Form 3160-5
(June 2015)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB NO. 1004-0137
Expires: January 31, 2018

Carlsbad Field Office
OCD Hobbs

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 page 2

HOBBS OCD
OCT 30 2017
RECEIVED

5. Lease Serial No.
NMNM 136677

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.
CAVE LION 5 FEDERAL BC 1H

2. Name of Operator
MARATHON OIL PERMIAN LLC
Contact: JENNIFER E VAN CUREN
E-Mail: jvancuren@marathonoil.com

9. API Well No.
30-025-44087-00-X1

3a. Address
5555 SAN FELIPE STREET
HOUSTON, TX 77056

3b. Phone No. (include area code)
Ph: 713-296-2500

10. Field and Pool or Exploratory Area
JABALINA

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 5 T26S R35E SWSW 185FSL 330FWL
32.065605 N Lat, 103.396957 W Lon

11. County or Parish, State
LEA COUNTY, NM

12. CHECK THE 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
☐ Subsequent Report	☐ Alter Casing	☐ Hydraulic Fracturing	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other Change to Original APD
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ 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 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 must 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 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 IS REQUESTING APPROVAL TO CHANGE THE TARGET FORMATION FROM THE BRUSHY CANYON TO THE 3RD BONE SPRINGS. ATTACHED IS THE DETAILS OF DRILLING PROGRAM CHANGES REQUIRED FOR FORMATION CHANGE.

SEE ATTACHED FOR CONDITIONS OF APPROVAL

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

Electronic Submission #389541 verified by the BLM Well Information System
For MARATHON OIL PERMIAN LLC, sent to the Hobbs
Committed to AFMSS for processing by TEUNGKU KRUENG on 10/10/2017 (18TMK0002SE)

Name *(Printed/Typed)* JENNIFER E VAN CUREN — Title SR. REGULATORY COMPLIANCE REP

Signature (Electronic Submission) — Date 09/25/2017

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By Teungku Krueng (7) — Title Engineer — Date 10/26/17

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 BLM Carlsbad

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 **

Marathon Oil Permian, LLC

CAVE LION 5 FEDERAL BC 1H

SHL: 185' FSL & 330' FWL / Sec 5 – T26S – R35E

BHL: 330' FNL & 330' FWL / Sec 5 – T26S – R35E

Lea County, New Mexico

Drilling Program Changes

1. **Target Formation:**

Changes: target formation changed from Brushy Canyon to 3rd Bone Spring. Revised a more accurate formation tops:

Formation	TVD RKB, ft.	Expected Fluid
Rustler	1073	
Salado	1509	
Castile	3545	
Base of Salt	5104	
Lamar	5368	
Bell Canyon	5397	Oil/Gas
Brushy Canyon	7870	Oil/Gas
Bone Spring	9350	Oil/Gas
1st Bone Spring Sand	10417	Oil/Gas
2nd Bone Spring Sand	10966	Oil/Gas
3rd Bone Spring Sand	12051	Oil/Gas
3rd Bone Spring Sand Target	12450	Oil/Gas

Anticipated Bottom Hole Pressure: 6,847 psi (0.55 psi/ft)
Anticipated Surface Pressure: 4,108 psi
Anticipated Bottom Hole Temperature (°F): 160

2. **Casing Program:**

Changes:

I. Added a second intermediate casing string to be able to drill production section into the 3rd Bone Spring formation in a safe manner due to expected formation pressure in the target formation. 7" intermediate casing will be set at the top of the 3rd Bone Springs formation and casing will be cemented to a minimum depth of 3,900 ft.

II. Added a 6 1/8" production section to be drilled lateral in the 3rd Bone Spring formation. 4 ½" Production liner will be ran in the lateral section and a liner hanger will be use to hang 4 ½" liner at ~11,700 ft. 4 ½" liner will be cemented from TD to the top of the liner hanger.

III. Revised casing design for surface section, 13 3/8" 54.5# J55 meet minimum design safety factors (see table below).

Hole size	Casing Interval		Csg. Size	Weight (lbs/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17 ½"	0	1050	13 3/8"	54.5	J55	BTC	2.95	1.71	4.83
12 ¼"	0	5400	9 5/8"	40	L80	BTC	1.16	2.62	3.17
8 ¾"	0	12050	7"	29	P110IC	TXP	2.25	1.17	2.47
6 1/8"	11700	17097	4 ½"	13.5	P110IC	TXP	1.85	1.32	2.78

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

3. Cementing Program:

Changes:

- Revised cement slurry formulations for surface and 1st Intermediate. Added cement slurries for the 7" intermediate casing and 4 ½" production liner.

Casing	Slurry	Top MD	Bottom MD	#Sks	Wt. lbs/gal	Yield ft3/sx	Water gal/sk	Slurry Description
Surface (13-3/8")	Single	0	1050	1125	14.8	1.33	6.37	Premium (Class C) + 0.25 % Accelerator
1St Intermediate (9 5/8")	Lead	0	4800	1410	12.8	1.73	9.27	35/65 POZ C + 0.02 Gal/Sx Defoamer + 0.5% Extender + 1% Accelerator
	Tail	4800	5400	240	14.8	1.33	6.36	Premium (Class C) + 0.07 % Retarder
2nd Intermediate Casing - (7")	Single	3900	11050	860	11	2.7	16.5	TXI Cement + 0.8% retarder + 10% extender + 0.02 gal/sk + 2.0% Extender + 015% Viscosifier
	Tail	11050	12050	200	15.6	1.09	4.8	Class H + 3% extender + 0.1% Dispersant + 0.2% retarder
Production Liner (4-1/2")	Single	11700	17097	540	14.5	1.22	5.37	50/50 POZ H + 0.15% retarder + 3.5% extender + 0.25% fluid loss

Casing String	TOC	% Excess
Surface - 13-3/8"	0	100% Single Slurry
1St Intermediate - 9 5/8"	0	75% Lead and 50% Tail
2nd Intermediate Casing – 7"	Minimum 3900'	70% Lead and 30% Tail
Production Liner – 4 ½"	11,700	30% Single Slurry

4. Pressure Control Equipment

BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	✓	Tested to:
12.25	13-5/8"	5M	Annular	X	50% of working pressure
			Blind Ram	X	
			Pipe Ram		
			Double Ram	X	
			Other*		
8.75	13-5/8"	5M	Annular	X	50% working pressure
			Blind Ram	X	
			Pipe Ram		
			Double Ram	X	
			Other*		
6.125	13-5/8"	5M	Annular	X	50% working pressure
			Blind Ram	X	
			Pipe Ram		
			Double Ram	X	
			Other*		

*Specify if additional ram is utilized.

Pressure control will not be required for drilling the surface hole section. The section will be drilled with returns into the tinhorn cellar with a cemented bottom then pumped to the rig tanks to maintain a closed loop system with cuttings hauled to disposal. After drilling surface hole a 5M multibowl wellhead will be installed on the 13-3/8" surface casing. A load shoulder in the wellhead will allow a standard test plug to be used so the BOP testing can be completed per Onshore Order 2 requirements.

The equipment will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. Durations between tests will be consistent with Onshore order 2.

Pipe rams will be function tested per BLM requirements. 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 and floor safety valve (inside BOP) and choke lines and choke manifold.

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 variance is requested to use a multibowl wellhead. 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. A landing ring will be installed on the 20" conductor. A hanger will be installed on the surface casing that will land on the landing ring. The hanger will hold the surface casing in tension during the WOC duration. The wellhead will be installed on the surface casing. See attached wellhead schematic.	

5. Wellhead

Changes:

- A 5M multibowl wellhead will be used in this well. See attached new wellhead diagram.

6. Directional Plan

Changes:

- Revised directional plan to account for target formation change, see attached directional plan.

7. Drilling Fluids Program

Changes:

- Revised mud program for new well design

Surface Hole:

Mud Type	Density (lb/gal)	Funnel Viscosity (sec/qt)	Plastic Viscosity (cp)	Yield Point (lbf/100_ft2)	LGS (%)	pH
Water Based Mud	8.4 – 8.8	28 - 32	1-4	1-4	<5	9-9.5

1st Intermediate:

Mud Type	Density (lb/gal)	Funnel Viscosity (sec/qt)	Plastic Viscosity (cp)	Yield Point (lbf/100_ft2)	Filtrate (cc/30min)	Chlorides (ppm)	pH
Brine	9.9 – 10.2	28 - 32	1 - 4	1 - 4	N/C	180,000+	10 - 11

2nd Intermediate:

Mud Type	Density (lb/gal)	Funnel Viscosity (sec/qt)	Plastic Viscosity (cp)	Yield Point (lbf/100_ft 2)	Filtrate (cc/30min)	Chlorides (ppm)	pH
Cut brine	9.0 – 9.4	28 - 32	1 - 4	1 - 4	N/A	20k – 75k	10 - 11

Production Section:

Mud Type	Density (lb/gal)	Plastic Viscosity (cp)	Yield Point (lbf/100_ft 2)	WPS (ppm)	HTHP (mL/30 min) HTHP	ES (V)	Excess Lime ppb	OWR	LGS%
Oil Based Mud	11.5-11.8	20 - 28	12 - 18	225K – 250K	<10	250 - 400	1 - 2	65/35 – 70/30	<10%