ATS-12-1108

Form 3160-3
(March 2012)

HOBBS OCD
Hobbs
DEC 20 2012
RECEIVED

FORM APPROVED
OMB No. 1004-0137
Expires October 31, 2014

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
LC068281-B

6. If Indian, Allotee or Tribe Name
N/A

1a. Type of work: ☑ DRILL ☐ REENTER

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

1b. Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other ☑ Single Zone ☐ Multiple Zone

8. Lease Name and Well No. (39058)
Buck 20 Federal # 6H

2. Name of Operator ConocoPhillips Company (217817)

9. API Well No.
30-025-40902

3a. Address
P.O. Box 51810
Midland, Tx 79710

3b. Phone No. *(include area code)*
432-688-6943

10. Field and Pool or Exploratory (97838)
~~Bad Hills; Bone Spring~~ Jennings Upper Shale

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface 55 FNL & 2659 FEL (NWNE) of 20-26S-32E Unit C
At proposed prod. zone 330 FSL & 2310 FEL (SWSE) of 20-26S-32E Unit O

11. Sec., T. R. M. or Blk. and Survey or Area
Section 20-26S-32E (Surface)

14. Distance in miles and direction from nearest town or post office*
30 miles suth/west of Jal, NM

12. County or Parish
Lea

13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 330

16. No. of acres in lease
640

17. Spacing Unit dedicated to this well
160

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 325

19. Proposed Depth
13540 MD/8824 TVD

20. BLM/BIA Bond No. on file
ES0085

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3177 GL

22. Approximate date work will start*
09/01/2012

23. Estimated duration
30 days

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No.1, must be attached to this form:

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification
6. Such other site specific information and/or plans as may be required by the BLM.

25. Signature

Name *(Printed/Typed)*
Donna Williams

Date
08/13/2012

Title
Sr. Regulatory Advisor

Approved by *(Signature)* /s/George MacDonell

Name *(Printed/Typed)* /s/George MacDonell

Date DEC 18 2012

Title (Act) FIELD MANAGER

Office CARLSBAD FIELD OFFICE

Application approval 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.
Conditions of approval, if any, are attached.

APPROVAL FOR TWO YEARS

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.

(Continued on page 2)

*(Instructions on page 2)

Carlsbad Controlled Water Basin

KK 12/27/12

Approval Subject to General Requirements & Special Stipulations Attached

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

JAN 08 2013

OPERATORS NAME:	**ConocoPhillips Company**
LEASE NAME AND WELL NO.:	**Buck Federal 20 # 6H**
SURFACE LOCATION:	**55 FNL & 2659 FEL (NWNE) of 20-26S-32E**
CASING POINT:	**790.1 FNL & 2321.2 FEL (NWNE) of 20-26S-32E**
BHL:	**330 FSL & 2310 FEL (SWSE) of 20-26S-32E**
FIELD NAME:	**Red Hills; Bone Spring**
POOL NAME:	**Bone Spring/Avalon**
COUNTY:	**Lea County, New Mexico**
	Federal Surface/Federal Minerals LC068281-B

The following information is to supplement the Application for Permit to Drill.

DRILLING PLAN

1. Name and estimated tops of all geologic groups, formations, members, or zones.(TVD)

Quaternary	Surface	Water
Rustler	1037	Salt
Castille	2566	Salt
Delaware Top	4353	Oil/gas/water
Ramsey	4383	Oil/gas/water
Ford Shale	4440	Oil/gas/water
Olds	4453	Oil/gas/water
Cherry Canyon Lower Top	6555	Oil/gas/water
Bone Spring	8159	Oil/gas/water
Bone Spring 1st Carbonate	8304	Oil/gas/water
Base of Bone Spring 1st Carbonate	8400	Oil/gas/water
KOP (estimate)	8122	
Avalon A Shale Top	8677	Oil/gas/water
Avalon B Zone Top	8920	Oil/gas/water
Avalon C Shale Top	N/A	Oil/gas/water
Avalon Target	N/A	Oil/gas/water

2. Estimated depths and thickness of formations, members or zones potentially containing usable water, oil, gas, or prospectively valuable deposits of other minerals that the operator expects to encounter, and the operator's plans for protecting such resources.

Quanternary	Surface-1037 (water)
Rustler & Castile	1037-4353' (salt)

All of the water bearing formations identified above will be protected by the intermediate setting of the 9 5/8" casing and circulating of cement to surface

Delaware 4353-8159 (oil/gas/water)
The prospective formation identified will be protected by the intermediate setting of the 7" casing and tying the cement into the 9 5/8" casing
Bone Spring 8159-8920 (oil/gas/water)
The geologic tops identified above from the top of the Bone Spring/Avalon are part of the target formation

3. The operator's minimum specifications for blowout prevention equipment and diverter systems to be used, including size, pressure rating, configuration, and the testing procedure and frequency.

A 5000# system will be installed, used, maintained, and tested accordingly. After nippling up, and every 30 days thereafter, preventors will be pressure tested. BOP will be inspected and operated at least daily to insure good working order. All pressure and operating tests will be recorded on the daily drilling reports. Ram Type preventors will be tested to rated working pressure or 70% of the minimum internal yield of the casing. Annular type preventer(s) shall be tested to 50% of the approved BOP stack working pressure. Pressure shall be maintained at least 10 minutes or until provisions of test are met, whichever is longer. Pursuant to Onshore Oil and Gas Order No. 2, the BOP equipment for a 5M system or greater shall include lower Kelly cock valve with handle available, safety valves and subs to fit all drill string connections in use and inside BOP or float sub shall be available. All choke lines from the drilling spool forward shall meet the requirements of the Onshore Order 2 as specified. **See Attached BOPe Schematic**

4. The proposed casing program including size, grade, weights, type of thread and coupling, and the setting depth of each string and its condition (new or acceptably reconditioned). For exploratory wells, or for wells as otherwise specified by the authorized officer, the operator shall include the minimum design factors for tensions, burst, and collapse that are incorporated into the casing design. In cases where tapered casing strings are utilized, the operator shall also include and/or setting depths of each portion.

NEW CASING:

See COA

Surface: 17 1/2" hole, 13 3/8" 54.5# J55 STC csg, set @ 1030 ~~1065~~'. Drill out with 12 ¼" bit and perform shoe test to 11.0 ppg MWE.
Burst: 2.37/Collapse: 4.92/Tension: 2.57
Intermediate 1: 12 1/4" hole, 9 5/8" 36# J55 LTC csg, set @ 4380
Burst: 2.88/Collapse: 2.62/Tension: 4.74
(This string of casing would not be subject ot the production collapse load case of being pumped off to zero pressure on the inside by beam pump or ESP production pumping the fluid level down. The 9 5/8" casing would be isolated

from the beam pumping production collapse load case by the production casing that would be run. If loss of circulation occurs during the drilling phase while drilling below the 9 5/8" intermediate casing, we would expect the fluid level would fall no further than 2200' below the surface of ground before reaching hydrostatic balance with the pressure of the loss zone. Our anticipated maximum mud weight for drilling below the 9 5/8" intermediate casing is 9.3 ppg and our experience has been that we have not had severe losses with this mud weight in our previous wells in this area. The 9 5/8" casing will be filled with mud while running it by filling it at least once each 30 joints) See COA

Intermediate 2: 8 3/4" hole, 7" 29# P110 BTC csg set @ 9302
Burst: 2.29/Collapse: 1.74/Tension: 2.81/3.31
Production Liner (Uncemented): 6" hole, 4 ½" 11.6# P110 BTC liner set @ 9202-13540 MD Burst: 3.25/Collapse: 3.36/Tension: 5.78/6.80 (Packers and Sleeves)
The plan is to set casing and drill open hole in a southern direction to a proposed bottomhole location of 330 FSL & 2310 FEL (SWSE) of Section 20-26S-32E
ConocoPhillips will utilize casing friendly hardbanded drill pipe in a manner that is consistent with current company policy and standards with respect to minimizing or mitigating internal casing wear. The responsibility to ensure all parties are acting according to their roles and responsibilities rest with the Company. Any damage or impacts from use of casing friendly hardbanded drill pipe rest with ConocoPhillips Company.

5. The amount and type(s) of cement, including anticipated additives to be used in setting each casing string, shall be described. If stage cementing techniques are to be employed, the setting depth of the stage collars and amount and type of cement, including additives, and preflush amounts to be used in each stage, shall be given. The expected linear fill-up of each cemented string, or each stage when utilizing stage-cementing techniques, shall also be given.

13 3/8 casing: Lead w/800 sxs Class C cmt + HalCem-C (Yield 1.33 cft) Tail w/230 sxs Class C cmt + 1 lbm/sk EconoChem HRLTRRC (Yield 1.85 Cuft/sk). Circulated to surface based on 17 ½" hole with 100% excess

9 5/8" casing: Lead w/990 sxs 50/50 Class C Poz + 2.5 gal/bbl WG-19 + 1 lbm/sk EconoCem-C (Yield 2.48 cft/sk), Tail w/140 sxs H + HalCem C (Yield 1.33 cft/sk) Circulatd to surface based on 12 ¼" hole w/120% excess

7" casing: Lead w/560 sxs HLH + .3% Halad9 + 5 lbs/sk silicalite + .3% HR-800 (Yield 2.0 cft/sk), Tail w/232 sxs Class H + .4% Halad-9 + .1% WG-17 + 3.0% KCl + .3% HR800 (Yield 1.2 cft/sk). Circulate cement 500' into the 9 5/8" casing based on 8 ¾" hole w/100% excess

4 ½" Liner: Uncemented

6. The anticipated type and characteristics of the proposed circulating medium or mediums proposed for the drilling of each wellbore section, the quantities and types of mud and weighting material to be maintained, and the monitoring equipment to be used on the circulating system.

Mud Program:

1030	0-1065	Aquagel-Spud Mud	8.9	Wt/Gl	32-36 Vis. NC
	1065-4380	Brine	10	Wt/Gl	28-30 Vis. 5-8
	4380-9278	Brine	9.3	Wt/Gl	28-30 Vis 5-8
	9278-13539	Cut Brine	9.3	Wt/Gl	30-40 Vis <=5

Gas detection equipment and pit level flow monitoring equipment will be on location. ConocoPhillips Company will maintain sufficient mud and weighted material on location at all times.

7. The anticipated testing, logging, and coring procedures to be used, including drill stem testing procedures, equipment, and safety measures.

a. DST Program: None
b. Mud Logging: Two-Man – 1065-TD See COA
Logs to be run: GR/MWD

8. List the expected bottom-hole pressure and any anticipated abnormal pressures, temperatures or potential hazards that are expected to be encountered, such as lost circulation zones and hydrogen sulfide. The operator's plans for mitigating such hazards shall be discussed. Should the potential to encounter hydrogen sulfide exist, the mitigation procedures shall comply with the provisions of the BLM.

The expected pressure gradient is 0.433 psi/ft or 9-9.1 ppg equivalent
.The average anticipated bottom hole pressure ranges on average is .65 psi/ft
No hydrogen sulfide is expected during drilling operations; however, the potential does exist for H2S. Please see attached H2S contingency plan to be used in the event of occurrence.

Any other facets of the proposed operation which the operator wishes to be considered in reviewing the application.

Anticipated construction date is September 1, 2012 with anticipated spud date of October 1, 2012. Construction of well pad and road will begin as soon as all agency approvals are obtained.

9. Address the proposed directional design, plan view, and vertical section in true vertical and measured depth for directional, horizontal, or coil tubing operations.

The proposed directional/horizontal documents are attached.

DRILLING PLAN

PROSPECT/FIELD	Bonespring/Red Hills			COUNTY/STATE	Lea County, NM	
OWNERS	ConocoPhillips			LEASE		
WELL NO.	Buck Federal 20 6H	FNL	FSL	FEL	FWL	
LOCATION	Surface Location:	55		2659		
	Bottom Hole Location:		330	2310		
EST. T.D.	Leg #1 13,540' MD			GROUND ELEV.	3,171' (est)	
				RKB	3,187' (est)	

PROGNOSIS: Based on 3,187' KB(est)

MARKER	S.S. DEPTH	TVD
Quaternary		Surface
Rustler	2,150	1,037
Delaware Top	-1,166	4,353
Bone Spring	-8,159	8,159
Bone Spring 1st Carbonate Top	-5,117	8,304
Bone Spring 1st Carbonate Base	-5,213	8,400
KOP		7,956
Avalon A Shale Top	-5,490	8,677
Avalon A Shale Base	-5,733	8,920
Avalon A Shale Horizontal Target	-5,634	8,821

LOGS:

Type	Interval
Open Hole:	
GR-MWD	KOP-TD

DEVIATION:

Surf:	3° max., svy every 500'
Int #1/2:	3° max., svy every 90'
Interm #2 Curve :	90°., svy every 30'
Prod Lateral :	90°., svy every 30'

DST'S:

CORES: No core.

SAMPLES:

	Start	End	
Mudlogging:			
Two-Man:	1065'	TD	Vertical and Horizontal sections

BOP:

COP Category 3 Well Control Requirements

Precision 827 BOPE:	13-5/8"-5Mpsi Annular
(With Rotating Head)	13-3/8"-5Mpsi Blind Ram
	13-3/8"-5Mpsi Cross / Choke & Kill Lines
	13-3/8"-5M psi Pipe Ram
	13-3/8"-5Mpsi Spacer Spool

Dip Rate: (See inclination prediction)

Max. Anticipated BHP: 0.65 psi/ft

Surface Formation:

MUD:	Interval	Type	Max. MW	Vis	WL	Remarks
Surface:	0'-1065'	Aquagel - Spud Mud	8.9	32-36	NC	
Intermediate 1:	1065'-4380'	Brine	10	28-30	5-8	
Intermediate 2:	4380'-9302'	Brine	9.3	28-30	5-8	
Production:	9302'-13540'	Cut Brine	9.3	30-40	<=5	

CASING:	Size	Wt ppf	Hole	Depth	Cement	WOC	Remarks
Surface:	13-3/8"	54.5	17-1/2	1,065'	To Surface	18hrs	
Intermediate 1:	9-5/8"	36	12-1/4"	4,380'	To Surface	18hrs	
Intermediate 2:	7"	29	8 3/4"	9,302'	500' into the 9-5/8"	18hrs	
Production Lat #1:	4 1/2"	11.6	6"	13,540'	Packers and Sleeves	N/A	Liner

DIRECTIONAL PLAN

	MD	TVD	AZ	
Surface:	N/A	N/A	0	Directional Company: DDC
Vertical KOP :	7,956'	7,956'	0.0	Vertical Build Rate: 8.0 °/100'
End Build/ 7"Casing (90° curve):	9,302'	8,821'	179.9	Tan Leg Turn Rate: 0.0 °/100'
Tangent:	N/A	N/A	179.9	
Turn:	N/A	N/A	179.9	
TD:	13,540'	8,824'	179.9	

Comments:
Surveys will be taken with INC Survey Tool below surface casing while drilling with PDC + Scout Vertical Seeking Tool + Straight Motor BHA

Prep By: Katia Filina Date: 7/26/12 Doc: REV.2

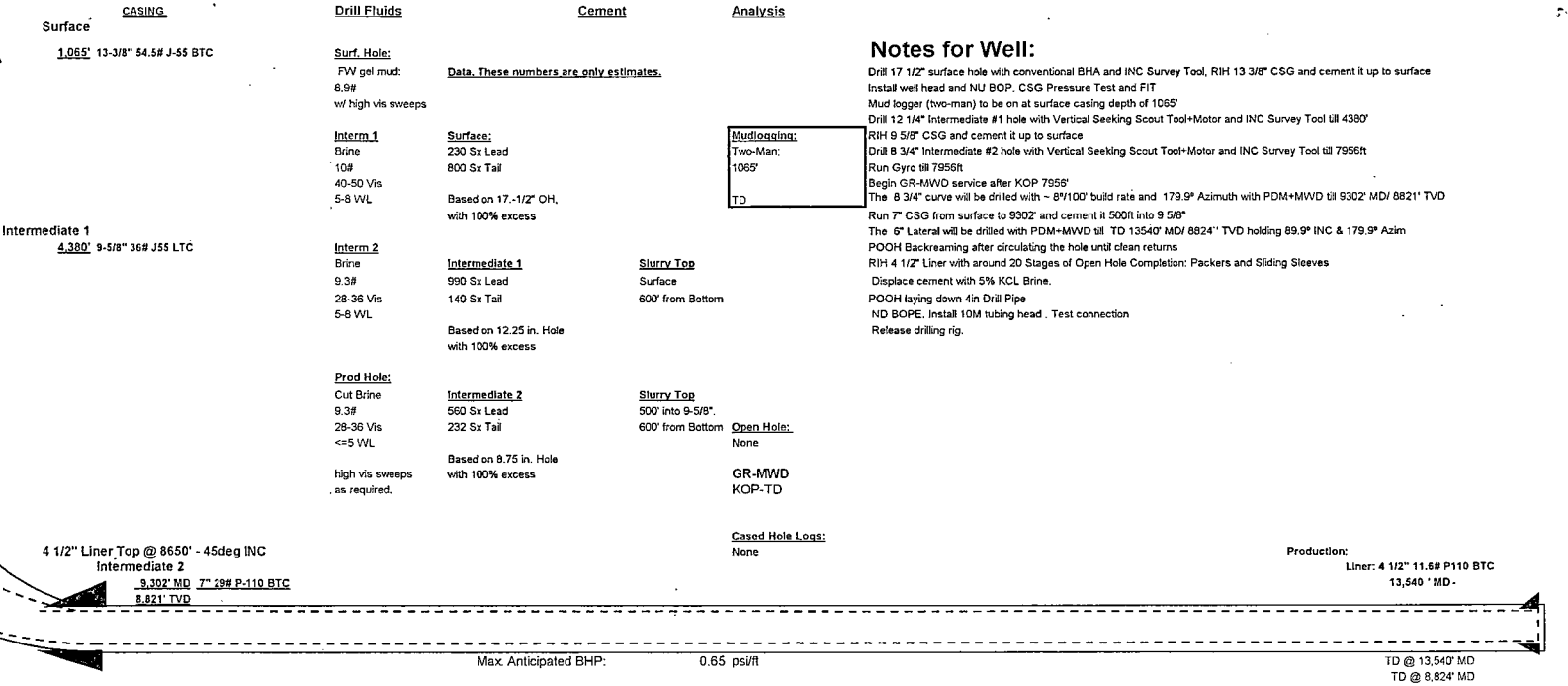
k Federal 20 6H

Surface Location:		Bottom Hole Location	
55FNL	2659FEL	330FSL	2310FEL

Directional:

	MD	TVD	FNL/FSL	FEL/FWL	S-T-R	AZI
Vertical KOP :	7956	7956	0	0	0	0
End Build/ 7"Casing (90° curve):	9,302'	8,821'	0	0	0	179.9
Tangent:	N/A	N/A	0	0	0	179.9
Turn:	N/A	N/A	0	0	0	179.9
TD:	13,540'	8,824'	0	0	0	179.9

Formation	TVD
ernary	Surface
ler	1,037
ware Top	4,353
	8,159
Spring	8,304
Spring 1st Carbonate Top	8,400
Spring 1st Carbonate Base	7,955
	7,956
on A Shale Top	8,677
on A Shale Base	8,920
ion A Shale Horizontal Target	8,821
KOP (8°/100')	7,956



CASING

Drill Fluids

Surf. Hole:
FW gel mud:
8.9#
w/ high vis sweeps

Interm 1
Brine
10#
40-50 Vis
5-8 WL

Interm 2
Brine
9.3#
28-36 Vis
5-8 WL

Prod Hole:
Cut Brine
9.3#
28-36 Vis
<=5 WL

high vis sweeps as required.

Cement

Data. These numbers are only estimates.

Surface:
230 Sx Lead
800 Sx Tail

Based on 17.-1/2" OH, with 100% excess

Intermediate 1
990 Sx Lead
140 Sx Tail

Based on 12.25 in. Hole with 100% excess

Intermediate 2
560 Sx Lead
232 Sx Tail

Based on 8.75 in. Hole with 100% excess

Slurry Top
Surface
600' from Bottom

Slurry Top
500' into 9-5/8".
600' from Bottom

Analysis

Mudlogging:
Two-Man:
1065'

TD

Open Hole:
None

GR-MWD
KOP-TD

Cased Hole Logs:
None

Notes for Well:

Drill 17 1/2" surface hole with conventional BHA and INC Survey Tool, RIH 13 3/8" CSG and cement it up to surface
Install well head and NU BOP. CSG Pressure Test and FIT
Mud logger (two-man) to be on at surface casing depth of 1065'
Drill 12 1/4" Intermediate #1 hole with Vertical Seeking Scout Tool+Motor and INC Survey Tool till 4380'
RIH 9 5/8" CSG and cement it up to surface
Drill 8 3/4" Intermediate #2 hole with Vertical Seeking Scout Tool+Motor and INC Survey Tool till 7956ft
Run Gyro till 7956ft
Begin GR-MWD service after KOP 7956'
The 8 3/4" curve will be drilled with ~ 8°/100' build rate and 179.9° Azimuth with PDM+MWD till 9302' MD/ 8821' TVD
Run 7" CSG from surface to 9302' and cement it 500ft into 9 5/8"
The 6" Lateral will be drilled with PDM+MWD till TD 13540' MD/ 8824'' TVD holding 89.9° INC & 179.9° Azim
POOH Backreaming after circulating the hole until clean returns
RIH 4 1/2" Liner with around 20 Stages of Open Hole Completion: Packers and Sliding Sleeves
Displace cement with 5% KCL Brine.
POOH laying down 4in Drill Pipe
ND BOPE. Install 10M tubing head . Test connection
Release drilling rig.

Production:
Liner: 4 1/2" 11.6# P110 BTC
13,540 ' MD -

Max. Anticipated BHP: 0.65 psi/ft

TD @ 13,540' MD
TD @ 8,824' MD

Vick Harvey Geologist	Date 7/26/2012	
Katia Filina Drilling Engineer	Date 7/26/2012	

Bonespring/Red Hills
ConocoPhillips
Buck Federal 20 6H

Surface Casing:	
Surface Casing Depth (Ft)	1,065
Surface Casing O.D. (In.)	13.375
Surface Casing ID (In)	12.715
Hole O.D. (In)	17.5
Excess (%)	100%
Volume Tail (Sx)	230
Yield Tail (Cu. Ft./Sx)	1.85
Yield Lead (Cu. Ft./Sx)	1.33
Shoe Joint (Ft)	40
Shoe Volume (Cu. Ft)	35.3
Tail feet of cement	300
Calculated Total Volume (Cu. Ft.)	1,515
Calc. Tail Volume (Cu. Ft.)	417
Calc. Lead Volume (Cu. Ft.)	1,063
Calc. Lead Volume (Sx)	800

Intermediate1 Casing (Lead):	
Intermediate Casing O.D. (In.)	9.625
Intermediate Casing ID (In)	8.921
Hole O.D. (In)	12.25
Excess (%)	100%
cap 12-1/4 - 9-5/8"	0.0558
Calculated fill:	3,880'
Yield Lead (Cu. Ft./Sx)	2.48
Calculated Total Lead (Cu. Ft.)	2,430
Calc. Lead Volume (Sx)	990

Intermediate2 Casing (Lead):	
Intermediate Casing O.D. (In.)	7.000
Intermediate Casing ID (In)	6.184
Hole O.D. (In)	8.75
Excess (%)	135%
cap 7" - 8-3/4" bls/ft	0.0268
cap 7 - 9-5/8" bls/ft	0.02823
Calculated fill: (500' into 9-5/8")	4,122'
Yield Lead (Cu. Ft./Sx)	2.0
Calculated Total Lead (Cu. Ft.)	1,118
Calc. Lead Volume (Sx)	560

3880
8,002'

Intermediate1 Casing (Tail):	
Intermediate Casing O.D. (In.)	9.625
Production Casing ID (In)	8.835
Hole O.D. (In)	12.25
Excess (%)	100%
cap 12-1/4 - 9-5/8"	0.0558
Calculated fill:	500'
Yield Tail (Cu. Ft./Sx)	1.33
Shoe Joint (Ft)	40
Shoe Volume (Cu. Ft)	17.0
Calc. Tail Volume (Cu. Ft.)	174
Required Tail Volume (Sx)	140

Intermediate2 Casing (Tail):	
Intermediate Casing O.D. (In.)	7.000
Intermediate Casing ID (In)	6.184
Hole O.D. (In)	8.75
Excess (%)	135%
cap 7" - 8-3/4" bls/ft	0.0268
cap 7 - 9-5/8" bls/ft	0.02823
Calculated fill:	1,300'
Yield Lead (Cu. Ft./Sx)	1.2
Calculated Total Tail (Cu. Ft.)	278
Required Tail Volume (Sx)	232

Buck Federal 20 6H Proposed Tops

GL 3,171 | **KB** 16' (via survey plat) 3,187

Notes: No pilot hole will be drilled. This horizontal well will be drilled from N to S into the Avalon A Shale Zone. The surface loction will require that the well be drilled "3D", with the borehole drilled initially SE and then curved south in order to place the lateral portion of the bonehole within the Avalon A 160 acre spacing window. The well will be drilled virtually flat with a ~4,230' long lateral.

Surface Location	Sec 20	T26S	R32E	Lea Co. NM, Surface Location: 120' FNL & 2,520' FEL
Bottom Hole Location	Sec 20	T26S	R32E	Lea Co. NM, Terminus Location: 330' FSL & 2,310' FEL

Formation Name	Formation Top (TVD)	Subsea Depth	Gross Thickness	Gross Thickness	Gross Thickness	Comments
Quaternary	Surface					
Rustler	1,037	2,150				
Salado Top	1,414	1,773				
Castile Top	2,566	621				
Delaware Top	4,353	-1,166				
Ramsey	4,383	-1,196				
Ford Sh	4,440	-1,253				
Olds	4,453	-1,266				
Cherry Canyon Lower Top	6,555	-3,368				
KOP (est)	**8,122**					
Bone Spring Top	8,159	-4,972				
Bone Spring 1st Carbonate Top	8,304	-5,117	96			
Bone Spring 1st Carbonate Base	8,400	-5,213				
Avalon A Shale Top	8,677	-5,490				
LANDING: Avalon A Shale Horizontal Upper Target Limit	8,796	-5,609	50			Not a formation top.
LANDING: Avalon A Shale Horizontal Target Center	**8,821**	**-5,634**				Not a formation top.
LANDING: Avalon A Shale Horizontal Lower Target Limit	8,846	-5,659				Not a formation top.
TERMINUS: Avalon A Shale Horizontal Upper Target Limit	8,799	-5,612	50		243	Not a formation top.
TERMINUS: Avalon A Shale Horizontal Target Center	**8,824**	**-5,637**				Not a formation top.
TERMINUS: Avalon A Shale Horizontal Lower Target Limit	8,849	-5,662				Not a formation top.
Avalon A Shale Base (Should not penetrate)	8,920	-5,733				

Proposed total MD of well ~12,850'.

ConocoPhillips

Conoco Phillips

Lea County, New Mexico
Sec 20, T26S, 32E
Buck Federal 20 #6H

Wellbore #1

Plan: Design #2

DDC Well Planning Report

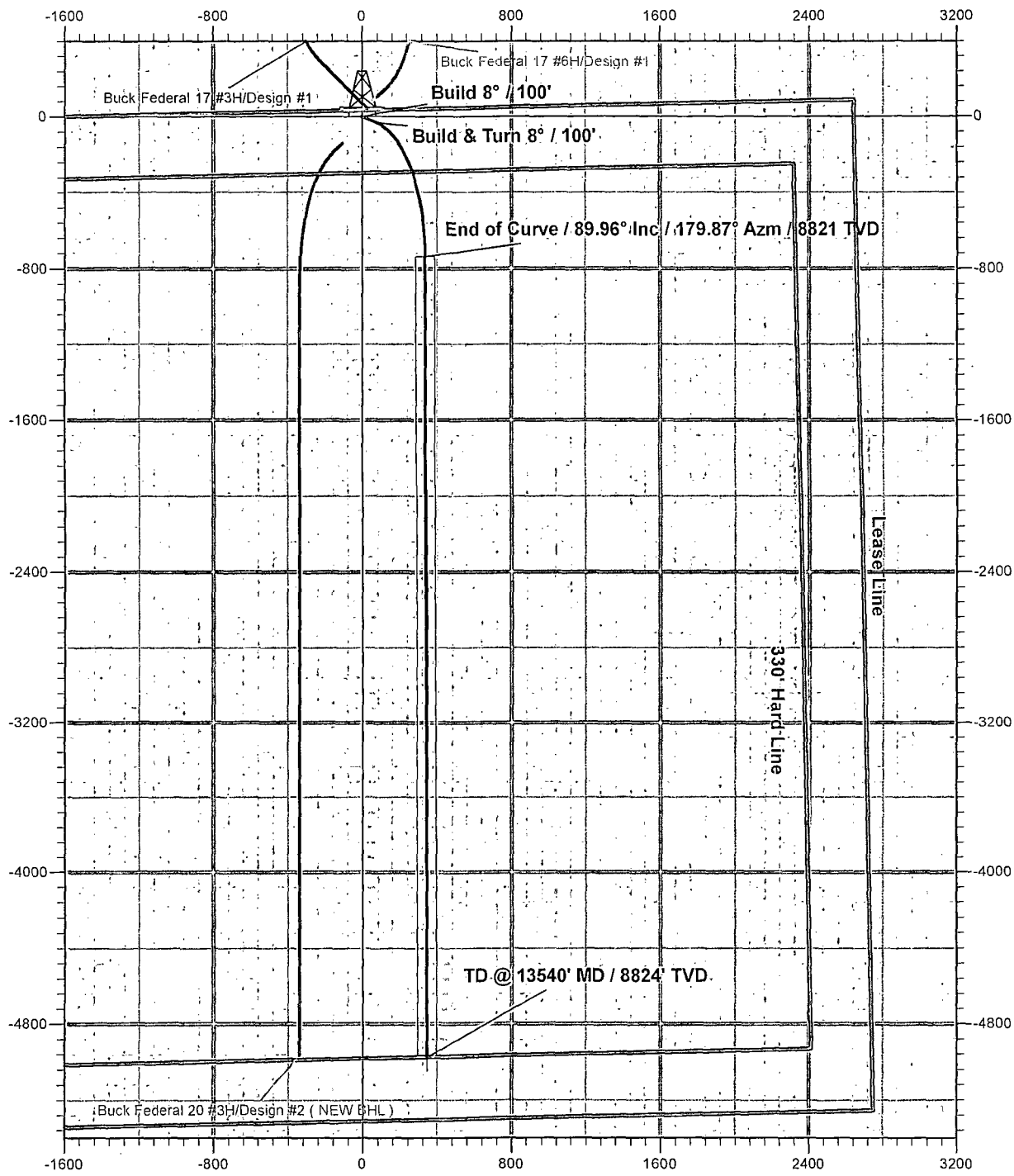
17 June, 2012

DDC
The DIRECTIONAL DRILLING COMPANY

ConocoPhillips

Lea County, New Mexico
Buck Federal 20 #6H
Design #2

DDC
The DIRECTIONAL DRILLING COMPANY



ConocoPhillips

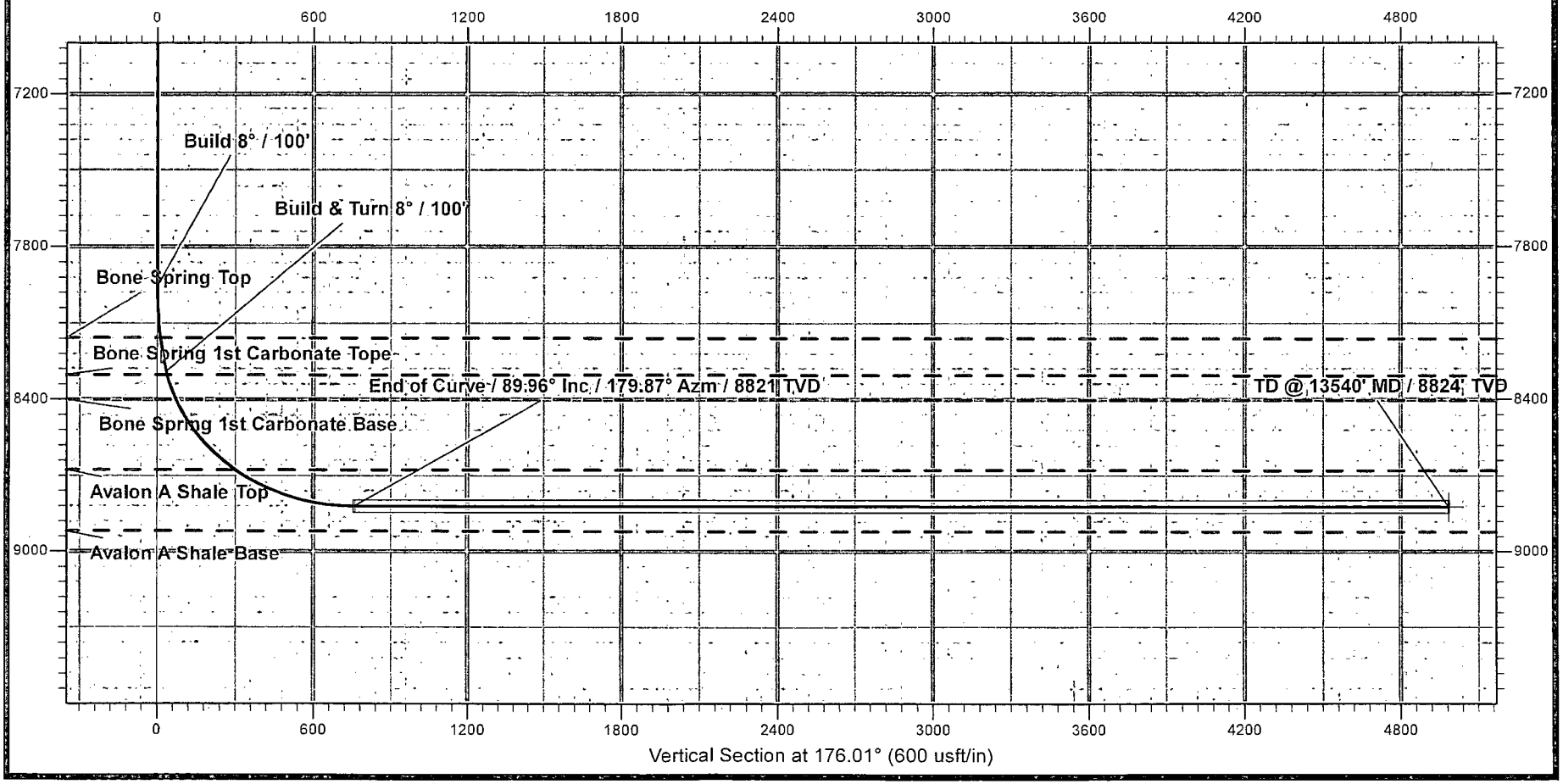
Lea County, New Mexico

Buck Federal 20 #6H

Design #2

DDC

The DIRECTIONAL DRILLING COMPANY



Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well Buck Federal 20 #6H
Company:	Conoco Phillips	**TVD Reference:**	WELL @ 3187.0usft (Precision #827)
Project:	Lea County, New Mexico	**MD Reference:**	WELL @ 3187.0usft (Precision #827)
Site:	Sec 20, T26S, 32E	**North Reference:**	Grid
Well:	Buck Federal 20 #6H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

Project	Lea County, New Mexico		
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 20, T26S, 32E				
Site Position:		**Northing:**	376,829.70 usft	**Latitude:**	32° 2' 3.859 N
From:	Map	**Easting:**	698,257.30 usft	**Longitude:**	103° 41' 36.778 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.34 °

Well	Buck Federal 20 #6H					
Well Position	**+N/-S**	303.8 usft	**Northing:**	377,133.48 usft	**Latitude:**	32° 2' 6.922 N
	+E/-W	-966.3 usft	**Easting:**	697,290.95 usft	**Longitude:**	103° 41' 47.983 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**		**Ground Level:**	3,171.0 usft

Wellbore	Wellbore #1				
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2010	6/15/2012	7.51	59.97	48,390

Design	Design #2				
Audit Notes:					
Version:		**Phase:**	PLAN	**Tie On Depth:**	0.0
Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**	
	0.0	0.0	0.0	176.01	

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	
7,956.5	0.00	0.00	7,956.5	0.0	0.0	0.00	0.00	0.00	0.00	
8,304.6	27.85	112.00	8,291.1	-31.1	76.9	8.00	8.00	0.00	112.00	
9,302.5	89.96	179.87	8,821.2	-735.1	337.8	8.00	6.22	6.80	70.24	
13,540.3	89.96	179.87	8,824.0	-4,972.9	347.0	0.00	0.00	0.00	0.00	PBHL Buck Federa

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well Buck Federal 20 #6H
Company:	Conoco Phillips	**TVD Reference:**	WELL @ 3187.0usft (Precision #827)
Project:	Lea County, New Mexico	**MD Reference:**	WELL @ 3187.0usft (Precision #827)
Site:	Sec 20, T26S, 32E	**North Reference:**	Grid
Well:	Buck Federal 20 #6H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

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 8° / 100'									
7,956.5	0.00	0.00	7,956.5	0.0	0.0	0.0	0.00	0.00	0.00
8,000.0	3.48	112.00	8,000.0	-0.5	1.2	0.6	8.00	8.00	0.00
8,100.0	11.48	112.00	8,099.0	-5.4	13.3	6.3	8.00	8.00	0.00
Bone Spring Top									
8,161.8	16.42	112.00	8,159.0	-10.9	27.1	12.8	8.00	8.00	0.00
8,200.0	19.48	112.00	8,195.3	-15.4	38.0	18.0	8.00	8.00	0.00
8,300.0	27.48	112.00	8,287.0	-30.3	74.9	35.4	8.00	8.00	0.00
Build & Turn 8° / 100'									
8,304.6	27.85	112.00	8,291.1	-31.1	76.9	36.4	8.00	8.00	0.00
Bone Spring 1st Carbonate Tope									
8,319.3	28.27	114.33	8,304.0	-33.8	83.2	39.5	8.00	2.84	15.90
8,400.0	31.20	125.96	8,374.2	-54.0	117.6	62.0	8.00	3.63	14.41
Bone Spring 1st Carbonate Base									
8,430.4	32.54	129.80	8,400.0	-63.8	130.3	72.7	8.00	4.42	12.63
8,500.0	36.01	137.55	8,457.5	-90.9	158.5	101.7	8.00	4.98	11.14
8,600.0	41.69	146.55	8,535.4	-140.4	196.7	153.8	8.00	5.68	9.00
8,700.0	47.93	153.67	8,606.4	-201.6	231.6	217.2	8.00	6.24	7.12
8,800.0	54.53	159.48	8,669.0	-273.1	262.4	290.7	8.00	6.60	5.81
Avalon A Shale Top									
8,814.0	55.47	160.21	8,677.0	-283.8	266.3	301.7	8.00	6.75	5.24
8,900.0	61.37	164.39	8,722.0	-353.6	288.5	372.8	8.00	6.85	4.86
9,000.0	68.36	168.69	8,764.5	-441.6	309.4	462.1	8.00	6.99	4.30
9,100.0	75.45	172.59	8,795.6	-535.3	324.8	556.6	8.00	7.09	3.90
9,200.0	82.60	176.25	8,814.6	-632.9	334.3	654.7	8.00	7.15	3.65
9,300.0	89.78	179.79	8,821.2	-732.6	337.7	754.3	8.00	7.18	3.54
End of Curve / 89.96° Inc / 179.87° Azm / 8821 TVD									
9,302.5	89.96	179.87	8,821.2	-735.1	337.8	756.8	8.00	7.19	3.52
9,400.0	89.96	179.87	8,821.3	-832.6	338.0	854.1	0.00	0.00	0.00
9,500.0	89.96	179.87	8,821.4	-932.6	338.2	953.9	0.00	0.00	0.00
9,600.0	89.96	179.87	8,821.4	-1,032.6	338.4	1,053.6	0.00	0.00	0.00
9,700.0	89.96	179.87	8,821.5	-1,132.6	338.6	1,153.4	0.00	0.00	0.00
9,800.0	89.96	179.87	8,821.6	-1,232.6	338.8	1,253.2	0.00	0.00	0.00
9,900.0	89.96	179.87	8,821.6	-1,332.6	339.1	1,352.9	0.00	0.00	0.00
10,000.0	89.96	179.87	8,821.7	-1,432.6	339.3	1,452.7	0.00	0.00	0.00
10,100.0	89.96	179.87	8,821.8	-1,532.6	339.5	1,552.5	0.00	0.00	0.00
10,200.0	89.96	179.87	8,821.8	-1,632.6	339.7	1,652.3	0.00	0.00	0.00
10,300.0	89.96	179.87	8,821.9	-1,732.6	339.9	1,752.0	0.00	0.00	0.00
10,400.0	89.96	179.87	8,822.0	-1,832.6	340.2	1,851.8	0.00	0.00	0.00
10,500.0	89.96	179.87	8,822.0	-1,932.6	340.4	1,951.6	0.00	0.00	0.00
10,600.0	89.96	179.87	8,822.1	-2,032.6	340.6	2,051.4	0.00	0.00	0.00
10,700.0	89.96	179.87	8,822.2	-2,132.6	340.8	2,151.1	0.00	0.00	0.00
10,800.0	89.96	179.87	8,822.2	-2,232.6	341.0	2,250.9	0.00	0.00	0.00
10,900.0	89.96	179.87	8,822.3	-2,332.6	341.2	2,350.7	0.00	0.00	0.00
11,000.0	89.96	179.87	8,822.4	-2,432.6	341.5	2,450.4	0.00	0.00	0.00
11,100.0	89.96	179.87	8,822.4	-2,532.6	341.7	2,550.2	0.00	0.00	0.00
11,200.0	89.96	179.87	8,822.5	-2,632.6	341.9	2,650.0	0.00	0.00	0.00
11,300.0	89.96	179.87	8,822.5	-2,732.6	342.1	2,749.8	0.00	0.00	0.00
11,400.0	89.96	179.87	8,822.6	-2,832.6	342.3	2,849.5	0.00	0.00	0.00
11,500.0	89.96	179.87	8,822.7	-2,932.6	342.6	2,949.3	0.00	0.00	0.00
11,600.0	89.96	179.87	8,822.7	-3,032.6	342.8	3,049.1	0.00	0.00	0.00
11,700.0	89.96	179.87	8,822.8	-3,132.6	343.0	3,148.8	0.00	0.00	0.00
11,800.0	89.96	179.87	8,822.9	-3,232.6	343.2	3,248.6	0.00	0.00	0.00

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Site:	Sec 20, T26S, 32E	**North Reference:**	Grid
Well:	Buck Federal 20 #6H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

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)
11,900.0	89.96	179.87	8,822.9	-3,332.6	343.4	3,348.4	0.00	0.00	0.00
12,000.0	89.96	179.87	8,823.0	-3,432.6	343.7	3,448.2	0.00	0.00	0.00
12,100.0	89.96	179.87	8,823.1	-3,532.6	343.9	3,547.9	0.00	0.00	0.00
12,200.0	89.96	179.87	8,823.1	-3,632.6	344.1	3,647.7	0.00	0.00	0.00
12,300.0	89.96	179.87	8,823.2	-3,732.6	344.3	3,747.5	0.00	0.00	0.00
12,400.0	89.96	179.87	8,823.3	-3,832.6	344.5	3,847.3	0.00	0.00	0.00
12,500.0	89.96	179.87	8,823.3	-3,932.6	344.7	3,947.0	0.00	0.00	0.00
12,600.0	89.96	179.87	8,823.4	-4,032.6	345.0	4,046.8	0.00	0.00	0.00
12,700.0	89.96	179.87	8,823.5	-4,132.6	345.2	4,146.6	0.00	0.00	0.00
12,800.0	89.96	179.87	8,823.5	-4,232.6	345.4	4,246.3	0.00	0.00	0.00
12,900.0	89.96	179.87	8,823.6	-4,332.6	345.6	4,346.1	0.00	0.00	0.00
13,000.0	89.96	179.87	8,823.6	-4,432.6	345.8	4,445.9	0.00	0.00	0.00
13,100.0	89.96	179.87	8,823.7	-4,532.6	346.1	4,545.7	0.00	0.00	0.00
13,200.0	89.96	179.87	8,823.8	-4,632.6	346.3	4,645.4	0.00	0.00	0.00
13,300.0	89.96	179.87	8,823.8	-4,732.6	346.5	4,745.2	0.00	0.00	0.00
13,400.0	89.96	179.87	8,823.9	-4,832.6	346.7	4,845.0	0.00	0.00	0.00
13,500.0	89.96	179.87	8,824.0	-4,932.6	346.9	4,944.8	0.00	0.00	0.00
TD @ 13540' MD / 8824' TVD									
13,540.3	89.96	179.87	8,824.0	-4,972.9	347.0	4,985.0	0.00	0.00	0.00

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL Buck Federal 2 - plan hits target center - Rectangle (sides W100.0 H50.0 D4,237.8)	90.04	179.87	8,824.0	-4,972.9	347.0	372,160.59	697,637.97	32° 1' 17.689 N	103° 41' 44.293 W

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,037.0	1,037.0	Rustler		0.04	175.01
1,414.0	1,414.0	Salado Top		0.04	175.01
2,566.0	2,566.0	Castile Top		0.04	175.01
4,353.0	4,353.0	Delaware Top		0.04	175.01
4,383.0	4,383.0	Ramsey		0.04	175.01
4,440.0	4,440.0	Ford Sh		0.04	175.01
4,453.0	4,453.0	Olds		0.04	175.01
6,555.0	6,555.0	Cherry Canyon Lower Top		0.04	175.01
8,161.8	8,159.0	Bone Spring Top		0.04	175.01
8,319.3	8,304.0	Bone Spring 1st Carbonate Tope		0.04	175.01
8,430.4	8,400.0	Bone Spring 1st Carbonate Base		0.04	175.01
8,814.0	8,677.0	Avalon A Shale Top		0.04	175.01

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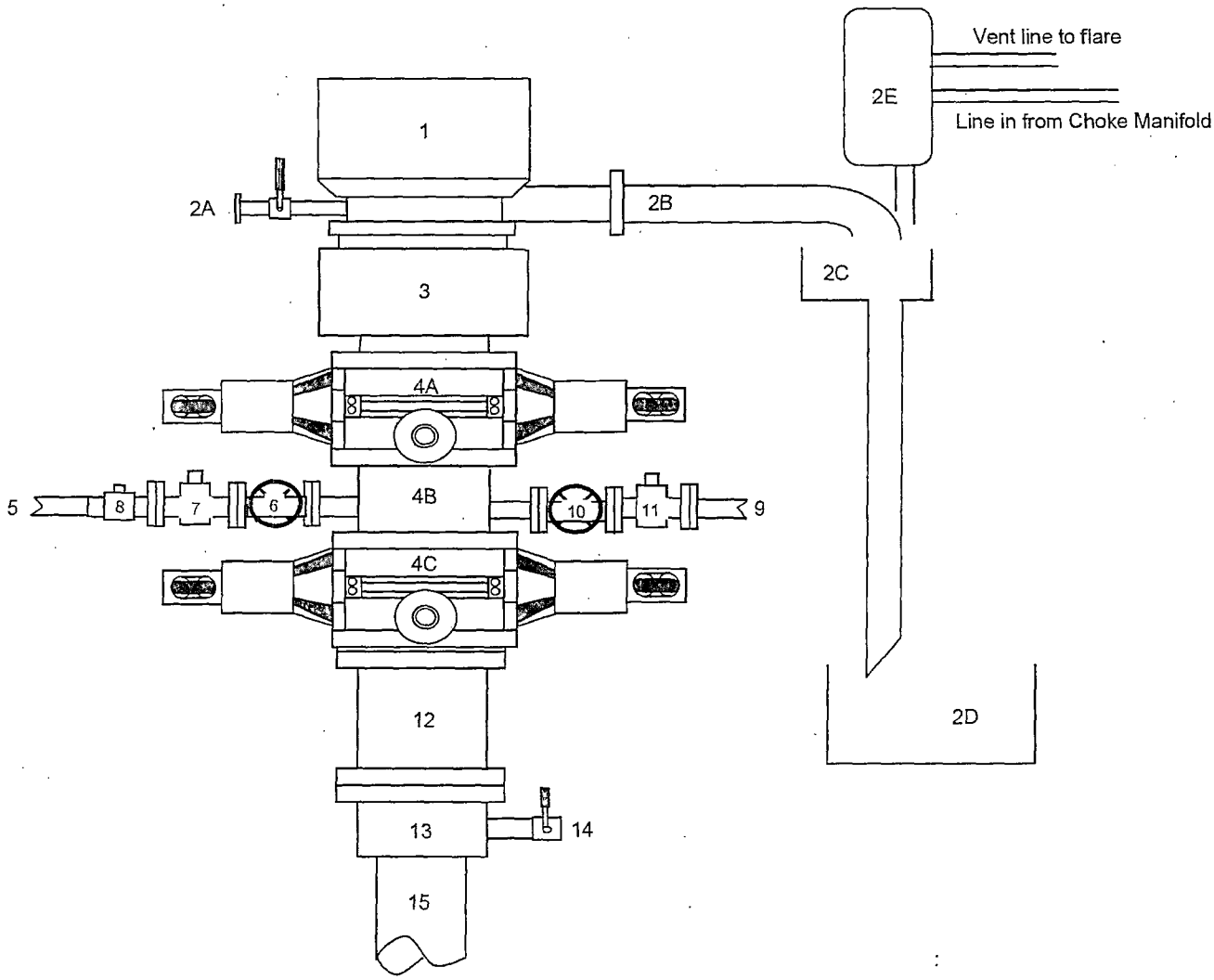
Site:	Sec 20, T26S, 32E	**North Reference:**	Grid
Well:	Buck Federal 20 #6H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
7,956.5	7,956.5	0.0	0.0	Build 8° / 100'
8,304.6	8,291.1	-31.1	76.9	Build & Turn 8° / 100'
9,302.5	8,821.2	-735.1	337.8	End of Curve / 89.96° Inc / 179.87° Azm / 8821 TVD
13,540.3	8,824.0	-4,972.9	347.0	TD @ 13540' MD / 8824' TVD

BLOWOUT PREVENTER ARRANGEMENT

3M System per Onshore Oil and Gas Order No. 2 utilizing 5M Rated Equipment

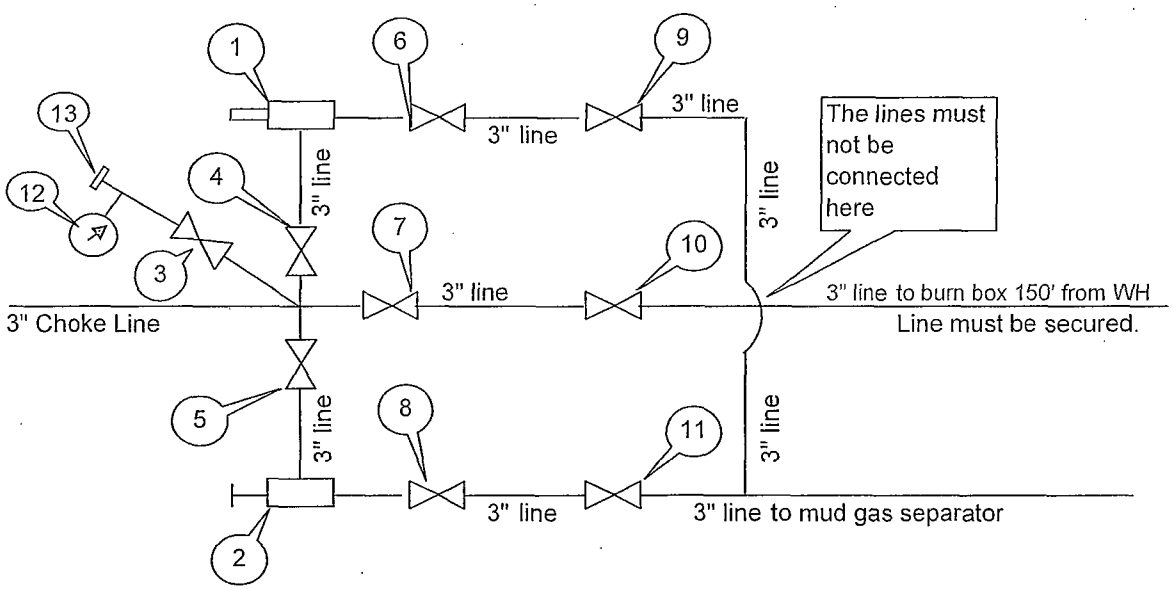


Item	Description
1	Rotating Head, 13-5/8"
2A	Fill up Line and Valve
2B	Flow Line (10")
2C	Shale Shakers and Solids Settling Tank
2D	Cuttings Bins for Zero Discharge
2E	Mud Gas Separator with vent line to flare and return line to mud system
3	Annular BOP (13-5/8", 5M)
4A	Single Ram (13-3/8", 5M, equipped with Blind Rams)
4B	Drilling Spool (13-3/8" 5M)
4C	Single Ram (13-3/8", 5M, equipped with Pipe Rams)
5	Kill Line (3", 5000 psi WP, steel line) (not a flexible line)
6	Kill Line Valve, Inner (3-1/8", 5000 psi WP)
7	Kill Line Valve, Outer (3-1/8", 5000 psi WP, Hydraulically Operated)
8	Kill Line Check Valve (3-1/8", 5000 psi WP)
9	Choke Line (3", 5000 psi WP, steel line) (not a flexible line)
10	Choke Line Valve, Inner (3-1/8", 5000 psi WP)
11	Choke Line Valve, Outer, (Hydraulically operated, 3-1/8", 5000 psi WP)
12	Spacer Spool (13-3/8", 5M, with rotating bottom flange)
13	Casing Head (11", 5M)
14	Ball Valve and Threaded Nipple on Casing Head Outlet, 2" 5M
15	Surface Casing

Drawn by: Steven O. Moore, Chief Drilling Engineer, Mid-Continent Business Unit, ConocoPhillips Company, 29-May-2012

CHOKE MANIFOLD ARRANGEMENT

3M System per Onshore Oil and Gas Order No. 2 utilizing 5M Equipment



All Tees must be targeted

Item	Description
1	Remote Controlled Hydraulic Adjustable Choke, 3-1/8", 5M
2	Manual Adjustable Choke, 3-1/8", 5M
3	Gate Valve, 2-1/16" 5M
4	Gate Valve, 3-1/8" 5M
5	Gate Valve, 3-1/8" 5M
6	Gate Valve, 3-1/8" 5M
7	Gate Valve, 3-1/8" 5M
8	Gate Valve, 3-1/8" 5M
9	Gate Valve, 3-1/8" 5M
10	Gate Valve, 3-1/8" 5M
11	Gate Valve, 3-1/8" 5M
12	Pressure Gauge
13	2" hammer union tie-in point for BOP Tester

We will test each valve to 3000 psi from the upstream side.

Drawn by:
Steven O. Moore
Chief Drilling Engineer, Mid-Continent Business Unit, ConocoPhillips Company
Date: 25-Sept-2012