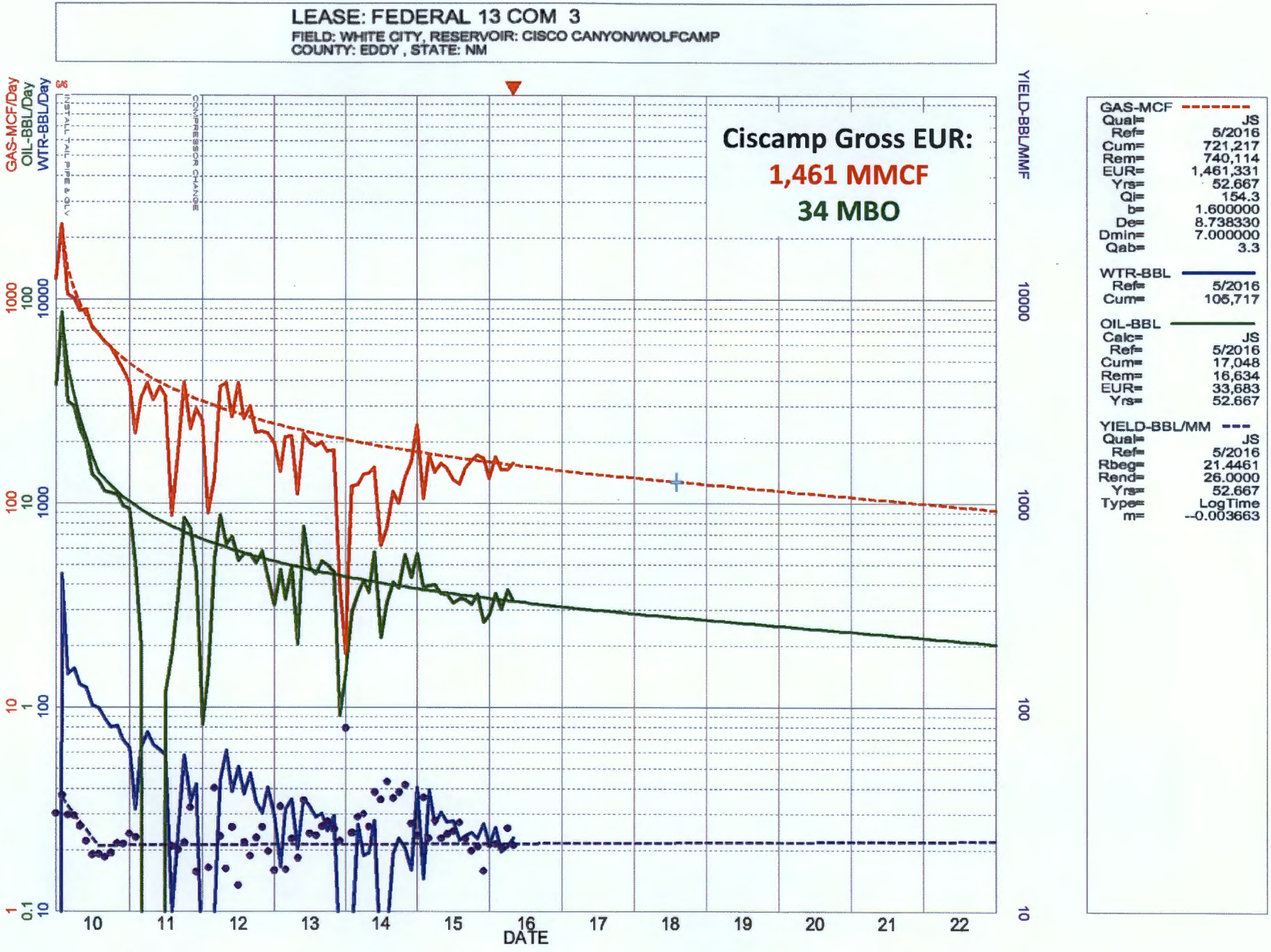
EXHIBIT 16C: Stratigraphic Log Section of the Trinity 20 Federal 1 Compared to

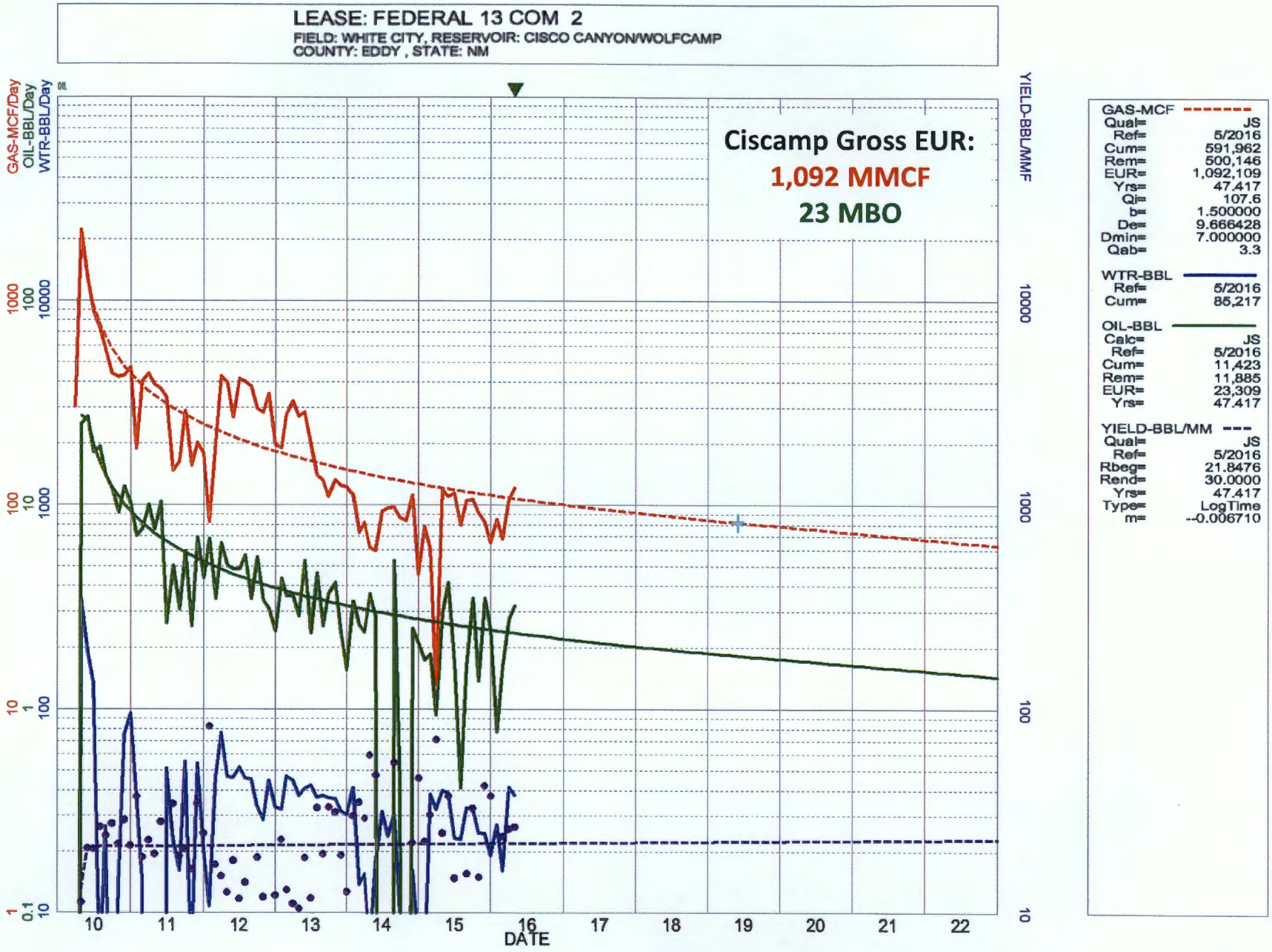


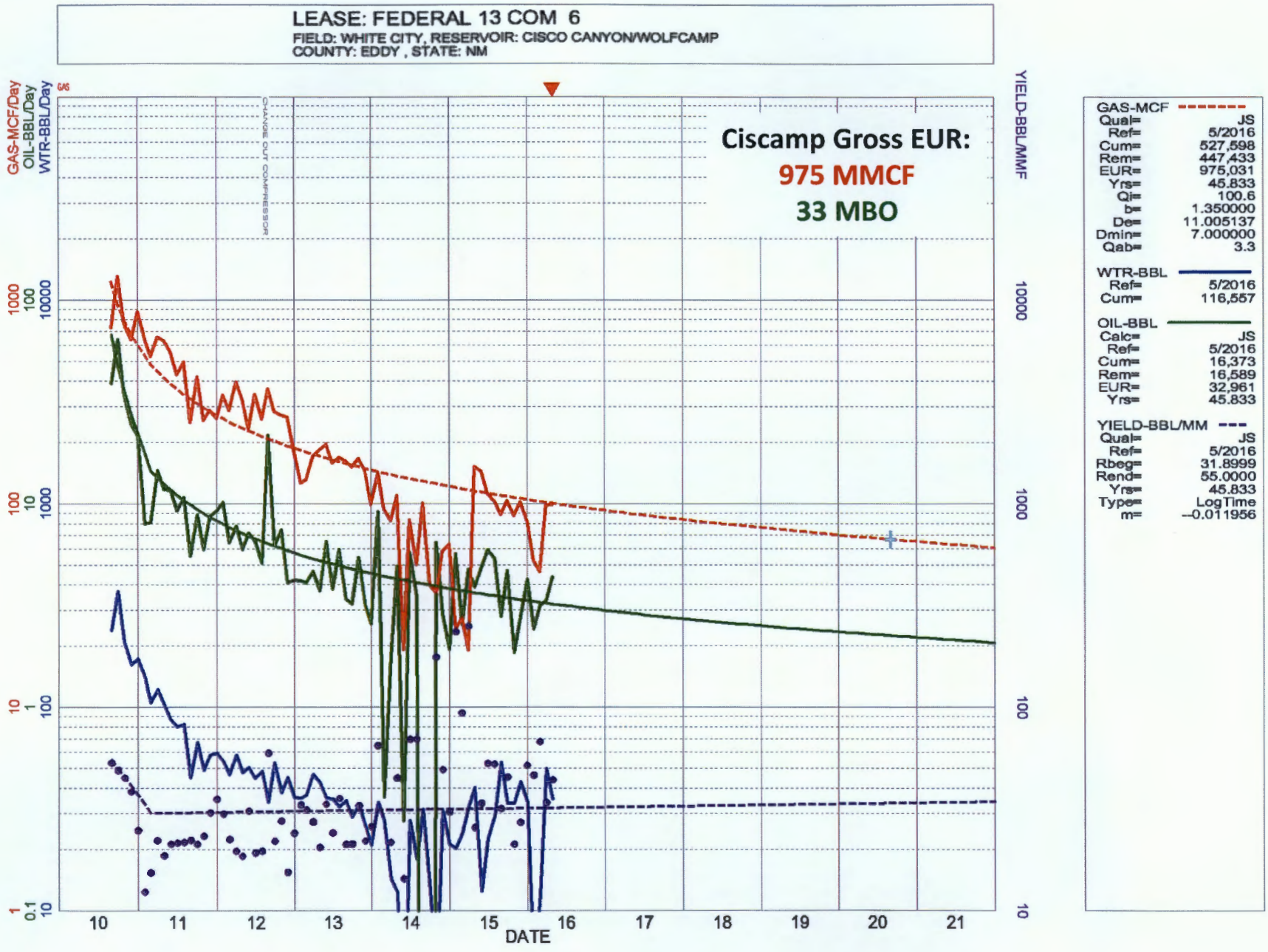
APPENDIX A

*Production Decline Performance Analysis from **Ciscamp Analogs** in White City Area*

Eddy Co. NM, White City


LEASE: FEDERAL 13 COM 3
FIELD: WHITE CITY, RESERVOIR: CISCO CANYON/WOLFCAMP
COUNTY: EDDY , STATE: NM
Ciscamp Gross EUR:
1,461 MMCF
34 MBO
GAS-MCF/Day
OIL-BBL/Day
WTR-BBL/Day
YIELD-BBL/MMF
DATE
GAS-MCF
Qual= JS
Ref= 5/2016
Cum= 721,217
Rem= 740,114
EUR= 1,461,331
Yrs= 52.667
Qi= 154.3
b= 1.600000
De= 8.738330
Dmin= 7.000000
Qab= 3.3
WTR-BBL
Ref= 5/2016
Cum= 105,717
OIL-BBL
Calc= JS
Ref= 5/2016
Cum= 17,048
Rem= 16,634
EUR= 33,683
Yrs= 52.667
YIELD-BBL/MM
Qual= JS
Ref= 5/2016
Rbeg= 21.4461
Rend= 26.0000
Yrs= 52.667
Type= LogTime
m= -0.003663

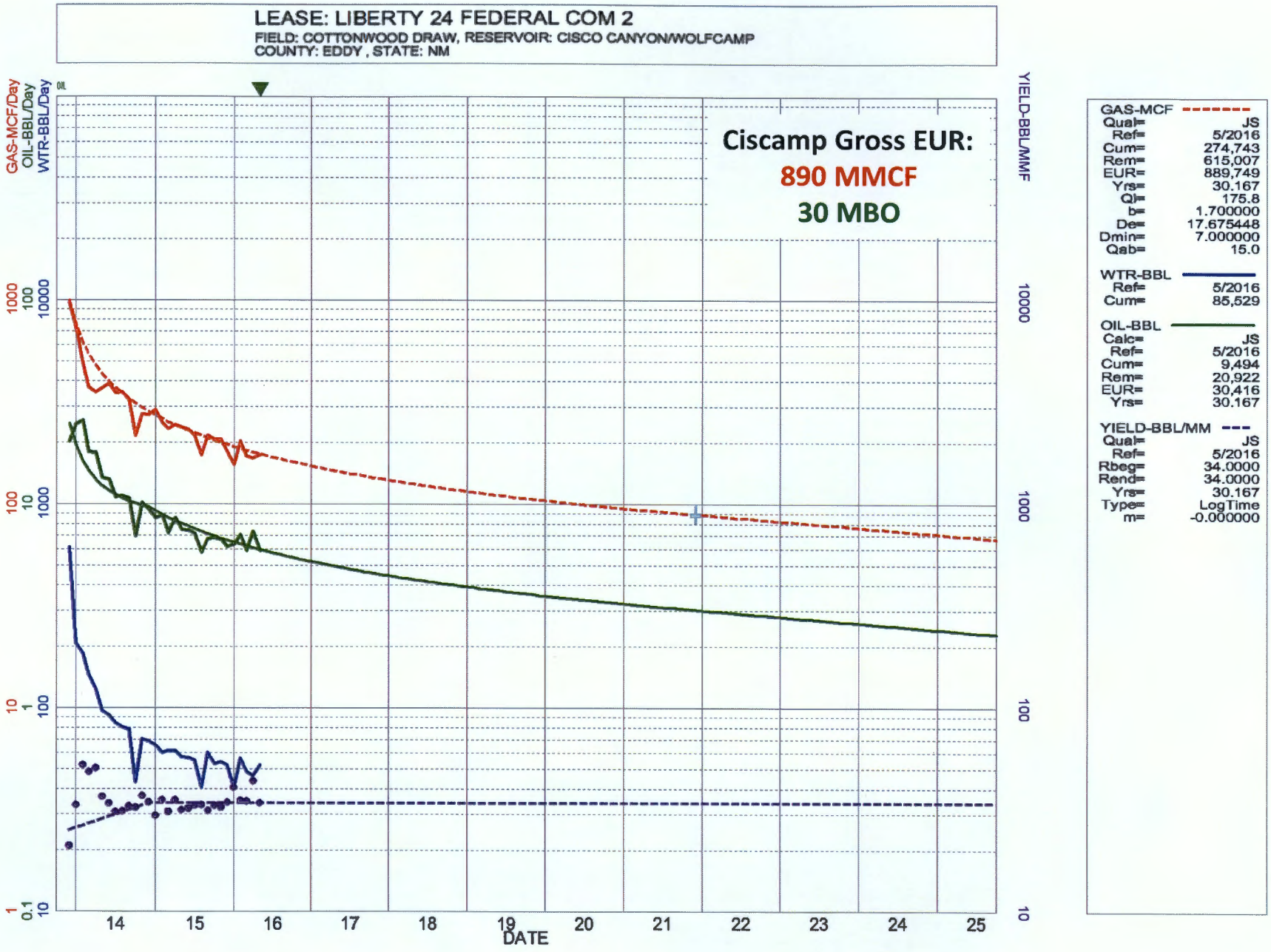

LEASE: FEDERAL 13 COM 2
FIELD: WHITE CITY, RESERVOIR: CISCO CANYON/WOLFCAMP
COUNTY: EDDY , STATE: NM
Ciscamp Gross EUR:
1,092 MMCF
23 MBO
GAS-MCF/Day
OIL-BBL/Day
WTR-BBL/Day
YIELD-BBL/MMF
DATE
10
11
12
13
14
15
16
17
18
19
20
21
22
GAS-MCF
Qual= JS
Ref= 5/2016
Cum= 591,962
Rem= 500,146
EUR= 1,092,109
Yrs= 47.417
Qi= 107.6
b= 1.500000
De= 9.666428
Dmin= 7.000000
Qab= 3.3
WTR-BBL
Ref= 5/2016
Cum= 85,217
OIL-BBL
Calc= JS
Ref= 5/2016
Cum= 11,423
Rem= 11,885
EUR= 23,309
Yrs= 47.417
YIELD-BBL/MM
Qual= JS
Ref= 5/2016
Rbeg= 21.8476
Rend= 30.0000
Yrs= 47.417
Type= LogTime
m= --0.006710


LEASE: FEDERAL 13 COM 6
FIELD: WHITE CITY, RESERVOIR: CISCO CANYON/WOLFCAMP
COUNTY: EDDY , STATE: NM
Ciscamp Gross EUR:
975 MMCF
33 MBO
GAS-MCF/Day
OIL-BBL/Day
WTR-BBL/Day
YIELD-BBL/MMF
CHANGE OUT COMPRESSOR
DATE
10
11
12
13
14
15
16
17
18
19
20
21
GAS-MCF
Qual= JS
Ref= 5/2016
Cum= 527,598
Rem= 447,433
EUR= 975,031
Yrs= 45.833
Qi= 100.6
b= 1.350000
De= 11.005137
Dmin= 7.000000
Qab= 3.3
WTR-BBL
Ref= 5/2016
Cum= 116,557
OIL-BBL
Calc= JS
Ref= 5/2016
Cum= 16,373
Rem= 16,589
EUR= 32,961
Yrs= 45.833
YIELD-BBL/MM
Qual= JS
Ref= 5/2016
Rbeg= 31.8999
Rend= 55.0000
Yrs= 45.833
Type= LogTime
m= -0.011956

LEASE: GADWALL 18 FED COM 1 (CISCAMP)

FIELD: WHITE CITY, RESERVOIR: CISCO CANYON/WOLFCAMP
COUNTY: EDDY , STATE: NM

GAS-MCF	
Qual=	JS
Ref=	5/2016
Cum=	703,267
Rem=	1,105,032
EUR=	1,808,299
Yrs=	58.083
Qi=	236.8
b=	1.700000
De=	10.394104
Dmin=	7.000000
Qab=	3.3
WTR-BBL	
Ref=	5/2016
Cum=	113,162
OIL-BBL	
Calc=	JS
Ref=	5/2016
Cum=	39,083
Rem=	53,706
EUR=	92,789
Yrs=	58.083
YIELD-BBL/MM	
Qual=	JS
Ref=	5/2016
Rbeg=	49.6617
Rend=	45.0000
Yrs=	58.083
Type=	LogTime
m=	-0.001696


LEASE: LIBERTY 24 FEDERAL COM 2
FIELD: COTTONWOOD DRAW, RESERVOIR: CISCO CANYON/WOLFCAMP
COUNTY: EDDY , STATE: NM
Ciscamp Gross EUR:
890 MMCF
30 MBO
GAS-MCF/Day
OIL-BBL/Day
WTR-BBL/Day
YIELD-BBL/MMF
DATE
14
15
16
17
18
19
20
21
22
23
24
25
GAS-MCF
Qual= JS
Ref= 5/2016
Cum= 274,743
Rem= 615,007
EUR= 889,749
Yrs= 30.167
Qi= 175.8
b= 1.700000
De= 17.675448
Dmin= 7.000000
Qab= 15.0
WTR-BBL
Ref= 5/2016
Cum= 85,529
OIL-BBL
Calc= JS
Ref= 5/2016
Cum= 9,494
Rem= 20,922
EUR= 30,416
Yrs= 30.167
YIELD-BBL/MM
Qual= JS
Ref= 5/2016
Rbeg= 34.0000
Rend= 34.0000
Yrs= 30.167
Type= LogTime
m= -0.000000

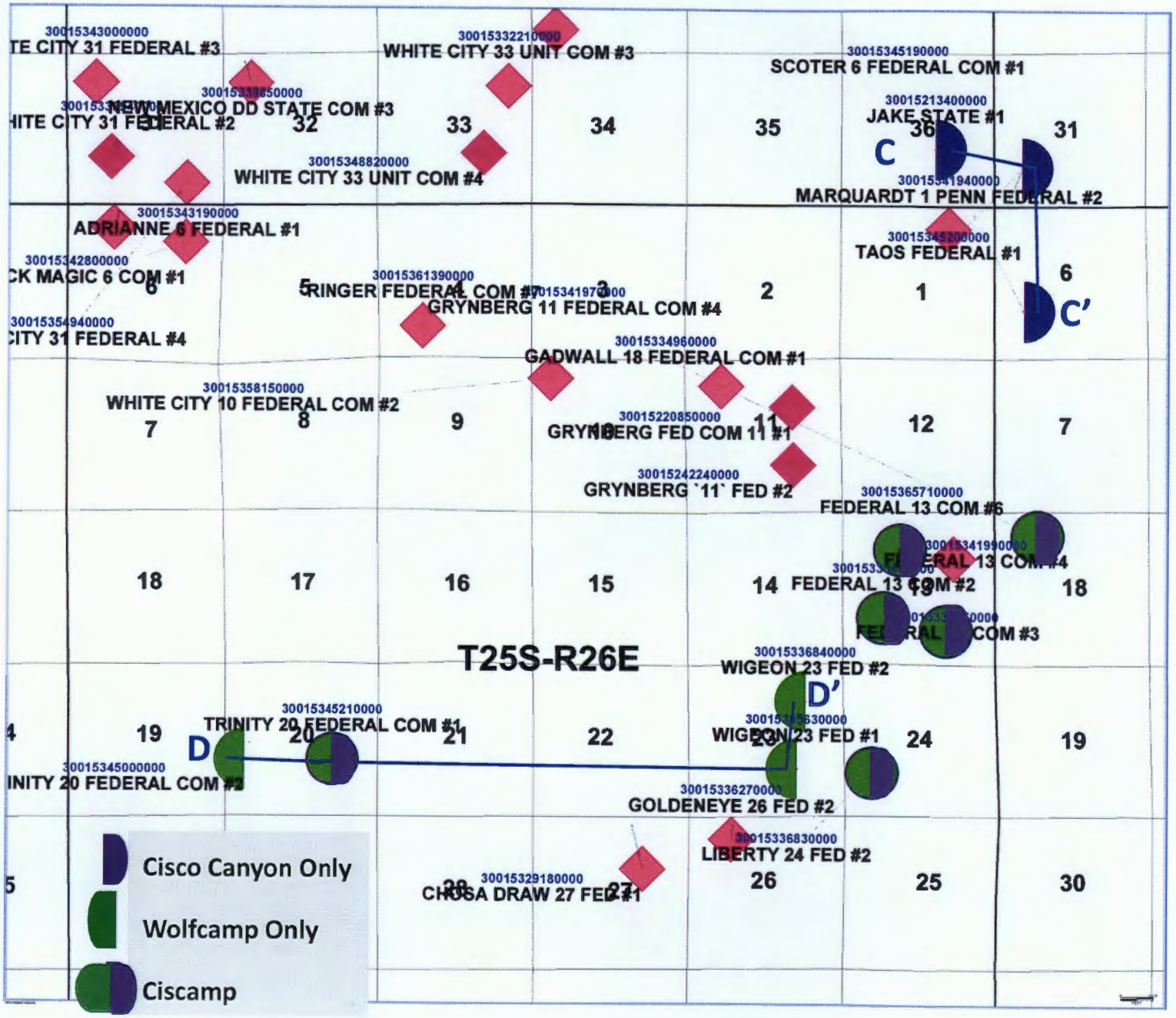
APPENDIX B

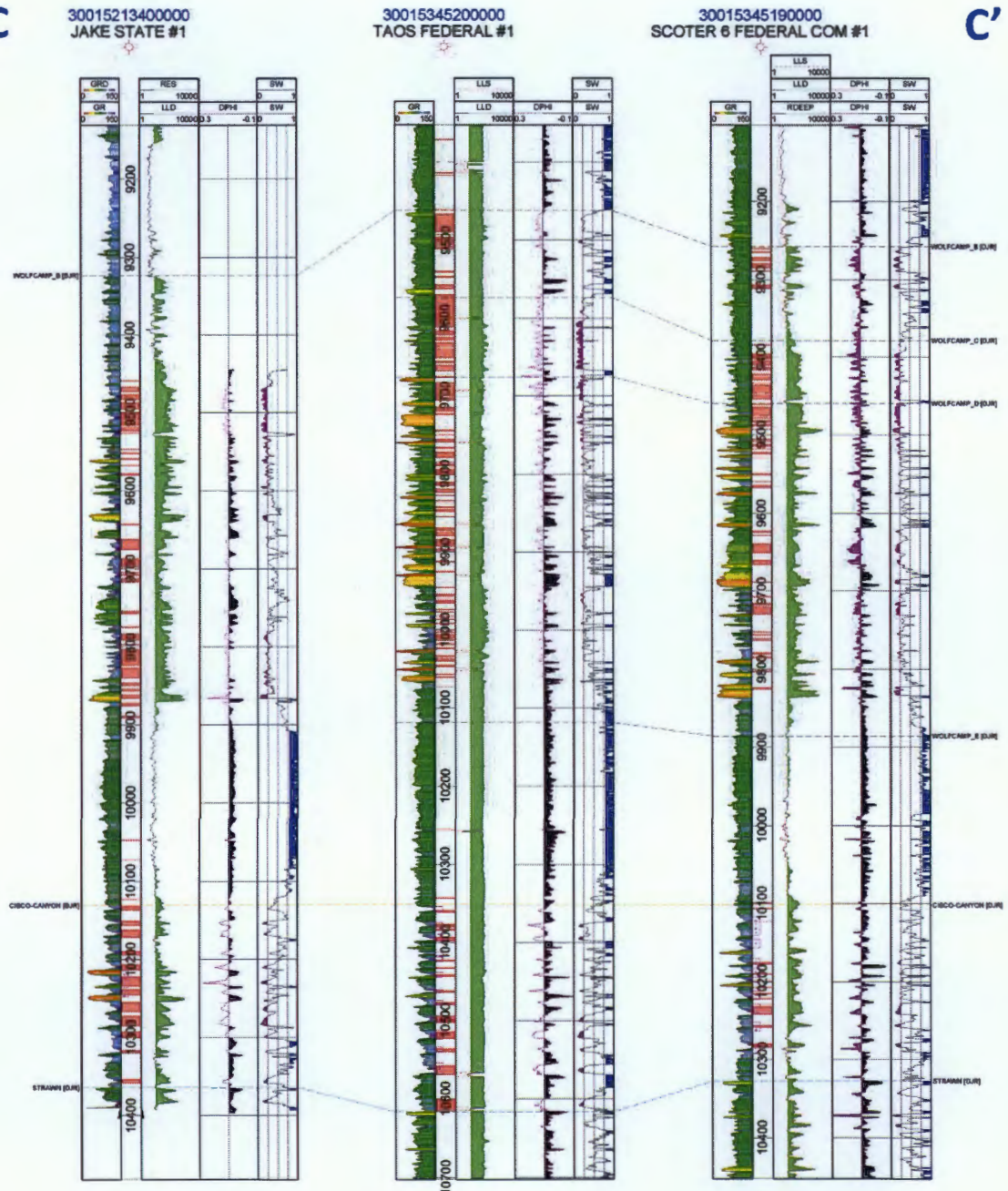
Production Decline Performance Analysis from **Cisco Canyon Solo Producers** in White City Area

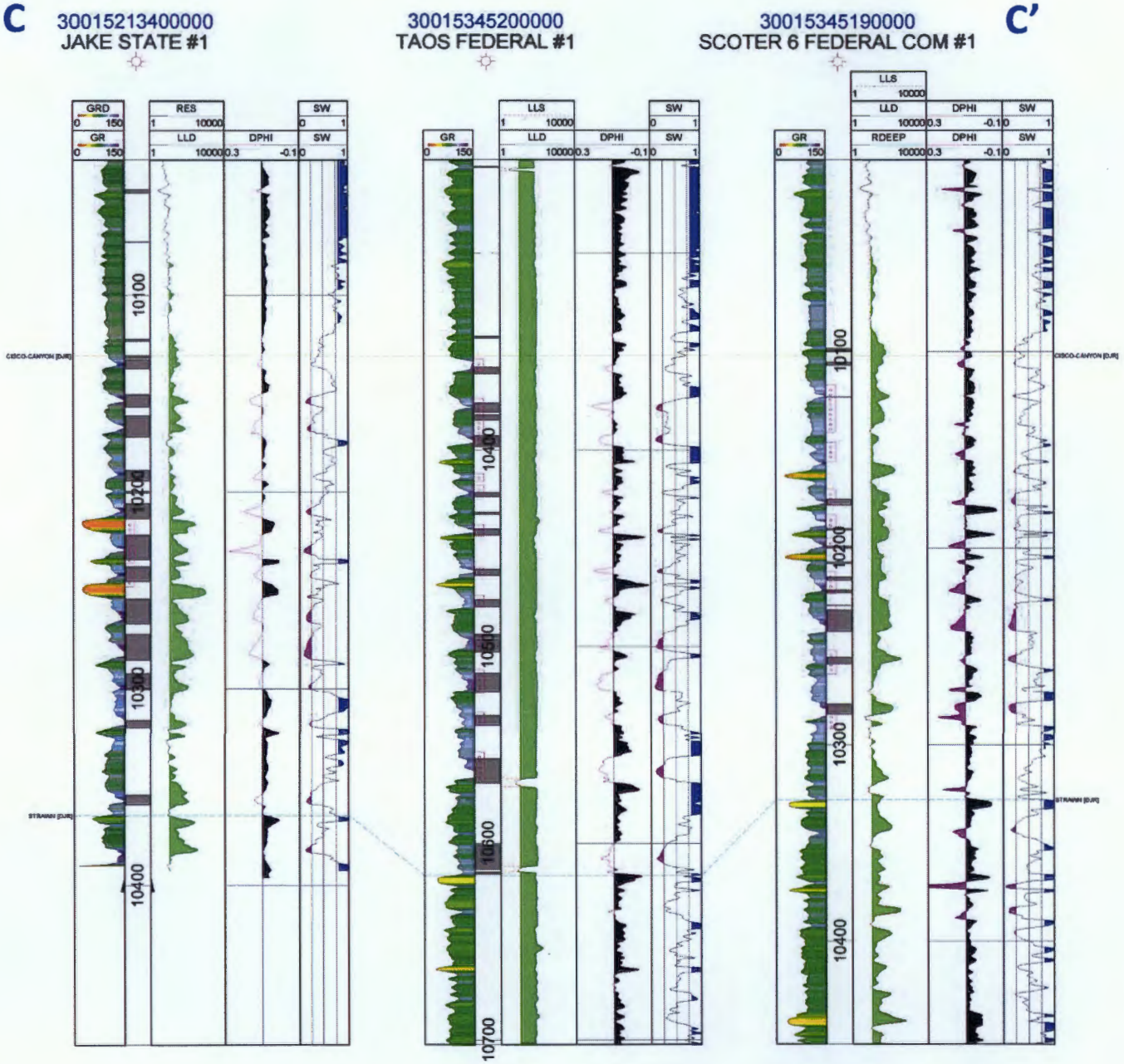
Eddy Co. NM, White City

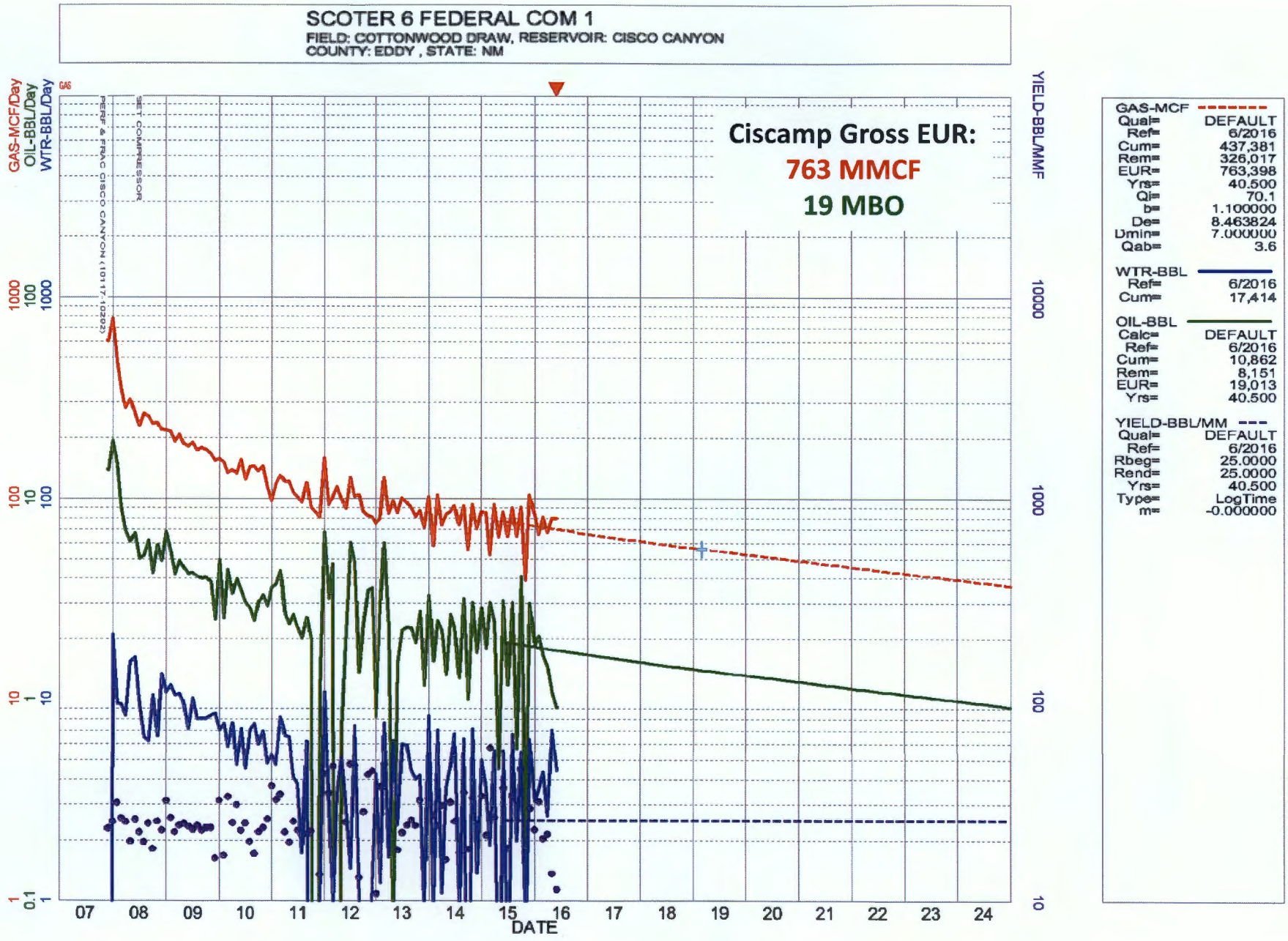
Vertical Cisco Canyon Solo Producers
in White City Area

UWI (APINum)	Well / Lease Name	Current Completed Zone(S)	Prod. Start Date	Cum. Gas: Cisco, MCF	Cum. Gas: Wolfcamp, MCF	Total Cum Gas: Cisco + Wolfcamp MCF
3001534519	Scoter 6 Fed Com 1	Cisco	11-07	437,381	-	**437,381**
3001534520	Taos Fed 1	Cisco	10-06	1,816,239	-	**1,816,239**
3001521340	Jake State #1	Cisco	4-76	2,598,766	-	**2,598,766**


30015343000000
TE CITY 31 FEDERAL #3
30015332210000
WHITE CITY 33 UNIT COM #3
30015345190000
SCOTER 6 FEDERAL COM #1
30015333850000
NEW MEXICO DD STATE COM #3
30015213400000
JAKE STATE #1
HITE CITY 31 FEDERAL #2
30015348820000
WHITE CITY 33 UNIT COM #4
C
30015341940000
MARQUARDT 1 PENN FEDERAL #2
30015343190000
ADRIANNE 6 FEDERAL #1
30015345200000
TAOS FEDERAL #1
30015342800000
CK MAGIC 6 COM #1
30015361390000
RINGER FEDERAL COM #1
30015341970000
GRYNBERG 11 FEDERAL COM #4
C'
30015354940000
CITY 31 FEDERAL #4
30015334960000
GADWALL 18 FEDERAL COM #1
30015358150000
WHITE CITY 10 FEDERAL COM #2
30015220850000
GRYNBERG FED COM 11 #1
30015242240000
GRYNBERG `11` FED #2
30015365710000
FEDERAL 13 COM #6
30015341990000
FEDERAL 13 COM #4
FEDERAL 13 COM #2
FEDERAL 13 COM #3
T25S-R26E
30015336840000
WIGEON 23 FED #2
D'
30015345210000
TRINITY 20 FEDERAL COM #1
D
30015345000000
INITY 20 FEDERAL COM #2
WIGEON 23 FED #1
30015336270000
GOLDENEYE 26 FED #2
30015336830000
LIBERTY 24 FED #2
30015329180000
CHOSA DRAW 27 FED #1
Cisco Canyon Only
Wolfcamp Only
Ciscamp

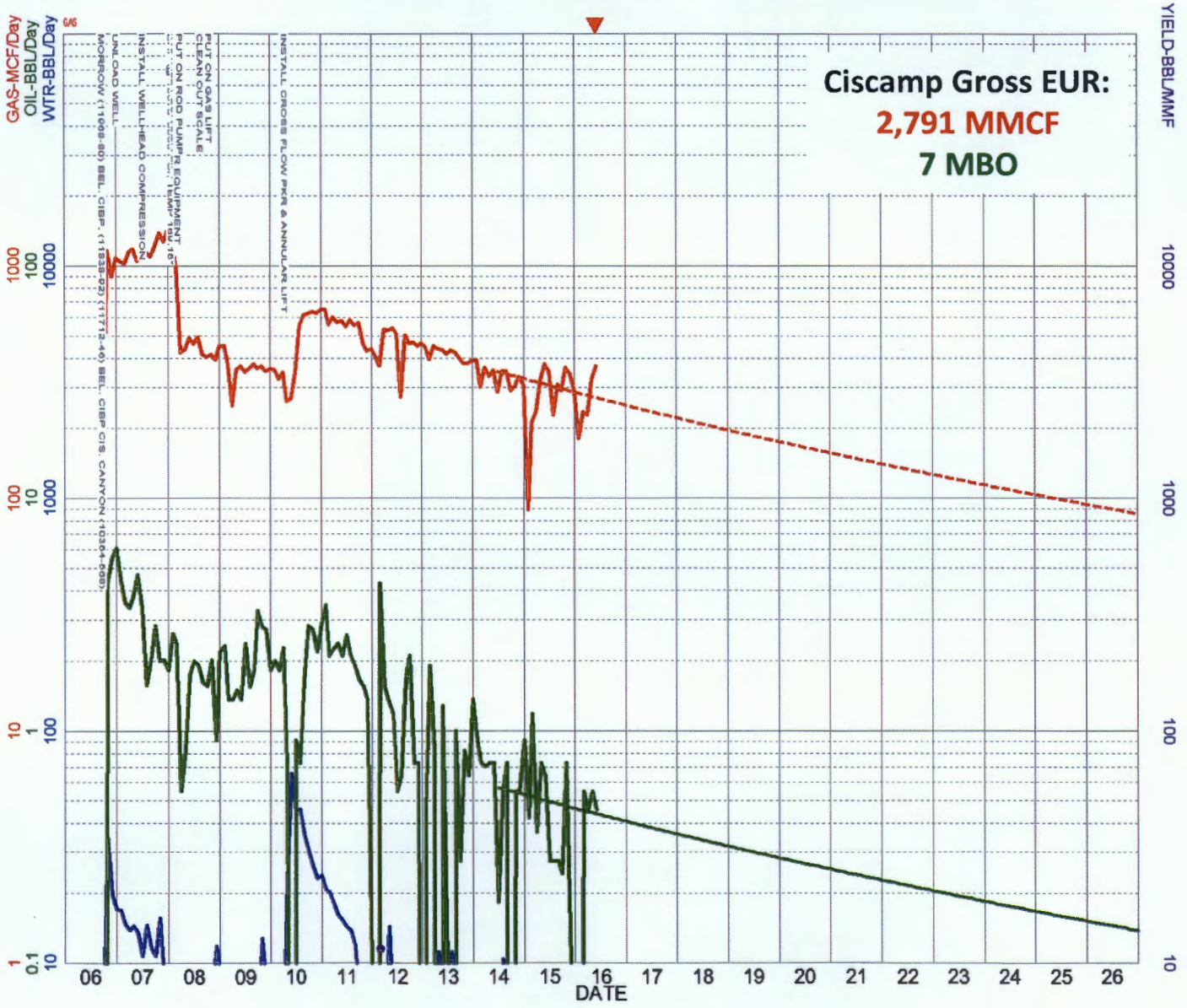

C
30015213400000
JAKE STATE #1
30015345200000
TAOS FEDERAL #1
30015345190000
SCOTER 6 FEDERAL COM #1
C'
WOLFCAMP_B [DJR]
CISCO-CANYON [DJR]
STRAWN [DJR]
WOLFCAMP_C [DJR]
WOLFCAMP_D [DJR]
WOLFCAMP_E [DJR]


C
30015213400000
JAKE STATE #1
30015345200000
TAOS FEDERAL #1
30015345190000
SCOTER 6 FEDERAL COM #1
C'
GRD
RES
SW
GR
LLD
DPHI
LLS
RDEEP
CISCO-CANYON [DJR]
STRAWN [DJR]
10100
10200
10300
10400
10500
10600
10700

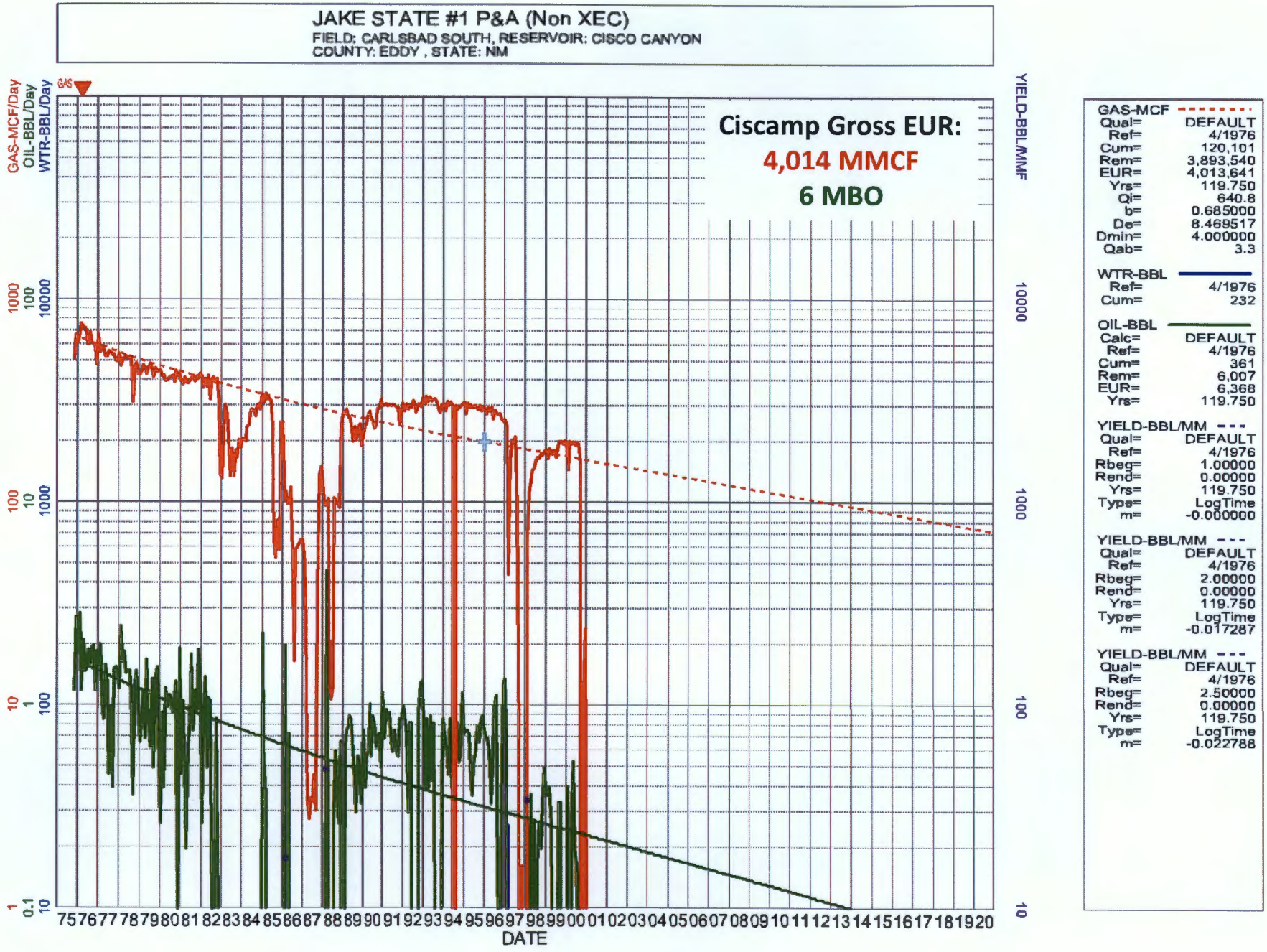

SCOTER 6 FEDERAL COM 1
FIELD: COTTONWOOD DRAW, RESERVOIR: CISCO CANYON
COUNTY: EDDY , STATE: NM
GAS-MCF/Day
OIL-BBL/Day
WTR-BBL/Day
YIELD-BBL/MMF
PERF & FRAC CISCO CANYON (10117-10202)
SET COMPLESSOR
Ciscamp Gross EUR:
763 MMCF
19 MBO
DATE
07
08
09
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
GAS-MCF
Qual= DEFAULT
Ref= 6/2016
Cum= 437,381
Rem= 326,017
EUR= 763,398
Yrs= 40.500
Qi= 70.1
b= 1.100000
De= 8.463824
Dmin= 7.000000
Qab= 3.6
WTR-BBL
Ref= 6/2016
Cum= 17,414
OIL-BBL
Calc= DEFAULT
Ref= 6/2016
Cum= 10,862
Rem= 8,151
EUR= 19,013
Yrs= 40.500
YIELD-BBL/MM
Qual= DEFAULT
Ref= 6/2016
Rbeg= 25.0000
Rend= 25.0000
Yrs= 40.500
Type= LogTime
m= -0.000000

TAOS FEDERAL 1

FIELD: CARLSBAD SOUTH, RESERVOIR: CISCO CANYON
COUNTY: EDDY , STATE: NM



GAS-MCF	
Qual=	YE2014
Ref=	6/2016
Cum=	1,816,239
Rem=	974,674
EUR=	2,790,913
Yrs=	46.667
Qi=	271.0
b=	0.300000
De=	11.972847
Dmin=	7.000000
Qab=	5.7
WTR-BBL	
Ref=	6/2016
Cum=	39,021
OIL-BBL	
Calc=	YE2014
Ref=	6/2016
Cum=	5,430
Rem=	1,572
EUR=	7,002
Yrs=	46.667
YIELD-BBL/MM	
Qual=	YE2014
Ref=	6/2016
Rbeg=	1.61505
Rend=	1.60603
Yrs=	46.667
Type=	LogTime
m=	-0.000120


JAKE STATE #1 P&A (Non XEC)
FIELD: CARLSBAD SOUTH, RESERVOIR: CISCO CANYON
COUNTY: EDDY , STATE: NM
Ciscamp Gross EUR:
4,014 MMCF
6 MBO
GAS-MCF/Day
OIL-BBL/Day
WTR-BBL/Day
YIELD-BBL/MMF
GAS
DATE
GAS-MCF
Qual= DEFAULT
Ref= 4/1976
Cum= 120,101
Rem= 3,893,540
EUR= 4,013,641
Yrs= 119.750
Qi= 640.8
b= 0.685000
De= 8.469517
Dmin= 4.000000
Qab= 3.3
WTR-BBL
Ref= 4/1976
Cum= 232
OIL-BBL
Calc= DEFAULT
Ref= 4/1976
Cum= 361
Rem= 6,007
EUR= 6,368
Yrs= 119.750
YIELD-BBL/MM
Qual= DEFAULT
Ref= 4/1976
Rbeg= 1.00000
Rend= 0.00000
Yrs= 119.750
Type= LogTime
m= -0.000000
YIELD-BBL/MM
Qual= DEFAULT
Ref= 4/1976
Rbeg= 2.00000
Rend= 0.00000
Yrs= 119.750
Type= LogTime
m= -0.017287
YIELD-BBL/MM
Qual= DEFAULT
Ref= 4/1976
Rbeg= 2.50000
Rend= 0.00000
Yrs= 119.750
Type= LogTime
m= -0.022788

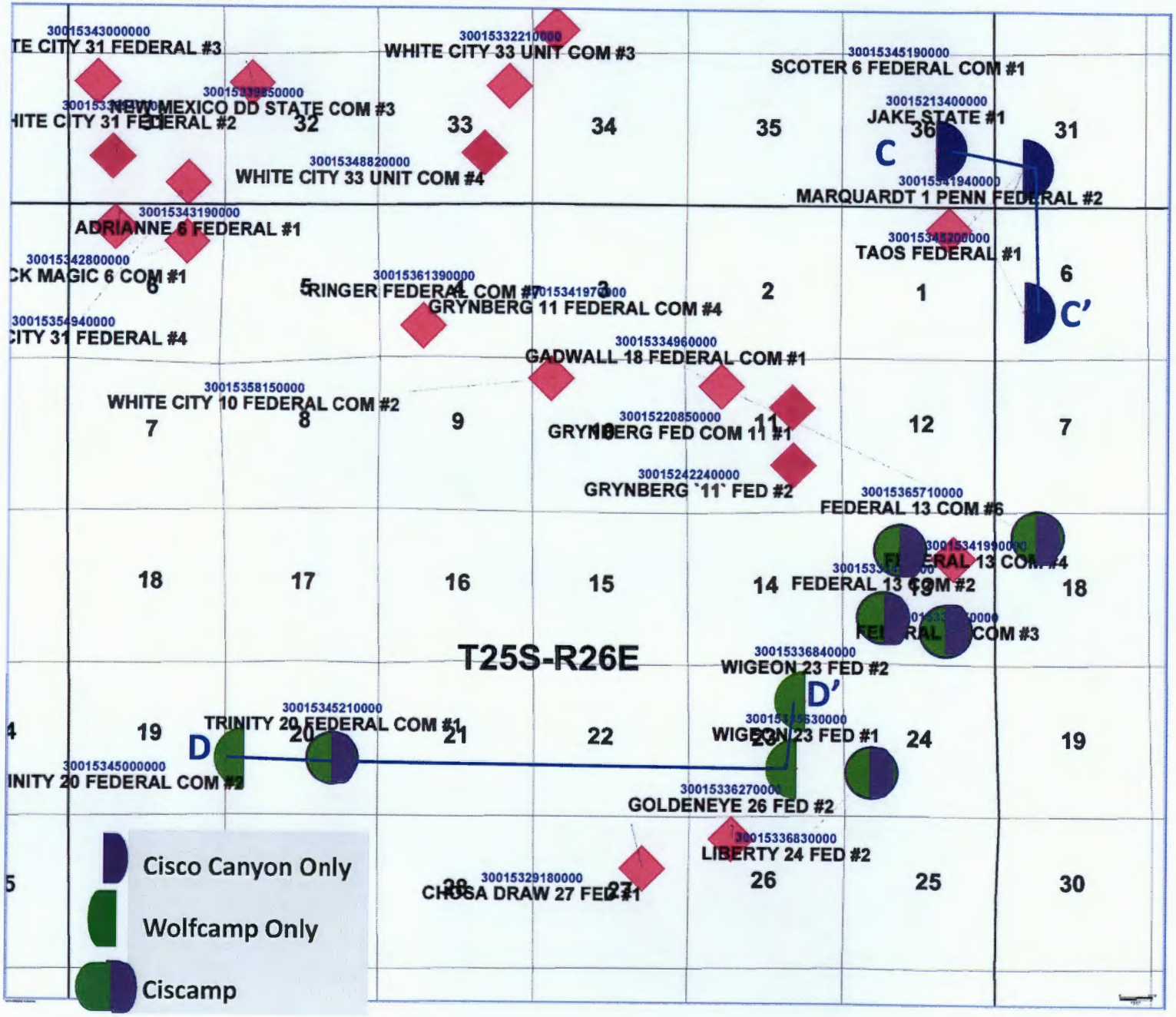
APPENDIX C

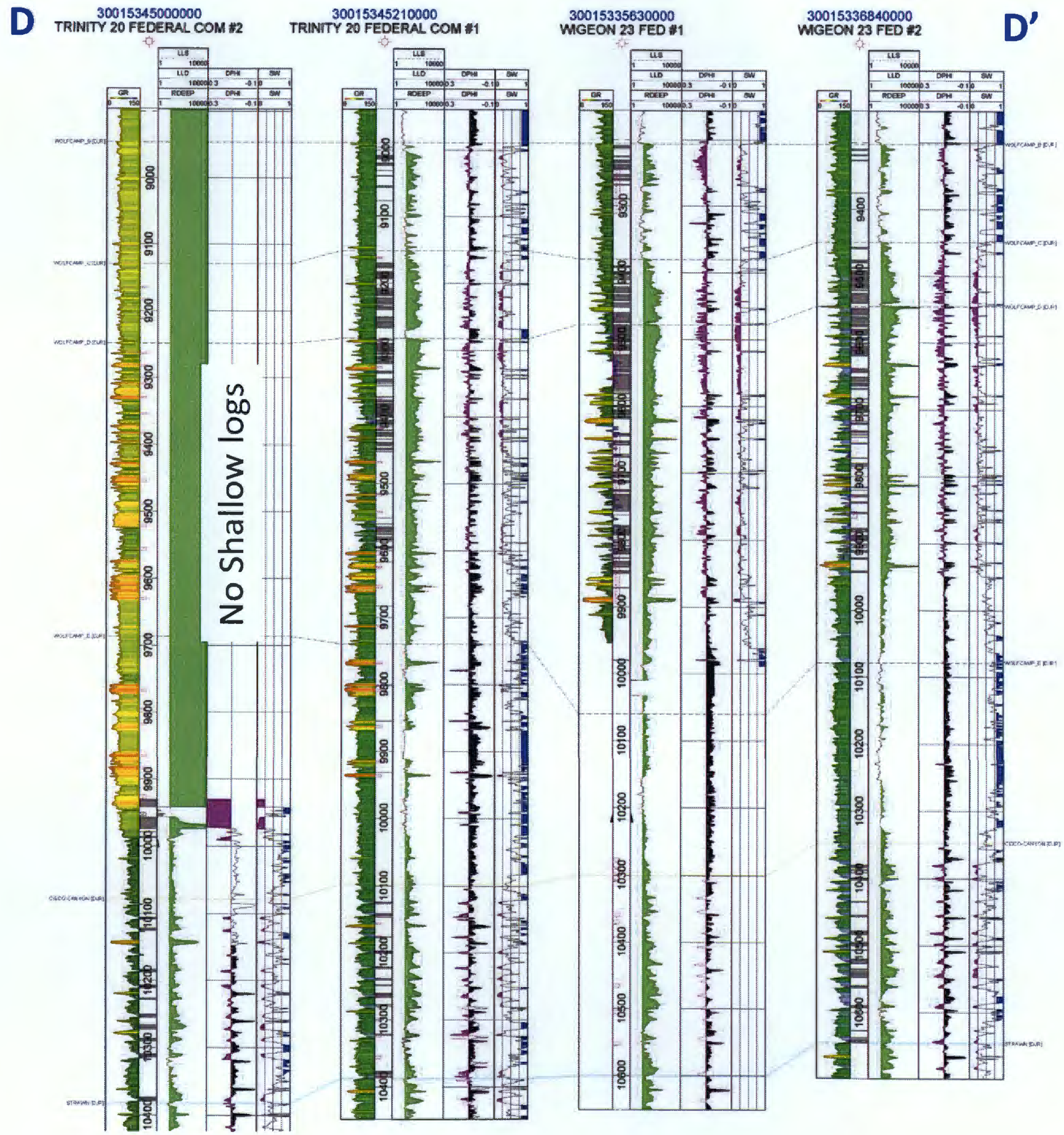
Production Decline Performance Analysis from **Wolfcamp Solo Producers** in White City Area

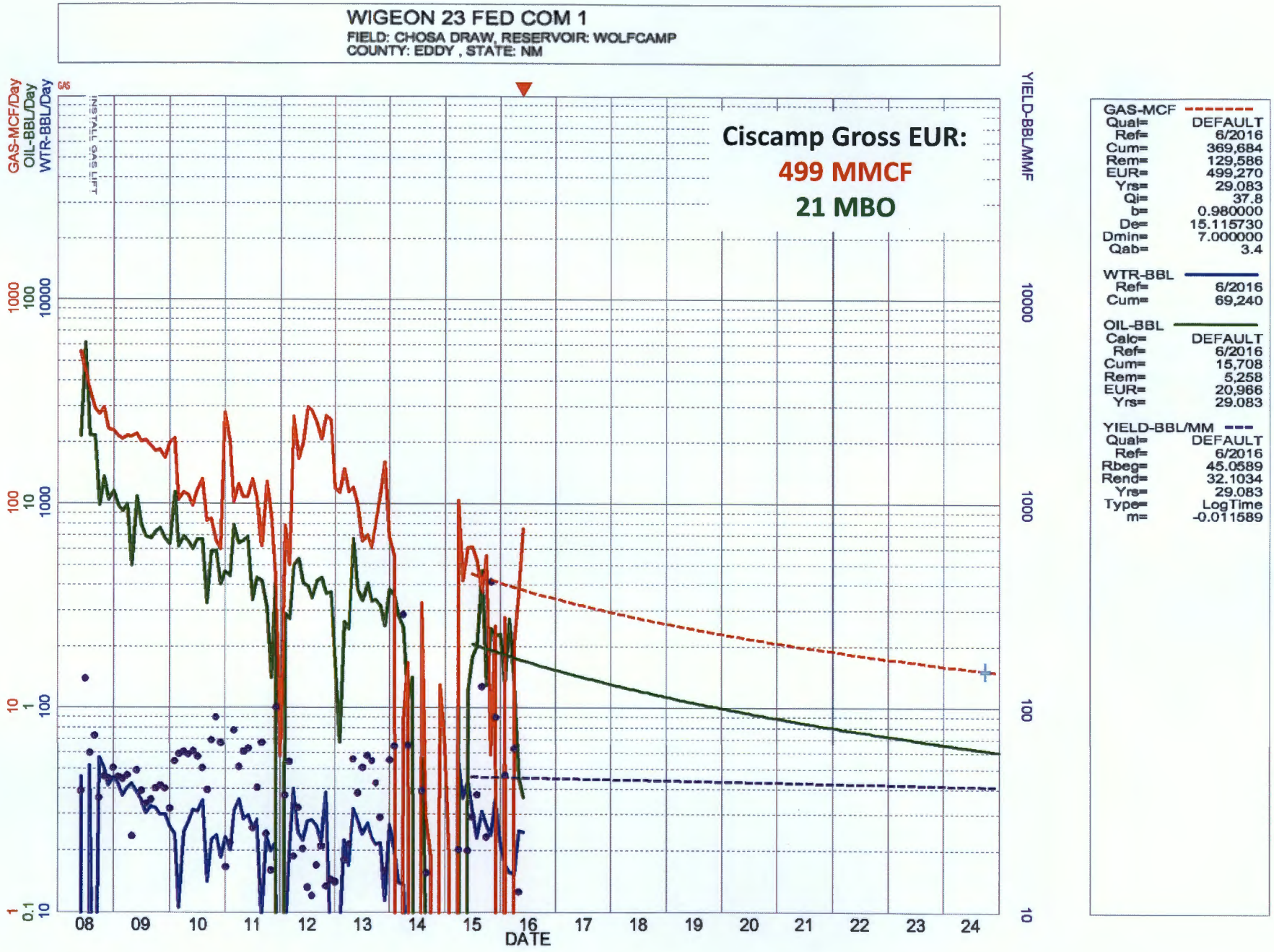
Eddy Co. NM, White City

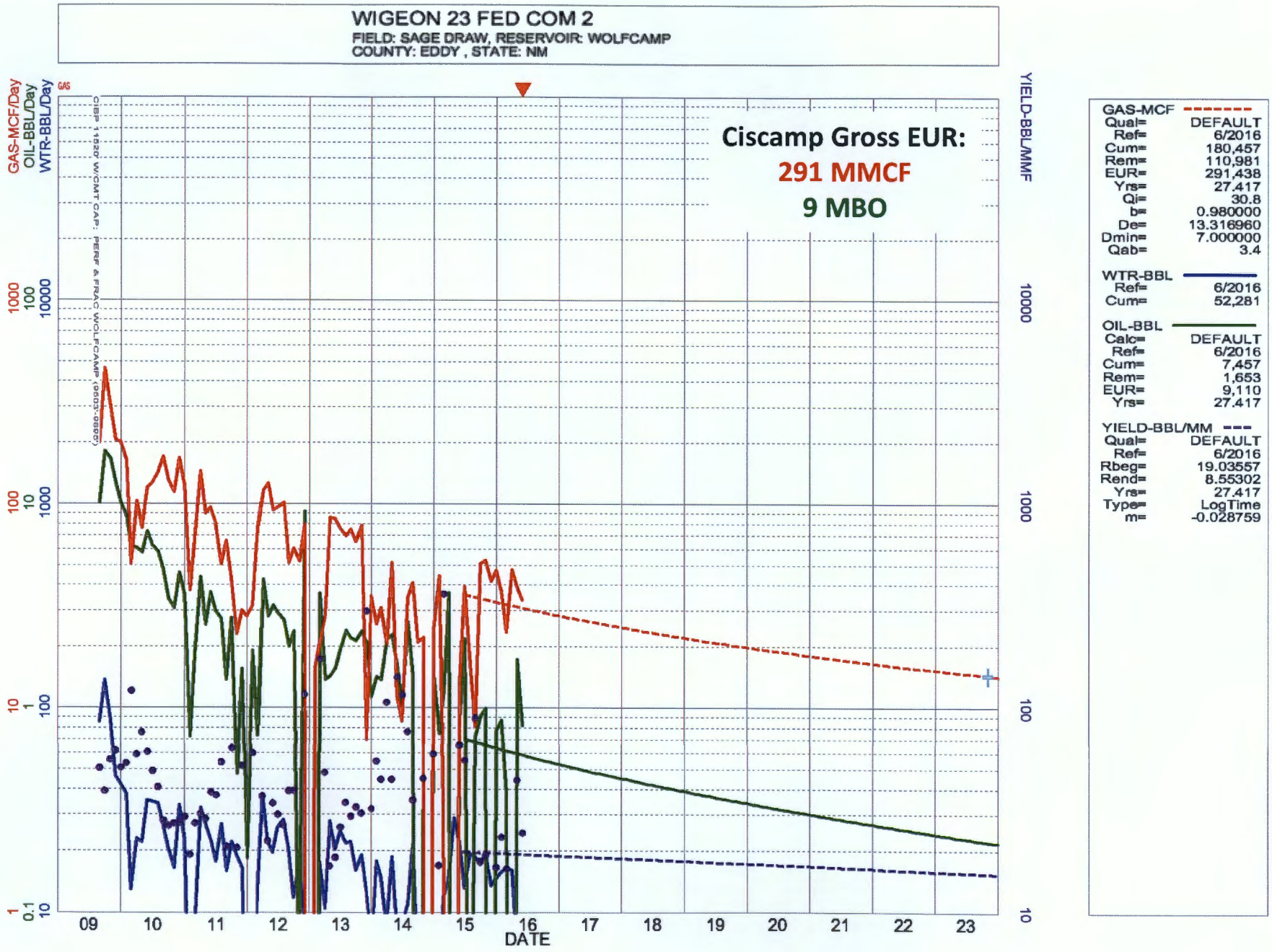
Vertical Wolfcamp Solo Producers
in White City Area

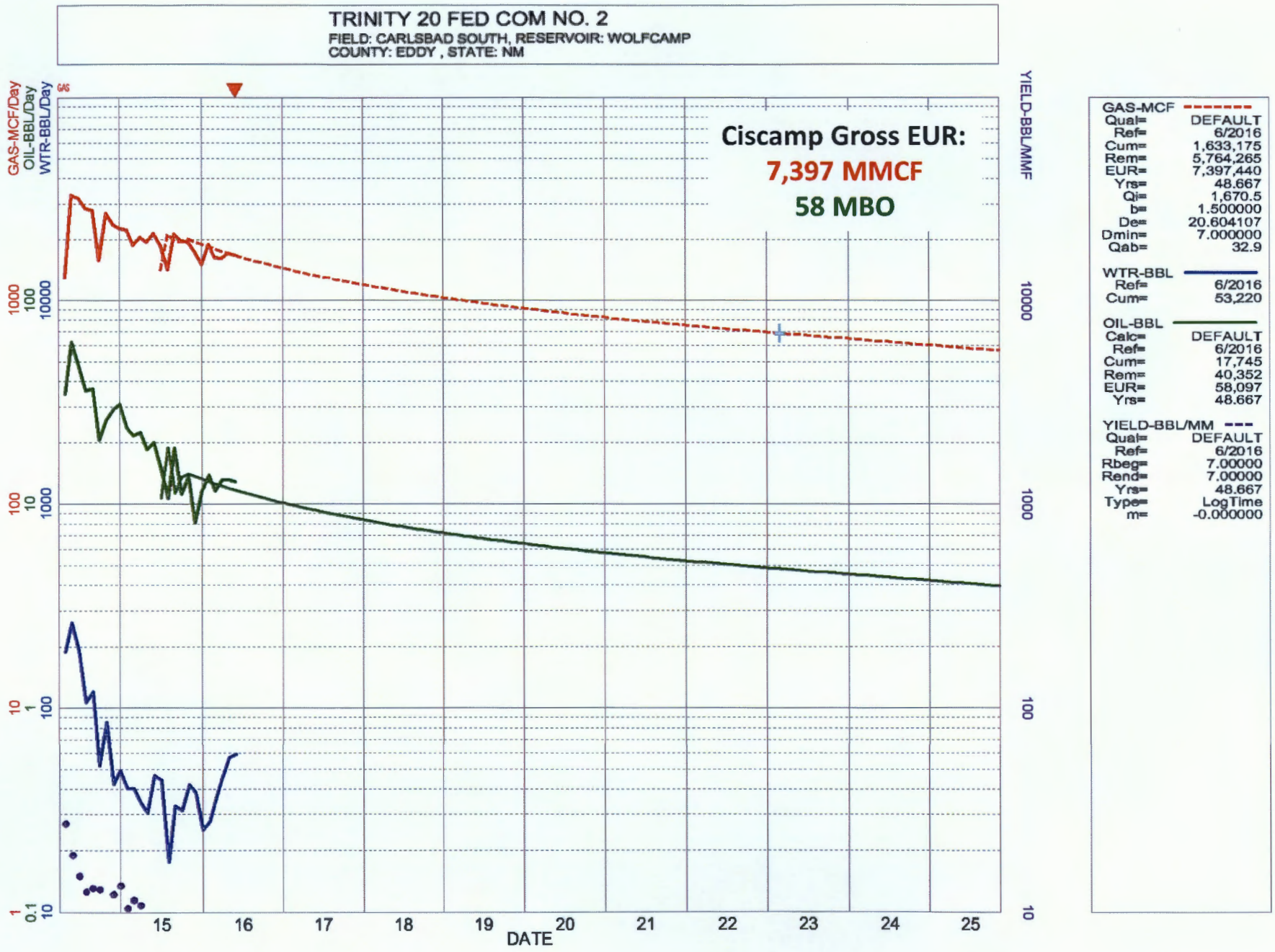
UWI (APINum)	Well / Lease Name	Current Completed Zone(S)	Prod. Start Date	Cum. Gas: Cisco, MCF	Cum. Gas: Wolfcamp, MCF	Total Cum Gas: Cisco + Wolfcamp MCF
3001533563	Wigeon 23 Fed Com 1	Wolfcamp BCD	5-08	-	369,684	**369,684**
3001533684	Wigeon 23 Fed Com 2	Wolfcamp BCD	8-09	-	180,457	**180,457**
3001534500	Trinity 20 Fed Com 2	Wolfcamp BCDE	4-14	-	1,633,175	**1,633,175**


30015343000000
TE CITY 31 FEDERAL #3
30015332210000
WHITE CITY 33 UNIT COM #3
30015345190000
SCOTER 6 FEDERAL COM #1
30015339850000
NEW MEXICO DD STATE COM #3
30015213400000
JAKE STATE #1
HITE CITY 31 FEDERAL #2
32
33
34
35
36
31
C
30015348820000
WHITE CITY 33 UNIT COM #4
30015341940000
MARQUARDT 1 PENN FEDERAL #2
30015343190000
ADRIANNE 6 FEDERAL #1
30015345200000
TAOS FEDERAL #1
30015342800000
CK MAGIC 6 COM #1
6
5
4
3
2
1
6
C'
30015361390000
RINGER FEDERAL COM #7
30015341970000
GRYNBERG 11 FEDERAL COM #4
30015354940000
CITY 31 FEDERAL #4
30015334960000
GADWALL 18 FEDERAL COM #1
30015358150000
WHITE CITY 10 FEDERAL COM #2
7
8
9
10
11
12
7
30015220850000
GRYNBERG FED COM 11 #1
30015242240000
GRYNBERG `11` FED #2
30015365710000
FEDERAL 13 COM #6
18
17
16
15
14
13
18
FEDERAL 13 COM #2
FEDERAL 13 COM #3
T25S-R26E
30015336840000
WIGEON 23 FED #2
D'
30015345210000
TRINITY 20 FEDERAL COM #1
4
19
20
21
22
23
24
19
D
30015345000000
INITY 20 FEDERAL COM #2
30015336270000
GOLDENEYE 26 FED #2
30015336830000
LIBERTY 24 FED #2
5
28
27
26
25
30
30015329180000
CHOSA DRAW 27 FED #1
Cisco Canyon Only
Wolfcamp Only
Ciscamp


D
30015345000000
TRINITY 20 FEDERAL COM #2
30015345210000
TRINITY 20 FEDERAL COM #1
30015335630000
WIGEON 23 FED #1
30015336840000
WIGEON 23 FED #2
D'
No Shallow logs


WIGEON 23 FED COM 1
FIELD: CHOSA DRAW, RESERVOIR: WOLFCAMP
COUNTY: EDDY , STATE: NM
GAS-MCF/Day
OIL-BBL/Day
WTR-BBL/Day
GAS
INSTALL GAS LIFT
YIELD-BBL/MMF
Ciscamp Gross EUR:
499 MMCF
21 MBO
1000
100
10000
100
10
1000
10
1
100
1
0.1
10
10000
1000
100
10
08
09
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
DATE
GAS-MCF
Qual= DEFAULT
Ref= 6/2016
Cum= 369,684
Rem= 129,586
EUR= 499,270
Yrs= 29.083
Qi= 37.8
b= 0.980000
De= 15.115730
Dmin= 7.000000
Qab= 3.4
WTR-BBL
Ref= 6/2016
Cum= 69,240
OIL-BBL
Calc= DEFAULT
Ref= 6/2016
Cum= 15,708
Rem= 5,258
EUR= 20,966
Yrs= 29.083
YIELD-BBL/MM
Qual= DEFAULT
Ref= 6/2016
Rbeg= 45.0589
Rend= 32.1034
Yrs= 29.083
Type= LogTime
m= -0.011589


WIGEON 23 FED COM 2
FIELD: SAGE DRAW, RESERVOIR: WOLFCAMP
COUNTY: EDDY , STATE: NM
GAS-MCF/Day
OIL-BBL/Day
WTR-BBL/Day
YIELD-BBL/MMF
CIBP 11520 W/CMT CAP; PERF & FRAC WOLFCAMP (9603'-9866')
Ciscamp Gross EUR:
291 MMCF
9 MBO
DATE
09
10
11
12
13
14
15
16
17
18
19
20
21
22
23
GAS-MCF
Qual= DEFAULT
Ref= 6/2016
Cum= 180,457
Rem= 110,981
EUR= 291,438
Yrs= 27.417
Qi= 30.8
b= 0.980000
De= 13.316960
Dmin= 7.000000
Qab= 3.4
WTR-BBL
Ref= 6/2016
Cum= 52,281
OIL-BBL
Calc= DEFAULT
Ref= 6/2016
Cum= 7,457
Rem= 1,653
EUR= 9,110
Yrs= 27.417
YIELD-BBL/MM
Qual= DEFAULT
Ref= 6/2016
Rbeg= 19.03557
Rend= 8.55302
Yrs= 27.417
Type= LogTime
m= -0.028759


TRINITY 20 FED COM NO. 2
FIELD: CARLSBAD SOUTH, RESERVOIR: WOLFCAMP
COUNTY: EDDY , STATE: NM
Ciscamp Gross EUR:
7,397 MMCF
58 MBO
GAS-MCF/Day
OIL-BBL/Day
WTR-BBL/Day
YIELD-BBL/MMF
DATE
15
16
17
18
19
20
21
22
23
24
25
GAS-MCF
Qual= DEFAULT
Ref= 6/2016
Cum= 1,633,175
Rem= 5,764,265
EUR= 7,397,440
Yrs= 48.667
Qi= 1,670.5
b= 1.500000
De= 20.604107
Dmin= 7.000000
Qab= 32.9
WTR-BBL
Ref= 6/2016
Cum= 53,220
OIL-BBL
Calc= DEFAULT
Ref= 6/2016
Cum= 17,745
Rem= 40,352
EUR= 58,097
Yrs= 48.667
YIELD-BBL/MM
Qual= DEFAULT
Ref= 6/2016
Rbeg= 7.00000
Rend= 7.00000
Yrs= 48.667
Type= LogTime
m= -0.000000

Purpose

The present production allocation field study has been conducted by Cimarex Energy for the U.S. Bureau of Land Management (BLM) in support of the commingling applications for the company's upcoming Ciscamp completion program in the White City area. Cimarex is seeking BLM's consideration and acceptance of the herein recommended production allocation methodology, as well as, the approval of the commingling permit and proposed allocation factors for the Chosa Draw 27 Federal 1 (API: 30-015-32918) upcoming recompletion.

Scope

The prospective area of interest (AOI) is located in and around Cimarex's White City field area, in Eddy County, New Mexico. The area is specifically centered within Township 22S, Range 24E (T22S-R24E) and Township 25S, Range 28E (T25S-R28E) as shown in Exhibit 1. The main completion targets are the Cisco Canyon and the Wolfcamp formations, widely known as "Ciscamp" when completed together. Cimarex has approximately 46 prospective Ciscamp vertical well recompletions within its leasehold in the AOI (Exhibit 6A and 6B). Of these, 36 wells are located in the heart of White City, mostly within T24S-R26E and T25S-R26E (Exhibit 6C).

Introduction

Allocation of hydrocarbons producing together from different geologic sources of supply and sharing the same wellbore (commingling) has always been an important part of the petroleum industry. This practice is defined as the process of assigning the portions of the total commingled stream to each contributing formation. Allocation has many benefits (e.g. allows for the optimization of production resources, and the maximization and acceleration of oil and gas recovery), but it also has several challenges that need to be addressed in order to minimize data uncertainty. This study assesses how allocation factors have been established in the past in the study area and how well it ties to individually measured performance. The study also recommends an alternative suitable allocation method that addresses the known challenges and captures reservoir properties and reserves potential of each formation. Transparency and regulatory compliance are also fundamental criteria considered in the proposed methodology.

Objective

The objective of this study is to develop and recommend a sound production allocation methodology for commingled Cisco Canyon and Wolfcamp completions. The approach incorporates formation quality and/or potential reserves expectations validated and adjusted using zonal production and/or test data. The ultimate goal is to protect both royalty and working interest owners by maximizing the enhanced ultimate recovery of oil, gas and NGLs from the prospective wells, while also reducing uncertainty of zonal cumulative production data.

Eventually, more accurate production records translates into better hydrocarbon exploration and exploitation practices and results, as it enables for the proper assessment of drainage and depletion in the zones of interest.

Highlights

There are more than 10 vertical wells currently completed in the Ciscamp within the AOI. In addition, Cimarex plans to recomplete more than 40 additional wells in the Ciscamp in the next 5 years. The average enhanced ultimate recovery (EUR) from analogs in the area is: 1.6 BCF, 42 MBO and 86 MBBls of NGL per well; or approximately 74 BCF, 1.9 MMBO, 3.9 MMBBls of NGL for the 46-well recompletion program. The next proposed Ciscamp recompletion is the Chosa Draw 27 Federal 1. Details of this opportunity are discussed later in this report.

As shown in this study, the ability to simultaneously complete and produce the target formations from the start further enhances ultimate hydrocarbon recovery and significantly increases the feasibility of the Cimarex's proposed multi-well recompletion program.

Challenges of Allocation of Wellbore Commingled Production

Correct contribution allocation determination is critical as it affects gas reserves assessment and future reservoir development. However, implementing the proper methodology for such allocation can be difficult. Production logging surveys (PLS) can be used to estimate the right production contribution by zone; however, the estimation obtained from such surveys is only valid for steady-state reservoir and wellbore flow conditions and at a particular decline period in the life of the well. During normal reservoir depletion, the parameters affecting production allocation can change with time depending on multiphase flow regime, pressure and formation properties and completed flow units' deliverability. Combination of stimulated and no or barely stimulated zones also pose a challenge. Therefore, reservoir quality parameters and reserves potential could be a useful toolbox to establish and further adjust production allocation factors, when combined with production logs, or when possible, individual flow tests.

Handling of Existing Rate Contribution from Proven Developed Producing (PDP) Zone(s)

In cases when the current producing (PDP) zone(s) in a proposed recompletion has or have attractive remaining reserves, the operator will make its best effort not to abandon such zone(s) via temporary or flow-through composite bridge plug. In these cases, and for each of the produced hydrocarbon streams, Total Flowrate is given by:

Total Well Flowrate = New Completion Zone(s) Flowrate + PDP Zone(s) Flowrate	**(Eq.1.1)**

where the **PDP Zone(s) Flowrate** can be established using its/their historic production trend or via Production Logging Survey (PLS), once production from this or these zone(s) has or have been re-established, drilled-out CBP or confirmed by PLS, by following the herein proposed allocation procedure.

In terms of % Allocation Contribution Factors:

Total (100%) Well Contribution = % Contribution from Cisco Canyon +
% Contribution from Wolfcamp + % Contribution from PDP Zone(s) **(Eq.1.2)**

In those cases where the existing PDP Zone(s) is or are abandoned or non-productive, then:

Flowrate or % Contribution from PDP Zone(s) = 0

Total Well Flowrate = Cisco Canyon Flowrate + Wolfcamp Flowrate **(Eq.1.3)**

or in terms of % Contribution:

Total (100%) Well Contribution = % Contribution from Cisco Canyon +
% Contribution from Wolfcamp **(Eq.1.4)**

Proposed Initial Production Allocation Methodology for New Completion Zone(s)

A comprehensive allocation procedure for the New Completion Ciscamp Zone(s) has been developed and is herein proposed for BLM's approval consideration (see Figure 1). The proposed approach honors the Remaining Recoverable Gas In Place **(RRGIP)** of each new target formation (in case it has prior cumulative production) and provides a path to further validate or adjust the established allocation factors (Figure 2). Incorporating reservoir quality and expected recovery into the allocation formula mitigates data uncertainty caused by short-term and unstable wellbore conditions during initial frac flowback period. This approach more accurately captures the potential reserves contribution by each of the wellbore-commingled formations during the well lifespan rather than the rate contribution during a short production timeframe. **Figure 1** describes the proposed allocation procedure to be applied to establish the contribution from the ***New Completion Zone(s).***

Further Validation and Adjustment of Allocation Factors and Zonal Flowrates

Cimarex is proposing a clear path to further validate and/or adjust the initial or currently established allocation factors, if or when needed. This process, described in Figure 2, consists of monitoring well performance, running a Production Log Survey (PLS) within the first six months of the downhole commingling after the frac load recovery period; and also later if necessary.

Figure 1: Process Flowchart for Calculation of Initial Production Allocation Factors (for the New Completion Zone(s)

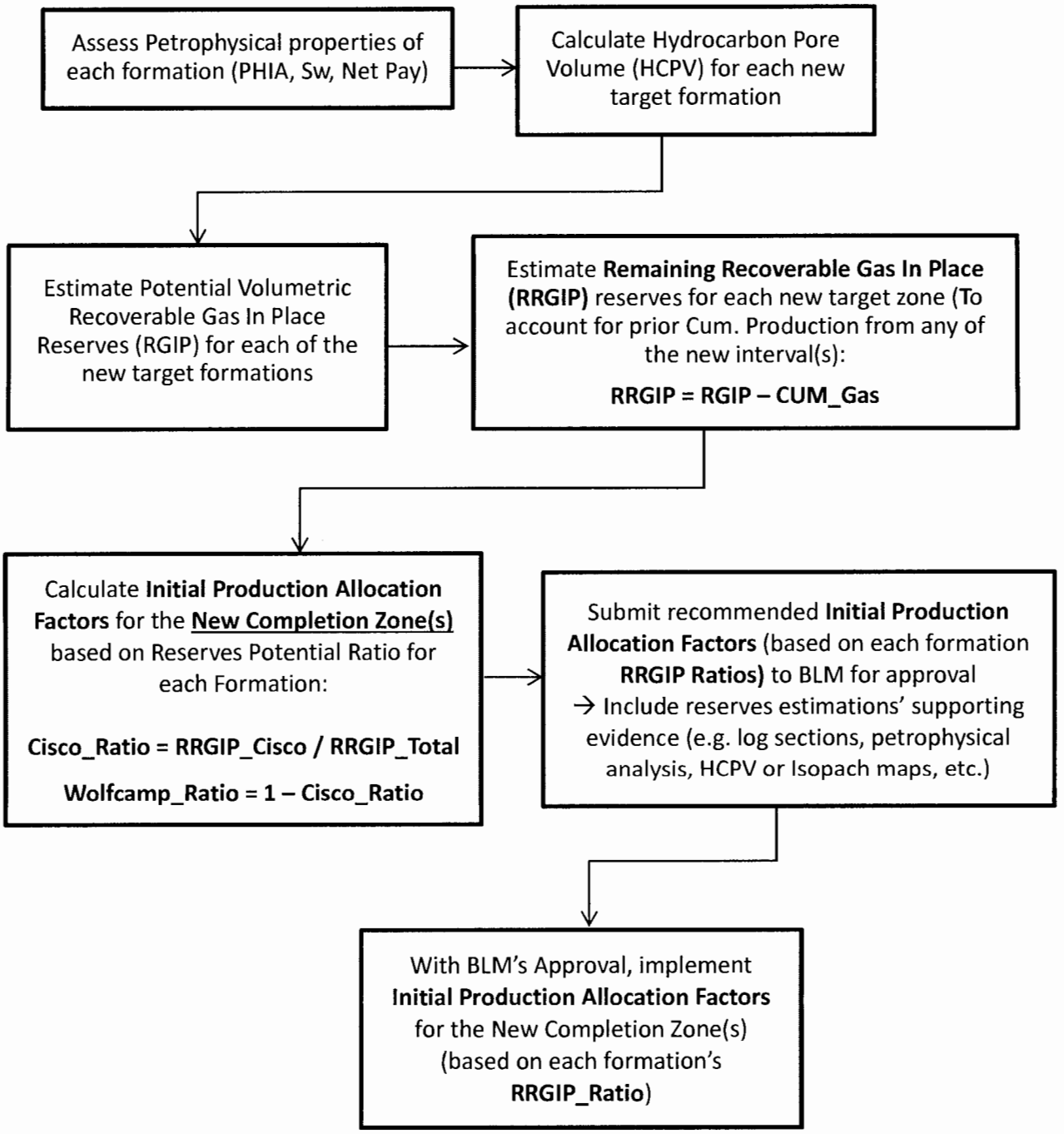
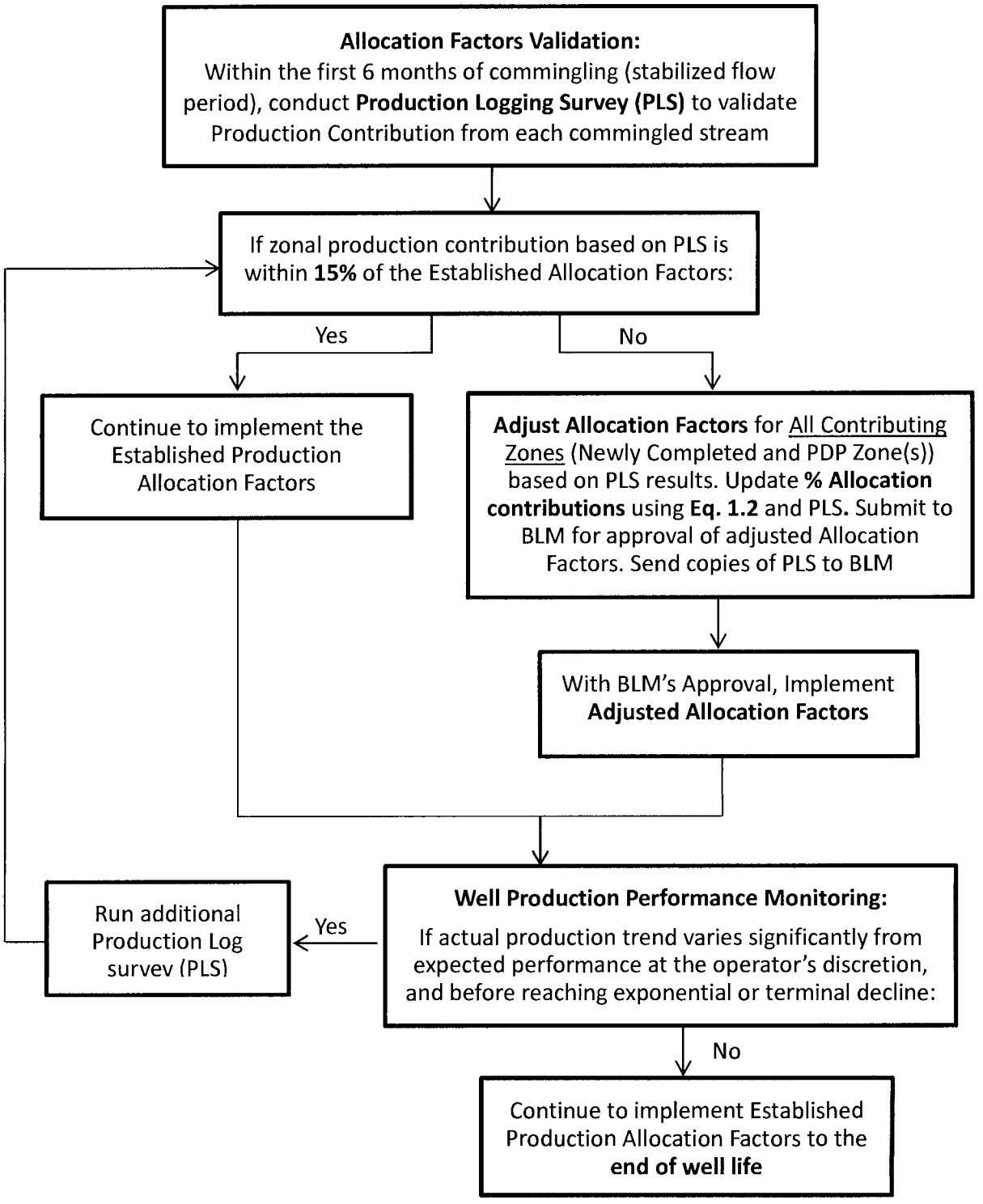


Figure 2: Process Flowchart for Validation and Adjustment of Production Allocation Factors



Verification and Justification of the Proposed Allocation Methodology

Following the herein proposed contribution allocation procedure, the ratio of production flowrate from an individual zone to the total well production flowrate should be proportional to the ratio of Remaining Recoverable Gas in Place (RRGIP) of that zone (Zone **A**) to the Total RRGIP for the combined zones, as follows:

$$Zone\ A\ Prod. = \frac{Zone\ A\ Measured\ Flowrate, MCFD}{Total\ Well\ Meas.\ Flow\ Rate, MCFD} \gg \frac{Zone\ A\_RRGIP}{Total\_RRGIP} = \boldsymbol{Zone\ A\ Alloc.\ Factor}\ \ (\boldsymbol{Eq.2})$$

The validity of this proposed allocation formula (Eq. 2) can be tested using, for example, independently measured production data recorded during a stable flow conditions from each the Cisco Canyon and the Wolfcamp formations in a well or group of analog wells. Similarly, remaining recoverable reserves (RRGIP) calculations should be estimated around such analog wells to then be used in the allocation model along with the measured flowrate ratios.

Methodology Validation Case Study:

A good Ciscamp analog illustration in the AOI is the Trinity 20 Federal 1 (API: 3001534521) that was recompleted in September 2014. For over a year and before the downhole commingling, each reservoir produced separately up tubing and the annular space and each individual contribution was recorded. During this period, the production performance was very unstable and erratic at times, especially in the Cisco Canyon, which was struggling to flow and showed clear signs of liquid loading. However, there are still several shut-in for build-up periods followed by days of steady production flow. In October 2015, and for a little over 20 continuous days, the Cisco produced at an average stable average rate of 125 MCFD (10.2%) and the Wolfcamp produced an average of 1,095 MCFD (89.8%), for a total combined average rate of 1,220 MCFD (see Exhibit 16A).

At the same time, the total estimated RRGIP near this well are 5,075 MMCF, with 560 MMCF (11%) and 4,515 MMCF (89%) projected for the Cisco Canyon and the Wolfcamp BCDE respectively. The following table summarizes the volumetric recoverable reserves estimations and calculated petrophysical parameters.

Current Completed Zone(S)	Adj. Alloc. Factor, %	Prod. Start Date	Cum. Gas, MMCF	% Cum Production Contrib.	OGIP, MMCF	RRGIP @ 85% RF, MMCF	Estim. % Prod. Allocation based on RRGIP Ratio	Net Pay, h (ft)	Avg. PHI	Avg. Sw	HCPV (1-Sw)*PHI*h
Cisco Canyon	10.0%	9-14	54	5.1%	661	562	11.1%	35.5	0.146	0.159	4.36
Wolfcamp BCD & E	90.0%	9-14	1,022	94.9%	5,312	4,515	88.9%	348.0	0.123	0.175	35.31
Total:	**100.0%**		**1,076**	**100.0%**	**5,973**	**5,077**	**100.0%**	**383.5**	**0.135**	**0.167**	**39.7**

Using the allocation equation (Eq. 2) and substituting the terms with actual production flowrates measured independently by zone and the estimated RRGIP for the Wolfcamp BCDE and the Cisco Canyon, results in:

Wolfcamp BCDE Allocation Factor:

$$\underbrace{\mathbf{89.8\%}}_{\text{Actual Measured Contribution Factor}} = \frac{\underbrace{1{,}095\ MCFD}_{\text{Measured Prod. Rates}}}{1{,}220\ MCFD} \gg \frac{\underbrace{4{,}515\ MMCF}_{\text{Estim. Remaining Recoverable Reserves}}}{5{,}075\ MMCF} = \underbrace{\mathbf{89.0\%}}_{\text{Predicted Contribution (proposed Allocation Factor)}}$$

Cisco Canyon Allocation Factor:

$$Cisco\ Canyon\ Prod.\ Allocation\ Factor = 100 - Wolfcamp\ Prod.\ Allocation\ Factor$$

$$\%\ Alloc.\ Factor = 100\% - 89.8\% = \mathbf{10.2\%}$$

As can be observed, Actual Measured Flowrate Contribution Ratio is proportional to the Reserves Ratio (Predicted Contribution Ratio) of the zone of interest. The currently established allocation factors in the Trinity 20 Federal 1 well are indeed 90% for the Wolfcamp BCDE and 10% for the Cisco Canyon, ***matching closely the results obtained using the proposed reserves ratio methodology.***

The RRGIP (RGIP – Cum Gas) is calculated using a Hydrocarbon Pore Volume (HCPV) assessment, an estimated drainage area of 10 acres, and an 85% recovery factor. The used net pay cut-offs are Avg. PHI > 10% and Sw < 25%. The HCPV, defined as hydrocarbon saturation (1-Sw) * Average porosity (PHIA) * Net Pay (h), has been mapped honoring offset subsurface data in the area and geologic interpretation (Exhibits 7 and 8). If the proposed commingling intervals have no prior cumulative production, then **RRGIP = RGIP**.

Alternative Validation of Estimated Allocation Factors

An alternate validation method of the proposed allocation factors can also be implemented using RRGIP ratios tied to historically established Allocation Factors in five nearby Ciscamp Analogs in the area, which are based on production logging and in a few cases, on individual zonal production. These factors have been, in some cases, adjusted through time, based on newly obtained production logging data (see Exhibit 11).

The alternate method is not intended for establishing the Initial Allocation Factors, but rather, as a means to confirm and/or further adjust the established allocation factors when no zonal test or production logs are available for any valid reason.

The approach is based in a correlation of historically established Cisco Canyon cumulative allocation factors and Hydrocarbon Pore Volume (HCPV) or RRGIP in the five Ciscamp analogous wells (Exhibits 13 and 14). RRGIP is preferred as it accounts for any prior cumulative production in a given well (Exhibit 12) including rock quality. There is a very good fit in the correlation between % Cisco Established Allocation Factors and RRGIP, with over 93% fit. (Exhibit 14)

The five Ciscamp analog wells were chosen due to their proximity and similarity of completion and formation properties as many of the prospective Ciscamp recompletions in the area. There are also a few solo Cisco Canyon and solo Wolfcamp vertical producers in the area that could provide additional insights on the production performance of such wells and reservoir thickness and quality. Map location, log cross-section, and production performance curves are included in Appendix B and C, as requested by BLM.

Commingling Considerations

For the most part, well spacing in the proposed commingling formations is the same, as well as public interest. Formations to be commingled are both sweet and have the same pore pressure gradient (~0.45 psi/ft). Both zones are located structurally right on top of the other. As shown in the stratigraphic cross section in Exhibit 9, the Cisco Canyon sits right below the Wolfcamp and above the Strawn intervals at an average depth of 10,400 ft. The datum depth of the Wolfcamp is approximately 9,600 ft. and is composed of the A, B, C, D and E intervals; some of which are undeveloped in parts of the field. In general, the deeper Cisco Canyon reservoir has lower rock quality development and lower productivity, making commingled completions cost-effective and justified to enable developing its reserves.

Early Commingling Justification

The Cisco Canyon combined with the Wolfcamp formation have been historically successful recompletion targets in the AOI. One of the main reasons of this success has been the ability to complete and flowback both formations together from the beginning. Specially because, in many cases, the wells have 7" casing which further prevents the well to naturally flow up the annular space, as the gas flow velocities in the annulus are far below the critical rate (see example in Exhibits 4 and 5). Even in smaller wellbores, dual-completions are not as efficient, resulting in lifting energy loss and the inability to optimize artificial lift. Therefore, completing and commingling both zones and installing artificial lift equipment from the start facilitates faster frac load flowback and improves reserves recovery efficiency, minimizing formation damage and

extending the life of the well. Stimulation of the two zones back-to-back is also cost efficient, as well as, practical to flowback and operate. Besides, the synergy between both zones enhances unloading efficiency and ultimately the recovery of hydrocarbons from both reservoirs, especially that of the deeper and tighter Cisco Canyon. On the other side, the inability to complete and commingle these zones from the start, in most cases, will discourage pursuing the Cisco Canyon, potentially leaving behind average reserves of over 500 MMCF, 12 MBO and 26 MBBls of NGL.

An example of commingling synergy and enhanced lifting capacity can be observed in the Trinity 20 Federal 1 Ciscamp producer. This well was recompleted in the Cisco and the Wolfcamp zones in September 2014 and both streams were produced independently for more than a year. The Cisco was flown through tubing while the Wolfcamp flowed through the annulus. A total average rate 1,013 mcf/d was produced right before commingling, with only nearly 10% of this gas contributed by the Cisco Canyon during the stand-alone period. As can be seen in Exhibit 16A, production from the Cisco Canyon was unstable and erratic throughout this flow period, with clear indication of fluid loading and severe slugging. After commingling both zones by the end of 2015, the combined stream averaged 1,380 mcf/d, a gas rate increase of over 36%. The contribution from the Cisco more than doubled, but more importantly, the overall production decline rate was flattened (Exhibit 16A and 16B), resulting in extended well lifespan and added hydrocarbon reserves uplift, besides cost effective operations.

Next Proposed Ciscamp Recompletion - Chosa Draw 27 Federal 1

Cimarex plans to recomplete the Chosa Draw 27 Federal 1 well (API: 30-015-32918) to the Lower and Middle part of the Cisco Canyon and the Wolfcamp. The well is located 330' FNL & 1980' FEL, Sec. 27, T25S-R26E, and has mainly produced from a highly permeable carbonate interval in the upper part of the Cisco Canyon, with a slight contribution from the Morrow. The upper Cisco was stimulated with a small acid job (not frac'd). Cumulative production to date is 496 MMCF, of which 485 MMCF are attributed to the Upper Cisco Canyon. The well is blown down once per month and makes approximately 85 MCF/month (See Exhibit 1). The new Cisco Canyon and Wolfcamp zones will be added to the existing producing ones. The Morrow will be isolated with a flow-thru composite bridge plug to allow for future production contribution. The proposed Ciscamp recompletion will be performed with 7-stage frac job, two of which will be in the Cisco Canyon (See Exhibit 3). A detailed recompletion and workover procedure is included in **Appendix D**.

Cimarex plans to commingle both zones immediately after completion. Commingling these formations from the beginning will ultimately allow for more efficient artificial lift and faster frac flowback recovery; in turn, minimizing formation damage and increasing recovery by extending

the life of the well. As observed earlier in the Trinity 20 Federal 1 case (Exhibit 16A), the commingling synergy between the Ciscamp streams will significantly improve liquid unloading by maintaining higher and more stable critical velocities for an extended period.

With the ability to commingle production from these formations, the remaining recoverable reserves are expected to be 368 MMCF and 1,409 MMCF from the Cisco Canyon (Middle and Lower) and the Wolfcamp BCD respectively (1,777 MMCF total). Total associated oil and NGL reserves are 54 MBO and 95 MBbls of NGL respectively (See Exhibit 15). In this case, the well spacing in both formations is the same (320 acres), as well as public interests (100% working interest and 79.375002% net royalty interest). Both formations are sweet.

Proposed Initial Production Allocation Factor for the Chosa Draw 27 Federal 1

Based on the herein proposed Allocation Methodology, the **Initial Allocation Factors** for the New Completion Zones are estimated as follows:

$$\boldsymbol{Wolfcamp\ \%\ Alloc.Factor} = \frac{1{,}409\ MMCF}{1{,}777\ MMCF} = \mathbf{79\%}$$

$$\boldsymbol{Cisco\ Canyon\ \%\ Alloc.Factor} = 100\% - 79\% = \mathbf{21\%}$$

Cimarex intends to set a flow-through composite bridge plug 50'-100' uphole of the current deeper producing zone (Morrow) in order to allow for future recovery of any remaining reserves in this zone, while also eliminating the concern of potential reserves loss due to cross-flow caused by depletion. Because this Morrow (PDP) zone already has an established production trend, the amount of production from this formation is expected to yield approximately 3 mcf per month. However this rate contribution will be confirmed via production log and following the herein proposed production allocation methodology to further adjust the PDP and the New Zones flowrate contributions using Eq. 1.2.

Recommendations

Based on the presented supporting evidence and potential benefits, Cimarex recommends BLM to consider granting:

1. *The acceptance of the proposed production allocation methodology developed in this study, to be implemented in future Ciscamp* completions in the scope area.

2. *The approval of the commingling permit for the* Chosa Draw 27 Federal 1 well *proposed Ciscamp recompletion, as wells as, the recommended initial allocation factors of* ***21%*** *for*

*the Cisco Canyon and **79%** for the Wolfcamp, based on the methodology developed in this study.*

Enclosed with this report are the "Downhole Commingling Applications" and supporting documents filed before BLM and the NMOCD.

Supporting Evidence and Exhibits Description

Exhibit 1 shows an area map for the offset Cisco Canyon and Wolfcamp recompletions near the Chosa Draw 27 Fed 1 indicated by the red star. It can be seen that the offset recompletions include the Liberty 24 Fed 2, Federal 13 Com 2, Federal 13 Com 3, Federal 13 Com 6, Gadwall 18 Fed Com 1, and Trinity 20 Fed Com 1.

Exhibit 2 shows the production from the Chosa Draw 27 Fed 1 throughout the life of the well. The production plot on the left side of the slide shows the production allocated to the Morrow zone, and the production plot on the right side of the slide shows the production allocated to the Cisco Canyon zone. The graph at the bottom of the slide summarizes the cumulative production from both zones by year.

The left wellbore diagram shown in Exhibit 3 is the current wellbore diagram for the Chosa Draw 27 Fed Com 1. The right wellbore diagram is the proposed wellbore diagram for the Chosa Draw 27 Fed Com 1. It can be seen from this wellbore diagram that the majority of the perfs for this recompletion (including all of the Wolfcamp perfs) will be in 7" casing. We also intend to run gas lift valves in this well, which would not be possible if we were to flow the Wolfcamp zone up the casing and produce the Cisco Canyon up the tubing.

Exhibit 4 shows the Coleman equation for critical rate. To the left is the hydraulic diameter and cross sectional area of 2-3/8" tbg, 2-7/8" tbg, a 4-1/2" csg x 2-3/8" tbg annulus, and a 7" csg x 2-3/8" tbg annulus. You can see from equation 3 that the critical gas flow rate is directly proportional to the cross sectional flow area indicated by the A in the numerator in equation 3.

Exhibit 5 shows the results of the Coleman equation for the Chosa Draw 27 Fed Com 1. Offset wells began flowing at 2,100 psi surface pressure (2,086 psi on the Trinity 20 Fed Com 1 specifically). At our expected IP of 2.096 MMCFD we would be significantly above critical rate in 2-3/8" tubing or in 2-7/8" tubing. In a 4-1/2" x 2-3/8" annulus we would be slightly below critical rate, and it is likely that we could get the well would flow, but the well would be slugging. However, in a 7" x 2-3/8" annulus we would be more than 4 times below what our critical rate needs to be, so there is no possible way that the well would flow.

Exhibit 6 shows the names of 46 additional wells in White City that could potentially be Ciscamp recompletions if the Chosa Draw 27 Fed Com 1 is successful.

Exhibit 7 shows a map of hydrocarbon pore volume (Hydrocarbon saturation multiplied by porosity multiplied by thickness) for the Cisco Canyon formation. This map also shows the location of the recompletions where Cisco Canyon and Wolfcamp are commingled. The net pay

cutoffs used to generate this map were average porosity > 10% and average water saturation < 25%.

Exhibit 8 shows a map of hydrocarbon pore volume for the Wolfcamp B, C, and D. Again, the net pay cutoffs used to generate this map were average porosity > 10% and average water saturation < 25%.

Exhibit 9 shows a cross section of the top of the Wolfcamp B to the top of the Strawn zones, whereas

Exhibit 10 shows the same cross section and wells zooming in from the top of the Cisco Canyon to the top of the Strawn zone in the nearby, analogous recompletions where the Cisco Canyon and Wolfcamp zones are commingled. These recompletions include the Chosa Draw 27 Fed Com 1, Liberty 24 Fed 2, Federal 13 Com 3, Federal 13 Com 2, Federal 13 Com 6, and Gadwall 18 Fed Com 1.

Exhibit 11 shows the API number, well name, current producing zones, starting production date, cumulative gas production allocated to the Cisco Canyon formation, cumulative gas production allocated to the Wolfcamp formation, total cumulative gas from both zones, and the allocation factor used. The bottom row shows the Chosa Draw 27 Fed Com 1 which began producing from the Cisco Canyon in February 2004 and has produced a cumulative 484,499 mcf.

Exhibit 12 shows each of the offset wells shown on the previous Exhibit, the date that the Cisco Canyon began production, the cumulative gas produced from the Cisco Canyon, the original gas in place, remaining gas in place at an 85% recovery factor, and remaining Cisco Canyon reserves based on a 10 acre drainage radius, 10% porosity cutoff, and 25% water saturation cutoff, the allocated gas volumes from the Cisco Canyon, and the net pay, average porosity, average water saturation, and hydrocarbon pore volume estimated from the hydrocarbon pore volume map. It can be seen from this exhibit that the remaining Cisco Canyon reserves is expected to be 368 MMCF, and is expected to yield an allocation factor of 23.5%.

Exhibit 13 shows a graph of the historically established Cisco Canyon production allocation factor from Ciscamp analogs in the area on the y axis, and the hydrocarbon pore volume (HCPV) on the x axis.

Exhibit 14 shows a graph of the historically established Cisco Canyon production allocation factor from Ciscamp analogs in the area on the y axis, and the recoverable gas in place (RGIP) on the x axis. It can be seen that a linear trend fits this data within 93%. Because of this, we know that by

using hydrocarbon pore volume we can determine how much will be produced from the Cisco Canyon zone, and the remainder of the production must be allocated from the Wolfcamp zone.

Exhibit 15 shows volumetrics for the offset wells and Chosa Draw 27 Fed 1 that do not incorporate the results of production logs. It can be seen that these volumetrics yield that the Wolfcamp formation is expected to produce 1,409 MMCF, or 79% of the recoverable reserves from the well, while the Cisco Canyon will produce 368 MMCF, or 21% of the recoverable reserves from the well. This alternative approach based on a Cisco / Wolfcamp formation quality and Gas reserves in Place relationship further confirms that the allocation factor for the Cisco Canyon in subject well should be between 20 to 24%.

Exhibit 16 (A,B,C) shows individual production plots for the Cisco Canyon and Wolfcamp in the Trinity 20 Federal 1 well. It also includes a log cross-section of this wells and 2 other offsets.

APPENDIX: The Appendix contains the decline curves for the wells used in the analysis described previously (Ciscamp Analogous). The estimated ultimate recovery for each well was found using these decline curves. Also included are a few solo vertical Cisco and Wolfcamp producers in the area. Appendix D is the workover procedure for the Chosa Draw 27 Federal 1 Ciscamp recompletion.

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 ***Adrianne 6 Federal #1*** well (API: 30-015-34319).

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 **78%** for the Wolfcamp and **22%** 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 ***Adrianne 6 Federal #1*** well to the Cisco Canyon and the Wolfcamp formations. This well is located within the BLM approved White City Ciscamp Field Study Area (see Exhibit 6A of the above referenced Field Study) and is currently completed in the Morrow formation. The well has produced **1,070 MMCF** of gas and has remaining gas reserves of approximately 250 MMCF (see **Appendix C**). The company plans to temporarily abandon the Morrow zone under a cast-iron bridge plug with cement on top, and will consider returning this zone to production and commingle with the new proposed Ciscamp formations in the future once these zones reach an equivalent reservoir pressure. In such case, the production allocations factors will be revised and re-submitted for approval following the approved Field Study methodology for "Handling of Existing Rate Contribution from Proven Developed Producing (PDP) Zone(s)", using Eq.1.1 and Eq. 1.2; and along with the required BLM and NMOCD documentation.

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

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

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 **1,592 MMCF** from the Wolfcamp and **454 MMCF** from the Cisco Canyon, for a total of **2,046 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:

$$\textbf{\textit{Wolfcamp \% Alloc. Factor}} = \frac{1{,}592\ MMCF}{2{,}046\ MMCF} = \mathbf{78\%}$$

$$\textbf{\textit{Cisco Canyon \% Alloc. Factor}} = \frac{454\ MMCF}{2{,}046\ MMCF} = \mathbf{22\%}$$

The RGIP for each zone is estimated using the Hydrocarbon Pore Volume (HCPV) assessment as shown in Table 1. The implemented net pay cut-offs are Average Porosity (PHI) > 10% and Average Sw < 35%. *Total estimated oil reserves are 51 MBO.*

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

Proposed RC Zone(S)	Avg. Depth, ft	Est. Reservoir Pressure, psi	Net Pay, h (ft)	Avg. PHI	Avg. Sw	HCPV (1-Sw)*PHI*h	OGIP, MMCF	Est. Recovery Factor	RGIP @RF, MMCF	Zone Prod. Start Date	Prev. Cum. Gas, MMCF	Remaining RGIP (RRGIP), MMCF	Initial Alloc. Factor, % (based on RRGIP Ratio)
Wolfcamp	9,230	4,113	222	13.7%	19.1%	24.5	1,886	84%	1,592		-	1,592	78%
Cisco Canyon	10,135	4,917	45	15.1%	14.2%	5.8	527	86%	454		-	454	22%
Total:			267.0			30.4	2,413	85%	2,046		-	2,046	100%

In this well, the spacing for both formations is the same (320 acres), as well as, public interests: 100% working interest and 75% net royalty 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.

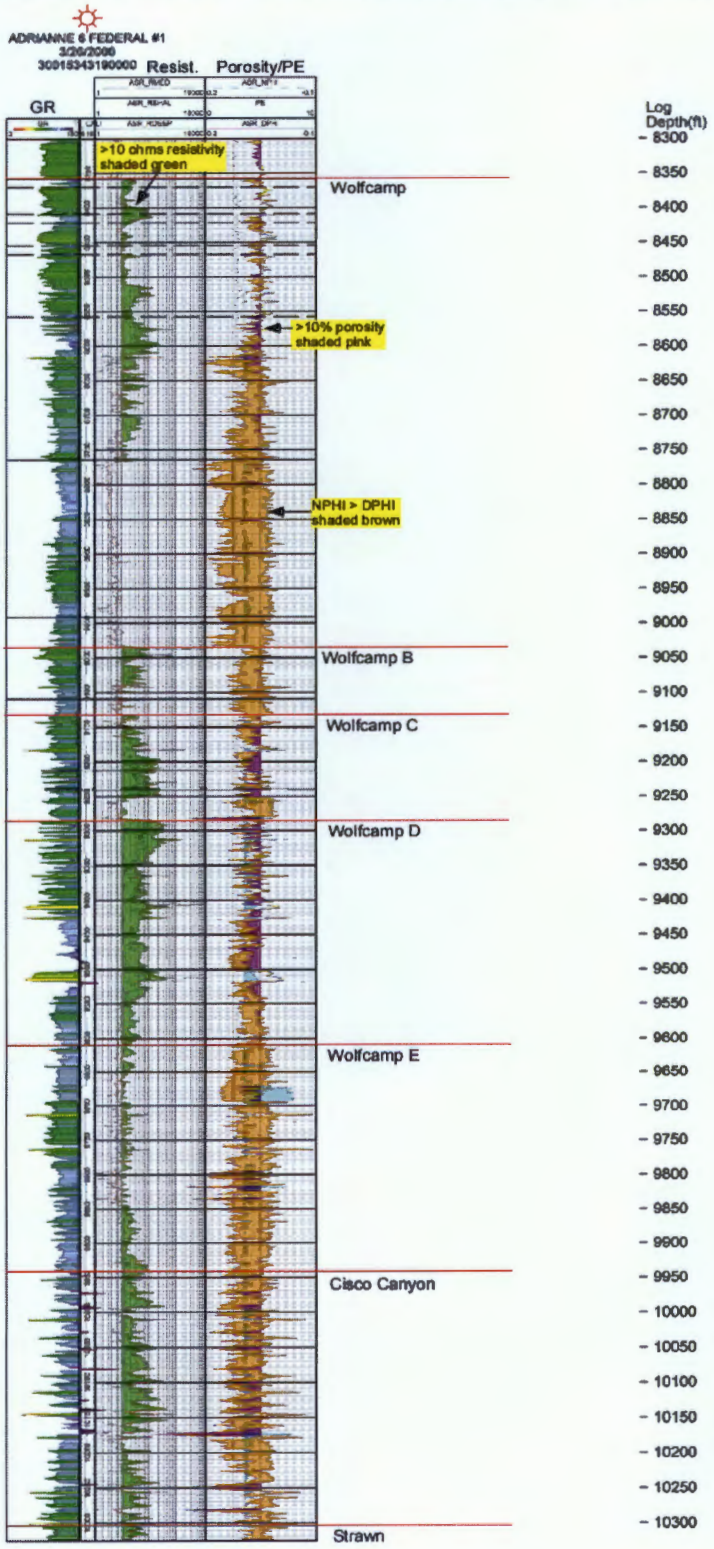
Sincerely,

Edward G. Fernandez

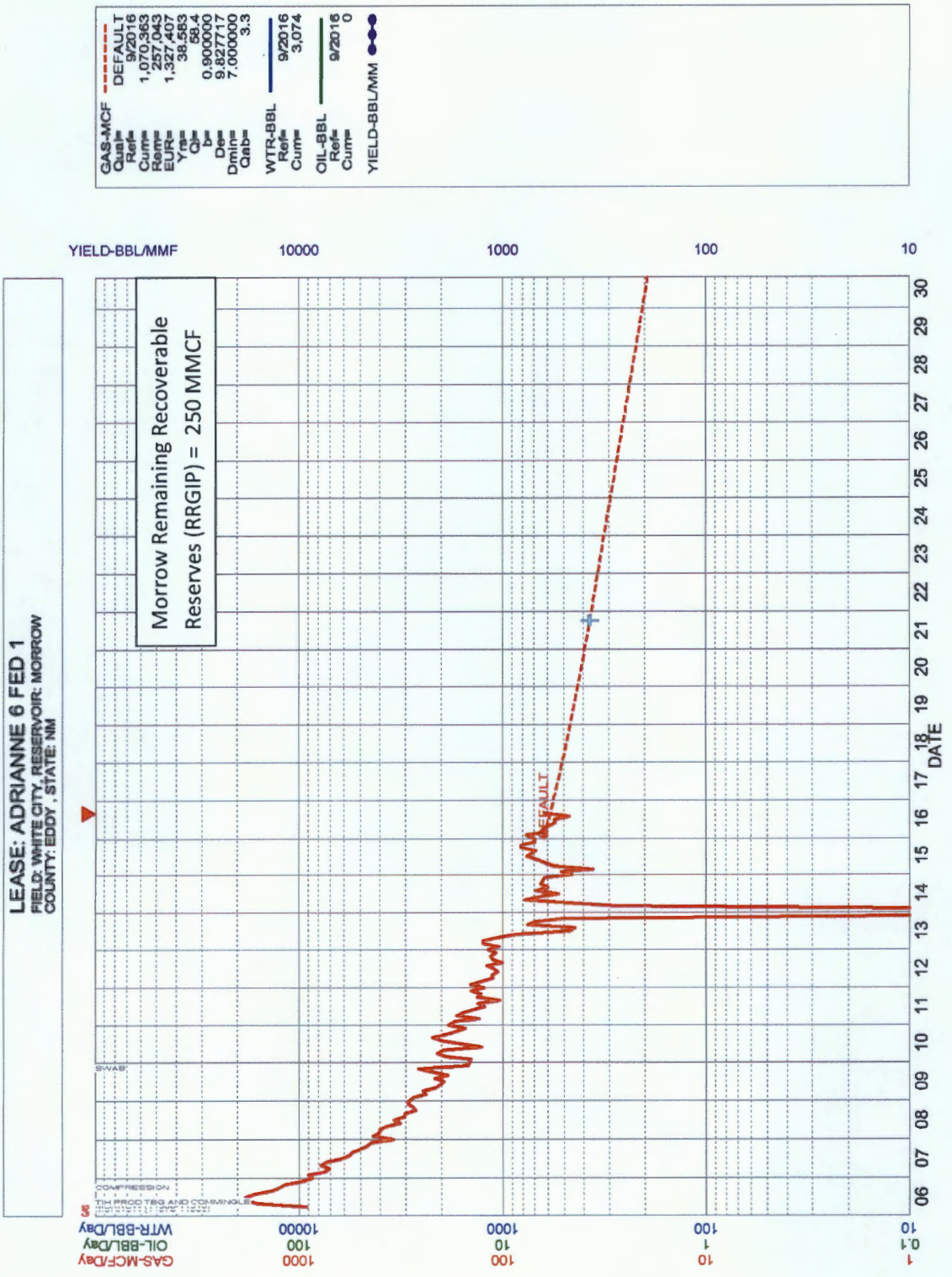
for Cody R. Layton
Assistant Field Manager,
Lands and Minerals

Enclosure
cc: NMP0220 (CFO I&E)

Appendix B: Log section from top of Wolfcamp to top of Strawn – ADRIANNE 6 FEDERAL #1



Appendix C: Recompletion Procedure – **ADRIANNE 6 FEDERAL #1**



Appendix D: Recompletion Procedure – **ADRIANNE 6 FEDERAL #1**

Well Data

KB	16' above GL
TD	12,235'
PBTD	12,130'
Casing	13-3/8" 48# H-40 csg @ 215'. Cmt'd w/ 260 sx, cmt circ. 9-5/8" 40# J-55 csg @ 1,915'. Cmt'd w/ 735 sx, cmt circ. 5-1/2" 17# P-110 @ 12,235'. Cmtd w/ 1,060 sx. 1st stage TOC 7,920' by CBL dated 3/2/2006. DV Tool @ 7,290' cmt'd w/ 980 sx, cmt circ.
Tubing	2-3/8" 4.7# L-80 8rd @ 11,250' (363 jts)
Prod. Perfs	Morrow (11,306' – 11,955')
Proposed Perfs	Wolfcamp (8,446' – 9,954') & Cisco Canyon (10,090' – 10,303')

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 5-1/2" x 2-3/8" Versa-set packer at 11,250' and TOOH w/ packer on 2-3/8" 4.7# L-80 tbg. Lay down tubing while TOOH.
6. RU Wireline and 5k short lubricator
7. RIH w/ gauge ring/junk basket to +/- 11,286'
8. RIH w/ 5-1/2" CIBP and set at +/- 11,256'
9. RIH w/ bailer and bail 35' of cement on top of CIBP set at +/- 11,256'
10. RDMO Wireline and 5k short lubricator
11. RU pump truck
12. Pressure test 5-1/2" 17# P-110 casing to 8,500 psi (Max treating pressure, 80% of burst) for 30 minutes on a chart with no more than 10% leak off. **Note: Well has a 10k wellhead**
13. RD pump truck.
14. ND BOP, RU two 10k frac valves and flow cross, RDMO Pulling unit
15. MIRU water transfer with frac tanks to contain water to be pumped from frac pond
16. Test frac valves and flow cross prior to frac job. Arrange for these items, manlift, forklift, and Pace testers to be on location the day before the frac job to test so that we do not have the frac waiting on a successful test the following day.

17. RU frac valves, flow cross, goat head, and wireline lubricator.
18. RIH w/ gauge ring/junk basket for 5-1/2" 17# P-110 csg to +/- 10,333'
19. Perforate stage one proposed perforations Cisco Canyon from 10,090' – 10,303'. Correlate to Dual Spaced Neutron Spectral Gamma Ray log dated 2/4/2006.
20. RU frac and flowback equipment.
21. Acidize and frac stage 1 Cisco Canyon perfs down casing.
22. Set 10k flow through composite plug at 10,075'
23. Test to 8,500 psi
24. Perforate stage two proposed perforations Wolfcamp from 9,738' – 9,954'. Correlate to Dual Spaced Neutron Spectral Gamma Ray log dated 2/4/2006.
25. Acidize and frac stage 2 Wolfcamp perfs down casing.
26. Set 10k flow through composite plug at 9,723'
27. Test to 8,500 psi
28. Perforate stage three proposed perforations Wolfcamp from 9,312' – 9,531'. Correlate to Dual Spaced Neutron Spectral Gamma Ray log dated 2/4/2006.
29. Acidize and frac stage 3 Wolfcamp perfs down casing.
30. Set 10k flow through composite plug at 9,297'
31. Test to 8,500 psi
32. Perforate stage four proposed perforations Wolfcamp from 9,136' – 9,244'. Correlate to Dual Spaced Neutron Spectral Gamma Ray log dated 2/4/2006.
33. Acidize and frac stage 4 Wolfcamp perfs down casing.
34. Set 10k flow through composite plug at 9,121'.
35. Test to 8,500 psi
36. Perforate stage five proposed perforations Wolfcamp from 8,446' – 8,641'. Correlate to Dual Spaced Neutron Spectral Gamma Ray log dated 2/4/2006.
37. Acidize and frac stage 5 Wolfcamp perfs down casing.
38. RD frac
39. MIRU 2" coiled tbg unit.
40. RIH w/ tri cone bit & downhole motor on 2" CT and drill out sand and composite plugs using freshwater for circulation. Pump sweeps each time a plug is tagged, each time a plug is drilled out, and every 60 bbls pumped.
41. Clean out to PBTD 11,221'
42. POOH w/ tri cone bit, motor & CT
43. RDMO coiled tbg unit.
44. Flow back well for 24 hours, then SI well overnight.
45. RU wireline and lubricator.
46. RIH w/ GR/JB for 5-1/2" 17# P-110 to +/- 8,426'
47. 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, 5-1/2" Arrowset 1X packer and on-off tool stinger w/ 1.875" X profile nipple. Set packer +/- 8,396'. 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 w/ blanking plug
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

48. RD WL and lubricator
49. ND goat head and frac valve, NU BOP, MIRU Pulling Unit
50. TIH w/ on/off tool overshot, GLVs, and 2-3/8" 4.7# L-80 tbg.
51. Latch overshot onto on-off tool and space out tubing
52. ND BOP, NU WH
53. RDMO pulling unit
54. RU pump truck and pump out plug. Put well on production.
55. **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.**