

13207

Form 3160-3
(April 2004)

OCD Hobbs

FORM APPROVED
OMB No. 1004-0137
Expires March 31, 2007

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

1a. Type of work: ☒ DRILL ☐ REENTER		5. Lease Serial No. NMNM-2512
1b. Type of Well: ☒ Oil Well ☐ Gas Well ☐ Other ☒ Single Zone ☐ Multiple Zone		6. If Indian, Allottee or Tribe Name
2. Name of Operator APACHE CORPORATION		7. If Unit or CA Agreement, Name and No. NE DRINKARD <NMNM072602X>
3a. Address 303 VETERANS AIRPARK LN #3000 MIDLAND, TX 79705	3b. Phone No. (include area code) 432-818-1167	8. Lease Name and Well No. <22503> NORTHEAST DRINKARD UNIT # 278
4. Location of Well (Report location clearly and in accordance with any State requirements.)* At surface 2405' FSL & 390' FEL At proposed prod. zone 2600' FSL & 650' FEL		9. API Well No. 30-025- 41287
14. Distance in miles and direction from nearest town or post office* APPROX 5 MILES NORTH OF EUNICE, NM		10. Field and Pool, or Exploratory EUNICE; BLI-TU-DR, N. <22900>
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 390'	16. No. of acres in lease 708.67	11. Sec., T. R. M. or Blk. and Survey or Area UL: I SEC: 3 T21S R37E
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. ~ 300'	19. Proposed Depth TVD: ~ 7050' TMD: ~ 7059'	12. County or Parish LEA
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3474'	22. Approximate date work will start* AS SOON AS APPROVED	13. State NM
20. BLM/BIA Bond No. on file BLM - CO - 1463 NATIONWIDE / NMB000736		
23. Estimated duration ~ 10 DAYS		
24. Attachments		

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

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

25. Signature <i>Sorina L Flores</i>	Name (Printed/Typed) SORINA L. FLORES	Date 11/15/12
Title SUPV OF DRILLING SERVICES		
Approved by (Signature) <i>/s/George MacDonell</i>	Name (Printed/Typed)	Date JUL 16 2013
Title 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.

*(Instructions on page 2)

Capitan Controlled Water Basin

Ka
07/26/13

Approval Subject to General Requirements
& Special Stipulations Attached

dm

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

JUL 31 2013

DRILLING PLAN: BLM COMPLIANCE
(Supplement to BLM 3160-3)

APACHE CORPORATION (OGRID: 873) NORTHEAST DRINKARD UNIT #278

Lease #: NM-2512 Projected TVD: 7050' TMD: 7059' GL: 3474'
SHL: 2405' FSL & 390' FEL BHL: 2600' FSL & 650' FEL UL: I SEC: 3 T21S R37E LEA COUNTY, NM

1. GEOLOGIC NAME OF SURFACE FORMATION: Quaternary Aeolian Deposits
2. ESTIMATED TOPS OF GEOLOGICAL MARKERS & DEPTHS OF ANTICIPATED FRESH WATER, OIL OR GAS:

Quaternary Aeolian	Surf	San Andres	4114'
Rustler	1332'	Glorieta	5257'
Salt Top	1376'	Paddock	5319'
Salt Bottom	2496'	Blaine	5658' (Oil)
Yates	2635'	Tubb	6138' (Oil)
Seven Rivers	2890'	Drinkard	6590' (Oil)
Queen	3456'	ABO	6842' (Oil)
Grayburg	3798'	TD	TVD: 7050' / TMD: 7059'

Depth to Ground Water: ~ 75'

All fresh water & prospectively valuable minerals, as described by BLM, encountered during drilling, will be recorded by depth and adequately protected. All oil & gas shows within zones of correlative rights will be tested to determine commercial potential.

3. CASING PROGRAM: All casing is new & API approved

HOLE SIZE	DEPTH	OD CSG	WEIGHT	COLLAR	GRADE	COLLAPSE	BURST	TENSION
11"	0' - 1357'	8-5/8"	24#	STC	J-55	1.125	1.21	1.8
7-7/8"	0' - 7059'	5-1/2"	17#	LTC	L-80	1.125	1.21	1.8

4. CEMENT PROGRAM:

A. 8-5/8" Surface cmt with (100% excess cmt; Cmt to Surface):

Lead: 270 sx Class C w/ 2% CaCl₂, 0.13# CF, 3# LCM1, 0.005 gps FP-6L, 4% Bentonite
(13.5 ppg, 1.75 yld) Comp Strengths: 12 hr - 500 psi 24 hr - 782 psi

Tail: 200 sx Class C w/ 1% CaCl₂, 0.13 # CF, 0.005 gps FP-6L
(14.8 ppg, 1.34 yld) Comp Strengths: 12 hr - 755 psi 24 hr - 1347 psi

B. 5-1/2" Production cmt with (30% excess cmt; cmt to surf):

Lead: 600 sx (35:65) Poz Cl C w/ 5% CaCl₂, 0.125 # CF, 3# LCM1, 0.5% FL52, 0.005gps FP6L, 6% Bentonite, 0.3% Sodium Metasilicate
(11.9ppg, 2.24 yld) Comp Strengths: 12 hr - 603 psi 24 hr - 850 psi

Tail: 330 sx (50:50) Poz Cl C w/ 5% CaCl₂ + 0.13% CF, 3# LCM1 + 0.005gps FP6L + 2% Bentonite + 1% FL25 + 1% BA58 + 0.1% Sodium Metasilicate (14.8 ppg, 1.34 yld) Comp Strengths: 12 hr - 850 psi 24 psi - 1979 psi

** The above cmt volumes could be revised pending caliper measurement from open hole logs. TOC is designed to reach surface on Surface and Production. The above slurry design may change, but will meet BLM specifications. All slurries will be tested prior to loading to confirm thickening times & a lab report furnished to Apache. Fluid loss will be tested & reported on slurries with fluid loss additives. Lab test report will be furnished prior to pumping cement.

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5. PROPOSED CONTROL EQUIPMENT

"EXHIBIT 5" shows a 900 series 11" 3M psi WP BOP consisting of an annular bag type preventer, middle blind rams, bottom pipe rams. The BOP will be nipped up on the 8-5/8" csg and utilized continuously until TD is reached. The BOP will be tested at 2000 psi, maximum surface pressure is not expected to exceed 3M psi, BHP is calculated to be approximately 3105 psi. *All BOP's and associated equipment will be tested as per BLM *Drilling Operations Order #2*. The BOP will be operated and checked each 24 hr period & the blind rams will be operated & checked when the drill pipe is out of the hole. Functional tests will be documented on the daily driller's log. "EXHIBIT 5" also shows a 3M psi choke manifold with a 4" panic line. Full opening stabbing valve & Kelly cock will be on derrick floor in case of need. No abnormal pressures or temperatures are expected in this well. No nearby wells have encountered any problems.

6. AUXILIARY WELL CONTROL EQUIPMENT / MONITORING EQUIPMENT:

11" x 3000 psi Double BOP/Blind & pipe ram (3M BOP/BOPE to be used as 2M system)
4-1/2" x 3000 psi Kelly valve
9" x 3000 psi mud cross – H2S detector on production hole
Gate-type safety valve 3" choke line from BOP to manifold
2" adjustable chokes – 4" blow down line
Fill up line as per Onshore Order #2

7. PROPOSED MUD CIRCULATION SYSTEM: (Closed Loop System)

see COA

INTERVAL	MW (ppg)	VISC (sec/qt)	FLUID LOSS (cc)	MUD TYPE
0' - 1357' / 740	8.3 - 8.8	28 - 32	NC	Fresh Water
1357 - 7059'	9.8 - 10.2	28 - 32	NC	Brine

* Visual mud monitoring equipment shall be in place to detect volume changes. A mud test shall be performed every 24 hrs after mudding up to determine, as applicable: density, visc, gel strength, filtration, and pH. The necessary mud products for weight addition & fluid loss control will be on location at all times. In order to run open hole logs & casing, the above mud properties may have to be altered to meet these needs.

8. LOGGING, CORING & TESTING PROGRAM:

- A. OH logs: Dual Laterolog, MSFL, CNL, Litho-Density, Spectral Gamma Ray, Caliper & Sonic from TD back to last csg shoe.
- B. Run CNL, Gamma Ray from last csg shoe back to surface.
- C. No cores or DST's are planned at this time. Mud log will be included on this well.
- D. Additional testing will be initiated subsequent to setting the 5-1/2" production casing. Specific intervals will be targeted based on log evaluation, geological sample shows & drill stem tests.

9. POTENTIAL HAZARDS:

see COA
No abnormal pressures or temperatures are anticipated. In the event abnormal pressures are encountered, however, the proposed mud program will be modified to increase the mud-weight. There is known presence of H₂S in this area. If H₂S is encountered the operator will comply with the provisions of *Onshore Oil & Gas Order No. 6 (SEE EXHIBIT 6)*. No lost circulation is expected to occur. All personnel will be familiar with all aspects of safe operation of equipment being used to drill this well. Estimated BHP: 3105 psi and estimated BHT: 115°.

10. ANTICIPATED STARTING DATE AND DURATION OF OPERATIONS:

Road and location construction will begin after BLM has approved APD. Anticipated spud date will be as soon after BLM approval and as soon as rig will be available. Move in operations and drilling is expected to take ~ 10 days. If production casing is run then an additional 90 days will be needed to complete well and construct surface facilities and/or lay flow lines in order to place well on production.

11. OTHER FACETS OF OPERATION:

After running csg, cased hole Gamma Ray, Neutron Collar logs will be run from TD back to all possible productive zones. The Eunice, BLI-TU-DRI, North formations will be perforated and stimulated in order to establish production. The well will be swab tested & potentialized as an oil well.

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Apache

Lea County, New Mexico (NAD 27)

NEDU

278

Wellbore #1

Plan: Design #1

Standard Planning Report

13 November, 2012



MS Energy Services
Planning Report



Database:	Southern Region	Local Co-ordinate Reference:	Well 278
Company:	Apache	TVD Reference:	WELL @ 3485.00usft (Capstar 120)
Project:	Lea County, New Mexico (NAD 27)	MD Reference:	WELL @ 3485.00usft (Capstar 120)
Site:	NEDU	North Reference:	Grid
Well:	278	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Project	Lea County, New Mexico (NAD 27)		
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		

Well	278			
Well Position	+N/-S	550,283.90 usft	Northing:	550,283.90 usft
	+E/-W	866,907.98 usft	Easting:	866,907.98 usft
Position Uncertainty		0.00 usft	Wellhead Elevation:	
			Ground Level:	3,474.00 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	WMM_2010	11/13/12	7.25	60.48	48,688

Design	Design #1			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	306.18

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	
1,407.00	0.00	0.00	1,407.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,574.24	3.34	306.18	1,574.15	2.88	-3.94	2.00	2.00	-32.18	306.18	
7,059.44	3.34	306.18	7,050.00	191.79	-262.27	0.00	0.00	0.00	0.00	PBHL v1 - NEDU 278

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Database:	Southern Region	JUL 23 2013	Local Co-ordinate Reference:	Well 278
Company:	Apache		TVD Reference:	WELL @ 3485.00usft (Capstar 120)
Project:	Lea County, New Mexico (NAD 27)		MD Reference:	WELL @ 3485.00usft (Capstar 120)
Site:	NEDU	RECEIVED	North Reference:	Grid
Well:	278		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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
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
1,338.00	0.00	0.00	1,338.00	0.00	0.00	0.00	0.00	0.00	0.00
Rustler									
1,382.00	0.00	0.00	1,382.00	0.00	0.00	0.00	0.00	0.00	0.00
T. Salt									
1,407.00	0.00	0.00	1,407.00	0.00	0.00	0.00	0.00	0.00	0.00
KOP, 2.00°/100' Build									
1,500.00	1.86	306.18	1,499.98	0.89	-1.22	1.51	2.00	2.00	0.00
1,574.24	3.34	306.18	1,574.15	2.88	-3.94	4.88	2.00	2.00	0.00
Begin 3.34° Tangent									
1,600.00	3.34	306.18	1,599.86	3.77	-5.15	6.38	0.00	0.00	0.00
1,700.00	3.34	306.18	1,699.69	7.21	-9.86	12.22	0.00	0.00	0.00
1,800.00	3.34	306.18	1,799.52	10.66	-14.57	18.05	0.00	0.00	0.00
1,900.00	3.34	306.18	1,899.35	14.10	-19.28	23.89	0.00	0.00	0.00
2,000.00	3.34	306.18	1,999.18	17.54	-23.99	29.72	0.00	0.00	0.00
2,100.00	3.34	306.18	2,099.01	20.99	-28.70	35.56	0.00	0.00	0.00
2,200.00	3.34	306.18	2,198.84	24.43	-33.41	41.39	0.00	0.00	0.00
2,300.00	3.34	306.18	2,298.67	27.88	-38.12	47.22	0.00	0.00	0.00
2,400.00	3.34	306.18	2,398.50	31.32	-42.83	53.06	0.00	0.00	0.00
2,500.00	3.34	306.18	2,498.33	34.76	-47.54	58.89	0.00	0.00	0.00
2,503.68	3.34	306.18	2,502.00	34.89	-47.71	59.11	0.00	0.00	0.00
Tansil									
2,600.00	3.34	306.18	2,598.16	38.21	-52.25	64.73	0.00	0.00	0.00
2,642.92	3.34	306.18	2,641.00	39.69	-54.27	67.23	0.00	0.00	0.00
Yates									
2,700.00	3.34	306.18	2,697.99	41.65	-56.96	70.56	0.00	0.00	0.00
2,800.00	3.34	306.18	2,797.82	45.09	-61.67	76.40	0.00	0.00	0.00
2,898.35	3.34	306.18	2,896.00	48.48	-66.30	82.14	0.00	0.00	0.00
Seven Rivers									
2,900.00	3.34	306.18	2,897.65	48.54	-66.38	82.23	0.00	0.00	0.00
3,000.00	3.34	306.18	2,997.48	51.98	-71.09	88.07	0.00	0.00	0.00
3,100.00	3.34	306.18	3,097.31	55.43	-75.80	93.90	0.00	0.00	0.00
3,200.00	3.34	306.18	3,197.14	58.87	-80.51	99.74	0.00	0.00	0.00
3,300.00	3.34	306.18	3,296.97	62.31	-85.22	105.57	0.00	0.00	0.00
3,400.00	3.34	306.18	3,396.79	65.76	-89.93	111.40	0.00	0.00	0.00
3,465.32	3.34	306.18	3,462.00	68.01	-93.00	115.22	0.00	0.00	0.00
Queen									
3,500.00	3.34	306.18	3,496.62	69.20	-94.64	117.24	0.00	0.00	0.00
3,600.00	3.34	306.18	3,596.45	72.65	-99.35	123.07	0.00	0.00	0.00
3,700.00	3.34	306.18	3,696.28	76.09	-104.06	128.91	0.00	0.00	0.00



MS Energy Services
Planning Report



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Company:	Apache	TVD Reference:	WELL @ 3485.00usft (Capstar 120)
Project:	Lea County, New Mexico (NAD 27)	MD Reference:	WELL @ 3485.00usft (Capstar 120)
Site:	NEDU	North Reference:	Grid
Well:	278	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

JUL 23 2013

Planned Survey										RECEIVED
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)	
3,800.00	3.34	306.18	3,796.11	79.53	-108.76	134.74	0.00	0.00	0.00	
3,807.90	3.34	306.18	3,804.00	79.81	-109.14	135.20	0.00	0.00	0.00	
Grayburg										
3,900.00	3.34	306.18	3,895.94	82.98	-113.47	140.58	0.00	0.00	0.00	
4,000.00	3.34	306.18	3,995.77	86.42	-118.18	146.41	0.00	0.00	0.00	
4,100.00	3.34	306.18	4,095.60	89.87	-122.89	152.25	0.00	0.00	0.00	
4,124.44	3.34	306.18	4,120.00	90.71	-124.04	153.67	0.00	0.00	0.00	
San Andres										
4,200.00	3.34	306.18	4,195.43	93.31	-127.60	158.08	0.00	0.00	0.00	
4,300.00	3.34	306.18	4,295.26	96.75	-132.31	163.91	0.00	0.00	0.00	
4,400.00	3.34	306.18	4,395.09	100.20	-137.02	169.75	0.00	0.00	0.00	
4,500.00	3.34	306.18	4,494.92	103.64	-141.73	175.58	0.00	0.00	0.00	
4,600.00	3.34	306.18	4,594.75	107.09	-146.44	181.42	0.00	0.00	0.00	
4,700.00	3.34	306.18	4,694.58	110.53	-151.15	187.25	0.00	0.00	0.00	
4,800.00	3.34	306.18	4,794.41	113.97	-155.86	193.09	0.00	0.00	0.00	
4,900.00	3.34	306.18	4,894.24	117.42	-160.57	198.92	0.00	0.00	0.00	
5,000.00	3.34	306.18	4,994.07	120.86	-165.28	204.76	0.00	0.00	0.00	
5,100.00	3.34	306.18	5,093.90	124.31	-169.99	210.59	0.00	0.00	0.00	
5,200.00	3.34	306.18	5,193.73	127.75	-174.70	216.43	0.00	0.00	0.00	
5,269.39	3.34	306.18	5,263.00	130.14	-177.97	220.47	0.00	0.00	0.00	
Glorieta										
5,300.00	3.34	306.18	5,293.56	131.19	-179.41	222.26	0.00	0.00	0.00	
5,331.50	3.34	306.18	5,325.00	132.28	-180.89	224.10	0.00	0.00	0.00	
Paddock										
5,400.00	3.34	306.18	5,393.39	134.64	-184.12	228.09	0.00	0.00	0.00	
5,500.00	3.34	306.18	5,493.22	138.08	-188.83	233.93	0.00	0.00	0.00	
5,600.00	3.34	306.18	5,593.05	141.52	-193.54	239.76	0.00	0.00	0.00	
5,671.07	3.34	306.18	5,664.00	143.97	-196.89	243.91	0.00	0.00	0.00	
Blaine										
5,700.00	3.34	306.18	5,692.88	144.97	-198.25	245.60	0.00	0.00	0.00	
5,800.00	3.34	306.18	5,792.71	148.41	-202.96	251.43	0.00	0.00	0.00	
5,900.00	3.34	306.18	5,892.54	151.86	-207.67	257.27	0.00	0.00	0.00	
6,000.00	3.34	306.18	5,992.37	155.30	-212.38	263.10	0.00	0.00	0.00	
6,100.00	3.34	306.18	6,092.20	158.74	-217.09	268.94	0.00	0.00	0.00	
6,151.89	3.34	306.18	6,144.00	160.53	-219.53	271.96	0.00	0.00	0.00	
Tubb										
6,200.00	3.34	306.18	6,192.03	162.19	-221.80	274.77	0.00	0.00	0.00	
6,300.00	3.34	306.18	6,291.85	165.63	-226.51	280.60	0.00	0.00	0.00	
6,400.00	3.34	306.18	6,391.68	169.08	-231.22	286.44	0.00	0.00	0.00	
6,500.00	3.34	306.18	6,491.51	172.52	-235.93	292.27	0.00	0.00	0.00	
6,600.00	3.34	306.18	6,591.34	175.96	-240.64	298.11	0.00	0.00	0.00	
6,604.66	3.34	306.18	6,596.00	176.12	-240.85	298.38	0.00	0.00	0.00	
Drinkard										
6,700.00	3.34	306.18	6,691.17	179.41	-245.34	303.94	0.00	0.00	0.00	
6,800.00	3.34	306.18	6,791.00	182.85	-250.05	309.78	0.00	0.00	0.00	
6,857.09	3.34	306.18	6,848.00	184.82	-252.74	313.11	0.00	0.00	0.00	
Abo										
6,900.00	3.34	306.18	6,890.83	186.30	-254.76	315.61	0.00	0.00	0.00	
7,000.00	3.34	306.18	6,990.66	189.74	-259.47	321.45	0.00	0.00	0.00	
7,059.44	3.34	306.18	7,050.00	191.79	-262.27	324.91	0.00	0.00	0.00	
PBHL										



Database:	Southern Region	Local Co-ordinate Reference:	Well 278
Company:	Apache	TVD Reference:	WELL @ 3485.00usft (Capstar 120)
Project:	Lea County, New Mexico (NAD 27)	MD Reference:	WELL @ 3485.00usft (Capstar 120)
Site:	NEDU	North Reference:	Grid
Well:	278	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Design Targets

Target Name

- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
PBHL v1 - NEDU 278	0.00	0.00	7,050.00	191.79	-262.27	550,475.68	866,645.70	32° 30' 27.8839 N	103° 8' 38.475 W
- plan hits target center									
- Point									

Formations

Measured Depth	Vertical Depth	Name	Lithology	Dip	Dip Direction
(usft)	(usft)			(°)	(°)
1,338.00	1,338.00	Rustler		0.00	
1,382.00	1,382.00	T. Salt		0.00	
2,503.68	2,502.00	Tansil		0.00	HOBBS OCD
2,642.92	2,641.00	Yates		0.00	
2,898.35	2,896.00	Seven Rivers		0.00	
3,465.32	3,462.00	Queen		0.00	JUL 23 2013
3,807.90	3,804.00	Grayburg		0.00	
4,124.44	4,120.00	San Andres		0.00	
5,269.39	5,263.00	Glorieta		0.00	RECEIVED
5,331.50	5,325.00	Paddock		0.00	
5,671.07	5,664.00	Blinebry		0.00	
6,151.89	6,144.00	Tubb		0.00	
6,604.66	6,596.00	Drinkard		0.00	
6,857.09	6,848.00	Abo		0.00	

Plan Annotations

Measured Depth	Vertical Depth	Local Coordinates		Comment
(usft)	(usft)	+N/-S (usft)	+E/-W (usft)	
1,407.00	1,407.00	0.00	0.00	KOP, 2.00°/100' Build
1,574.24	1,574.15	2.88	-3.94	Begin 3.34° Tangent
7,059.44	7,050.00	191.79	-262.27	PBHL



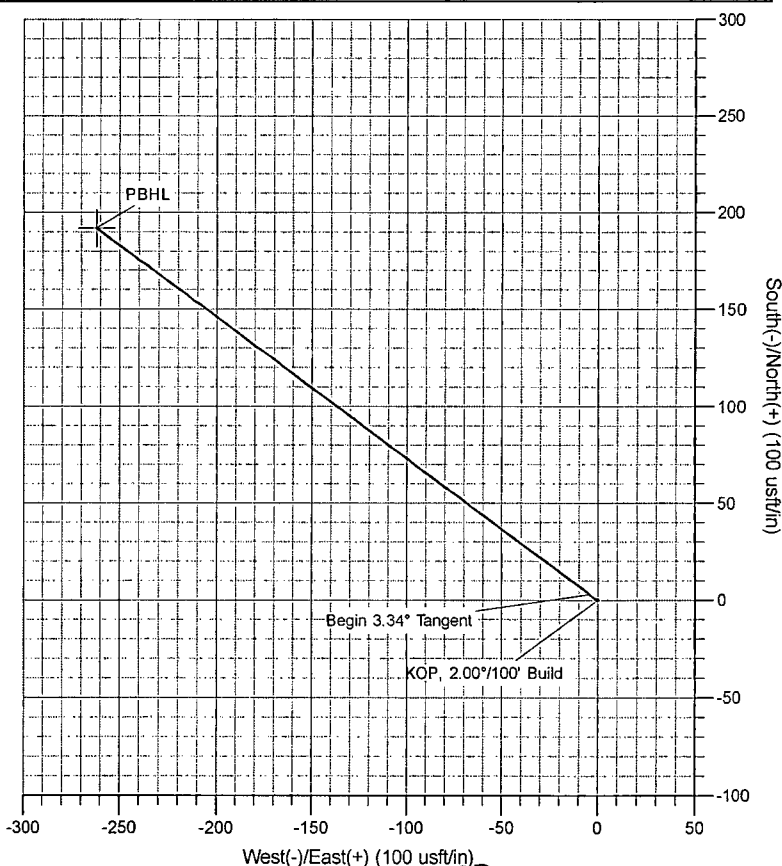
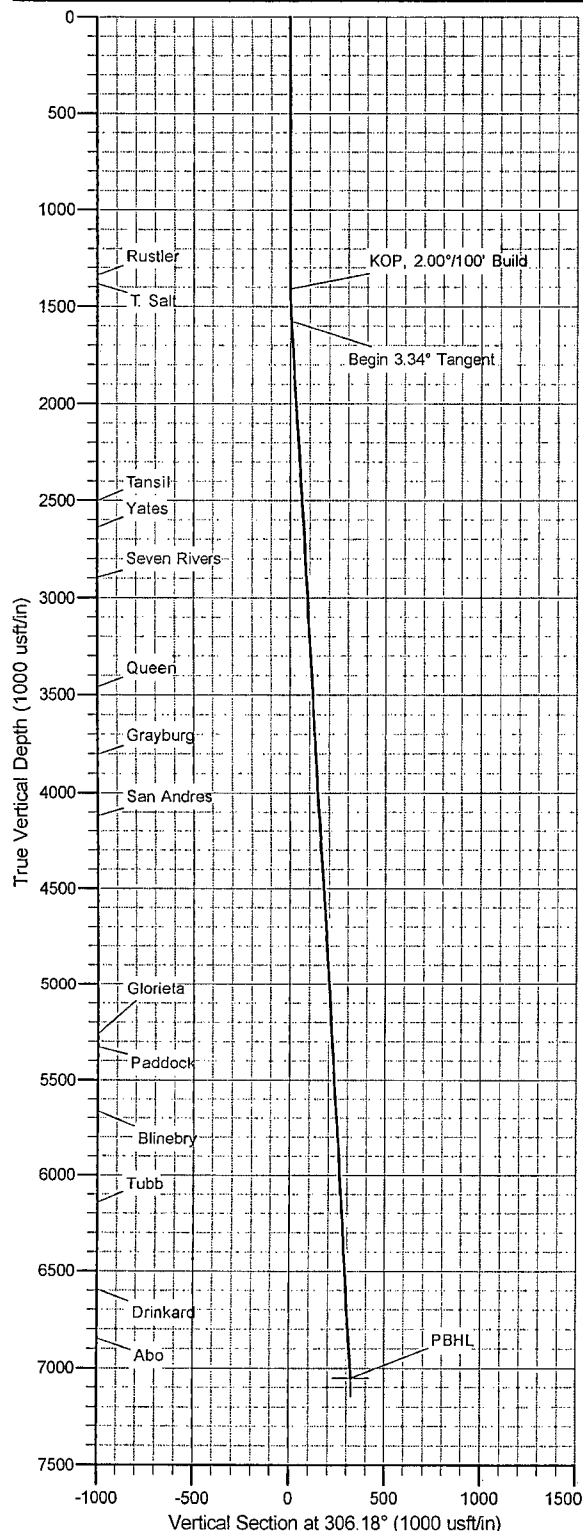
Company: Apache
 Site: NEDU
 Well: 278
 Project: Lea County, New Mexico (NAD 27)
 Rig Name: Capstar 120



Planning: 936.442.2510 Fax: 936.442.2515
 Operations: 936.442.2500 Fax: 936.442.2599

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Vsect	Departure	Annotation
1407.00	0.00	0.00	1407.00	0.00	0.00	0.00	0.00	KOP, 2.00°/100' Build
1574.24	3.34	306.18	1574.15	2.88	-3.94	4.88	4.88	Begin 3.34° Tangent
7059.44	3.34	306.18	7050.00	191.79	-262.27	324.91	324.91	PBHL



HOBBS OCD

JUL 23 2013

RECEIVED

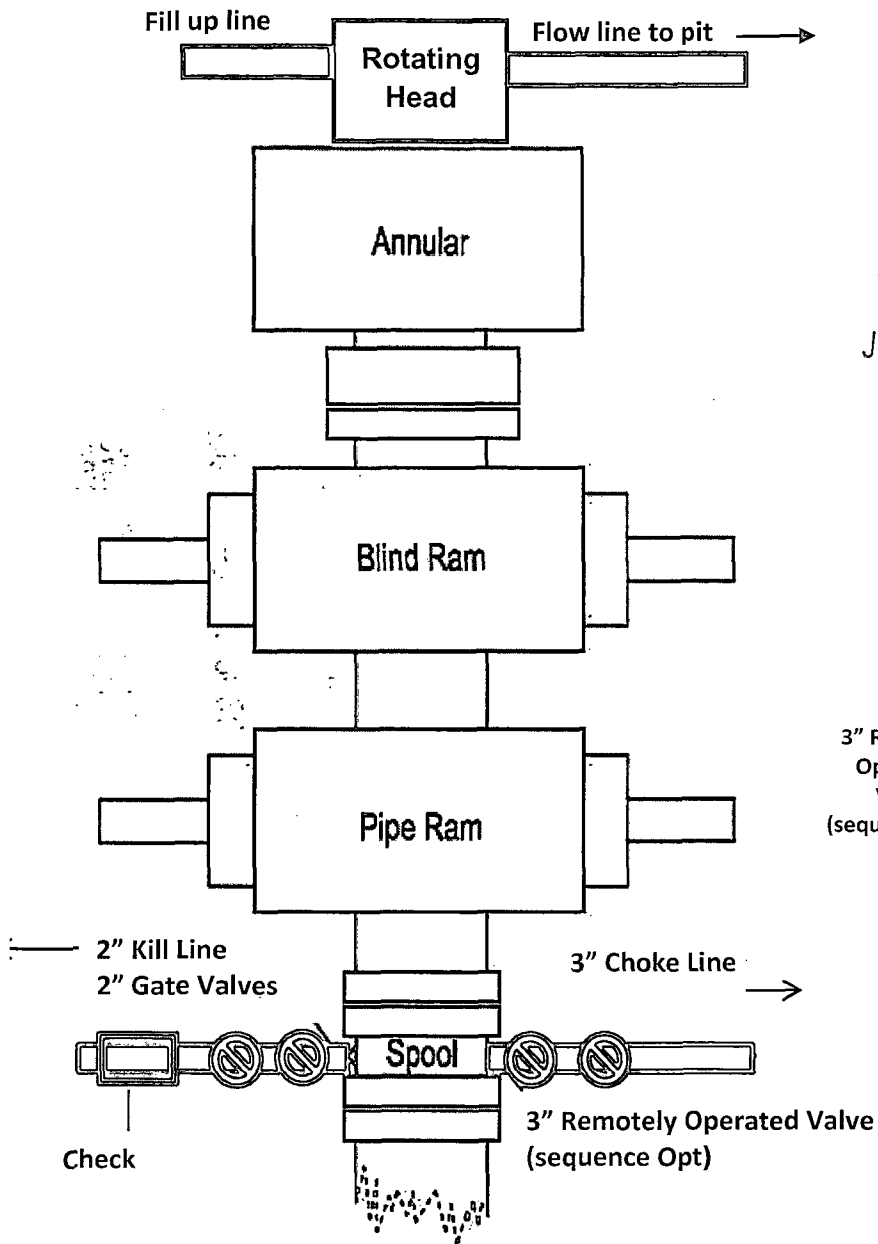
Azimuths to Grid North
 True North: -0.64°
 Magnetic North: 6.61°

Magnetic Field
 Strength: 48688.4snT
 Dip Angle: 60.48°
 Date: 11/13/2012
 Model: WMM_2010

US State Plane 1927 (Exact solution)
 New Mexico East 3001

Created By: Allen Slack
 Date: 8:50, November 13 2012
 Plan: Design #1

The customer should only rely on this document after independently verifying all paths, targets, coordinates, lease and hard lines represented. Any decisions made or wells drilled utilizing this or any other information supplied by MS Energy are at the sole risk and responsibility of the customer. MS Energy is not responsible for the accuracy of this schematic or the information contained herein.



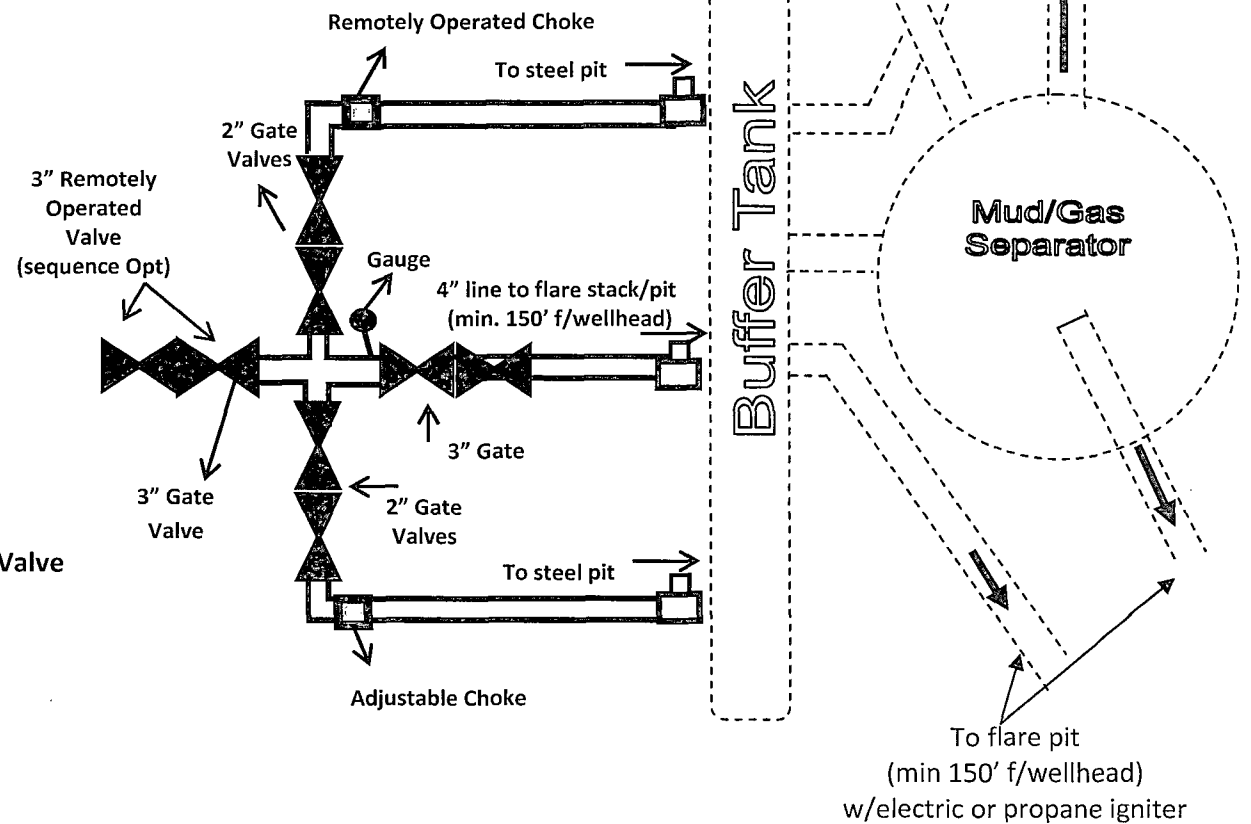
HOBBS OCD

JUL 23 2013

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**11" 3M psi
BOPE & Choke Manifold
EXHIBIT 3A**

All valve & lines on choke manifold are 2" unless noted.
Exact manifold configuration may vary



JUL 23 2013

Apache

Closed Loop Equipment Diagram

Exhibit 4

