

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENTFORM APPROVED
OMB NO. 1004-0137
Expires: January 31, 2018**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.***HOBBS OCD****SUBMIT IN TRIPLICATE - Other instructions on page 2**

MAR 12 2019

5. Lease Serial No.
NMNM13647

6. If Indian, Allottee or Tribe Name

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

8. Well Name and No.
CAVE LION FEDERAL 26 35 5 WD 10H9. API Well No.
30-025-45421-00-X110. Field and Pool or Exploratory Area
WOLFCAMP11. County or Parish, State
LEA COUNTY, NM

1. Type of Well

☒ Oil Well ☐ Gas Well ☐ Other

2. Name of Operator

MARATHON OIL PERMIAN LLC

Contact: JENNIFER VAN CUREN

E-Mail: jvancuren@marathonoil.com

3a. Address

5555 SAN FELIPE STREET
HOUSTON, TX 77056

3b. Phone No. (include area code)

Ph: 713.296.2500

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)

Sec 5 T26S R35E SESW 287FSL 1811FWL
32.065876 N Lat, 103.392174 W Lon

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

TYPE OF SUBMISSION

- ☐
- Notice of Intent
-
- ☒
- Subsequent Report
-
- ☐
- Final Abandonment Notice

TYPE OF ACTION

- ☐
- Acidize
- ☐
- Deepen
- ☐
- Production (Start/Resume)
- ☐
- Water Shut-Off
-
- ☐
- Alter Casing
- ☐
- Hydraulic Fracturing
- ☐
- Reclamation
- ☐
- Well Integrity
-
- ☐
- Casing Repair
- ☐
- New Construction
- ☐
- Recomplete
- ☒
- Other
-
- ☐
- Change Plans
- ☐
- Plug and Abandon
- ☐
- Temporarily Abandon Change to Original APD
-
- ☐
- Convert to Injection
- ☐
- Plug Back
- ☐
- Water Disposal

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recompleteness 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 must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompleteness in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.

Marathon Oil Permian LLC. respectfully requests to make the following changes to the approved APD.

Change Name to match OCD formatting
From: Cave Lion Federal 5 WD 10H
To: Cave Lion 5 WC Federal 2HChange FTP
From: 150 FSL & 2315 FWL
To: 100 FSL & 1313 FWLChange LTP
From: 150 FNL & 2313 FWLCarlsbad Field Office
OCD Hobbs

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

Electronic Submission #451461 verified by the BLM Well Information System

For MARATHON OIL PERMIAN LLC, sent to the Hobbs

Committed to AFMSS for processing by PRISCILLA PEREZ on 01/29/2019 (19PP0859SE)

Name (Printed/Typed) JENNIFER VAN CUREN

Title SR. REGULATORY COMPLIANCE REP

Signature (Electronic Submission)

Date 01/23/2019

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By ZOTA STEVENS

Title PETROLEUM ENGINEER

Date 02/18/2019

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 Hobbs

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make 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 page 2)

** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED **

Additional data for EC transaction #451461 that would not fit on the form

32. Additional remarks, continued

To: 100 FNL & 1312 FWL

Update slurry density of the intermediate 2

From: 15.6

To: 14.8

Adi

District I
25 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 30-025 45421	² Pool Code 72860 98117	WC-025 5-09 12133 041W BRADLEY; WOLFCAMP (GAS)
⁴ Property Code 323003	⁵ Property Name CAVE LION 5 WC FEDERAL	⁶ Well Number 2H
⁷ OGRID No. 372098	⁸ Operator Name MARATHON OIL PERMIAN LLC	⁹ Elevation 3263'

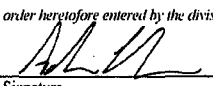
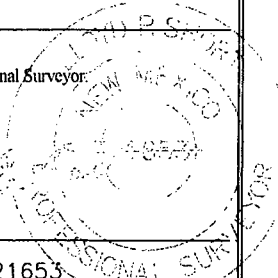
¹⁰ Surface Location									
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	5	26S	35E		287	SOUTH	1811	WEST	LEA

¹¹ Bottom Hole Location If Different From Surface

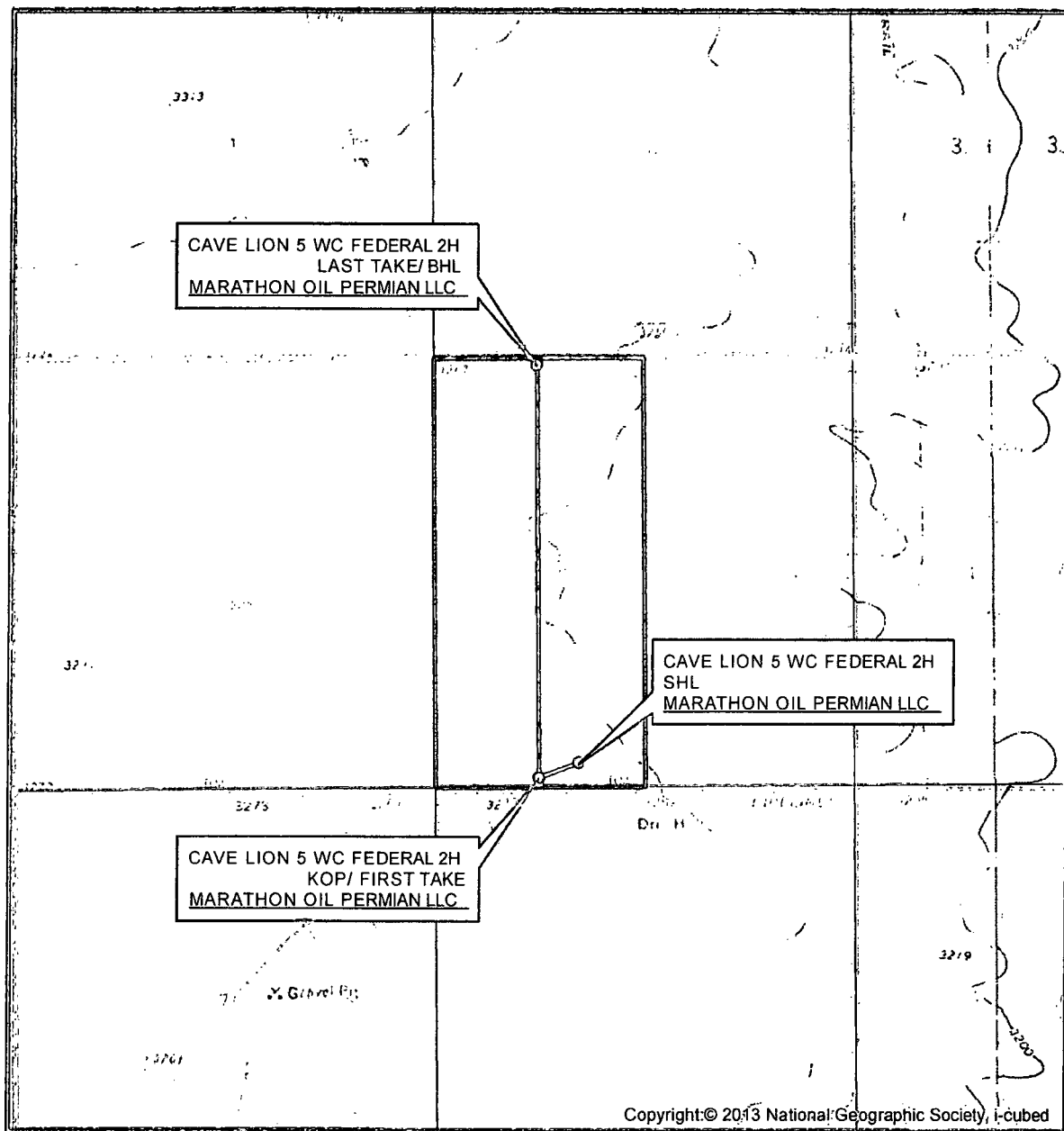
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	5	26S	35E		100	NORTH	1312	WEST	LEA

¹² Dedicated Acres 320.0	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No.
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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.

Defining Well		CORNER COORDINATES NAD 83, SPCS NM EAST A - X: 831020.60' / Y: 393959.45' B - X: 833663.69' / Y: 393977.99' C - X: 833719.73' / Y: 388693.48' D - X: 831074.50' / Y: 388675.34'	CORNER COORDINATES NAD 27, SPCS NM EAST A - X: 789833.20' / Y: 393901.74' B - X: 792476.27' / Y: 393920.25' C - X: 792532.08' / Y: 388635.88' D - X: 789886.87' / Y: 388617.76'	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.  Date 1/4/2019 Signature Adrian Covarrubias Printed Name E-mail Address	
LAST TAKE/ BHL A T25S R35E B T26S R35E 1312' 1332' SECTION 31 SECTION 32 SECTION 6 SECTION 5 SECTION 8		LAST TAKE POINT/BOTTOM HOLE LOCATION 100' FNL 1312' FWL, SECTION 5 NAD 83, SPCS NM EAST X: 832333.20' / Y: 393868.65' LAT: 32.07934113N / LON: -103.39380992W NAD 27, SPCS NM EAST X: 791145.79' / Y: 393810.93' LAT: 32.07921493N / LON: -103.39334674W		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. DECEMBER 13, 2018 Date of Survey Signature and Seal of Professional Surveyor  Certificate Number LLOYD P. SHORT 21653	
KOP/ FIRST TAKE 1811' 1313' 1313' D		FIRST TAKE POINT 100' FSL 1313' FWL, SECTION 5 NAD 83, SPCS NM EAST X: 832386.09' / Y: 388784.34' LAT: 32.06536510N / LON: -103.39378211W NAD 27, SPCS NM EAST X: 791198.45' / Y: 388726.75' LAT: 32.06523883N / LON: -103.39331973W			
SHL 1333' 1333' C		KICK OFF POINT 100' FSL 1313' FWL, SECTION 5 NAD 83, SPCS NM EAST X: 832386.09' / Y: 388784.34' LAT: 32.06536510N / LON: -103.39378211W NAD 27, SPCS NM EAST X: 791198.45' / Y: 388726.75' LAT: 32.06523883N / LON: -103.39331973W			
SHEET 1 OF 3 JOB No. R3757_004 REV 4 JCS 12/6/2018		SURFACE HOLE LOCATION 287' FSL 1811' FWL, SECTION 5 NAD 83, SPCS NM EAST X: 832882.34' / Y: 388974.66' LAT: 32.06587633N / LON: -103.39217497W NAD 27, SPCS NM EAST X: 791694.71' / Y: 388917.06' LAT: 32.06575005N / LON: -103.39171261W			

LOCATION VERIFICATION MAP



SEC. 5 TWP. 26-S RGE. 35-E
 SURVEY: N.M.P.M.
 COUNTY: LEA
 OPERATOR: MARATHON OIL PERMIAN LLC
 DESCRIPTION: 287' FSL & 1811' FWL
 ELEVATION: 3263'
 LEASE: CAVE LION 5 FEDERAL
 U.S.G.S. TOPOGRAPHIC MAP: ANDREWS PLACE, NM, TX.

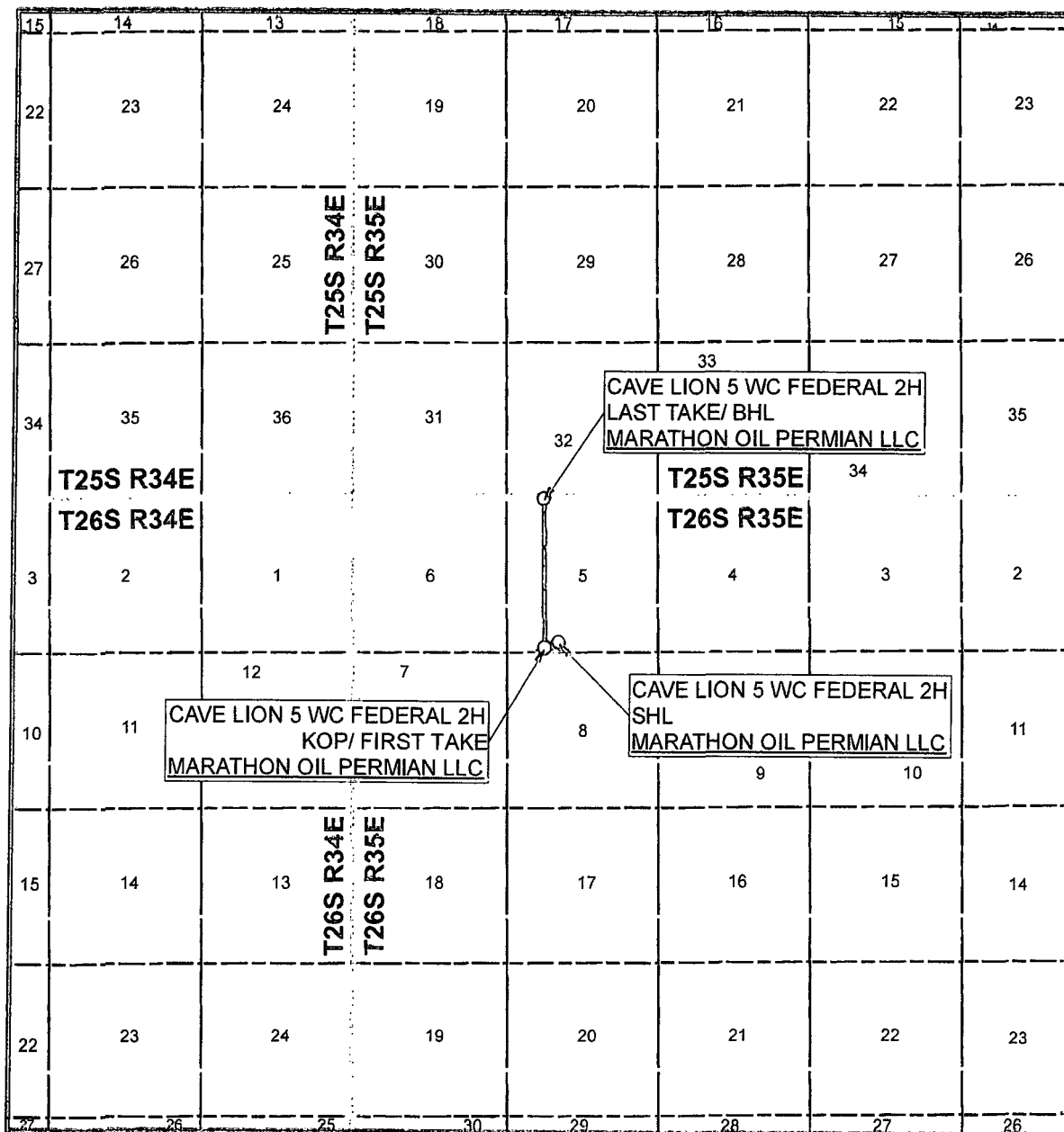
1" = 2,000'
 CONTOUR INTERVAL = 10'



SHEET 2 OF 3

PREPARED BY:
 R-SQUARED GLOBAL, LLC
 1309 LOUISVILLE AVENUE, MONROE, LA 71201
 318-323-6900 OFFICE
 JOB No. R3767_004

VICINITY MAP



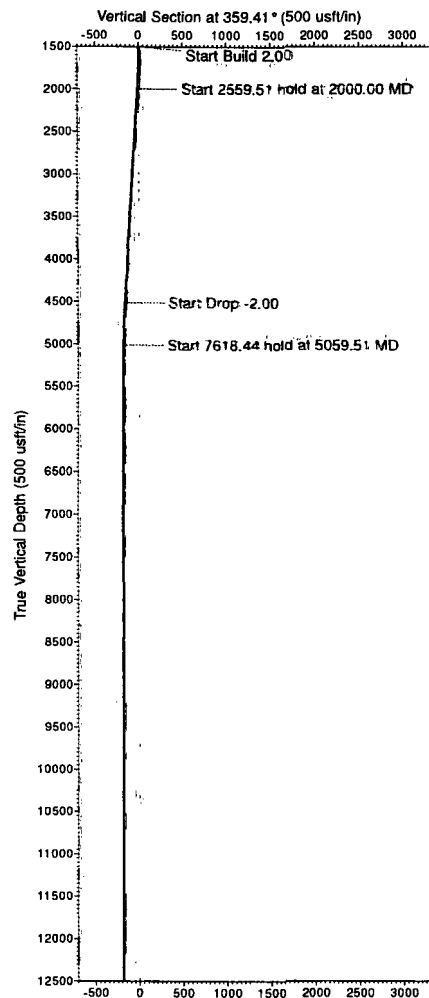
SEC. 5 TWP. 26-S RGE. 35-E
 SURVEY: N.M.P.M.
 COUNTY: LEA
 OPERATOR: MARATHON OIL PERMIAN LLC
 DESCRIPTION: 287' FSL & 1811' FWL
 ELEVATION: 3263'
 LEASE: CAVE LION 5 FEDERAL
 U.S.G.S. TOPOGRAPHIC MAP: ANDREWS PLACE, NM,TX.

1" = 1 MILE



SHEET 3 OF 3

PREPARED BY:
 R-SQUARED GLOBAL, LLC
 1309 LOUISVILLE AVENUE, MONROE, LA 71201
 318-323-6900 OFFICE
 JOB No. R3757_004



Marathon Oil Corporation

Marathon Oil
Lea County, NM
Cave Lion 5 Federal
WC #2H
Prelim Plan C
GL: 3263' + KB: 26.5' (H&P480)

US State Plane 1927 (Exact solution)
 NAD 1927 (NADCON CONUS)
 Clarke 1866
 New Mexico East 3001
 Mean Sea Level

RKB Elevation: Well @ 3289.50usft (GL: 3263' + KB: 26.5' (H&P480))

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	388917.06	791694.71	32.065750	-103.391713	

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dip	V-Sect
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	1500.00	0.00	0.00	1500.00	0.00	0.00	0.00	0.00
3	2500.00	10.00	248.02	1997.47	-15.58	-40.64	2.00	-15.16
4	4559.51	10.00	248.02	4518.09	-174.73	-455.62	0.00	-172.00
5	5059.51	0.00	0.00	5015.56	-190.31	-496.26	2.00	-185.19
6	12677.95	0.00	0.00	12634.00	-190.31	-496.26	0.00	-185.19
7	13581.91	90.40	359.41	13206.94	386.58	-502.24	10.00	391.73
8	18089.56	90.40	359.41	13175.80	4893.87	-548.92	0.00	4899.26

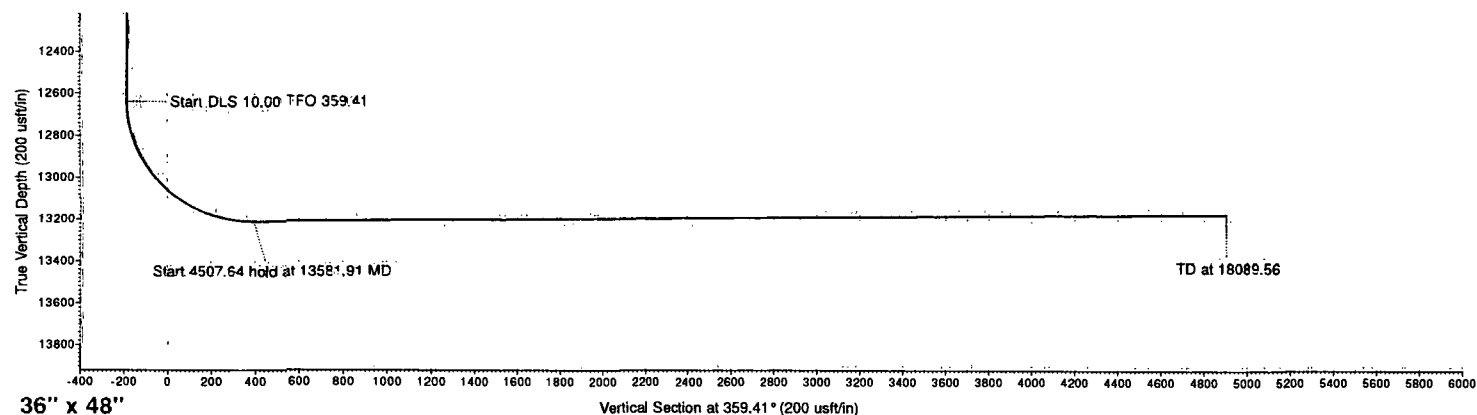
WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting
[CaveLionWC#2H]FTP	12634.00	-190.31	-496.26	388726.75	791198.45
[CaveLionWC#2H]LTP/BHL	13175.80	-893.87	-548.92	393910.90	791145.79



PRO DIRECTIONAL

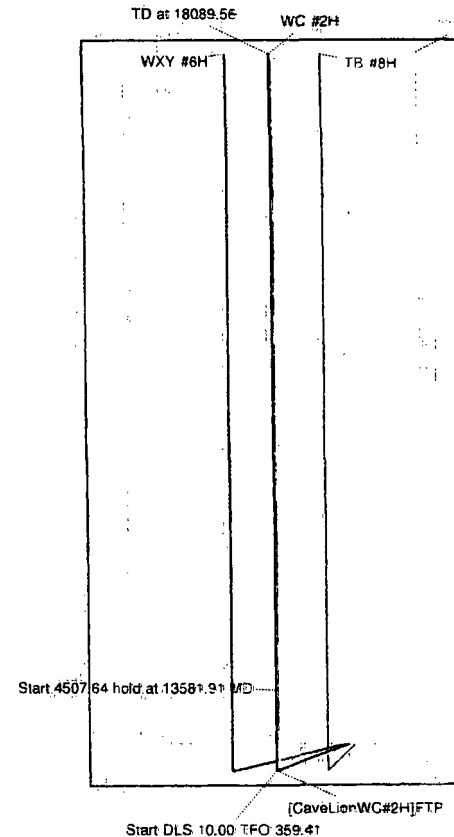
Target Line: 13210' TVD @ 0° VS, 90.4° INC



36" x 48"

West(-)/East(+) (300 usft/in)

-2400 -2100 -1800 -1500 -1200 -900 -600 -300 0 300 600 900 1200 1500 1800



Azimuths to Grid North
 True North: -0.50°
 Magnetic North: 6.20°
 Magnetic Field
 Strength: 47828.2nT
 Dip Angle: 59.73°
 Date: 4/10/2018
 Model: HDGM

Azimuth Corrections

Total Magnetic Corr. (M to G): 6.20°

Declination (M to T): 6.70° East

Company: Marathon Oil
Project: Lea County, NM
Site: Cave Lion 5 Federal
Well: WC #2H
Wellbore: OH
Design: Prelim Plan C

Local Co-ordinate Reference: Well WC #2H
TVD Reference: Well @ 3289.50usft (GL: 3263' + KB: 26.5' (H&P480))
MD Reference: Well @ 3289.50usft (GL: 3263' + KB: 26.5' (H&P480))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Project	Lea County, NM		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site		Cave Lion 5 Federal			
Site Position:		Northing:	388,805.07 usft	Latitude:	32.065478
From:	Map	Easting:	790,215.00 usft	Longitude:	-103.396492
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.50 °

Well	WC #2H					
Well Position	+N/-S	0.00 usft	Northing:	388,917.06 usft	Latitude:	32.065750
	+E/-W	0.00 usft	Easting:	791,694.71 usft	Longitude:	-103.391713
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,263.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	4/10/2018	6.70	59.73	47,828.20

Design	Prelim Plan C				
Audit Notes:					
Version:		Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	359.41	

Survey Tool Program	Date	12/17/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	1,150.00	Prelim Plan C (OH)	MWD+IFR1	OWSG MWD + IFR1	
1,150.00	5,400.00	Prelim Plan C (OH)	MWD+IFR1	OWSG MWD + IFR1	
5,400.00	10,000.00	Prelim Plan C (OH)	MWD+IFR1	OWSG MWD + IFR1	
10,000.00	18,089.56	Prelim Plan C (OH)	MWD+IFR1	OWSG MWD + IFR1	

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00

Company: Marathon Oil
Project: Lea County, NM
Site: Cave Lion 5 Federal
Well: WC #2H
Wellbore: OH
Design: Prelim Plan C

Local Co-ordinate Reference: Well WC #2H
TVD Reference: Well @ 3289.50usft (GL: 3263' + KB: 26.5' (H&P480))
MD Reference: Well @ 3289.50usft (GL: 3263' + KB: 26.5' (H&P480))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	2.00	249.02	1,599.98	-0.62	-1.63	-0.61	2.00	2.00	0.00
1,700.00	4.00	249.02	1,699.84	-2.50	-6.52	-2.43	2.00	2.00	0.00
1,800.00	6.00	249.02	1,799.45	-5.62	-14.65	-5.47	2.00	2.00	0.00
1,900.00	8.00	249.02	1,898.70	-9.98	-26.03	-9.71	2.00	2.00	0.00
2,000.00	10.00	249.02	1,997.47	-15.58	-40.64	-15.16	2.00	2.00	0.00
2,100.00	10.00	249.02	2,095.95	-21.80	-56.85	-21.21	0.00	0.00	0.00
2,200.00	10.00	249.02	2,194.43	-28.02	-73.06	-27.27	0.00	0.00	0.00
2,300.00	10.00	249.02	2,292.91	-34.24	-89.28	-33.32	0.00	0.00	0.00
2,400.00	10.00	249.02	2,391.39	-40.45	-105.49	-39.37	0.00	0.00	0.00
2,500.00	10.00	249.02	2,489.87	-46.67	-121.70	-45.42	0.00	0.00	0.00
2,600.00	10.00	249.02	2,588.35	-52.89	-137.92	-51.47	0.00	0.00	0.00
2,700.00	10.00	249.02	2,686.83	-59.11	-154.13	-57.52	0.00	0.00	0.00
2,800.00	10.00	249.02	2,785.31	-65.33	-170.34	-63.57	0.00	0.00	0.00
2,900.00	10.00	249.02	2,883.79	-71.54	-186.56	-69.62	0.00	0.00	0.00
3,000.00	10.00	249.02	2,982.27	-77.76	-202.77	-75.67	0.00	0.00	0.00
3,100.00	10.00	249.02	3,080.75	-83.98	-218.99	-81.72	0.00	0.00	0.00
3,200.00	10.00	249.02	3,179.23	-90.20	-235.20	-87.77	0.00	0.00	0.00
3,300.00	10.00	249.02	3,277.72	-96.41	-251.41	-93.82	0.00	0.00	0.00
3,400.00	10.00	249.02	3,376.20	-102.63	-267.63	-99.87	0.00	0.00	0.00
3,500.00	10.00	249.02	3,474.68	-108.85	-283.84	-105.92	0.00	0.00	0.00
3,600.00	10.00	249.02	3,573.16	-115.07	-300.05	-111.97	0.00	0.00	0.00
3,700.00	10.00	249.02	3,671.64	-121.28	-316.27	-118.02	0.00	0.00	0.00
3,800.00	10.00	249.02	3,770.12	-127.50	-332.48	-124.07	0.00	0.00	0.00
3,900.00	10.00	249.02	3,868.60	-133.72	-348.69	-130.12	0.00	0.00	0.00
4,000.00	10.00	249.02	3,967.08	-139.94	-364.91	-136.17	0.00	0.00	0.00
4,100.00	10.00	249.02	4,065.56	-146.16	-381.12	-142.22	0.00	0.00	0.00
4,200.00	10.00	249.02	4,164.04	-152.37	-397.33	-148.27	0.00	0.00	0.00
4,300.00	10.00	249.02	4,262.52	-158.59	-413.55	-154.32	0.00	0.00	0.00
4,400.00	10.00	249.02	4,361.00	-164.81	-429.76	-160.37	0.00	0.00	0.00
4,500.00	10.00	249.02	4,459.48	-171.03	-445.97	-166.42	0.00	0.00	0.00
4,559.51	10.00	249.02	4,518.09	-174.73	-455.62	-170.03	0.00	0.00	0.00
4,600.00	9.19	249.02	4,558.01	-177.14	-461.92	-172.38	2.00	-2.00	0.00

Company: Marathon Oil
Project: Lea County, NM
Site: Cave Lion 5 Federal
Well: WC #2H
Wellbore: OH
Design: Prelim Plan C

Local Co-ordinate Reference: Well WC #2H
TVD Reference: Well @ 3289.50usft (GL: 3263' + KB: 26.5' (H&P480))
MD Reference: Well @ 3289.50usft (GL: 3263' + KB: 26.5' (H&P480))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,700.00	7.19	249.02	4,656.99	-182.24	-475.23	-177.34	2.00	-2.00	0.00
4,800.00	5.19	249.02	4,756.40	-186.10	-485.29	-181.10	2.00	-2.00	0.00
4,900.00	3.19	249.02	4,856.13	-188.72	-492.11	-183.64	2.00	-2.00	0.00
5,000.00	1.19	249.02	4,956.05	-190.09	-495.68	-184.97	2.00	-2.00	0.00
5,059.51	0.00	0.00	5,015.56	-190.31	-496.26	-185.19	2.00	-2.00	0.00
5,100.00	0.00	0.00	5,056.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
5,200.00	0.00	0.00	5,156.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
5,300.00	0.00	0.00	5,256.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
5,400.00	0.00	0.00	5,356.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
5,500.00	0.00	0.00	5,456.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
5,600.00	0.00	0.00	5,556.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
5,700.00	0.00	0.00	5,656.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
5,800.00	0.00	0.00	5,756.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
5,900.00	0.00	0.00	5,856.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
6,000.00	0.00	0.00	5,956.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
6,100.00	0.00	0.00	6,056.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
6,200.00	0.00	0.00	6,156.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
6,300.00	0.00	0.00	6,256.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
6,400.00	0.00	0.00	6,356.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
6,500.00	0.00	0.00	6,456.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
6,600.00	0.00	0.00	6,556.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
6,700.00	0.00	0.00	6,656.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
6,800.00	0.00	0.00	6,756.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
6,900.00	0.00	0.00	6,856.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
7,000.00	0.00	0.00	6,956.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
7,100.00	0.00	0.00	7,056.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
7,200.00	0.00	0.00	7,156.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
7,300.00	0.00	0.00	7,256.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
7,400.00	0.00	0.00	7,356.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
7,500.00	0.00	0.00	7,456.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
7,600.00	0.00	0.00	7,556.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
7,700.00	0.00	0.00	7,656.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
7,800.00	0.00	0.00	7,756.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
7,900.00	0.00	0.00	7,856.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
8,000.00	0.00	0.00	7,956.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
8,100.00	0.00	0.00	8,056.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
8,200.00	0.00	0.00	8,156.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
8,300.00	0.00	0.00	8,256.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
8,400.00	0.00	0.00	8,356.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
8,500.00	0.00	0.00	8,456.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
8,600.00	0.00	0.00	8,556.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
8,700.00	0.00	0.00	8,656.05	-190.31	-496.26	-185.19	0.00	0.00	0.00

Company: Marathon Oil
Project: Lea County, NM
Site: Cave Lion 5 Federal
Well: WC #2H
Wellbore: OH
Design: Prelim Plan C

Local Co-ordinate Reference: Well WC #2H
TVD Reference: Well @ 3289.50usft (GL: 3263' + KB: 26.5' (H&P480))
MD Reference: Well @ 3289.50usft (GL: 3263' + KB: 26.5' (H&P480))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,800.00	0.00	0.00	8,756.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
8,900.00	0.00	0.00	8,856.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
9,000.00	0.00	0.00	8,956.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
9,100.00	0.00	0.00	9,056.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
9,200.00	0.00	0.00	9,156.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
9,300.00	0.00	0.00	9,256.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
9,400.00	0.00	0.00	9,356.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
9,500.00	0.00	0.00	9,456.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
9,600.00	0.00	0.00	9,556.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
9,700.00	0.00	0.00	9,656.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
9,800.00	0.00	0.00	9,756.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
9,900.00	0.00	0.00	9,856.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
10,000.00	0.00	0.00	9,956.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
10,100.00	0.00	0.00	10,056.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
10,200.00	0.00	0.00	10,156.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
10,300.00	0.00	0.00	10,256.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
10,400.00	0.00	0.00	10,356.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
10,500.00	0.00	0.00	10,456.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
10,600.00	0.00	0.00	10,556.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
10,700.00	0.00	0.00	10,656.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
10,800.00	0.00	0.00	10,756.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
10,900.00	0.00	0.00	10,856.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
11,000.00	0.00	0.00	10,956.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
11,100.00	0.00	0.00	11,056.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
11,200.00	0.00	0.00	11,156.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
11,300.00	0.00	0.00	11,256.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
11,400.00	0.00	0.00	11,356.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
11,500.00	0.00	0.00	11,456.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
11,600.00	0.00	0.00	11,556.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
11,700.00	0.00	0.00	11,656.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
11,800.00	0.00	0.00	11,756.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
11,900.00	0.00	0.00	11,856.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
12,000.00	0.00	0.00	11,956.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
12,100.00	0.00	0.00	12,056.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
12,200.00	0.00	0.00	12,156.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
12,300.00	0.00	0.00	12,256.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
12,400.00	0.00	0.00	12,356.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
12,500.00	0.00	0.00	12,456.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
12,600.00	0.00	0.00	12,556.05	-190.31	-496.26	-185.19	0.00	0.00	0.00
12,677.95	0.00	0.00	12,634.00	-190.31	-496.26	-185.19	0.00	0.00	0.00

[CaveLionWC#2H]FTP

12,700.00	2.20	359.41	12,656.04	-189.89	-496.26	-184.77	10.00	10.00	0.00
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Company: Marathon Oil
Project: Lea County, NM
Site: Cave Lion 5 Federal
Well: WC #2H
Wellbore: OH
Design: Prelim Plan C

Local Co-ordinate Reference: Well WC #2H
TVD Reference: Well @ 3289.50usft (GL: 3263' + KB: 26.5' (H&P480))
MD Reference: Well @ 3289.50usft (GL: 3263' + KB: 26.5' (H&P480))
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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
12,750.00	7.20	359.41	12,705.86	-185.79	-496.31	-180.67	10.00	10.00	0.00
12,800.00	12.20	359.41	12,755.13	-177.36	-496.39	-172.24	10.00	10.00	0.00
12,850.00	17.20	359.41	12,803.47	-164.67	-496.53	-159.55	10.00	10.00	0.00
12,900.00	22.20	359.41	12,850.53	-147.82	-496.70	-142.70	10.00	10.00	0.00
12,950.00	27.20	359.41	12,895.94	-126.93	-496.92	-121.81	10.00	10.00	0.00
13,000.00	32.20	359.41	12,939.35	-102.17	-497.17	-97.04	10.00	10.00	0.00
13,050.00	37.20	359.41	12,980.45	-73.71	-497.47	-68.58	10.00	10.00	0.00
13,100.00	42.20	359.41	13,018.90	-41.78	-497.80	-36.65	10.00	10.00	0.00
13,150.00	47.20	359.41	13,054.43	-6.62	-498.16	-1.49	10.00	10.00	0.00
13,200.00	52.20	359.41	13,086.75	31.50	-498.56	36.63	10.00	10.00	0.00
13,250.00	57.20	359.41	13,115.63	72.30	-498.98	77.43	10.00	10.00	0.00
13,300.00	62.20	359.41	13,140.85	115.45	-499.43	120.59	10.00	10.00	0.00
13,350.00	67.20	359.41	13,162.21	160.64	-499.90	165.78	10.00	10.00	0.00
13,400.00	72.20	359.41	13,179.54	207.52	-500.38	212.66	10.00	10.00	0.00
13,450.00	77.20	359.41	13,192.73	255.73	-500.88	260.87	10.00	10.00	0.00
13,500.00	82.20	359.41	13,201.66	304.91	-501.39	310.05	10.00	10.00	0.00
13,550.00	87.20	359.41	13,206.28	354.68	-501.90	359.83	10.00	10.00	0.00
13,581.91	90.40	359.41	13,206.94	386.58	-502.24	391.73	10.00	10.00	0.00
13,600.00	90.40	359.41	13,206.82	404.66	-502.42	409.81	0.00	0.00	0.00
13,700.00	90.40	359.41	13,206.13	504.65	-503.46	509.81	0.00	0.00	0.00
13,800.00	90.40	359.41	13,205.44	604.65	-504.49	609.81	0.00	0.00	0.00
13,900.00	90.40	359.41	13,204.75	704.64	-505.53	709.81	0.00	0.00	0.00
14,000.00	90.40	359.41	13,204.06	804.63	-506.57	809.80	0.00	0.00	0.00
14,100.00	90.40	359.41	13,203.36	904.62	-507.60	909.80	0.00	0.00	0.00
14,200.00	90.40	359.41	13,202.67	1,004.61	-508.64	1,009.80	0.00	0.00	0.00
14,300.00	90.40	359.41	13,201.98	1,104.61	-509.67	1,109.80	0.00	0.00	0.00
14,400.00	90.40	359.41	13,201.29	1,204.60	-510.71	1,209.79	0.00	0.00	0.00
14,500.00	90.40	359.41	13,200.60	1,304.59	-511.74	1,309.79	0.00	0.00	0.00
14,600.00	90.40	359.41	13,199.91	1,404.58	-512.78	1,409.79	0.00	0.00	0.00
14,700.00	90.40	359.41	13,199.22	1,504.58	-513.81	1,509.79	0.00	0.00	0.00
14,800.00	90.40	359.41	13,198.53	1,604.57	-514.85	1,609.78	0.00	0.00	0.00
14,900.00	90.40	359.41	13,197.84	1,704.56	-515.89	1,709.78	0.00	0.00	0.00
15,000.00	90.40	359.41	13,197.15	1,804.55	-516.92	1,809.78	0.00	0.00	0.00
15,100.00	90.40	359.41	13,196.46	1,904.55	-517.96	1,909.78	0.00	0.00	0.00
15,200.00	90.40	359.41	13,195.76	2,004.54	-518.99	2,009.78	0.00	0.00	0.00
15,300.00	90.40	359.41	13,195.07	2,104.53	-520.03	2,109.77	0.00	0.00	0.00
15,400.00	90.40	359.41	13,194.38	2,204.52	-521.06	2,209.77	0.00	0.00	0.00
15,500.00	90.40	359.41	13,193.69	2,304.51	-522.10	2,309.77	0.00	0.00	0.00
15,600.00	90.40	359.41	13,193.00	2,404.51	-523.14	2,409.77	0.00	0.00	0.00
15,700.00	90.40	359.41	13,192.31	2,504.50	-524.17	2,509.76	0.00	0.00	0.00
15,800.00	90.40	359.41	13,191.62	2,604.49	-525.21	2,609.76	0.00	0.00	0.00
15,900.00	90.40	359.41	13,190.93	2,704.48	-526.24	2,709.76	0.00	0.00	0.00

Company:	Marathon Oil	Local Co-ordinate Reference:	Well WC #2H
Project:	Lea County, NM	TVD Reference:	Well @ 3289.50usft (GL: 3263' + KB: 26.5' (H&P480))
Site:	Cave Lion 5 Federal	MD Reference:	Well @ 3289.50usft (GL: 3263' + KB: 26.5' (H&P480))
Well:	WC #2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan C	Database:	WellPlanner1

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
16,000.00	90.40	359.41	13,190.24	2,804.48	-527.28	2,809.76	0.00	0.00	0.00
16,100.00	90.40	359.41	13,189.55	2,904.47	-528.31	2,909.75	0.00	0.00	0.00
16,200.00	90.40	359.41	13,188.86	3,004.46	-529.35	3,009.75	0.00	0.00	0.00
16,300.00	90.40	359.41	13,188.16	3,104.45	-530.39	3,109.75	0.00	0.00	0.00
16,400.00	90.40	359.41	13,187.47	3,204.44	-531.42	3,209.75	0.00	0.00	0.00
16,500.00	90.40	359.41	13,186.78	3,304.44	-532.46	3,309.74	0.00	0.00	0.00
16,600.00	90.40	359.41	13,186.09	3,404.43	-533.49	3,409.74	0.00	0.00	0.00
16,700.00	90.40	359.41	13,185.40	3,504.42	-534.53	3,509.74	0.00	0.00	0.00
16,800.00	90.40	359.41	13,184.71	3,604.41	-535.56	3,609.74	0.00	0.00	0.00
16,900.00	90.40	359.41	13,184.02	3,704.41	-536.60	3,709.73	0.00	0.00	0.00
17,000.00	90.40	359.41	13,183.33	3,804.40	-537.64	3,809.73	0.00	0.00	0.00
17,100.00	90.40	359.41	13,182.64	3,904.39	-538.67	3,909.73	0.00	0.00	0.00
17,200.00	90.40	359.41	13,181.95	4,004.38	-539.71	4,009.73	0.00	0.00	0.00
17,300.00	90.40	359.41	13,181.26	4,104.37	-540.74	4,109.73	0.00	0.00	0.00
17,400.00	90.40	359.41	13,180.56	4,204.37	-541.78	4,209.72	0.00	0.00	0.00
17,500.00	90.40	359.41	13,179.87	4,304.36	-542.81	4,309.72	0.00	0.00	0.00
17,600.00	90.40	359.41	13,179.18	4,404.35	-543.85	4,409.72	0.00	0.00	0.00
17,700.00	90.40	359.41	13,178.49	4,504.34	-544.89	4,509.72	0.00	0.00	0.00
17,800.00	90.40	359.41	13,177.80	4,604.34	-545.92	4,609.71	0.00	0.00	0.00
17,900.00	90.40	359.41	13,177.11	4,704.33	-546.96	4,709.71	0.00	0.00	0.00
18,000.00	90.40	359.41	13,176.42	4,804.32	-547.99	4,809.71	0.00	0.00	0.00
18,089.56	90.40	359.41	13,175.80	4,893.87	-548.92	4,899.26	0.00	0.00	0.00

[CaveLionWC#2H]LTP/BHL

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
[CaveLionWC#2H]FTP - plan hits target center - Point	0.00	0.00	12,634.0 0	-190.31	-496.26	388,726.75	791,198.45	32.065239	-103.393320
[CaveLionWC#2H]LTP/E - plan hits target center - Point	0.00	0.00	13,175.8 0	4,893.87	-548.92	393,810.93	791,145.79	32.079215	-103.393347

Checked By: _____ Approved By: _____ Date: _____

MARATHON OIL PERMIAN LLC

DRILLING AND OPERATIONS PLAN

WELL NAME / NUMBER: CAVE LION FEDERAL 23 26 5 WC 2H

STATE: NEW MEXICO

COUNTY: LEA

	NS-Foot	NS Indicator	EW-Foot	EW Indicator	TWSP	Range	Section	Aliquot/Lot/Trac	Latitude (NAD 83)	Longitude (NAD 83)	County	State	Meridian	Lease Type	Lease Number	Elevation (ft SS)	MD (RKB)	TVD (RKB)
SHL	287	FSL	1811	FWL	26S	35E	5	SWSE	32.06587633 N	103.39217500 W	Lea	NM	NMP	F	NMNM050263	3263	26.5	26.5
KOP	0	FNL	2315	FWL	26S	35E	5	SWSE	32.06545465 N	103.39054651 W	Lea	NM	NMP	F	NMNM050263	-9885	13184	13148
PPP	150	FNL	2315	FWL	26S	35E	5	SWSE	32.06549740 N	103.39054610 W	Lea	NM	NMP	F	NMNM050263	-10458	14084	13721
BHL	150	FNL	2313	FWL	26S	35E	11	NWNE	32.07919900 N	103.39057610 W	Lea	NM	NMP	F	NMNM050263	-10458	18596	13721

1. GEOLOGIC NAME OF SURFACE FORMATION

- Permian/Quaternary Alluvium

2. ESTIMATED TOPS OF GEOLOGICAL MARKERS & DEPTHS OF ANTICIPATED FRESH WATER, OIL OR GAS

Formation	True Vertical Depth (ft)	Measured Depth (ft)	Lithologies	Mineral Resources	Producing Formation
Rustler	1064	1064	Anhydrite/Dolomite	BRINE	N
Salado	1503	1503	Salt/Anhydrite	BRINE	N
Castile	3541	3612	Base Salt	BRINE	N
Base of Salt	5098	5134	Limy Sands	BRINE	N
Lamar	5363	5399	Sand/Shales	OIL	Y
Bell Canyon	5391	5427	Sands/Shale	OIL	Y
Brushy Canyon	8000	8036	Sands/Carbonates	OIL	Y
Bone Spring	9291	9327	Sands/Carbonates	OIL	Y
1 st Bone Spring Sand	10411	10447	Sands/Carbonates	OIL	Y
2 nd Bone Spring Sand	10960	10996	Sands/Carbonates	OIL	Y
3 rd Bone Spring Sand	12045	12081	Sands/Carbonates	OIL	Y
Wolfcamp	12472	12508	Carbonates/Shales/Sand s	OIL	Y
Wolfcamp X	12493	12529	Carbonates/Shales/Sand s	OIL	Y
Wolfcamp Y	12551	12587	Carbonates/Shales/Sand s	OIL	Y
Wolfcamp A	12581	12617	Carbonates/Shales/Sand s	OIL	Y

Wolfcamp D	13721	14079	Carbonates/Shales/Sand s	OIL	Y
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DEEPEST EXPECTED FRESH WATER: 400' TVD

ANTICIPATED BOTTOM HOLE PRESSURE: 9,604 psi

ANTICIPATED BOTTOM HOLE TEMPERATURE: 205°F

ANTICIPATED ABNORMAL PRESSURE: N

ANTICIPATED ABNORMAL TEMPERATURE: N

3. CASING PROGRAM

String Type	Hole Size	Csg Size	Top Set MD	Bottom Set MD	Top Set TVD	TVD Bottom Set	Weight (lbs/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
Surface	<u>17 1/2</u>	<u>13 3/8</u>	<u>0</u>	<u>1080</u>	<u>0</u>	<u>1080</u>	<u>54.5</u>	<u>J55</u>	<u>STC</u>	<u>5.52</u>	<u>2.5</u>	<u>2.5</u>
Intermediate I	<u>12 1/4</u>	<u>9 5/8</u>	<u>0</u>	<u>5436</u>	<u>0</u>	<u>5400</u>	<u>40</u>	<u>J55</u>	<u>LTC</u>	<u>1.74</u>	<u>1.1 5</u>	<u>2.19</u>
Intermediate II	<u>8 3/4</u>	<u>7 5/8</u>	<u>0</u>	<u>1200 1</u>	<u>0</u>	<u>1196 5</u>	<u>33.7</u>	<u>P110</u>	<u>Wedge 523</u>	<u>3.12</u>	<u>1.1 6</u>	<u>2.37</u>
Production Casing	<u>6 1/8</u>	<u>5 1/2</u>	<u>0</u>	<u>1200 1</u>	<u>0</u>	<u>1196 5</u>	<u>23</u>	<u>P110</u>	<u>Wedge 625</u>	<u>1.73</u>	<u>1.2 0</u>	<u>2.09</u>
Production Casing	<u>6 1/8</u>	<u>4 1/2</u>	<u>1200 1</u>	<u>1859 7</u>	<u>1196 5</u>	<u>1372 1</u>	<u>15.1</u>	<u>P110</u>	<u>BTC</u>	<u>1.5</u>	<u>1.2 6</u>	<u>2.21</u>

Minimum safety factors: Burst 1.125 Collapse 1.125 Tension 1.8 Wet/1.6 Dry

All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

	Y or N
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Does casing meet API specifications? If no, attach casing specification sheet.	Y
Is premium or uncommon casing planned? If yes attach casing specification sheet.	N
Does the above casing design meet or exceed BLM's minimum standards? If not provide justification (loading assumptions, casing design criteria).	Y
Will the intermediate pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Y
Is well located within Capitan Reef?	N
If yes, does production casing cement tie back a minimum of 50' above the Reef?	
Is well within the designated 4 string boundary.	
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3 rd string cement tied back 500' into previous casing?	
Is well located in R-111-P and SOPA?	N

If yes, are the first three strings cemented to surface?	
Is 2 nd string set 100' to 600' below the base of salt?	
Is well located in high Cave/Karst?	N
If yes, are there two strings cemented to surface?	
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	
Is well located in critical Cave/Karst?	N
If yes, are there three strings cemented to surface?	

4. CEMENT PROGRAM:

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity (sks)	Yield (ft3/sks)	Density (ppg)	Slurry Volume (ft3)	Excess (%)	Cement Type	Additives
Surface	Lead	-	0	864	687	1.75	13.5	1200	100	Class C	3 lbm/sk granular LCM + 0.1250 lbm/sk Poly-E-Flake
Surface	Tail	-	864	1080	220	1.33	14.8	300	100	Class C	N/A
Intermediate I	Lead	-	0	4400	1394	1.75	12.8	2412	75	Class C	0.02 Gal/Sk Defoamer + 0.5% Extender + 1% Accelerator
Intermediate I	Tail	-	4400	5436	353	1.33	14.8	470	50	Class C	0.3 % Retarder
Intermediate II	Lead	-	5136	10900	555	2.7	11	1499	70	Class C	0.85% retarder + 10% extender + 0.02 gal/sk defoamer + 2.0% Extender + 0.15% Viscosifier
Production Casing	Lead	-	11001	12001	37	2.94	10.8	110	30	Class H	13% extender + 0.75% Retarder + 0.02 gal/sk Defoamer + 0.1% viscosifier + 0.2% Fluid Loss
Production Casing	Tail	-	12001	18597	662	1.18	15.6	807	30	Class H	0.3% fluid loss + 0.02% antifoam + 0.15% dispersant + 0.4% retarder + 0.02% viscosifier

Stage tool depth(s) will be adjusted based on hole conditions and cement volumes will be adjusted proportionally. Stage tool will be set a minimum of 50 feet below previous casing and a minimum of 200 feet above current shoe. Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

Pilot hole depth: N/A TVD/MD

KOP: N/A TVD/MD

Plug top	Plug Bottom	Excess (%)	Quantity (sx)	Density (ppg)	Yield (ft3/sx)	Water gal/sk	Slurry Description and Cement Type

Attach plugging procedure for pilot hole.

N/A

5. PRESSURE CONTROL EQUIPMENT

BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	✓	Tested to:
12 ¼"	13 5/8	5000	Annular	x	70% of working pressure
		10000	Blind Ram	x	100% of working pressure
			Pipe Ram		
			Double Ram	x	
			Other*		
8 ¾"	13 5/8	5000	Annular	x	70% of working pressure
		10000	Blind Ram	x	100% of working pressure
			Pipe Ram		
			Double Ram	x	
			Other*		
6 1/8"	13 5/8	5000	Annular	x	70% of working pressure
		10000	Blind Ram	x	100% of working pressure
			Pipe Ram		
			Double Ram	x	
			Other*		

*Specify if additional ram is utilized.

BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested.

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock, full opening safety valve / inside BOP and choke lines and choke manifold. See attached schematics.

Y	Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.
Y	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.
N	Are anchors required by manufacturer?
Y	A multibowl wellhead is being used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested.

See attached schematic.

6. MUD PROGRAM:

Top Depth	Bottom Depth	Mud Type	Min. Weight (ppg)	Max. Weight (ppg)	Additional Characteristics
0	1080	Water Based Mud	8.4	8.8	
1080	5436	Brine	9.9	10.2	
5403	12001	Cut Brine	8.8	9.4	
12001	18597	Oil Based mud	11.5	13.5	

Losses or gains in the mud system will be monitored visually/manually as well as with an electronic PVT. The necessary mud products for additional weight and fluid loss control will be on location at all times.

7. AUXILIARY WELL CONTROL AND MONITORING EQUIPMENT

- a. A Kelly cock will be in the drill string at all times.
- b. A full opening drill pipe stabbing valve having the appropriate connections will be on the rig floor unobstructed and readily accessible at all times.
- c. Hydrogen Sulfide detection equipment will be in operation after drilling out the surface casing shoe until the production casing is cemented. Breathing equipment will be on location upon drilling the surface casing shoe until total depth is reached. **If Hydrogen Sulfide is encountered, measured amounts and formations will be reported to the BLM**

8. LOGGING / CORING AND TESTING PROGRAM:

- A. Mud Logger: None.
- B. DST's: None.
- C. Open Hole Logs: GR while drilling from Intermediate casing shoe to TD.

9. POTENTIAL HAZARDS:

- A. H2S detection equipment will be in operation after drilling out the surface casing shoe until the production casing has been cemented. Breathing equipment will be on location from drilling out the surface shoe until production casing is cemented. If H2S is encountered the operator will comply with Onshore Order #6.
- B. No abnormal temperatures or pressures are anticipated. All personnel will be familiar with all aspects of safe operation of equipment being used to drill this well. Adequate flare lines will be installed off the mud/gas separator where gas may be flared safely.
- C. No losses are anticipated at this time.
- D. All personnel will be familiar with all aspects of safe operation of equipment being used to drill this well.
- E. Adequate flare lines will be installed off the mud/gas separator where gas may be flared safely.

10. ANTICIPATED STARTING DATE AND DURATION OF OPERATIONS

Road and location construction will begin after the BLM has approved the APD. Anticipated spud date will be as soon as possible after BLM approval and as soon as a rig will be available. Move in operations and drilling is expected to take 30 days.