Form 3160-5
(November 1994)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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OCD-HOBBS

FORM APPROVED
OMB No. 1004-0135
Expires July 31, 1996

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on reverse side

5. Lease Serial No.
LC-063586

6. If Indian, Allottee or Tribe Name

7. If Unit or CA/Agreement, Name and/or No.

1. Type of Well
☒ Oil Well ☐ Gas Well ☐ Other

8. Well Name and No.
Southern California 29 Federal No. 18

2. Name of Operator
Cimarex Energy Co. of Colorado

9. API Well No.
30-025-39889

3a. Address
600 N. Marienfeld St., Ste. 600; Midland, TX 79701

3b. Phone No. *(include area code)*
432-571-7800

10. Field and Pool, or Exploratory Area
Lusk; Bone Spring, S

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
SHL 1140 FNL & 330 FEL 29-19S-32E
BHL 660 FNL & 1650 FWL

11. County or Parish, State
Lea, NM

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

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Subsequent Report	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other Change BHL
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
☐ Final Abandonment Notice	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation (clearly state all pertinent details, included estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

Cimarex is changing BHL for this well as shown below in order to contact more pay.

SEE ATTACHED FOR CONDITIONS OF APPROVAL

Permitted Location	New Proposed Location
SHL 1140 FNL & 330 FEL	SHL 1140 FNL & 330 FEL
BHL 660 FNL & 1650 FWL	BHL 330 FNL & 330 FWL

The well's permitted casing program includes 7" for production casing and a 4½" lateral string. Cimarex would like to change the production casing plans to 5½" from surface, through the curve, to TD as shown below, using 8.4-9.0 ppg FW/Brine:

Drill 8¾" hole to pilot hole depth of 9550' and log. Set kick off plug from 7897-9550' with 270 sx Prem Plus H (15.8, 1.19) and kick off @ 9077' and drill to TD @ 13899.' Run 5½" 17# P-110 LTC from 0-13899.' Cement with Lead 500 sx EconoCem + 5lbm/sk Gilsonite 2.48 cf/sk 11.9 ppg and Tail 1760 sx Halcem 15.6 ppg 1.19 cf/sk
TOC 3500'

APPROVED
NOV - 4 2010
BUREAU OF LAND MANAGEMENT
CARLSBAD FIELD OFFICE

14. I hereby certify that the foregoing is true and correct

Name *(Printed/Typed)*	Title
Natalie Krueger	Regulatory
Signature	Date
Natalie Krueger	September 28, 2010

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by	Title	Date
	PETROLEUM ENGINEER	NOV 10 2010
Conditions of Approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.	Office	

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Instructions on reverse)

DISTRICT I
1625 N. French Dr., Hobbs, NM 88240

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

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

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

State of New Mexico
Energy, Minerals and Natural Resources Department

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Form C-102
Revised October 15, 2009
Submit one copy to appropriate District Office

OIL CONSERVATION DIVISION

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
30-025-39889	41460	Lusk; Bone Spring, S

Property Code	Property Name	Well Number
37971	SOUTHERN CALIFORNIA "29" FEDERAL	18

OGRID No.	Operator Name	Elevation
162683	CIMAREX ENERGY CO. OF COLORADO	3369'

Surface Location

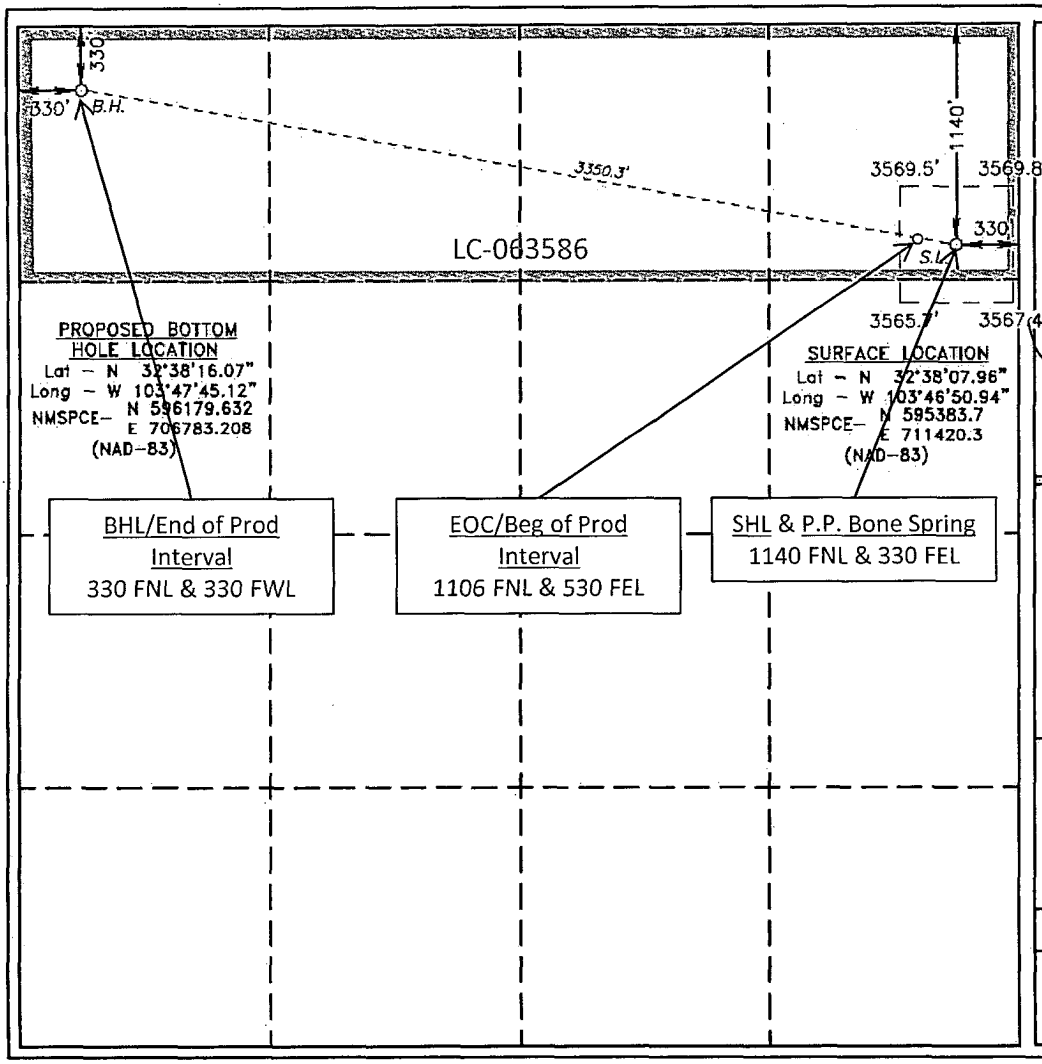
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	29	19 S	32 E		1140	NORTH	330	EAST	LEA

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
D	29	19 S	32 E		330	NORTH	330	WEST	LEA

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
160			

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



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.

Natalie Krueger 9/28/2010
Signature Date

Natalie Krueger
Printed Name

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 supervison, and that the same is true and correct to the best of my belief.

GARY L. JONES
NEW MEXICO
7977
REGISTERED PROFESSIONAL SURVEYOR

Date Surveyed
Signature & Seal of Professional Surveyor
W.O. 22755

Certificate No. Gary L. Jones 7977

BASIN SURVEYS

Cimarex Energy Co.

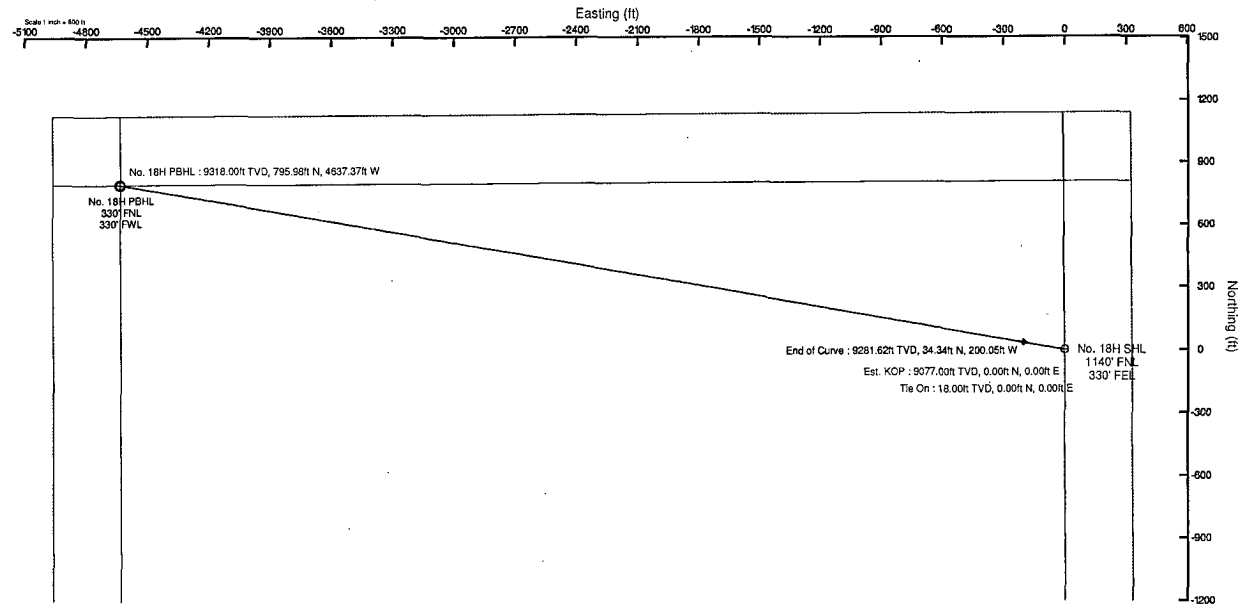
Location: Lea County, NM
Field: (SC) Sec 29, T19S, R32E
Facility: Southern California 29 Fed No. 18H

Slot: No. 18H SHL
Well: No. 18H
Wellbore: No. 18H PWB

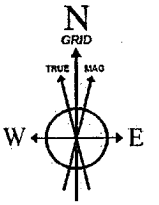
BAKER HUGHES

Well Profile Data

Design Comment	MD (ft)	Inc (°)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	DLS (°/100ft)	VS (ft)
Tie On	18.00	0.000	279.740	18.00	0.00	0.00	0.00	0.00
Est. KOP	9077.00	0.000	279.740	9077.00	0.00	0.00	0.00	0.00
End of Curve	9396.78	89.537	279.740	9281.62	34.34	-200.05	28.00	202.97
No. 18H PBHL	13899.13	89.537	279.740	9318.00	795.98	-4637.37	0.00	4705.19



Plot reference wellpath is Prelim_2	
True vertical depths are referenced to Rig on No. 18H SHL (GL)	Grid System: NAD83 / TM New Mexico State Planes, Eastern Zone (3001), US feet
Measured depths are referenced to Rig on No. 18H SHL (GL)	North Reference: Grid north
Rig on No. 18H SHL (GL) to Mean Sea Level: 3387 feet	Scale: True distance
Mean Sea Level to Mud line (Facility: Southern California 29 Fed No. 18H): -3369 feet	Depths are in feet
Coordinates are in feet referenced to Slot Location	Created by: Victor Hernandez on 9/13/2010



BGGM (1945.0 to 2011.0) Dip: 60.58° Field: 49012.7 nT
Magnetic North is 7.88 degrees East of True North (at 5/28/2010)
Grid North is 0.30 degrees East of True North
To correct azimuth from True to Grid subtract 0.30 degrees
To correct azimuth from Magnetic to Grid add 7.58 degrees
For example: if the Magnetic North Azimuth = 90 degs, then the Grid North Azimuth = 90 + 7.58 = 97.58

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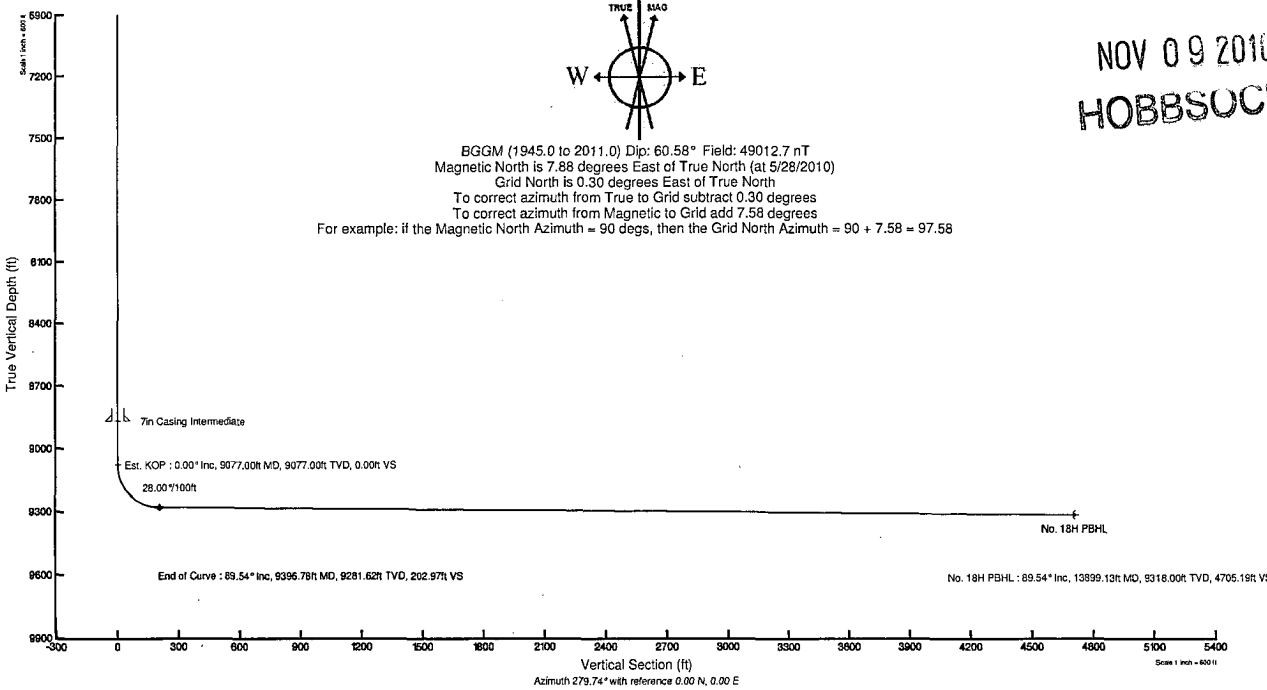

Planned Wellpath Report

Prelim_2

REFERENCE WELLPATH IDENTIFICATION			
Operator	**Cimarex Energy Co.**	Slot	**No. 18H SHL**
Area	**Lea County, NM**	Well	**No. 18H**
Field	**(SC) Sec 29, T19S, R32E**	Wellbore	**No. 18H PWB**
Facility	**Southern California 29 Fed No. 18H**		

REPORT SETUP INFORMATION			
Projection System	**NAD83 / TM New Mexico State Planes, Eastern Zone (3001), US feet**	Software System	**WellArchitect® 2.0**
North Reference	**Grid**	User	**Victor Hernandez**
Scale	**0.999942**	Report Generated	**9/13/2010** at **2:12:44 PM**
Convergence at slot	**0.30° East**	Database/Source file	**WA_Midland/No._18H_PWB.xml**

WELLPATH LOCATION	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	**East[ft]**	**Easting[USft]**	**Northing[USft]**	**Latitude**	**Longitude**
Slot Location	**0.00**	**0.00**	711420.30	595383.70	32°38'07.955"N	103°46'50.939"W
Facility Reference Pt			**711420.30**	**595383.70**	32°38'07.955"N	103°46'50.939"W
Field Reference Pt			**706799.20**	**591606.30**	32°37'30.812"N	103°47'45.203"W

WELLPATH DATUM			
Calculation method	**Minimum curvature**	Rig on No. 18H SHL (KB) to Ground Level	**18.00ft**
Horizontal Reference Pt	**Slot Location**	Rig on No. 18H SHL (KB) to Mean Sea Level	**3387.00ft**
Vertical Reference Pt	**Rig on No. 18H SHL (KB)**	Ground Level to Mud Line (Facility)	**0.00ft**
MD Reference Pt	**Rig on No. 18H SHL (KB)**	Section Origin	**N 0.00, E 0.00 ft**
Field Vertical Reference	**Mean Sea Level**	Section Azimuth	**279.74°**

Planned Wellpath Report

Prelim_2

REFERENCE WELLPATH IDENTIFICATION			
Operator	Cimarex Energy Co.	Slot	No. 18H SHL
Area	Lea County, NM	Well	No. 18H
Field	(SC) Sec 29, T19S, R32E	Wellbore	No. 18H PWB
Facility	Southern California 29 Fed No. 18H		

WELLPATH DATA (53 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [srv ft]	Grid North [srv ft]	Latitude	Longitude	DLS [°/100ft]	Comments
0.00†	0.000	279.740	0.00	0.00	0.00	0.00	711420.30	595383.70	32°38'07.955"N	103°46'50.939"W	0.00	
18.00	0.000	279.740	18.00	0.00	0.00	0.00	711420.30	595383.70	32°38'07.955"N	103°46'50.939"W	0.00	Tie On
9077.00	0.000	279.740	9077.00	0.00	0.00	0.00	711420.30	595383.70	32°38'07.955"N	103°46'50.939"W	0.00	Est. KOP
9177.00†	28.000	279.740	9173.07	23.95	4.05	-23.61	711396.69	595387.75	32°38'07.996"N	103°46'51.215"W	28.00	
9277.00†	56.000	279.740	9246.64	90.20	15.26	-88.90	711331.40	595398.96	32°38'08.110"N	103°46'51.978"W	28.00	
9377.00†	84.000	279.740	9280.51	183.24	31.00	-180.60	711239.71	595414.70	32°38'08.271"N	103°46'53.049"W	28.00	
9396.78	89.537	279.740	9281.62	202.97	34.34	-200.05	711220.26	595418.04	32°38'08.305"N	103°46'53.277"W	28.00	End of Curve
9477.00†	89.537	279.740	9282.27	283.20	47.91	-279.11	711141.20	595431.61	32°38'08.443"N	103°46'54.200"W	0.00	
9577.00†	89.537	279.740	9283.08	383.19	64.83	-377.67	711042.65	595448.52	32°38'08.616"N	103°46'55.352"W	0.00	
9677.00†	89.537	279.740	9283.89	483.19	81.74	-476.23	710944.10	595465.44	32°38'08.788"N	103°46'56.503"W	0.00	
9777.00†	89.537	279.740	9284.69	583.19	98.66	-574.78	710845.55	595482.35	32°38'08.961"N	103°46'57.655"W	0.00	
9877.00†	89.537	279.740	9285.50	683.18	115.57	-673.34	710747.00	595499.27	32°38'09.133"N	103°46'58.806"W	0.00	
9977.00†	89.537	279.740	9286.31	783.18	132.49	-771.89	710648.45	595516.18	32°38'09.305"N	103°46'59.958"W	0.00	
10077.00†	89.537	279.740	9287.12	883.18	149.41	-870.45	710549.90	595533.10	32°38'09.478"N	103°47'01.109"W	0.00	
10177.00†	89.537	279.740	9287.93	983.17	166.32	-969.00	710451.35	595550.01	32°38'09.650"N	103°47'02.260"W	0.00	
10277.00†	89.537	279.740	9288.73	1083.17	183.24	-1067.56	710352.81	595566.93	32°38'09.823"N	103°47'03.412"W	0.00	
10377.00†	89.537	279.740	9289.54	1183.17	200.16	-1166.11	710254.26	595583.85	32°38'09.995"N	103°47'04.563"W	0.00	
10477.00†	89.537	279.740	9290.35	1283.16	217.07	-1264.67	710155.71	595600.76	32°38'10.168"N	103°47'05.715"W	0.00	
10577.00†	89.537	279.740	9291.16	1383.16	233.99	-1363.22	710057.16	595617.68	32°38'10.340"N	103°47'06.866"W	0.00	
10677.00†	89.537	279.740	9291.97	1483.16	250.91	-1461.78	709958.61	595634.59	32°38'10.512"N	103°47'08.018"W	0.00	
10777.00†	89.537	279.740	9292.77	1583.15	267.82	-1560.34	709860.06	595651.51	32°38'10.685"N	103°47'09.169"W	0.00	
10877.00†	89.537	279.740	9293.58	1683.15	284.74	-1658.89	709761.51	595668.42	32°38'10.857"N	103°47'10.321"W	0.00	
10977.00†	89.537	279.740	9294.39	1783.15	301.66	-1757.45	709662.96	595685.34	32°38'11.030"N	103°47'11.472"W	0.00	
11077.00†	89.537	279.740	9295.20	1883.14	318.57	-1856.00	709564.41	595702.25	32°38'11.202"N	103°47'12.623"W	0.00	
11177.00†	89.537	279.740	9296.01	1983.14	335.49	-1954.56	709465.86	595719.17	32°38'11.374"N	103°47'13.775"W	0.00	
11277.00†	89.537	279.740	9296.81	2083.14	352.41	-2053.11	709367.31	595736.08	32°38'11.547"N	103°47'14.926"W	0.00	
11377.00†	89.537	279.740	9297.62	2183.13	369.32	-2151.67	709268.76	595753.00	32°38'11.719"N	103°47'16.078"W	0.00	
11477.00†	89.537	279.740	9298.43	2283.13	386.24	-2250.22	709170.21	595769.92	32°38'11.892"N	103°47'17.229"W	0.00	
11577.00†	89.537	279.740	9299.24	2383.13	403.16	-2348.78	709071.66	595786.83	32°38'12.064"N	103°47'18.381"W	0.00	
11677.00†	89.537	279.740	9300.05	2483.12	420.07	-2447.33	708973.11	595803.75	32°38'12.236"N	103°47'19.532"W	0.00	

Planned Wellpath Report

Prelim_2

REFERENCE WELLPATH IDENTIFICATION			
Operator	**Cimarex Energy Co.**	Slot	**No. 18H SHL**
Area	**Lea County, NM**	Well	**No. 18H**
Field	**(SC) Sec 29, T19S, R32E**	Wellbore	**No. 18H PWB**
Facility	**Southern California 29 Fed No. 18H**		

WELLPATH DATA (53 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [srv ft]	Grid North [srv ft]	Latitude	Longitude	DLS [°/100ft]	Comments
11777.00†	89.537	279.740	9300.85	2583.12	436.99	-2545.89	708874.56	595820.66	32°38'12.409"N	103°47'20.684"W	0.00	
11877.00†	89.537	279.740	9301.66	2683.12	453.90	-2644.45	708776.01	595837.58	32°38'12.581"N	103°47'21.835"W	0.00	
11977.00†	89.537	279.740	9302.47	2783.12	470.82	-2743.00	708677.46	595854.49	32°38'12.753"N	103°47'22.987"W	0.00	
12077.00†	89.537	279.740	9303.28	2883.11	487.74	-2841.56	708578.91	595871.41	32°38'12.926"N	103°47'24.138"W	0.00	
12177.00†	89.537	279.740	9304.09	2983.11	504.65	-2940.11	708480.36	595888.32	32°38'13.098"N	103°47'25.289"W	0.00	
12277.00†	89.537	279.740	9304.89	3083.11	521.57	-3038.67	708381.81	595905.24	32°38'13.271"N	103°47'26.441"W	0.00	
12377.00†	89.537	279.740	9305.70	3183.10	538.49	-3137.22	708283.26	595922.16	32°38'13.443"N	103°47'27.592"W	0.00	
12477.00†	89.537	279.740	9306.51	3283.10	555.40	-3235.78	708184.71	595939.07	32°38'13.615"N	103°47'28.744"W	0.00	
12577.00†	89.537	279.740	9307.32	3383.10	572.32	-3334.33	708086.17	595955.99	32°38'13.788"N	103°47'29.895"W	0.00	
12677.00†	89.537	279.740	9308.13	3483.09	589.24	-3432.89	707987.62	595972.90	32°38'13.960"N	103°47'31.047"W	0.00	
12777.00†	89.537	279.740	9308.93	3583.09	606.15	-3531.44	707889.07	595989.82	32°38'14.132"N	103°47'32.198"W	0.00	
12877.00†	89.537	279.740	9309.74	3683.09	623.07	-3630.00	707790.52	596006.73	32°38'14.305"N	103°47'33.350"W	0.00	
12977.00†	89.537	279.740	9310.55	3783.08	639.99	-3728.56	707691.97	596023.65	32°38'14.477"N	103°47'34.501"W	0.00	
13077.00†	89.537	279.740	9311.36	3883.08	656.90	-3827.11	707593.42	596040.56	32°38'14.649"N	103°47'35.653"W	0.00	
13177.00†	89.537	279.740	9312.17	3983.08	673.82	-3925.67	707494.87	596057.48	32°38'14.822"N	103°47'36.804"W	0.00	
13277.00†	89.537	279.740	9312.97	4083.07	690.74	-4024.22	707396.32	596074.39	32°38'14.994"N	103°47'37.956"W	0.00	
13377.00†	89.537	279.740	9313.78	4183.07	707.65	-4122.78	707297.77	596091.31	32°38'15.166"N	103°47'39.107"W	0.00	
13477.00†	89.537	279.740	9314.59	4283.07	724.57	-4221.33	707199.22	596108.23	32°38'15.339"N	103°47'40.259"W	0.00	
13577.00†	89.537	279.740	9315.40	4383.06	741.49	-4319.89	707100.67	596125.14	32°38'15.511"N	103°47'41.410"W	0.00	
13677.00†	89.537	279.740	9316.21	4483.06	758.40	-4418.44	707002.12	596142.06	32°38'15.683"N	103°47'42.562"W	0.00	
13777.00†	89.537	279.740	9317.01	4583.06	775.32	-4517.00	706903.57	596158.97	32°38'15.856"N	103°47'43.713"W	0.00	
13877.00†	89.537	279.740	9317.82	4683.05	792.24	-4615.56	706805.02	596175.89	32°38'16.028"N	103°47'44.865"W	0.00	
13899.13	89.537	279.740	9318.00[1]	4705.19	795.98	-4637.37	706783.21	596179.63	32°38'16.066"N	103°47'45.119"W	0.00	No. 18H PBHL

HOLE & CASING SECTIONS Ref Wellbore: No. 18H PWB Ref Wellpath: Prelim_2

String/Diameter	Start MD [ft]	End MD [ft]	Interval [ft]	Start TVD [ft]	End TVD [ft]	Start N/S [ft]	Start E/W [ft]	End N/S [ft]	End E/W [ft]
7in Casing Intermediate	18.00	8868.00	8850.00	18.00	8868.00	0.00	0.00	0.00	0.00

Planned Wellpath Report

Prelim_2

REFERENCE WELLPATH IDENTIFICATION			
Operator	**Cimarex Energy Co.**	Slot	**No. 18H SHL**
Area	**Lea County, NM**	Well	**No. 18H**
Field	**(SC) Sec 29, T19S, R32E**	Wellbore	**No. 18H PWB**
Facility	**Southern California 29 Fed No. 18H**		

TARGETS

Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [srv ft]	Grid North [srv ft]	Latitude	Longitude	Shape
1) No. 18H PBHL		9318.00	795.98	-4637.37	**706783.21**	**596179.63**	32°38'16.066"N	103°47'45.119"W	point

SURVEY PROGRAM Ref Wellbore: No. 18H PWB Ref Wellpath: Prelim_2

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
18.00	13899.13	NaviTrak (Standard)		No. 18H PWB

CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**Cimarex Energy Co. of Colorado**
LEASE NO.:	**NMLC-063586**
WELL NAME & NO.:	**Southern California 29 Federal #18**
SURFACE HOLE FOOTAGE:	**1140' FNL & 330' FEL**
BOTTOM HOLE FOOTAGE	**330' FNL & 330' FWL**
LOCATION:	**Section 29, T. 19 S., R 32 E., NMPM**
COUNTY:	**Lea County, New Mexico**

A. CASING

Changes to the approved APD casing and cement program require submitting a sundry and receiving approval prior to work. Failure to obtain approval prior to work will result in an Incident of Non-Compliance being issued.

Centralizers required on surface casing per Onshore Order 2.III.B.1.f.

Wait on cement (WOC) time for a primary cement job will be a minimum 18 hours for a water basin, 24 hours in the potash area, or 500 pounds compressive strength, whichever is greater for all casing strings. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. See individual casing strings for details regarding lead cement slurry requirements.

No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

Possible lost circulation in the Artesia Group and the Capitan Reef.
Possible water and brine flows in the Artesia and Salado Groups.

1. The **13-3/8** inch surface casing shall be set at **approximately 920 feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface.**

    a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.

    b. Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry.

c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.

d. If cement falls back, remedial cementing will be done prior to drilling out that string.

Special Capitan Reef requirements:

If any lost circulation occurs below the Base of the Salt, the operator is to switch to fresh water mud to protect the Capitan Reef and use fresh water mud until setting the intermediate casing. The appropriate BLM office is to be notified for a PET to witness the switch to fresh water.

In addition, daily drilling reports are to be submitted to the BLM CFO engineering staff via e-mail by 0800 hours each morning from the setting of the surface casing until the intermediate casing is set. Any lost circulation encountered is to be recorded on these drilling reports. The daily drilling report should show mud volume per shift/tour. Failure to submit these reports will result in an Incidence of Non-Compliance being issued for failure to comply with the Conditions of Approval. If not already planned, the operator shall run a caliper survey for the intermediate well bore and submit to the appropriate BLM office.

2. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is:

   ☒ Cement to surface. If cement does not circulate see B.1.a, c-d above. **Additional cement may be required as the excess calculates negative 1%.**

Centralizers required on horizontal leg, must be type for horizontal service and minimum of one every other joint.

3. The minimum required fill of cement behind the **5-1/2** inch production casing is:

   ☒ Cement should be at least **50** feet above the top of the Capitan Reef. Operator shall provide method of verification. **Additional cement may be required as the excess calculates to less than 25%.**

4. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

RGH 110410

13 3/8 surface csg in a 17 1/2 inch hole.

Segment	#/ft	Grade	Coupling	Joint	Design Factors Collapse	Burst	SURFACE Length	Weight
"A"	48.00	H 40	ST&C	7.29	1.87	0.83	920	44,160
"B"							0	0
w/8.4#/g mud, 30min Sfc Csg Test psig: 810			Tail Cmt	does	circ to sfc.	Totals:	920	44,160

Comparison of Proposed to Minimum Required Cement Volumes

Hole Size	Annular Volume	Proposed Sx Cmt	CuFt Cmt Proposed	Min Cu Ft	Excess % Cmt	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
17 1/2	0.6946	820	1107	687	61	8.60	1198	2M	1.56

Frac gradient 1.88 - Burst OK

9 5/8 casing inside the 13 3/8 casing.

Segment	#/ft	Grade	Coupling	Joint	Design Factors Collapse	Burst	INTERMEDIATE Length	Weight
"A"	40.00	J 55	LT&C	3.25	1.24	0.88	4,000	160,000
"B"							0	0
"C"							0	0
"D"							0	0
w/8.4#/g mud, 30min Sfc Csg Test psig: 1,020						Totals:	4,000	160,000

The cement volume(s) proposed may achieve a top 0 feet from surface.

Hole Size	Annular Volume	Proposed Sx Cmt	CuFt Cmt Proposed	Min Cu Ft	Excess % Cmt	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
12 1/4	0.3132	865	1314	1330	-1	10.00	2364	3M	0.81

Additional cement required. Frac gradient is 0.99- safety factor okay for burst.

5 1/2 casing inside the 9 5/8

Segment	#/ft	Grade	Coupling	Joint	Design Factors Collapse	Burst	PRODUCTION Length	Weight
"A"	17.00	P 110	LT&C	1.11	1.31	2.38	13,899	236,283
"B"							0	0
"C"							0	0
"D"							0	0
w/8.4#/g mud, 30min Sfc Csg Test psig: 2,050						Totals:	13,899	236,283

A Segment Design Factors would be: 2.81 1.72 if it were a vertical wellbore.

The cement volume(s) proposed may achieve a top 2800 feet from surface.

Hole Size	Annular Volume	Proposed Sx Cmt	CuFt Cmt Proposed	Min Cu Ft	Excess % Cmt	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
8 3/4	0.2526	2260	3334	2819	18	9.00			1.35

Sundry to do away with the 7" production casing & 4-1/2" liner and use 5-1/2 casing from 0-TD and cemented back to 50' above the top of the Capitan Reef. The BHL will be changed to 330'FNL & 330'FWL from 660'FNL & 1650'FWL before.