

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENTFORM APPROVED
OMB NO. 1004-0135
Expires: July 31, 2010**SUNDRY NOTICES AND REPORTS ON WELLS**
*Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.***SUBMIT IN TRIPLICATE - Other instructions on reverse side.**

1. Type of Well ☒ Oil Well ☐ Gas Well ☐ Other		5. Lease Serial No. NMNM118726	
2. Name of Operator COG OPERATING LLC		6. If Indian, Allottee or Tribe Name	
3a. Address 2208 WEST MAIN STREET ARTESIA, NM 88210		7. If Unit or CA/Agreement, Name and/or No.	
3b. Phone No. (include area code) Ph: 575-748-6945		8. Well Name and No. MONET FEDERAL COM 10H	
4. Location of Well (Footage, Sec., T., R., M., or Survey Description) Sec 4 T25S R33E NWNW 190FNL 410FWL		9. API Well No. 30-025-42767	
		10. Field and Pool, or Exploratory RED HILLS; U BS SHALE	
		11. County or Parish, and State LEA COUNTY, NM	

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

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other
	☐ 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 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 shall 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 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

COG Operating LLC, respectfully requests approval for the following drilling changes to the original approved APD.

This well will have a Pilot hole drilled to a depth of 12700?. It will be drilled with an 8 ??? bit with enough mud weight to hold back the predicted pressure we will incur at this depth. Based on offset mud reports mud weight will be below a 9 ppg fluid.

The pilot hole will be plugged back with several plugs forming a solid plug from 12700?- 8517?, (4183? of total cement). We will use a .98 cu ft cement and pump 1886 sxs with assumed hole size of 9?? this amount of cement is a 6% excess.

There will be a change of the INT setting depth to 5080? not 5050? to make sure we set the casing

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

14. I hereby certify that the foregoing is true and correct. Electronic Submission #322761 verified by the BLM Well Information System For COG OPERATING LLC, sent to the Hobbs Committed to AFMSS for processing by KENNETH RENNICK on 11/10/2015 ()	
Name (Printed/Typed) MAYTE X REYES	Title REGULATORY ANALYST
Signature (Electronic Submission)	Date 11/06/2015

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

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

Title 18 U.S.C. Section 1001 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.

**** OPERATOR-SUBMITTED ** OPERATOR-SUBMITTED ** OPERATOR-SUBMITTED ****

NOV 23 2015

Additional data for EC transaction #322761 that would not fit on the form

32. Additional remarks, continued

shoe into the Lamar.

The curve and lateral will be drilled with a 8 ??? bit not a 7 7/8?? to a total depth of 13848?.

Production cement values will be

Lead: 500 sxs 10.4 ppg 3.48 yield

Tail: 1200 sxs 14.4 ppg 1.25 yield

With the plan on bringing cement to at least 4500?. These values were calculated on 35 % excess.

Attached is a copy of the proposed directional report.

Per Operator See Email
Minimum working pressure below the 9-5/8 Intermediate
Casing Shoe shall be 5000 (5m) psi from
the original 3000 (3m) psi.

PECOS DISTRICT CONDITIONS OF APPROVAL

MONET FEDERAL COM 10H

API: 30-025-42767

COG Operating LLC

Section 4, T. 25 S., R 33 E.

Lea County

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Original COA still applies except for the addition of a Pilot Hole Section and a Drilling Mud Section. As well as the replacement of the Pressure Control Section. Please see the following:

A. PILOT HOLE

Pilot hole is required to have a plug at the bottom of the hole. As well as a plug that covers the top of Wolfcamp at 12220-feet which this plug needs to be tagged and witnessed by the BLM. The BLM is to be contacted, (575) 393-3612, at least 24-hours prior to the tagging of Wolfcamp plug. All plugs shall be Class H Cement. The several plugs that are proposed that will cover the interval of 12700-feet through 8517-feet are appropriate as proposed.

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 53.
2. Variance approved to use flex line from BOP to choke manifold. 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.** If the BLM inspector questions the straightness of the hose, a BLM engineer will be contacted and will review in the field or via picture supplied by inspector to determine if changes are required (operator shall expect delays if this occurs).
3. **In the case where the only BOP installed is an annular preventer, it shall be tested to a minimum of 2000 psi (which may require upgrading to 3M or 5M annular).**

4. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **2000 (2M)** psi.
5. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **9 5/8-inch** intermediate casing shoe shall be **5000 (5M)** psi. **5M 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.**
6. 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. The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer.**
 - c. 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.
 - d. The results of the test shall be reported to the appropriate BLM office.
 - 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 if test is done with a test plug and 30 minutes without a test plug. 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 **3rd Bone Springs** 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 **3rd Bone Springs** and the **Wolfcamp** formation, and shall be used until production casing is run and cemented.

Proposed mud weight may not be adequate for drilling through the **3rd Bone Springs** and the **Wolfcamp**.

Approved for aerated mud, but not air drilling.

KGR 11102015



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NOV 16 2015

Rennick, Kenneth <krennick@blm.gov>

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FW: [External] EC Document Submitted - Monet Federal Com #10H

3 messages

Mayte Reyes <mreyes1@concho.com>

Fri, Nov 6, 2015 at 10:13 AM

To: "Walls, Christopher (cwalls@blm.gov)" <cwalls@blm.gov>, "krennick@blm.gov" <krennick@blm.gov>

Good morning,

Attached is a PH and drilling change sundry for the Monet Federal Com #10H well.

Thanks,
Mayte

-----Original Message-----

From: wis-submission@blm.gov [mailto:wis-submission@blm.gov]

Sent: Friday, November 06, 2015 10:05 AM

To: Mayte Reyes

Subject: [External] EC Document Submitted

This email originates from an external source. Please be cautious before clicking on any links and/or opening any attachments.

Your EC Transaction 322761, Serial Number 852-633, was submitted to the Hobbs, NM BLM Office. You may wish to view this action by clicking <https://www.blm.gov/wispermits/wis/SP/show-form.do?FormId=852&FormInstanceNumber=633>.

CONFIDENTIALITY NOTICE: The information in this email may be confidential and/or privileged. If you are not the intended recipient or an authorized representative of the intended recipient, you are hereby notified that any review, dissemination or copying of this email and its attachments, if any, or the information contained herein, is prohibited. If you have received this email in error, please immediately notify the sender by return email and delete this email from your system. Thank you.



WIS_PRINT_SUBMITTED_322761.pdf

8K

Rennick, Kenneth <krennick@blm.gov>

Tue, Nov 10, 2015 at 2:25 PM

To: Mayte Reyes <mreyes1@concho.com>

Cc: "Walls, Christopher (cwalls@blm.gov)" <cwalls@blm.gov>

Hello Ms. Mayte Reyes,

I am reviewing the Sundry Notification for the subject well. Considering the depth of the Pilot Hole of 12700-feet and the 9-ppg Fluid, a 5000 (5M)-psi working pressure is required below the 9-5/8th Intermediate Casing Shoe.

Because of this, if you may please send me an email requesting that the Sundry be updated to reflect that a 5000 (5M)-psi system is now needed under the 9-5/8th-inch Intermediate Casing Shoe. As well as include the relevant attachments, the 5000-psi BOP Schematic and the 5M Choke Manifold Equipment with that email, that will be greatly appreciated.

Best Regards,

Kenneth Rennick

[Quoted text hidden]

Kenneth Rennick

Petroleum Engineer
Bureau of Land Management
Carlsbad Field Office
(575) 234-5964
krennick@blm.gov

HOBBS OCD

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Mayte Reyes <MReyes1@concho.com>
To: "Rennick, Kenneth" <krennick@blm.gov>

Tue, Nov 10, 2015 at 2:48 PM

Good afternoon Mr. Rennick,

COG respectfully requests that the submitted sundry be updated to reflect that a 5000 (5M) system is needed. Please attached 5M BOP and Choke diagrams.

Thank you very much,

Mayte

From: Rennick, Kenneth [mailto:krennick@blm.gov]
Sent: Tuesday, November 10, 2015 2:26 PM
To: Mayte Reyes
Cc: Walls, Christopher (cwalls@blm.gov)
Subject: Re: FW: [External] EC Document Submitted - Monet Federal Com #10H

[Quoted text hidden]

 **5M BOP & Choke Schematics.pdf**
30K

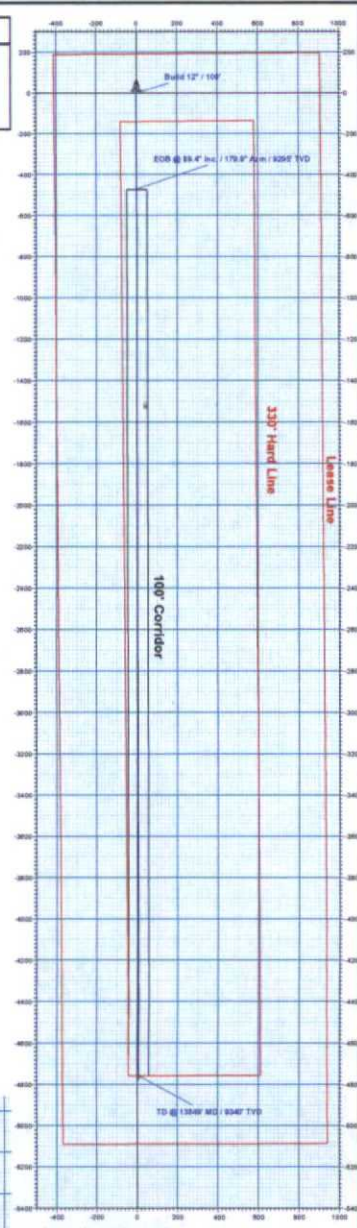
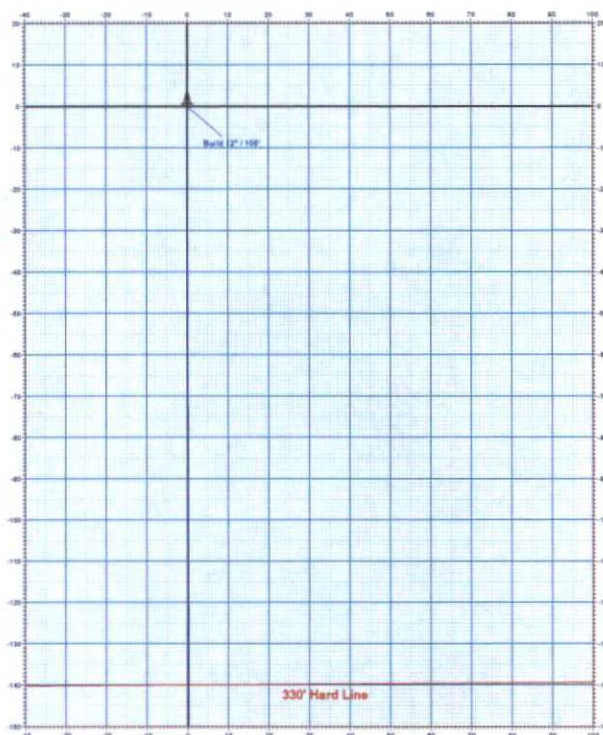
Company Name: COG Operating, LLC
 Monet Federal #10H
 Lea County, NM
 Rig: McVay #7
 Created By: Will Jorch
 Date: 11/3/2015

Monet Federal #10H
 Lea County, NM
 Q150*** & WT-150***
 Design #1

PROJECT DETAILS: Lea County, NM

Geodetic System: US State Plane 1927 (Exact solution)
 Datum: NAD 1927 (NADCON CONUS)
 Ellipsoid: Clarke 1866
 Zone: New Mexico East 3001
 System Datum: Mean Sea Level

ANNOTATIONS						
MD	Inc	Act	TVD	+N-S	+E-W	VSect Departure Annotation
8817.6	0.00	0.00	8817.6	0.0	0.0	Build 12" / 100'
9962.8	88.40	179.90	9294.0	-472.3	6.8	EOB @ 88.4' Inc. / 179.9' Azim / 9294' TVD
13846.7	88.40	179.90	9540.0	-4758.3	6.8	TD @ 13846' MD / 9340' TVD



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DESIGN TARGET DETAILS						
Name	TVD	+N-S	+E-W	Northing	Easting	Latitude Longitude
PBHL - Monet Federal #10 - plan hits target center	9340.0	-4758.3	6.8	429341.66	731889.39	32° 9' 11.314 N 103° 35' 2.996 W

WELL DETAILS: Monet Federal #10H						
+N-S	+E-W	Northing	Easting	Latitude	Longitude	Ground Level
0.0	0.0	424869.90	731889.39	32° 6' 55.401 N	103° 35' 2.987 W	3484.0

GM

T

Azimuths to Grid North

Correction: 6.73°

Magnetic Field

Strength: 48068.8snT

Dip Angle: 60.03°

Date: 11/3/2015

Model: IGRF2015



COG Operating, LLC

Lea County, NM
Sec 4, T25S, R33E
Monet Federal #10H

Wellbore #1

Plan: Design #1

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DDC Well Planning Report

03 November, 2015



Database:	EDM Compass	Local Co-ordinate Reference:	Well Monet Federal #10H
Company:	COG Operating, LLC	TVD Reference:	well @ 3481.0usft (McVay #7)
Project:	Lea County, NM	MD Reference:	well @ 3481.0usft (McVay #7)
Site:	Sec 4, T25S, R33E	North Reference:	Grid
Well:	Monet Federal #10H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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	Sec 4, T25S, R33E		
Site Position:		Northing:	424,999.76 usft
From:	Lat/Long	Easting:	731,880.25 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 9' 58.399 N
		Longitude:	103° 35' 2.306 W
		Grid Convergence:	0.40 °

Well	Monet Federal #10H		
Well Position	+N/-S	0.1 usft	Northing:
	+E/-W	-0.1 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft
		Latitude:	32° 9' 58.401 N
		Longitude:	103° 35' 2.307 W
		Ground Level:	3,464.0 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2015	11/3/2015	7.13
			Dip Angle
			(°)
			60.03
			Field Strength
			(nT)
			48,069

Design	Design #1		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth:
			0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction
			(°)
			179.90

Plan Sections										
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Dogleg	Build	Turn	TFO	Target
Depth	(°)	(°)	Depth	(usft)	(usft)	Rate	Rate	Rate	(°)	
(usft)			(usft)			(°/100usft)	(°/100usft)	(°/100usft)		
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
8,817.6	0.00	0.00	8,817.6	0.0	0.0	0.00	0.00	0.00	0.00	
9,562.6	89.40	179.90	9,295.0	-472.5	0.8	12.00	12.00	24.15	179.90	
13,848.7	89.40	179.90	9,340.0	-4,758.3	8.0	0.00	0.00	0.00	0.00	PBHL - Monet Federa

Database:	EDM Compass	Local Co-ordinate Reference:	Well Monet Federal #10H
Company:	COG Operating, LLC	TVD Reference:	well @ 3481.0usft (McVay #7)
Project:	Lea County, NM	MD Reference:	well @ 3481.0usft (McVay #7)
Site:	Sec 4, T25S, R33E	North Reference:	Grid
Well:	Monet Federal #10H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
Rustler									
1,141.0	0.00	0.00	1,141.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
TOS									
1,436.0	0.00	0.00	1,436.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	0.00
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	0.00
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	0.00
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	0.00
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	0.00
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	0.00
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	0.00
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	0.00
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	0.00
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	0.00
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	0.00
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	0.00
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	0.00
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	0.00
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	0.00
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	0.00
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	0.00
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	0.00

Database: EDM Compass
Company: COG Operating, LLC
Project: Lea County, NM
Site: Sec 4, T25S, R33E
Well: Monet Federal #10H
Wellbore: Wellbore #1
Design: Design #1

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:

Well Monet Federal #10H
well @ 3481.0usft (McVay #7)
well @ 3481.0usft (McVay #7)
Grid
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)
BOS (Fletcher)									
4,810.0	0.00	0.00	4,810.0	0.0	0.0	0.0	0.00	0.00	0.00
4,900.0	0.00	0.00	4,900.0	0.0	0.0	0.0	0.00	0.00	0.00
5,000.0	0.00	0.00	5,000.0	0.0	0.0	0.0	0.00	0.00	0.00
LMAR (Top Delaware)									
5,056.0	0.00	0.00	5,056.0	0.0	0.0	0.0	0.00	0.00	0.00
5,100.0	0.00	0.00	5,100.0	0.0	0.0	0.0	0.00	0.00	0.00
BLCN									
5,139.0	0.00	0.00	5,139.0	0.0	0.0	0.0	0.00	0.00	0.00
5,200.0	0.00	0.00	5,200.0	0.0	0.0	0.0	0.00	0.00	0.00
5,300.0	0.00	0.00	5,300.0	0.0	0.0	0.0	0.00	0.00	0.00
5,400.0	0.00	0.00	5,400.0	0.0	0.0	0.0	0.00	0.00	0.00
5,500.0	0.00	0.00	5,500.0	0.0	0.0	0.0	0.00	0.00	0.00
5,600.0	0.00	0.00	5,600.0	0.0	0.0	0.0	0.00	0.00	0.00
5,700.0	0.00	0.00	5,700.0	0.0	0.0	0.0	0.00	0.00	0.00
5,800.0	0.00	0.00	5,800.0	0.0	0.0	0.0	0.00	0.00	0.00
5,900.0	0.00	0.00	5,900.0	0.0	0.0	0.0	0.00	0.00	0.00
6,000.0	0.00	0.00	6,000.0	0.0	0.0	0.0	0.00	0.00	0.00
6,100.0	0.00	0.00	6,100.0	0.0	0.0	0.0	0.00	0.00	0.00
CYCN									
6,139.0	0.00	0.00	6,139.0	0.0	0.0	0.0	0.00	0.00	0.00
6,200.0	0.00	0.00	6,200.0	0.0	0.0	0.0	0.00	0.00	0.00
6,300.0	0.00	0.00	6,300.0	0.0	0.0	0.0	0.00	0.00	0.00
6,400.0	0.00	0.00	6,400.0	0.0	0.0	0.0	0.00	0.00	0.00
6,500.0	0.00	0.00	6,500.0	0.0	0.0	0.0	0.00	0.00	0.00
6,600.0	0.00	0.00	6,600.0	0.0	0.0	0.0	0.00	0.00	0.00
6,700.0	0.00	0.00	6,700.0	0.0	0.0	0.0	0.00	0.00	0.00
6,800.0	0.00	0.00	6,800.0	0.0	0.0	0.0	0.00	0.00	0.00
6,900.0	0.00	0.00	6,900.0	0.0	0.0	0.0	0.00	0.00	0.00
7,000.0	0.00	0.00	7,000.0	0.0	0.0	0.0	0.00	0.00	0.00
7,100.0	0.00	0.00	7,100.0	0.0	0.0	0.0	0.00	0.00	0.00
7,200.0	0.00	0.00	7,200.0	0.0	0.0	0.0	0.00	0.00	0.00
7,300.0	0.00	0.00	7,300.0	0.0	0.0	0.0	0.00	0.00	0.00
7,400.0	0.00	0.00	7,400.0	0.0	0.0	0.0	0.00	0.00	0.00
7,500.0	0.00	0.00	7,500.0	0.0	0.0	0.0	0.00	0.00	0.00
BYCN									
7,583.0	0.00	0.00	7,583.0	0.0	0.0	0.0	0.00	0.00	0.00
7,600.0	0.00	0.00	7,600.0	0.0	0.0	0.0	0.00	0.00	0.00
7,700.0	0.00	0.00	7,700.0	0.0	0.0	0.0	0.00	0.00	0.00
7,800.0	0.00	0.00	7,800.0	0.0	0.0	0.0	0.00	0.00	0.00
7,900.0	0.00	0.00	7,900.0	0.0	0.0	0.0	0.00	0.00	0.00
8,000.0	0.00	0.00	8,000.0	0.0	0.0	0.0	0.00	0.00	0.00
8,100.0	0.00	0.00	8,100.0	0.0	0.0	0.0	0.00	0.00	0.00
8,200.0	0.00	0.00	8,200.0	0.0	0.0	0.0	0.00	0.00	0.00
8,300.0	0.00	0.00	8,300.0	0.0	0.0	0.0	0.00	0.00	0.00
8,400.0	0.00	0.00	8,400.0	0.0	0.0	0.0	0.00	0.00	0.00
8,500.0	0.00	0.00	8,500.0	0.0	0.0	0.0	0.00	0.00	0.00
8,600.0	0.00	0.00	8,600.0	0.0	0.0	0.0	0.00	0.00	0.00
8,700.0	0.00	0.00	8,700.0	0.0	0.0	0.0	0.00	0.00	0.00
8,800.0	0.00	0.00	8,800.0	0.0	0.0	0.0	0.00	0.00	0.00
Build 12" / 100'									
8,817.6	0.00	0.00	8,817.6	0.0	0.0	0.0	0.00	0.00	0.00
8,900.0	9.89	179.90	8,899.6	-7.1	0.0	7.1	12.00	12.00	0.00

Database:	EDM Compass	Local Co-ordinate Reference:	Well Monet Federal #10H
Company:	COG Operating, LLC	TVD Reference:	well @ 3481.0usft (McVay #7)
Project:	Lea County, NM	MD Reference:	well @ 3481.0usft (McVay #7)
Site:	Sec 4, T25S, R33E	North Reference:	Grid
Well:	Monet Federal #10H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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)
9,000.0	21.89	179.90	8,995.6	-34.4	0.1	34.4	12.00	12.00	0.00
9,100.0	33.89	179.90	9,083.8	-81.1	0.1	81.1	12.00	12.00	0.00
Bone Sprg (BSGL)									
9,195.8	45.39	179.90	9,157.5	-142.1	0.2	142.1	12.00	12.00	0.00
9,200.0	45.89	179.90	9,160.4	-145.1	0.2	145.1	12.00	12.00	0.00
U Avalon Sh									
9,264.5	53.63	179.90	9,202.0	-194.3	0.3	194.3	12.00	12.00	0.00
9,300.0	57.89	179.90	9,222.0	-223.7	0.4	223.7	12.00	12.00	0.00
9,400.0	69.89	179.90	9,265.9	-313.3	0.5	313.3	12.00	12.00	0.00
9,500.0	81.89	179.90	9,290.3	-410.1	0.7	410.1	12.00	12.00	0.00
EOB @ 89.4° Inc. / 179.9° Azm / 9295' TVD									
9,562.6	89.40	179.90	9,295.0	-472.5	0.8	472.5	12.00	12.00	0.00
9,600.0	89.40	179.90	9,295.4	-509.9	0.9	509.9	0.00	0.00	0.00
9,700.0	89.40	179.90	9,296.5	-609.9	1.0	609.9	0.00	0.00	0.00
9,800.0	89.40	179.90	9,297.5	-709.9	1.2	709.9	0.00	0.00	0.00
9,900.0	89.40	179.90	9,298.6	-809.8	1.4	809.8	0.00	0.00	0.00
10,000.0	89.40	179.90	9,299.6	-909.8	1.5	909.8	0.00	0.00	0.00
10,100.0	89.40	179.90	9,300.7	-1,009.8	1.7	1,009.8	0.00	0.00	0.00
10,200.0	89.40	179.90	9,301.7	-1,109.8	1.9	1,109.8	0.00	0.00	0.00
10,300.0	89.40	179.90	9,302.8	-1,209.8	2.0	1,209.8	0.00	0.00	0.00
10,400.0	89.40	179.90	9,303.8	-1,309.8	2.2	1,309.8	0.00	0.00	0.00
10,500.0	89.40	179.90	9,304.9	-1,409.8	2.4	1,409.8	0.00	0.00	0.00
10,600.0	89.40	179.90	9,305.9	-1,509.8	2.5	1,509.8	0.00	0.00	0.00
10,700.0	89.40	179.90	9,307.0	-1,609.8	2.7	1,609.8	0.00	0.00	0.00
10,800.0	89.40	179.90	9,308.0	-1,709.8	2.9	1,709.8	0.00	0.00	0.00
10,900.0	89.40	179.90	9,309.1	-1,809.8	3.0	1,809.8	0.00	0.00	0.00
11,000.0	89.40	179.90	9,310.1	-1,909.8	3.2	1,909.8	0.00	0.00	0.00
11,100.0	89.40	179.90	9,311.2	-2,009.8	3.4	2,009.8	0.00	0.00	0.00
11,200.0	89.40	179.90	9,312.2	-2,109.8	3.5	2,109.8	0.00	0.00	0.00
11,300.0	89.40	179.90	9,313.3	-2,209.8	3.7	2,209.8	0.00	0.00	0.00
11,400.0	89.40	179.90	9,314.3	-2,309.8	3.9	2,309.8	0.00	0.00	0.00
11,500.0	89.40	179.90	9,315.4	-2,409.8	4.1	2,409.8	0.00	0.00	0.00
11,600.0	89.40	179.90	9,316.4	-2,509.7	4.2	2,509.8	0.00	0.00	0.00
11,700.0	89.40	179.90	9,317.5	-2,609.7	4.4	2,609.7	0.00	0.00	0.00
11,800.0	89.40	179.90	9,318.5	-2,709.7	4.6	2,709.7	0.00	0.00	0.00
11,900.0	89.40	179.90	9,319.6	-2,809.7	4.7	2,809.7	0.00	0.00	0.00
12,000.0	89.40	179.90	9,320.6	-2,909.7	4.9	2,909.7	0.00	0.00	0.00
12,100.0	89.40	179.90	9,321.7	-3,009.7	5.1	3,009.7	0.00	0.00	0.00
12,200.0	89.40	179.90	9,322.7	-3,109.7	5.2	3,109.7	0.00	0.00	0.00
12,300.0	89.40	179.90	9,323.8	-3,209.7	5.4	3,209.7	0.00	0.00	0.00
12,400.0	89.40	179.90	9,324.8	-3,309.7	5.6	3,309.7	0.00	0.00	0.00
12,500.0	89.40	179.90	9,325.9	-3,409.7	5.7	3,409.7	0.00	0.00	0.00
12,600.0	89.40	179.90	9,326.9	-3,509.7	5.9	3,509.7	0.00	0.00	0.00
12,700.0	89.40	179.90	9,328.0	-3,609.7	6.1	3,609.7	0.00	0.00	0.00
12,800.0	89.40	179.90	9,329.0	-3,709.7	6.2	3,709.7	0.00	0.00	0.00
12,900.0	89.40	179.90	9,330.0	-3,809.7	6.4	3,809.7	0.00	0.00	0.00
13,000.0	89.40	179.90	9,331.1	-3,909.7	6.6	3,909.7	0.00	0.00	0.00
13,100.0	89.40	179.90	9,332.1	-4,009.7	6.7	4,009.7	0.00	0.00	0.00
13,200.0	89.40	179.90	9,333.2	-4,109.7	6.9	4,109.7	0.00	0.00	0.00
13,300.0	89.40	179.90	9,334.2	-4,209.7	7.1	4,209.7	0.00	0.00	0.00
13,400.0	89.40	179.90	9,335.3	-4,309.6	7.2	4,309.7	0.00	0.00	0.00
13,500.0	89.40	179.90	9,336.3	-4,409.6	7.4	4,409.6	0.00	0.00	0.00
13,600.0	89.40	179.90	9,337.4	-4,509.6	7.6	4,509.6	0.00	0.00	0.00

Database:	EDM Compass	Local Co-ordinate Reference:	Well Monet Federal #10H
Company:	COG Operating, LLC	TVD Reference:	well @ 3481.0usft (McVay #7)
Project:	Lea County, NM	MD Reference:	well @ 3481.0usft (McVay #7)
Site:	Sec 4, T25S, R33E	North Reference:	Grid
Well:	Monet Federal #10H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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)
13,700.0	89.40	179.90	9,338.4	-4,609.6	7.8	4,609.6	0.00	0.00	0.00
13,800.0	89.40	179.90	9,339.5	-4,709.6	7.9	4,709.6	0.00	0.00	0.00
TD @ 13849' MD / 9340' TVD									
13,848.7	89.40	179.90	9,340.0	-4,758.3	8.0	4,758.3	0.00	0.00	0.00

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude		Longitude
PBHL - Monet Federal # - hit/miss target - Shape - plan hits target center - Rectangle (sides W100.0 H0.0 D4,286.1)	91.60	179.90	9,340.0	-4,758.3	8.0	420,241.60	731,888.20	32° 9' 11.314 N		103° 35' 2.599 W

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,141.0	1,141.0	Rustler		0.60	179.90	
1,436.0	1,436.0	TOS		0.60	179.90	
4,810.0	4,810.0	BOS (Fletcher)		0.60	179.90	
5,056.0	5,056.0	LMAR (Top Delaware)		0.60	179.90	
5,139.0	5,139.0	BLCN		0.60	179.90	
6,139.0	6,139.0	CYCN		0.60	179.90	
7,583.0	7,583.0	BYCN		0.60	179.90	
9,195.8	9,157.5	Bone Sprg (BSGL)		0.60	179.90	
9,264.5	9,202.0	U Avalon Sh		0.60	179.90	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
8,817.6	8,817.6	0.0	0.0	Build 12° / 100'	
9,562.6	9,295.0	-472.5	0.8	EOB @ 89.4° Inc. / 179.9° Azm / 9295' TVD	
13,848.7	9,340.0	-4,758.3	8.0	TD @ 13849' MD / 9340' TVD	



COG Operating, LLC

Lea County, NM

Sec 4, T25S, R33E

Monet Federal #10H

Wellbore #1

Plan: Design #1

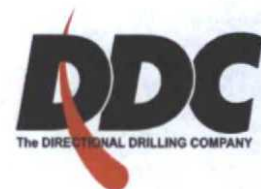
DDC Curve Report

03 November, 2015

HOBBS OCD

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Database:	EDM Compass	Local Co-ordinate Reference:	Well Monet Federal #10H
Company:	COG Operating, LLC	TVD Reference:	well @ 3481.0usft (McVay #7)
Project:	Lea County, NM	MD Reference:	well @ 3481.0usft (McVay #7)
Site:	Sec 4, T25S, R33E	North Reference:	Grid
Well:	Monet Federal #10H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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	Sec 4, T25S, R33E		
Site Position:		Northing:	424,999.76 usft
From:	Lat/Long	Easting:	731,880.25 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"
		Latitude:	32° 9' 58.399 N
		Longitude:	103° 35' 2.306 W
		Grid Convergence:	0.40 °

Well	Monet Federal #10H		
Well Position	+N/-S	0.1 usft	Northing:
	+E/-W	-0.1 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft
		Latitude:	32° 9' 58.401 N
		Longitude:	103° 35' 2.307 W
		Ground Level:	3,464.0 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2015	11/3/2015	7.13
			Dip Angle
			(°)
			60.03
			Field Strength
			(nT)
			48,069

Design	Design #1		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth:
			0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction
			(°)
			179.90

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
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
8,817.6	0.00	0.00	8,817.6	0.0	0.0	0.00	0.00	0.00	0.00	
9,562.6	89.40	179.90	9,295.0	-472.5	0.8	12.00	12.00	24.15	179.90	
13,848.7	89.40	179.90	9,340.0	-4,758.3	8.0	0.00	0.00	0.00	0.00	PBHL - Monet Federa

Database:	EDM Compass	Local Co-ordinate Reference:	Well Monet Federal #10H
Company:	COG Operating, LLC	TVD Reference:	well @ 3481.0usft (McVay #7)
Project:	Lea County, NM	MD Reference:	well @ 3481.0usft (McVay #7)
Site:	Sec 4, T25S, R33E	North Reference:	Grid
Well:	Monet Federal #10H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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)
Build 12° / 100'									
8,817.6	0.00	0.00	8,817.6	0.0	0.0	0.0	0.00	0.00	0.00
8,820.0	0.29	179.90	8,820.0	0.0	0.0	0.0	12.00	12.00	0.00
8,850.0	3.89	179.90	8,850.0	-1.1	0.0	1.1	12.00	12.00	0.00
8,880.0	7.49	179.90	8,879.8	-4.1	0.0	4.1	12.00	12.00	0.00
8,910.0	11.09	179.90	8,909.4	-8.9	0.0	8.9	12.00	12.00	0.00
8,940.0	14.69	179.90	8,938.7	-15.6	0.0	15.6	12.00	12.00	0.00
8,970.0	18.29	179.90	8,967.4	-24.1	0.0	24.1	12.00	12.00	0.00
9,000.0	21.89	179.90	8,995.6	-34.4	0.1	34.4	12.00	12.00	0.00
9,030.0	25.49	179.90	9,023.1	-46.5	0.1	46.5	12.00	12.00	0.00
9,060.0	29.09	179.90	9,049.7	-60.2	0.1	60.2	12.00	12.00	0.00
9,090.0	32.69	179.90	9,075.5	-75.6	0.1	75.6	12.00	12.00	0.00
9,120.0	36.29	179.90	9,100.2	-92.6	0.2	92.6	12.00	12.00	0.00
9,150.0	39.89	179.90	9,123.8	-111.1	0.2	111.1	12.00	12.00	0.00
9,180.0	43.49	179.90	9,146.2	-131.1	0.2	131.1	12.00	12.00	0.00
Bone Sprg (BSGL)									
9,195.8	45.39	179.90	9,157.5	-142.1	0.2	142.1	12.00	12.00	0.00
9,210.0	47.09	179.90	9,167.3	-152.4	0.3	152.4	12.00	12.00	0.00
9,240.0	50.69	179.90	9,187.0	-175.0	0.3	175.0	12.00	12.00	0.00
U Avalon Sh									
9,264.5	53.63	179.90	9,202.0	-194.3	0.3	194.3	12.00	12.00	0.00
9,270.0	54.29	179.90	9,205.3	-198.8	0.3	198.8	12.00	12.00	0.00
9,300.0	57.89	179.90	9,222.0	-223.7	0.4	223.7	12.00	12.00	0.00
9,330.0	61.49	179.90	9,237.2	-249.6	0.4	249.6	12.00	12.00	0.00
9,360.0	65.09	179.90	9,250.6	-276.3	0.5	276.3	12.00	12.00	0.00
9,390.0	68.69	179.90	9,262.4	-303.9	0.5	303.9	12.00	12.00	0.00
9,420.0	72.29	179.90	9,272.4	-332.2	0.6	332.2	12.00	12.00	0.00
9,450.0	75.89	179.90	9,280.7	-361.0	0.6	361.1	12.00	12.00	0.00
9,480.0	79.49	179.90	9,287.1	-390.4	0.7	390.4	12.00	12.00	0.00
9,510.0	83.09	179.90	9,291.6	-420.0	0.7	420.0	12.00	12.00	0.00
9,540.0	86.69	179.90	9,294.3	-449.9	0.8	449.9	12.00	12.00	0.00
EOB @ 89.4° Inc. / 179.9° Azm / 9295' TVD									
9,562.6	89.40	179.90	9,295.0	-472.5	0.8	472.5	12.00	12.00	0.00
TD @ 13849' MD / 9340' TVD									
13,848.7	89.40	179.90	9,340.0	-4,758.3	8.0	4,758.3	0.00	0.00	0.00

Design Targets

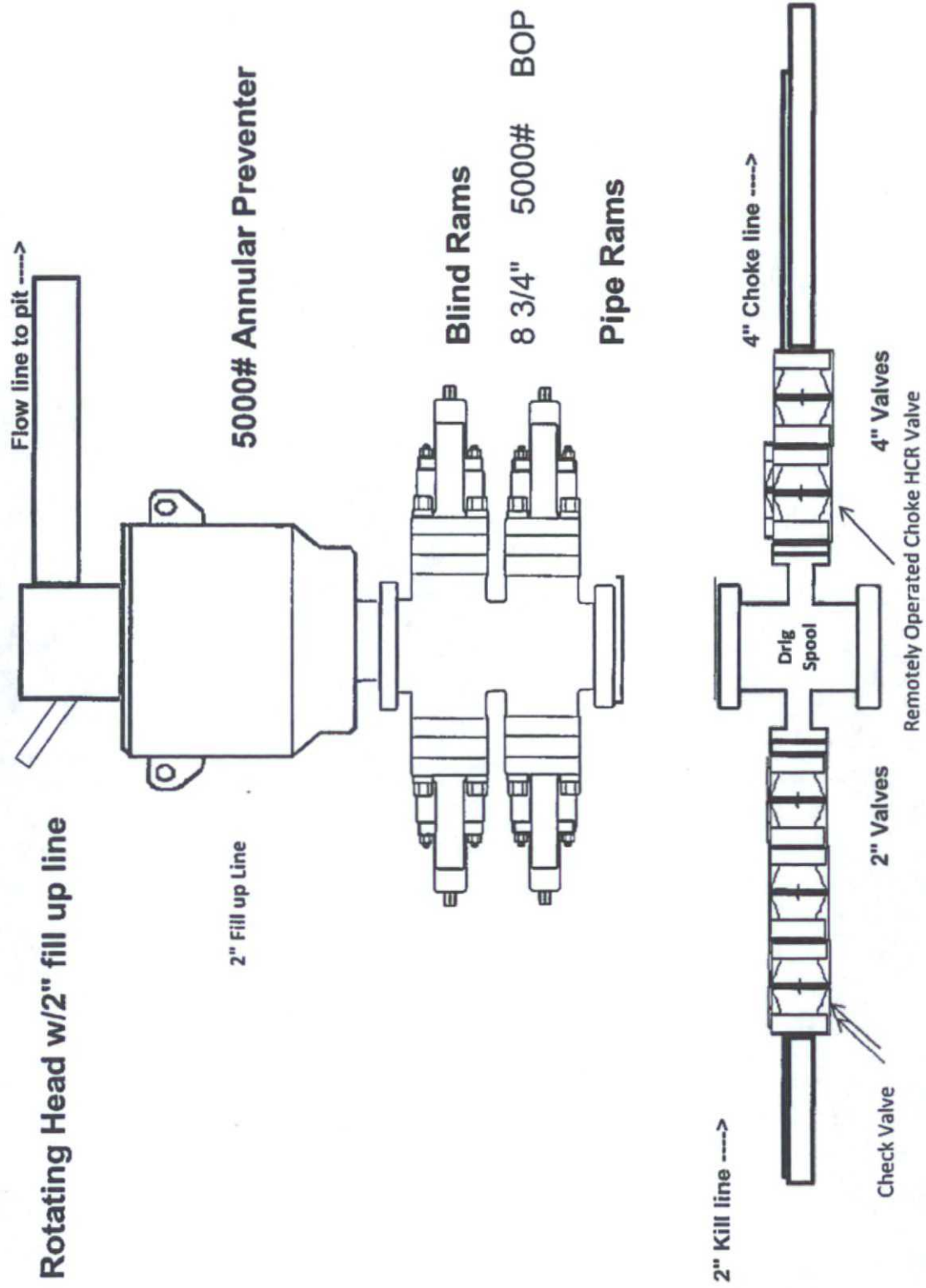
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
PBHL - Monet Federal #	91.60	179.90	9,340.0	-4,758.3	8.0	420,241.60	731,888.20	32° 9' 11.314 N	103° 35' 2.599 W
- plan hits target center									
- Rectangle (sides W100.0 H0.0 D4,286.1)									

Database:	EDM Compass	Local Co-ordinate Reference:	Well Monet Federal #10H
Company:	COG Operating, LLC	TVD Reference:	well @ 3481.0usft (McVay #7)
Project:	Lea County, NM	MD Reference:	well @ 3481.0usft (McVay #7)
Site:	Sec 4, T25S, R33E	North Reference:	Grid
Well:	Monet Federal #10H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

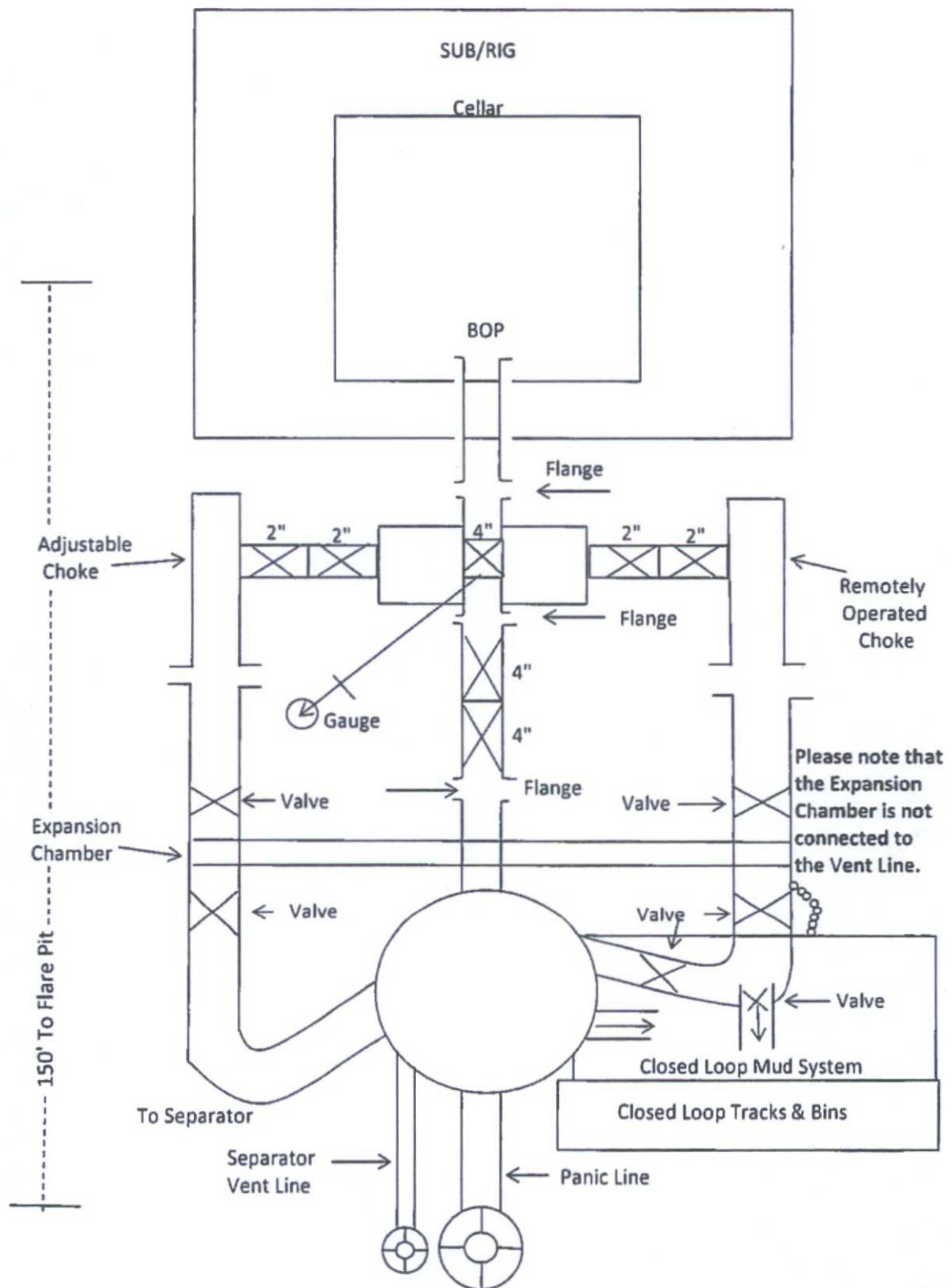
Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,141.0	1,141.0	Rustler		0.60	179.90	
1,436.0	1,436.0	TOS		0.60	179.90	
4,810.0	4,810.0	BOS (Fletcher)		0.60	179.90	
5,056.0	5,056.0	LMAR (Top Delaware)		0.60	179.90	
5,139.0	5,139.0	BLCN		0.60	179.90	
6,139.0	6,139.0	CYCN		0.60	179.90	
7,583.0	7,583.0	BYCN		0.60	179.90	
9,195.8	9,157.5	Bone Sprg (BSGL)		0.60	179.90	
9,264.5	9,202.0	U Avalon Sh		0.60	179.90	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
8,817.6	8,817.6	0.0	0.0	Build 12° / 100'	
9,562.6	9,295.0	-472.5	0.8	EOB @ 89.4° Inc. / 179.9° Azm / 9295' TVD	
13,848.7	9,340.0	-4,758.3	8.0	TD @ 13849' MD / 9340' TVD	

5,000 psi BOP Schematic



5M Choke Manifold Equipment



In a Lesser Prairie-Chicken section.

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	7.86	2.01	1.01	1,200	65,400	
"B"							0	0	
w/8.4#/g mud, 30min Sfc Csg Test psig: 1,387			Tail Cmt	does not	circ to sfc.	Totals:	1,200	65,400	
Comparison of Proposed to Minimum Required Cement Volumes									
Hole Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
17 1/2	0.6946	750	1210	888	36	9.00	1574	2M	1.56

9 5/8	casing inside the	13 3/8	Design Factors				INTERMEDIATE		
Segment	#/ft	Grade	Coupling	Joint	Collapse	Burst	Length	Weight	
"A"	40.00	J 55	LT&C	2.56	1.08	0.91	4,500	180,000	
"B"	40.00	L 80	LT&C	31.34	1.15	1.32	580	23,200	
w/8.4#/g mud, 30min Sfc Csg Test psig:							Totals:	5,080	203,200
The cement volume(s) are intended to achieve a top of				0	ft from surface or a		1200	overlap.	
Hole Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
12 1/4	0.3132	1200	2439	1669	46	10.20	2300	3M	0.81
Collapse OK									
Burst Frac Gradient(s) for Segment(s): A, B, C, D = 0.88, b, c, d All > 0.70, OK.									

5 1/2	casing inside the 9 5/8			Design Factors			PRODUCTION		
Segment	#/ft	Grade	Coupling	Joint	Collapse	Burst	Length	Weight	
"A"	17.00	P 110	LT&C	2.10	1.81	1.79	8,818	149,899	
"B"	17.00	P 110	LT&C	5.65	1.52	1.79	682	11,601	
w/8.4#/g mud, 30min Sfc Csg Test psig: 1,940							Totals:	9,500 161,500	
B would be:				7.13	1.72	if it were a vertical wellbore.			
No Pilot Hole Planned		MTD	Max VTD	Csg VD	Curve KOP	Dogleg°	Severity°	MEOC	
		9500	9290	9290	8818	89	12	9562.6	
The cement volume(s) are intended to achieve a top of				4500	ft from surface or a		580	overlap.	
Hole Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
8 3/4	0.2526		0			9.00	3144	5M	1.35

Tail cmt									
5 1/2	In tandem @		9500	Design Factors				Tandem	
Segment	#/ft	Grade	Coupling	Joint	Collapse	Burst	Length	Weight	
"A"	17.00	P 110	LT&C	3.08	1.48	1.79	63	1,064	
"B"	17.00	P 110	LT&C	2.07	1.26	1.79	4,286	72,864	
w/8.4#/g mud, 30min Sfc Csg Test psig: 2,104						Totals:		4,349	73,928
A Segment Design Factors would be:				2.06	1.67	if it were a vertical wellbore.			
No Pilot Hole Planned			MTD	Max VTD	Csg VD	Curve KOP	Dogleg°	Severity°	MEOC
			13849	12700	12700	8818	89	12	9562.6
Cmt vol calc includes previous csg (tandem conn) TOC					9500	ft from surface or a		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	0.1841	1700	3160	2074	52	9.00			0.98
Class 'H' tail cmt yld > 1.20									
For the 8 3/4 & 8 Hole Size									

For the 8 3/4 & 8 Hole Size