

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.

5. Lease Serial No.
NMNM093223

6. If Indian, Allottee or Tribe Name

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

SUBMIT IN TRIPLICATE - Other instructions on page 2

OCT 24 2018

8. Well Name and No.
MADERA 19 FEDERAL 26 35 19 WB 5H9. API Well No.
30-025-44901-00-X110. Field and Pool or Exploratory Area
BRADLEY
WOLFCAMP11. County or Parish, State
LEA COUNTY, NM1. Type of Well
☐ Oil Well ☒ Gas Well ☐ Other2. Name of Operator
MARATHON OIL PERMIAN LLCContact: JENNIFER VAN CUREN
E-Mail: jvancuren@marathonoil.co3a. Address
5555 SAN FELIPE STREET
HOUSTON, TX 770563b. Phone No. (include area code)
Ph: 713-296-25004. Location of Well (Footage, Sec., T., R., M., or Survey Description)
Sec 19 T26S R35E SESW 351FSL 1398FWL
32.022404 N Lat, 103.410149 W Lon

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 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 recompleat 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 recompleat 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 requests to make the following changes to APD:

Change name:
From Madera 19 Federal 26 35 19 WB 5H to Madera 19 WB Fed Com 5HCasing Changes:
Change casing design to allow for production casing rather
Utilize Semi-flush integral join connection in 7-5/8" Intermediate II for coupling clearance.
Utilize Semi-Flush integral join connection in 5-1/2" Tapered Production string for coupling clearance.

Cementing Program Changes:

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

14. I hereby certify that the foregoing is true and correct.	
Electronic Submission #439051 verified by the BLM Well Information System For MARATHON OIL PERMIAN LLC, sent to the Hobbs Committed to AFMSS for processing by ZOTA STEVENS on 10/10/2018 (19ZS0010SE)	
Name (Printed/Typed) JENNIFER VAN CUREN	Title SR. REGULATORY COMPLIANCE REP
Signature (Electronic Submission)	Date 10/10/2018

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By ZOTA STEVENS	Title PETROLEUM ENGINEER	Date 10/18/2018
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 ** KZ

Additional data for EC transaction #439051 that would not fit on the form

32. Additional remarks, continued

Revised cement volumes due to change in casing scheme.

Wellhead changes:

Utilize 10M 4 string multi-bowl wellhead.

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.

Please see highlighted areas for all changes on attached detail.

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 30-025-44901	² Pool Code 72860	³ Well Name BRADLEY; WOLFCAMP (GAS)
⁴ Property Code 322214	⁵ Property Name MADERA 10 WB FED COM	⁶ Well Number 5H
⁷ OGRID No. 372098	⁸ Operator Name MARATHON OIL PERMIAN LLC	⁹ Elevation 3184'

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	19	T26S	R35E		351'	SOUTH	1398'	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
L (LOT 3)	18	T26S	R35E		2312'	SOUTH	1352'	WEST	LEA

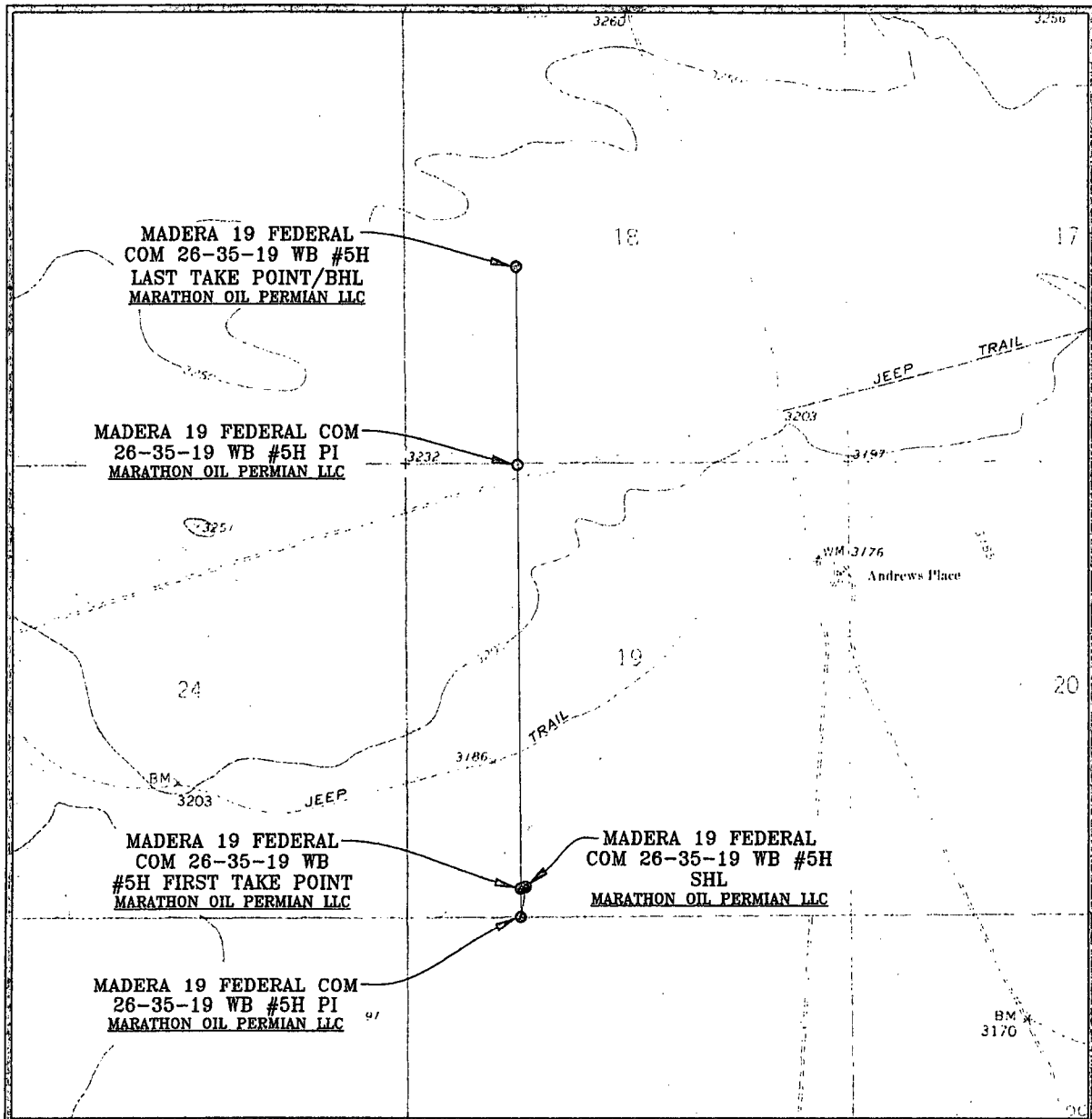
¹² Dedicated Acres 485.60	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No.
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No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

¹⁶ SECTION 12 SECTION 13 LAST TAKE POINT/BOTTOM HOLE LOCATION 2312' FSL 1352' FWL, SECTION 18 NAD 83, SPCS NM EAST Y:380396.51 / X:827197.71 LAT:32.04243316N / LON:103.41076053W NAD 27, SPCS NM EAST Y:380339.19 / X:786009.76 LAT:32.04230697N / LON:103.4102989W SECTION 13 SECTION 24 FIRST TAKE POINT 330' FSL 1359' FWL, SECTION 19 NAD 83, SPCS NM EAST Y:373134.52 / X:827267.63 LAT:32.02247099N / LON:103.41073506W NAD 27, SPCS NM EAST Y:373077.40 / X:786079.35 LAT:32.02234469N / LON:103.41027459W SURFACE HOLE LOCATION 351' FSL 1398' FWL, SECTION 19 NAD 83, SPCS NM EAST Y:373155.99 / X:827307.05 LAT:32.02252908N / LON:103.41060729W NAD 27, SPCS NM EAST Y:373098.90 / X:786118.75 LAT:32.02240279N / LON:103.41014681W SECTION 24 SECTION 25	SECTION 7 SECTION 18 SECTION 13 SECTION 19 SECTION 20 SECTION 19 SECTION 30	SECTION 8 SECTION 17 SECTION 18 SECTION 19 SECTION 20 SECTION 19 SECTION 29	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. Signature: <i>Adrian Covarrubias</i> Date: 10/10/2018 Printed Name: Adrian Covarrubias 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: MARCH 05, 2018 Signature and Seal of Professional Surveyor: <i>Lloyd P. Short</i> Certificate Number: LLOYD P. SHORT 21653
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4 03/05/2018 CAP
REV. DATE BY

LOCATION VERIFICATION MAP

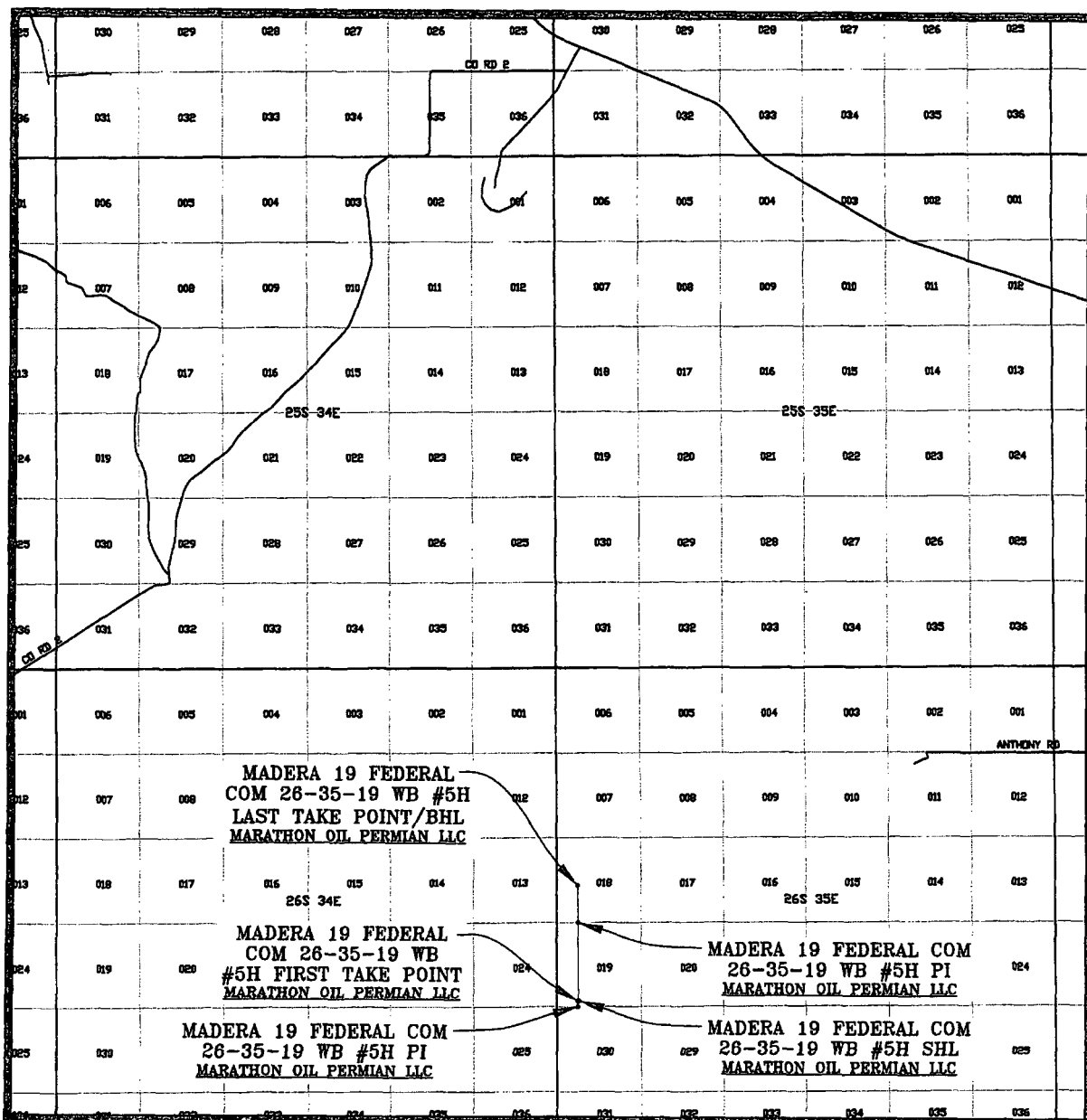


SEC. 19 TWP. 26-S RGE. 35-E
SURVEY: N.M.P.M.
COUNTY: LEA
DESCRIPTION: 351' FSL & 1398' FWL
ELEVATION: 3184'
OPERATOR: MARATHON OIL PERMIAN LLC
LEASE: MADERA 19 FEDERAL COM 26-35-19
U.S.G.S. TOPOGRAPHIC MAP: ANDREWS PLACE, N.M.

SCALE: 1" = 2000'
CONTOUR INTERVAL = 10'

PREPARED BY:
R-SQUARED GLOBAL, LLC
1309 LOUISVILLE AVENUE, MONROE, LA 71201
318-323-6900 OFFICE
JOB No. R3817_003

VICINITY MAP



SEC. 19 TWP. 26-S RGE. 35-E

SURVEY: N.M.P.M.

COUNTY: LEA

DESCRIPTION: 351' FSL & 1398' FWL

ELEVATION: 3184'

OPERATOR: MARATHON OIL PERMIAN LLC

LEASE: MADERA 19 FEDERAL COM 26-35-19

U.S.G.S. TOPOGRAPHIC MAP: ANDREWS PLACE, N.M.

SCALE: 1" = 2 MILES

PREPARED BY:
R-SQUARED GLOBAL, LLC
1309 LOUISVILLE AVENUE, MONROE, LA 71201
318-323-6900 OFFICE
JOB No. R3817_003

Marathon Oil Permian, LLC

Madera 19 Federal 26 35 19 WB 5H

API# 30-025-44901

SHL: 351' FSL & 1398' FWL / Sec 19 – T26S – R35E

BHL: 2312' FSL & 1352' FWL / Sec 18 – T26S – R35E

Lea County, New Mexico

Drilling Program Changes

1. Casing Changes:

- Change casing design to allow for production casing rather
- Utilize Semi-Flush Integral Joint connections in 7-5/8" Intermediate II for coupling clearance. Connection data sheet attached.
- Utilize Semi-Flush Integral Joint Connections in 5-1/2" Tapered Production string for coupling clearance. Connection data sheet attached.

String Type	Hole Size	Csg Size	Top Set MD	Bottom Set MD	Top Set TVD	Bottom Set TVD	Weight (lbs/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
Surface	<u>17</u> <u>1/2</u>	<u>13 3/8</u>	<u>0</u>	<u>1165</u>	<u>0</u>	<u>1165</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</u> <u>1/4</u>	<u>9 5/8</u>	<u>0</u>	<u>5350</u>	<u>0</u>	<u>5350</u>	<u>40</u>	<u>J55</u>	<u>LTC</u>	<u>1.74</u>	<u>1.15</u>	<u>2.19</u>
Intermediate II	<u>8 3/4</u>	<u>7 5/8</u>	<u>0</u>	<u>12000</u>	<u>0</u>	<u>1198</u> <u>3</u>	<u>29.7</u>	<u>P110</u>	<u>VAM</u> <u>SLIJ-II</u>	<u>3.12</u>	<u>1.16</u>	<u>2.37</u>
Production Casing	<u>6 1/8</u>	<u>5 1/2</u>	<u>0</u>	<u>12000</u>	<u>0</u>	<u>1198</u> <u>3</u>	<u>23</u>	<u>P110</u>	<u>TMK</u> <u>Ultra BPN</u>	<u>1.73</u>	<u>1.2</u>	<u>2.09</u>
Production Casing	<u>6 1/8</u>	<u>4 1/2</u>	<u>1200</u> <u>0</u>	<u>2031T</u> <u>20352</u>	<u>1198</u> <u>3</u>	<u>1305</u> <u>0</u>	<u>15.1</u>	<u>P110</u>	<u>BTC</u>	<u>1.5</u>	<u>1.26</u>	<u>2.21</u>

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

2. Cementing Program:

Changes:

- Revised cement volumes due to change in casing scheme

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	952	741	1.75	13.5	1295	100	Class C	3 lbm/sk granular LCM + 0.1250 lbm/sk Poly-E-Flake
Surface	Tail	--	932	1065	137	1.53	14.8	191	100	Class C	7.5
Intermediate I	Lead	--	0	1550	1072	1.75	12.8	1873	75	Class C	0.02 Gal/Sk Defoamer + 0.5% Extender + 1% Accelerator
Intermediate I	Tail	--	1550	1550	11	1.33	14.8	160	50	Class C	1.5 lbm/sk Retarder
Intermediate II	Lead	--	1050	1060	376	2.7	11	1016	70	Class C	0.85% retarder + 10% extender + 0.02 gal/sk defoamer + 2.0% Extender + 0.15% Viscosifier

Intermediate II	Tail	--	111000	12000	121	1.09	15.6	151	30	Class H	32 extender + 0.15% Dispersant + 0.05% pH 11 Surfactant
Production Casing	12000	12000	11000	12000	37	1.92	10.1	110	30	Class H	32 extender + 0.75% Remover + 0.05% pH 11 Defoamer + 0.1% Dispersant + 0.05% Surfactant
Production Casing	Tail	--	12000	20311 20352	121	1.14	15.6	120	30	Class H	1.5% Anti loss 0.05% antifoam + 0.15% Dispersant + 0.4% Remover + 0.05% Dispersant

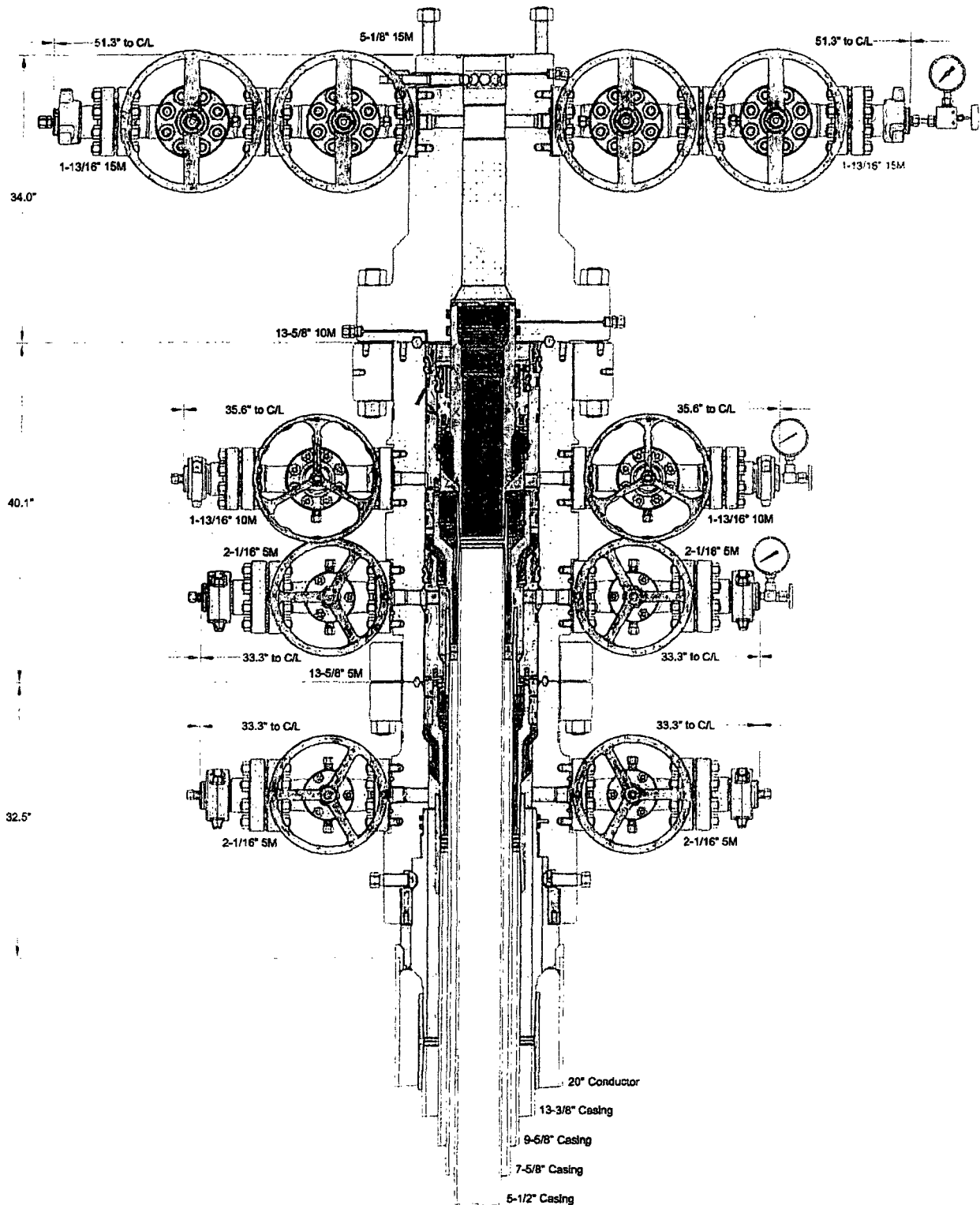
3. Wellhead:

Changes:

- Utilize 10M 4 string multi-bowl wellhead. Wellhead diagram attached.

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.



INFORMATION CONTAINED HEREIN IS THE PROPERTY OF CACTUS WELLHEAD, LLC. REPRODUCTION, DISCLOSURE, OR USE THEREOF IS PERMISSIBLE ONLY AS PROVIDED BY CONTRACT OR AS EXPRESSLY AUTHORIZED BY CACTUS WELLHEAD, LLC.

ALL DIMENSIONS APPROXIMATE

CACTUS WELLHEAD LLC

EOG RESOURCES
CARLSBAD, NM

20" x 13-3/8" x 9-5/8" x 7-5/8" x 5-1/2" MBU-4T CFL Wellhead Sys.
With 13-5/8" 10M x 5-1/8" 15M CMT-DBLHPS Tubing Head
And 9-5/8" & 7-5/8" & 5-1/2" Mandrel Casing Hangers

DRAWN	DLE	21AUG18
APPRV		

DRAWING NO.	ODE0002527
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TUBULAR PARAMETERS

Nominal OD, (inch)	5.500
Wall Thickness, (inch)	0.415
Pipe Grade	P110 HC
Drift	Standard

CONNECTION PARAMETERS

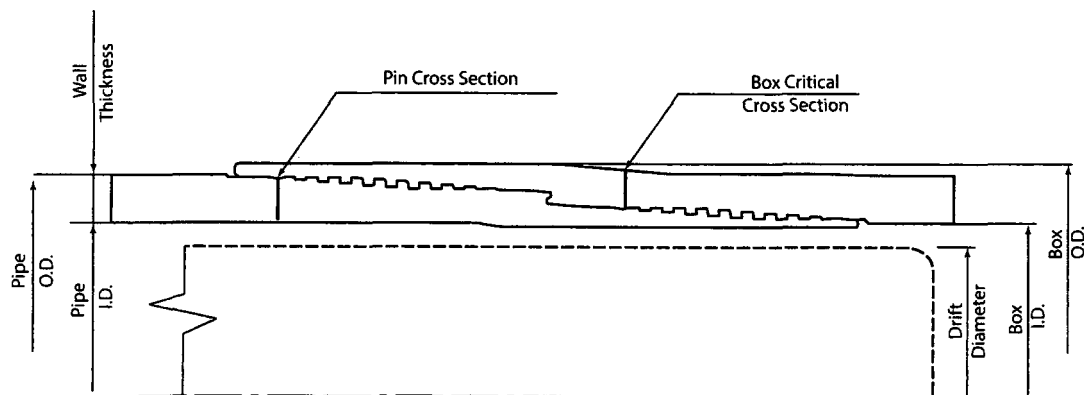
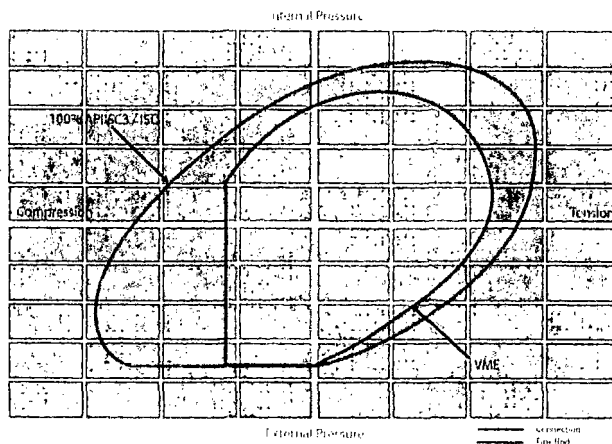
Connection OD (inch)	5.70
Connection ID, (inch)	4.626
Make-Up Loss, (inch)	5.441
Connection Critical Area, (sq inch)	5.621
Yield Strength in Tension, (klbs)	670
Yield Strength in Compression, (klbs)	670
Tension Efficiency	92%
Compression Efficiency	92%
Min. Internal Yield Pressure, (psi)	14 530
Collapse Pressure, (psi)	15 990
Uniaxial Bending (deg/100ft)	84.3

MAKE-UP TORQUES

Yield Torque, (ft-lb)	19 300
Minimum Make-Up Torque, (ft-lb)	12 800
Optimum Make-Up Torque, (ft-lb)	14 100
Maximum Make-Up Torque, (ft-lb)	15 500

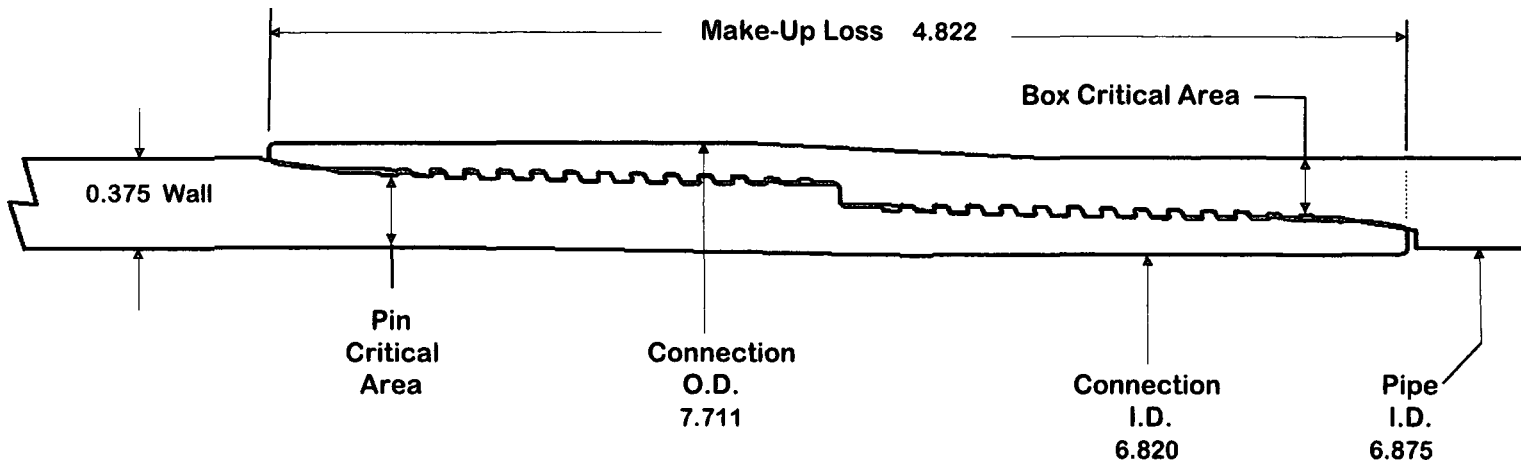
PIPE BODY PROPERTIES

PE Weight, (lbs/ft)	22.54
Nominal Weight, (lbs/ft)	23.00
Nominal ID, (inch)	4.670
Drift Diameter, (inch)	4.545
Nominal Pipe Body Area, (sq inch)	6.630
Yield Strength in Tension, (klbs)	729
Min. Internal Yield Pressure, (psi)	14 530
Collapse Pressure, (psi)	15 990



NOTE: The content of this Technical Data Sheet is for general information only and does not guarantee performance or imply fitness for a particular purpose, which only a competent drilling professional can determine considering the specific installation and operation parameters. This information supersedes all prior versions for this connection. Information that is printed or downloaded is no longer controlled by TMK and might not be the latest information. Anyone using the information herein does so at their own risk. To verify that you have the latest technical information, please contact P&O TMK Technical Sales in Russia (Tel.: +7 495 1775-6600, Email: techsales@tmk-group.com) and TMK IPSCO in North America (Tel.: +1 281 949-1044, Email: techsales@tmk-ipso.com).

VAM® SLIJ-II



O.D.
7.625

WEIGHT
29.70

WALL
0.375

GRADE
VST P110EC

D
6.

PIPE BODY PROPERTIES

Material Grade	VST P110EC
Min. Yield Strength	125 ksi
Min. Tensile Strength	135 ksi
Outside Diameter	7.625 in
Inside Diameter	6.875 in
Nominal Area	8.541 sq.in.
Yield Strength	1,068 kips
Ultimate Strength	1,153 kips
Min Internal Yield	10,760 psi
*High Collapse	7,360 psi

CONNECTION PROPERTIES

Connection OD	7.711 in
Connection ID	6.820 in
Make up Loss	4.822 in
Box Critical Area	5.911 sq.in.
%PB Section Area	69.2%
Pin Critical Area	5.971 sq.in.
%PB Section Area	69.9%
Yield Strength	739 kips
Parting Load	798 kips
Min Internal Yield	10,760 psi
*High Collapse	7,360 psi
Wk Compression	517 kips
Max Pure Bending	10 °/100 ft

TORQUE DATA ft-lb

min	opt	max
11,900	13,200	14,500

Contact: tech.support@vam-usa.com

Ref. Drawing: SI-PD 100268 Rev.A

Date: 10-Sep-18

Time: 5:37 PM



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8	7	6	5	4	3	2	1
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B



Database:	WellPlanner1	Local Co-ordinate Reference:	Well WB #5H
Company:	Marathon Oil	TVD Reference:	Well @ 3210.50usft (GL: 3184' + KB: 26.5' (H&P480))
Project:	Lea County, NM	MD Reference:	Well @ 3210.50usft (GL: 3184' + KB: 26.5' (H&P480))
Site:	Madera 19 Fed Com 26-35-19 (1-2-5-6)	North Reference:	Grid
Well:	WB #5H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim Plan B		

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	Madera 19 Fed Com 26-35-19 (1-2-5-6)			
Site Position:	Northing:	373,098.90 usft	Latitude:	32.022404
From:	Map	Easting:	786,088.75 usft	Longitude:
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:
				0.49 °

Well	WB #5H			
Well Position	+N/-S	0.00 usft	Northing:	373,098.90 usft
	+E/-W	30.00 usft	Easting:	786,118.75 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	Ground Level:	3,184.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	1/8/2018	6.73	59.72	47,801.50

Design	Prelim Plan B			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	359.45

Plan Survey Tool Program	Date	10/9/2018		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	1,850.00 Prelim Plan B (OH)	MWD+IFR1	
			OWSG MWD + IFR1	
2	1,850.00	5,400.00 Prelim Plan B (OH)	MWD+IFR1	
			OWSG MWD + IFR1	
3	5,400.00	10,000.00 Prelim Plan B (OH)	MWD+IFR1	
			OWSG MWD + IFR1	
4	10,000.00	20,352.24 Prelim Plan B (OH)	MWD+IFR1	
			OWSG MWD + IFR1	

Database:	WellPlanner1	Local Co-ordinate Reference:	Well WB #5H
Company:	Marathon Oil	TVD Reference:	Well @ 3210.50usft (GL: 3184' + KB: 26.5' (H&P480))
Project:	Lea County, NM	MD Reference:	Well @ 3210.50usft (GL: 3184' + KB: 26.5' (H&P480))
Site:	Madera 19 Fed Com 26-35-19 (1-2-5-6)	North Reference:	Grid
Well:	WB #5H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim Plan B		

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,700.00	10.00	188.42	2,697.47	-43.05	-6.37	2.00	2.00	0.00	188.42	
3,654.10	10.00	188.42	3,637.07	-206.95	-30.63	0.00	0.00	0.00	0.00	
4,154.10	0.00	0.00	4,134.54	-250.00	-37.00	2.00	-2.00	0.00	180.00	
12,534.56	0.00	0.00	12,515.00	-250.00	-37.00	0.00	0.00	0.00	0.00	[MaderaWB#5H]KOP
13,434.56	90.00	359.45	13,087.96	322.93	-42.51	10.00	10.00	-0.06	359.45	
20,352.24	90.00	359.45	13,088.00	7,240.29	-108.99	0.00	0.00	0.00	0.00	[MaderaWB#5H]LTP/I

Database: WellPlanner1
Company: Marathon Oil

Project: Lea County, NM

Site: Madera 19 Fed Com 26-35-19 (1-2-5-6)
Well: WB #5H
Wellbore: OH
Design: Prelim Plan B

Local Co-ordinate Reference: Well WB #5H
TVD Reference: Well @ 3210.50usft (GL: 3184' + KB: 26.5' (H&P480))
MD Reference: Well @ 3210.50usft (GL: 3184' + KB: 26.5' (H&P480))
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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
[MaderaWB#5H]FTP									
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
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	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	2.00	188.42	2,299.98	-1.73	-0.26	-1.72	2.00	2.00	0.00
2,400.00	4.00	188.42	2,399.84	-6.90	-1.02	-6.89	2.00	2.00	0.00
2,500.00	6.00	188.42	2,499.45	-15.52	-2.30	-15.50	2.00	2.00	0.00
2,600.00	8.00	188.42	2,598.70	-27.58	-4.08	-27.54	2.00	2.00	0.00
2,700.00	10.00	188.42	2,697.47	-43.05	-6.37	-42.99	2.00	2.00	0.00
2,800.00	10.00	188.42	2,795.95	-60.23	-8.91	-60.14	0.00	0.00	0.00
2,900.00	10.00	188.42	2,894.43	-77.41	-11.46	-77.30	0.00	0.00	0.00
3,000.00	10.00	188.42	2,992.91	-94.59	-14.00	-94.45	0.00	0.00	0.00
3,100.00	10.00	188.42	3,091.39	-111.76	-16.54	-111.60	0.00	0.00	0.00
3,200.00	10.00	188.42	3,189.87	-128.94	-19.08	-128.75	0.00	0.00	0.00
3,300.00	10.00	188.42	3,288.35	-146.12	-21.63	-145.91	0.00	0.00	0.00
3,400.00	10.00	188.42	3,386.83	-163.30	-24.17	-163.06	0.00	0.00	0.00
3,500.00	10.00	188.42	3,485.31	-180.48	-26.71	-180.21	0.00	0.00	0.00
3,600.00	10.00	188.42	3,583.79	-197.65	-29.25	-197.36	0.00	0.00	0.00
3,654.10	10.00	188.42	3,637.07	-206.95	-30.63	-206.64	0.00	0.00	0.00
3,700.00	9.08	188.42	3,682.34	-214.47	-31.74	-214.16	2.00	-2.00	0.00
3,800.00	7.08	188.42	3,781.34	-228.38	-33.80	-228.04	2.00	-2.00	0.00
3,900.00	5.08	188.42	3,880.77	-238.86	-35.35	-238.51	2.00	-2.00	0.00
4,000.00	3.08	188.42	3,980.51	-245.90	-36.39	-245.54	2.00	-2.00	0.00
4,100.00	1.08	188.42	4,080.44	-249.49	-36.93	-249.13	2.00	-2.00	0.00
4,154.10	0.00	0.00	4,134.54	-250.00	-37.00	-249.63	2.00	-2.00	0.00
4,200.00	0.00	0.00	4,180.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
4,300.00	0.00	0.00	4,280.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
4,400.00	0.00	0.00	4,380.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
4,500.00	0.00	0.00	4,480.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
4,600.00	0.00	0.00	4,580.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
4,700.00	0.00	0.00	4,680.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
4,800.00	0.00	0.00	4,780.44	-250.00	-37.00	-249.63	0.00	0.00	0.00

Database: WellPlanner1
Company: Marathon Oil
Project: Lea County, NM
Site: Madera 19 Fed Com 26-35-19 (1-2-5-6)
Well: WB #5H
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Local Co-ordinate Reference: Well WB #5H
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North Reference: Grid
Survey Calculation Method: Minimum Curvature

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)
4,900.00	0.00	0.00	4,880.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
5,000.00	0.00	0.00	4,980.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
5,100.00	0.00	0.00	5,080.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
5,200.00	0.00	0.00	5,180.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
5,300.00	0.00	0.00	5,280.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
5,400.00	0.00	0.00	5,380.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
5,500.00	0.00	0.00	5,480.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
5,600.00	0.00	0.00	5,580.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
5,700.00	0.00	0.00	5,680.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
5,800.00	0.00	0.00	5,780.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
5,900.00	0.00	0.00	5,880.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
6,000.00	0.00	0.00	5,980.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
6,100.00	0.00	0.00	6,080.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
6,200.00	0.00	0.00	6,180.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
6,300.00	0.00	0.00	6,280.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
6,400.00	0.00	0.00	6,380.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
6,500.00	0.00	0.00	6,480.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
6,600.00	0.00	0.00	6,580.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
6,700.00	0.00	0.00	6,680.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
6,800.00	0.00	0.00	6,780.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
6,900.00	0.00	0.00	6,880.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
7,000.00	0.00	0.00	6,980.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
7,100.00	0.00	0.00	7,080.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
7,200.00	0.00	0.00	7,180.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
7,300.00	0.00	0.00	7,280.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
7,400.00	0.00	0.00	7,380.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
7,500.00	0.00	0.00	7,480.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
7,600.00	0.00	0.00	7,580.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
7,700.00	0.00	0.00	7,680.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
7,800.00	0.00	0.00	7,780.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
7,900.00	0.00	0.00	7,880.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
8,000.00	0.00	0.00	7,980.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
8,100.00	0.00	0.00	8,080.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
8,200.00	0.00	0.00	8,180.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
8,300.00	0.00	0.00	8,280.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
8,400.00	0.00	0.00	8,380.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
8,500.00	0.00	0.00	8,480.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
8,600.00	0.00	0.00	8,580.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
8,700.00	0.00	0.00	8,680.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
8,800.00	0.00	0.00	8,780.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
8,900.00	0.00	0.00	8,880.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
9,000.00	0.00	0.00	8,980.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
9,100.00	0.00	0.00	9,080.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
9,200.00	0.00	0.00	9,180.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
9,300.00	0.00	0.00	9,280.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
9,400.00	0.00	0.00	9,380.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
9,500.00	0.00	0.00	9,480.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
9,600.00	0.00	0.00	9,580.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
9,700.00	0.00	0.00	9,680.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
9,800.00	0.00	0.00	9,780.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
9,900.00	0.00	0.00	9,880.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
10,000.00	0.00	0.00	9,980.44	-250.00	-37.00	-249.63	0.00	0.00	0.00

Database: WellPlanner1
Company: Marathon Oil

Project: Lea County, NM

Site: Madera 19 Fed Com 26-35-19 (1-2-5-6)
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North Reference: Grid
Survey Calculation Method: Minimum Curvature

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)
10,100.00	0.00	0.00	10,080.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
10,200.00	0.00	0.00	10,180.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
10,300.00	0.00	0.00	10,280.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
10,400.00	0.00	0.00	10,380.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
10,500.00	0.00	0.00	10,480.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
10,600.00	0.00	0.00	10,580.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
10,700.00	0.00	0.00	10,680.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
10,800.00	0.00	0.00	10,780.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
10,900.00	0.00	0.00	10,880.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
11,000.00	0.00	0.00	10,980.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
11,100.00	0.00	0.00	11,080.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
11,200.00	0.00	0.00	11,180.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
11,300.00	0.00	0.00	11,280.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
11,400.00	0.00	0.00	11,380.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
11,500.00	0.00	0.00	11,480.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
11,600.00	0.00	0.00	11,580.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
11,700.00	0.00	0.00	11,680.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
11,800.00	0.00	0.00	11,780.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
11,900.00	0.00	0.00	11,880.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
12,000.00	0.00	0.00	11,980.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
12,100.00	0.00	0.00	12,080.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
12,200.00	0.00	0.00	12,180.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
12,300.00	0.00	0.00	12,280.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
12,400.00	0.00	0.00	12,380.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
12,500.00	0.00	0.00	12,480.44	-250.00	-37.00	-249.63	0.00	0.00	0.00
12,534.56	0.00	0.00	12,515.00	-250.00	-37.00	-249.63	0.00	0.00	0.00
[MaderaWB#5H]KOP									
12,550.00	1.54	359.45	12,530.43	-249.79	-37.00	-249.43	10.00	10.00	0.00
12,600.00	6.54	359.45	12,580.29	-246.27	-37.04	-245.90	10.00	10.00	0.00
12,650.00	11.54	359.45	12,629.66	-238.41	-37.11	-238.04	10.00	10.00	0.00
12,700.00	16.54	359.45	12,678.15	-226.28	-37.23	-225.91	10.00	10.00	0.00
12,750.00	21.54	359.45	12,725.40	-209.97	-37.38	-209.61	10.00	10.00	0.00
12,800.00	26.54	359.45	12,771.04	-189.61	-37.58	-189.24	10.00	10.00	0.00
12,850.00	31.54	359.45	12,814.74	-165.35	-37.81	-164.97	10.00	10.00	0.00
12,900.00	36.54	359.45	12,856.16	-137.36	-38.08	-136.99	10.00	10.00	0.00
12,950.00	41.54	359.45	12,894.98	-105.88	-38.39	-105.51	10.00	10.00	0.00
13,000.00	46.54	359.45	12,930.91	-71.13	-38.72	-70.76	10.00	10.00	0.00
13,050.00	51.54	359.45	12,963.67	-33.39	-39.08	-33.01	10.00	10.00	0.00
13,100.00	56.54	359.45	12,993.02	7.07	-39.47	7.45	10.00	10.00	0.00
13,150.00	61.54	359.45	13,018.73	49.94	-39.88	50.32	10.00	10.00	0.00
13,200.00	66.54	359.45	13,040.61	94.88	-40.31	95.26	10.00	10.00	0.00
13,250.00	71.54	359.45	13,058.49	141.55	-40.76	141.94	10.00	10.00	0.00
13,300.00	76.54	359.45	13,072.23	189.61	-41.23	189.99	10.00	10.00	0.00
13,350.00	81.54	359.45	13,081.73	238.68	-41.70	239.07	10.00	10.00	0.00
13,400.00	86.54	359.45	13,086.92	288.39	-42.17	288.78	10.00	10.00	0.00
13,434.56	90.00	359.45	13,087.96	322.93	-42.51	323.32	10.00	10.00	0.00
13,500.00	90.00	359.45	13,087.96	388.36	-43.14	388.76	0.00	0.00	0.00
13,600.00	90.00	359.45	13,087.96	488.36	-44.10	488.76	0.00	0.00	0.00
13,700.00	90.00	359.45	13,087.96	588.35	-45.06	588.76	0.00	0.00	0.00
13,800.00	90.00	359.45	13,087.96	688.35	-46.02	688.76	0.00	0.00	0.00
13,900.00	90.00	359.45	13,087.96	788.35	-46.98	788.76	0.00	0.00	0.00
14,000.00	90.00	359.45	13,087.96	888.34	-47.94	888.76	0.00	0.00	0.00

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Project: Lea County, NM
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Survey Calculation Method: Minimum Curvature

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)
14,100.00	90.00	359.45	13,087.96	988.34	-48.90	988.76	0.00	0.00	0.00
14,200.00	90.00	359.45	13,087.96	1,088.33	-49.86	1,088.76	0.00	0.00	0.00
14,300.00	90.00	359.45	13,087.96	1,188.33	-50.82	1,188.76	0.00	0.00	0.00
14,400.00	90.00	359.45	13,087.96	1,288.32	-51.78	1,288.76	0.00	0.00	0.00
14,500.00	90.00	359.45	13,087.96	1,388.32	-52.75	1,388.76	0.00	0.00	0.00
14,600.00	90.00	359.45	13,087.97	1,488.31	-53.71	1,488.76	0.00	0.00	0.00
14,700.00	90.00	359.45	13,087.97	1,588.31	-54.67	1,588.76	0.00	0.00	0.00
14,800.00	90.00	359.45	13,087.97	1,688.30	-55.63	1,688.76	0.00	0.00	0.00
14,900.00	90.00	359.45	13,087.97	1,788.30	-56.59	1,788.76	0.00	0.00	0.00
15,000.00	90.00	359.45	13,087.97	1,888.29	-57.55	1,888.76	0.00	0.00	0.00
15,100.00	90.00	359.45	13,087.97	1,988.29	-58.51	1,988.76	0.00	0.00	0.00
15,200.00	90.00	359.45	13,087.97	2,088.29	-59.47	2,088.76	0.00	0.00	0.00
15,300.00	90.00	359.45	13,087.97	2,188.28	-60.43	2,188.76	0.00	0.00	0.00
15,400.00	90.00	359.45	13,087.97	2,288.28	-61.40	2,288.76	0.00	0.00	0.00
15,500.00	90.00	359.45	13,087.97	2,388.27	-62.36	2,388.76	0.00	0.00	0.00
15,600.00	90.00	359.45	13,087.97	2,488.27	-63.32	2,488.76	0.00	0.00	0.00
15,700.00	90.00	359.45	13,087.97	2,588.26	-64.28	2,588.76	0.00	0.00	0.00
15,800.00	90.00	359.45	13,087.97	2,688.26	-65.24	2,688.76	0.00	0.00	0.00
15,900.00	90.00	359.45	13,087.97	2,788.25	-66.20	2,788.76	0.00	0.00	0.00
16,000.00	90.00	359.45	13,087.97	2,888.25	-67.16	2,888.76	0.00	0.00	0.00
16,100.00	90.00	359.45	13,087.97	2,988.24	-68.12	2,988.76	0.00	0.00	0.00
16,200.00	90.00	359.45	13,087.97	3,088.24	-69.08	3,088.76	0.00	0.00	0.00
16,300.00	90.00	359.45	13,087.98	3,188.23	-70.05	3,188.76	0.00	0.00	0.00
16,400.00	90.00	359.45	13,087.98	3,288.23	-71.01	3,288.76	0.00	0.00	0.00
16,500.00	90.00	359.45	13,087.98	3,388.23	-71.97	3,388.76	0.00	0.00	0.00
16,600.00	90.00	359.45	13,087.98	3,488.22	-72.93	3,488.76	0.00	0.00	0.00
16,700.00	90.00	359.45	13,087.98	3,588.22	-73.89	3,588.76	0.00	0.00	0.00
16,800.00	90.00	359.45	13,087.98	3,688.21	-74.85	3,688.76	0.00	0.00	0.00
16,900.00	90.00	359.45	13,087.98	3,788.21	-75.81	3,788.76	0.00	0.00	0.00
17,000.00	90.00	359.45	13,087.98	3,888.20	-76.77	3,888.76	0.00	0.00	0.00
17,100.00	90.00	359.45	13,087.98	3,988.20	-77.73	3,988.76	0.00	0.00	0.00
17,200.00	90.00	359.45	13,087.98	4,088.19	-78.69	4,088.76	0.00	0.00	0.00
17,300.00	90.00	359.45	13,087.98	4,188.19	-79.66	4,188.76	0.00	0.00	0.00
17,400.00	90.00	359.45	13,087.98	4,288.18	-80.62	4,288.76	0.00	0.00	0.00
17,500.00	90.00	359.45	13,087.98	4,388.18	-81.58	4,388.76	0.00	0.00	0.00
17,600.00	90.00	359.45	13,087.98	4,488.17	-82.54	4,488.76	0.00	0.00	0.00
17,700.00	90.00	359.45	13,087.98	4,588.17	-83.50	4,588.76	0.00	0.00	0.00
17,800.00	90.00	359.45	13,087.98	4,688.17	-84.46	4,688.76	0.00	0.00	0.00
17,900.00	90.00	359.45	13,087.99	4,788.16	-85.42	4,788.76	0.00	0.00	0.00
18,000.00	90.00	359.45	13,087.99	4,888.16	-86.38	4,888.76	0.00	0.00	0.00
18,100.00	90.00	359.45	13,087.99	4,988.15	-87.34	4,988.76	0.00	0.00	0.00
18,200.00	90.00	359.45	13,087.99	5,088.15	-88.31	5,088.76	0.00	0.00	0.00
18,300.00	90.00	359.45	13,087.99	5,188.14	-89.27	5,188.76	0.00	0.00	0.00
18,400.00	90.00	359.45	13,087.99	5,288.14	-90.23	5,288.76	0.00	0.00	0.00
18,500.00	90.00	359.45	13,087.99	5,388.13	-91.19	5,388.76	0.00	0.00	0.00
18,600.00	90.00	359.45	13,087.99	5,488.13	-92.15	5,488.76	0.00	0.00	0.00
18,700.00	90.00	359.45	13,087.99	5,588.12	-93.11	5,588.76	0.00	0.00	0.00
18,800.00	90.00	359.45	13,087.99	5,688.12	-94.07	5,688.76	0.00	0.00	0.00
18,900.00	90.00	359.45	13,087.99	5,788.11	-95.03	5,788.76	0.00	0.00	0.00
19,000.00	90.00	359.45	13,087.99	5,888.11	-95.99	5,888.76	0.00	0.00	0.00
19,100.00	90.00	359.45	13,087.99	5,988.11	-96.96	5,988.76	0.00	0.00	0.00
19,200.00	90.00	359.45	13,087.99	6,088.10	-97.92	6,088.76	0.00	0.00	0.00

Database:	WellPlanner1	Local Co-ordinate Reference:	Well WB #5H
Company:	Marathon Oil	TVD Reference:	Well @ 3210.50usft (GL: 3184' + KB: 26.5' (H&P480))
Project:	Lea County, NM	MD Reference:	Well @ 3210.50usft (GL: 3184' + KB: 26.5' (H&P480))
Site:	Madera 19 Fed Com 26-35-19 (1-2-5-6)	North Reference:	Grid
Well:	WB #5H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim Plan B		

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)
19,300.00	90.00	359.45	13,087.99	6,188.10	-98.88	6,188.76	0.00	0.00	0.00
19,400.00	90.00	359.45	13,087.99	6,288.09	-99.84	6,288.76	0.00	0.00	0.00
19,500.00	90.00	359.45	13,088.00	6,388.09	-100.80	6,388.76	0.00	0.00	0.00
19,600.00	90.00	359.45	13,088.00	6,488.08	-101.76	6,488.76	0.00	0.00	0.00
19,700.00	90.00	359.45	13,088.00	6,588.08	-102.72	6,588.76	0.00	0.00	0.00
19,800.00	90.00	359.45	13,088.00	6,688.07	-103.68	6,688.76	0.00	0.00	0.00
19,900.00	90.00	359.45	13,088.00	6,788.07	-104.64	6,788.76	0.00	0.00	0.00
20,000.00	90.00	359.45	13,088.00	6,888.06	-105.60	6,888.76	0.00	0.00	0.00
20,100.00	90.00	359.45	13,088.00	6,988.06	-106.57	6,988.76	0.00	0.00	0.00
20,200.00	90.00	359.45	13,088.00	7,088.05	-107.53	7,088.76	0.00	0.00	0.00
20,300.00	90.00	359.45	13,088.00	7,188.05	-108.49	7,188.76	0.00	0.00	0.00
20,352.24	90.00	359.45	13,088.00	7,240.29	-108.99	7,241.00	0.00	0.00	0.00

[MaderaWB#5H]LTP/BHL

PECOS DISTRICT

DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	MARATHON OIL PERMIAN LLC
LEASE NO.:	NMNM093223
WELL NAME & NO.:	5H –MADERA 19 WB FEDERAL COM
SURFACE HOLE FOOTAGE:	351'/S & 1398'/W
BOTTOM HOLE FOOTAGE	2312'/S & 1320'/W
LOCATION:	Section 19.,T26S., R.35E., NMP
COUNTY:	LEA County, New Mexico

COA

All previous COAs still apply expect the following:

H2S	☐ Yes	☒ No	
Potash	☒ None	☐ Secretary	☐ R-111-P
Cave/Karst Potential	☒ Low	☐ Medium	☐ High
Variance	☐ None	☒ Flex Hose	☐ Other
Wellhead	☐ Conventional	☒ Multibowl	☐ Both
Other	☐ 4 String Area	☐ Capitan Reef	☐ WIPP

A. Hydrogen Sulfide

Hydrogen Sulfide (H2S) monitors shall be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area shall meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, provide measured values and formations to the BLM.

B. CASING

1. The 13-3/8 inch surface casing shall be set at approximately 1165 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 will be a minimum of 8 hours or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)

- 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.

Operator shall filled 1/3rd casing with fluid while running intermediate casing to maintain collapse safety factor.

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.

Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.

3. The minimum required fill of cement behind the 7-5/8 inch 2nd intermediate casing is:

- Cement should tie-back at least 200 feet into previous casing string. Operator shall provide method of verification.

4. The minimum required fill of cement behind the 5 1/2 x 4-1/2 inch production casing is:

- Cement should tie-back 200' into the previous casing. Operator shall provide method of verification.

C. PRESSURE CONTROL

1. Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).
2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M) psi**.
3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the 7 intermediate casing shoe shall be **10,000 (10M) psi**.

Variance approved to use a 5M annular. The annular must be tested to full working pressure (5000 psi.)

GENERAL REQUIREMENTS

The BLM is to be notified in advance for a representative to witness:

- a. Spudding well (minimum of 24 hours)
- b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
- c. BOPE tests (minimum of 4 hours)

☒ Chaves and Roosevelt Counties

Call the Roswell Field Office, 2909 West Second St., Roswell NM 88201.

During office hours call (575) 627-0272.

After office hours call (575)

☒ Eddy County

Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220,
(575) 361-2822

☒ Lea County

Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240, (575)
393-3612

1. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.
 - a. **The operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).**
 - b. **The operator proposes to set surface casing with Spudder Rig**
 - **Notify the BLM when moving in and removing the Spudder Rig.**
 - **Notify the BLM when moving in the 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.**
 - **BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.**
2. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.

3. The record of the drilling rate along with the GR/N well log (one log per well pad is acceptable) run from TD to surface (horizontal well – vertical portion of hole) shall be submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.

A. CASING

1. Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.
2. Wait on cement (WOC) for Potash Areas: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi for all cement blends, 2) until cement has been in place at least 24 hours. WOC time will be recorded in the driller's log. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
3. Wait on cement (WOC) for Water Basin: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well specific cement details onsite prior to pumping the cement for each casing string.
5. No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.
6. 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. Formation at the shoe shall be tested to a minimum of the mud weight equivalent anticipated to control the formation pressure to the next casing depth or at total depth of the well. This test shall be performed before drilling more than 20 feet of new hole.

7. 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.
8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

B. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.
2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: The flex line must meet the requirements of API 16C. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.
3. 5M or higher system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.
4. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:
 - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
 - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
 - c. Manufacturer representative shall install the test plug for the initial BOP test.
 - d. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
 - e. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.

5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
- a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).
 - b. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the plug. However, **no tests** shall commence until the cement has had a minimum of 24 hours setup time, except the casing pressure test can be initiated immediately after bumping the plug (only applies to single stage cement jobs).
 - c. The tests shall be done by an independent service company utilizing a test plug. The results of the test shall be reported to the appropriate BLM office.
 - d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.
 - e. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.
 - f. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes. This test shall be performed prior to the test at full stack pressure.
 - g. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

C. DRILLING MUD

Mud system monitoring equipment, with derrick floor indicators and visual and audio alarms, shall be operating before drilling into the Wolfcamp formation, and shall be used until production casing is run and cemented.

D. WASTE MATERIAL AND FLUIDS

All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

Waste Minimization Plan (WMP)

In the interest of resource development, submission of additional well gas capture development plan information is deferred but may be required by the BLM Authorized Officer at a later date.

ZS 101818

13 3/8	surface csg in a	17 1/2	inch hole.	Design Factors			SURFACE		
Segment	#/ft	Grade	Coupling	Joint	Collapse	Burst	Length	Weight	
"A"	54.50	J 55	ST&C	8.10	2.12	0.96	1,165	63,493	
"B"							0	0	
w/8.4#/g mud, 30min Sfc Csg Test psig: 1,403			Tail Cmt	does not	circ to sfc.	Totals:	1,165	63,493	
Comparison of Proposed to Minimum Required Cement Volumes									
Hole	Annular	1 Stage	1 Stage	Min	1 Stage	Drilling	Calc	Req'd	Min Dist
Size	Volume	Cmt Sx	CuFt Cmt	Cu Ft	% Excess	Mud Wt	MASP	BOPE	Hole-Cplg
17 1/2	0.6946	955	1588	863	84	8.80	1658	2M	1.56
Class 'C' tail cmt yield above 1.35.									
Burst Frac Gradient(s) for Segment(s) A, B = , b All > 0.70, OK.									

9 5/8 casing inside the 13 3/8			Design Factors				INTERMEDIATE		
Segment	#/ft	Grade	Coupling	Body	Collapse	Burst	Length	Weight	
"A"	40.00	J 55	BUTT	2.94	0.91	0.67	5,350	214,000	
"B"							0	0	
w/8.4#/g mud, 30min Sfc Csg Test psig:						Totals:	5,350	214,000	
The cement volume(s) are intended to achieve a top of				0	ft from surface or a		1165	overlap.	
Hole	Annular	1 Stage	1 Stage	Min	1 Stage	Drilling	Calc	Req'd	Min Dist
Size	Volume	Cmt Sx	CuFt Cmt	Cu Ft	% Excess	Mud Wt	MASP	BOPE	Hole-Cplg
12 1/4	0.3132	1731	2881	1752	64	10.20	3220	5M	0.81
Burst Frac Gradient(s) for Segment(s): A, B, C, D = 0.74, b, c, d All > 0.70, OK.									ALT. COLLAPSE SF: 09*1.5=1.35; BRUST GRADIENT IS GOOD.

7 5/8	casing inside the		9 5/8	Design Factors				INTERMEDIATE	
Segment	#/ft	Grade	Coupling	Joint	Collapse	Burst	Length	Weight	
"A"	29.70	P 110	VAM	2.07	1.26	1.27	12,000	356,400	
"B"							0	0	
w/8.4#/g mud, 30min Sfc Csg Test psig: 2,640						Totals:	12,000	356,400	
The cement volume(s) are intended to achieve a top of				5150	ft from surface or a		200	overlap.	
Hole	Annular	1 Stage	1 Stage	Min	1 Stage	Drilling	Calc	Req'd	Min Dist
Size	Volume	Cmt Sx	CuFt Cmt	Cu Ft	% Excess	Mud Wt	MASP	BOPE	Hole-Cplg
8 3/4	0.1005	496	1146	701	63	9.40	5603	10M	0.56
MASP is within 10% of 5000psig, need exrta equip?									

Tail cmt										
5 1/2		casing inside the		7 5/8		Design Factors		PRODUCTION		
Segment	#/ft	Grade		Coupling	Joint	Collapse	Burst	Length	Weight	
"A"	23.00	P 110		TMK	2.30	2.05	1.71	12,000	276,000	
"B"	15.10	P 110		BUTT	7.11	1.57	1.59	8,311	125,496	
w/8.4#/g mud, 30min Sfc Csg Test psig: 2,640								Totals:	20,311 401,496	
B Segment Design Factors would be:					30.58	1.69	if it were a vertical wellbore.			
No Pilot Hole Planned			MTD	Max VTD	Csg VD	Curve KOP	Dogleg°	Severity°	MEOC	
			20311	13050	13050	12493	90	10	13393	
The cement volume(s) are intended to achieve a top of					11800	ft from surface or a		200	overlap.	
Hole	Annular	1 Stage	1 Stage	Min	1 Stage	Drilling	Calc	Req'd	Min Dist	
Size	Volume	Cmt Sx	CuFt Cmt	Cu Ft	% Excess	Mud Wt	MASP	BOPE	Hole-Cplg	
6 1/8	0.0396	789	963	351	174	12.50			0.56	
Class 'H' tail cmt yld > 1.20					Capitan Reef est top XXXX.					MASP is within 10% of 5000psig, need exrta equip?