

Results of Directional Survey

API number:	30-025-41287	DD
OGRID:		Operator: APACHE CORP
	Property:	NORTHEAST DRINKARD UNIT # 278

surface	ULSTR:	Q (I)	03	T 21S	R 37E
				2405 FSL	390 FEL

BH Loc	ULSTR:	Q (I)	03	T 21S	R 37E
6965 MD		6953.2	TVD	2587 FSL	652 FEL

Top Perf/OH	ULSTR:	Q	03	T 21S	R 37E
5727 MD		5718.0	TVD	2539 FSL	586 FEL

Bot Perf/OH	ULSTR:	Q	03	T 21S	R 37E
6780 MD		6768.5	TVD	2581 FSL	645 FEL

	MD	N/S	E/W	VD
	5725	134.24	-196.09	5715.97
TOP PERFS/OH	5727	134.30	-196.21	5717.97
	5818	136.83	-201.59	5808.77
	6757	175.43	-253.74	6745.48
BOT PERFS/OH	6780	176.23	-254.72	6768.45
	6850	178.67	-257.69	6838.34

NEXT TO LAST	6910	180.61	-260.09	6898.26
LAST READING	6965	182.39	-262.23	6953.19
TD	6965	182.39	-262.23	6953.19

Surface Location	2405 FS	390 FE
Projected BHL	2587 FS	652 FE
Location of		
Top Perfs/OH	2539 FS	586 FE
Bottom Perfs/OH	2581 FS	645 FE

SUMMARY of Subsurface Locations

Surface Location	Q-03-21S-37E	2405 FS	390 FE	Vert. Depth
Top Perfs/OH	Q-03-21S-37E	2539 FS	586 FE	5717.97
Bottom Perfs/OH	Q-03-21S-37E	2581 FS	645 FE	6768.45
Projected TD	Q-03-21S-37E	2587 FS	652 FE	6953.19

MAR 19 2014



PO Box 1370
Artesia, NM 88211-1370
(575) 748-1288

HOBBS OCD

MAR 14 2014



RECEIVED

November 14, 2013

Apache Corporation
303 Veterans Airpark Lane
Suite 3000
Midland, TX 79705

30-025-41287
RE: Northeast Drinkard Unit #278
2405' FSL & 390' FEL
Sec. 3, T21S, R37E
Lea County, New Mexico

Dear Sir,

The attached is the Deviation Survey for the above captioned well.

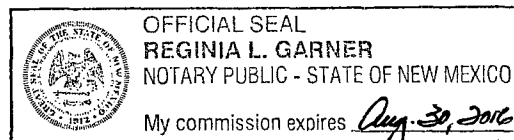
Very truly yours,


Eddie C. LaRue
Operations Manager

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 14th day of November, 2013.


Regina L. Garner
Notary Public



Apache Corporation
303 Veterans Airpark Lane
Suite 3000
Northeast Drinkard Unit 278 Midland, TX 79705

30-025-41287
RE: Northeast Drinkard Unit #278
2405' FSL & 390' FEL
Sec. 3, T21S, R37E
Lea County, New Mexico

Date	Depth	Deviation	Direction
11/5/2013	139	0.40	0.00
11/5/2013	261	0.10	0.00
11/6/2013	472	0.60	0.00
11/6/2013	712	0.70	0.00
11/6/2013	961	0.30	0.00
11/6/2013	1211	0.20	0.00
11/6/2013	1470	0.20	0.00
11/8/2013	1380	0.10	244.30
11/8/2013	1630	0.20	70.80
11/8/2013	1693	0.50	90.00
11/8/2013	1756	0.70	87.30
11/8/2013	1881	1.00	92.50
11/8/2013	1912	1.00	88.80
11/8/2013	2006	2.40	18.30
11/8/2013	2100	4.30	351.50
11/8/2013	2194	4.70	338.30
11/8/2013	2287	3.90	324.00
11/8/2013	2381	3.40	312.20
11/8/2013	2568	2.68	310.40
11/8/2013	2631	3.70	300.60
11/8/2013	2725	4.30	284.60
11/8/2013	2818	3.30	292.60
11/9/2013	2911	2.20	346.30
11/9/2013	3005	1.90	346.90
11/9/2013	3099	1.60	261.90
11/9/2013	3193	3.40	237.10
11/9/2013	3286	5.10	270.00
11/9/2013	3474	4.20	282.90
11/9/2013	3568	4.10	318.00
11/9/2013	3662	3.70	316.50
11/9/2013	3756	4.50	297.00
11/9/2013	3850	4.40	296.70
11/9/2013	3944	4.10	296.10
11/10/2013	4038	4.60	297.90
11/10/2013	4131	6.20	301.30
11/10/2013	4225	6.10	301.70
11/10/2013	4318	6.00	301.20
11/10/2013	4412	4.50	303.10
11/10/2013	4506	3.50	328.70
11/10/2013	4599	3.20	313.00
11/10/2013	4693	3.40	301.50
11/10/2013	4786	3.90	297.80
11/10/2013	4881	3.90	297.70

Apache Corporation
303 Veterans Airpark Lane
Suite 3000
Midland, TX 79705

30-025-41287
RE: Northeast Drinkard Unit #278
2405' FSL & 390' FEL
Sec. 3, T21S, R37E
Lea County, New Mexico

Date	Depth	Deviation	Direction
11/10/2013	4974	4.00	298.10
11/10/2013	5068	3.90	298.00
11/10/2013	5162	4.30	311.60
11/10/2013	5256	4.00	311.00
11/11/2013	5350	3.80	308.20
11/11/2013	5443	3.60	307.90
11/11/2013	5537	3.30	307.10
11/11/2013	5631	2.90	307.00
11/11/2013	5725	3.80	296.40
11/11/2013	5818	3.70	294.00
11/11/2013	5912	3.60	292.90
11/11/2013	6006	4.70	309.90
11/11/2013	6100	4.60	309.20
11/11/2013	6194	4.40	310.80
11/11/2013	6288	4.30	309.30
11/11/2013	6382	4.00	308.10
11/11/2013	6475	3.70	305.60
11/11/2013	6569	3.60	306.40
11/11/2013	6663	3.40	307.70
11/12/2013	6757	3.30	310.10
11/12/2013	6850	3.00	308.40
11/12/2013	6910	2.90	309.70

EOF



HOBBS OCD

MAR 14 2014

Apache Corporation

Lea County, NM (NAD83 NME)

NEDU 30-025-41287 Surf. UL I 3-215-37E 2405' FSL + 390' FEL
#278D

WB1/Job #1311480

RECEIVED

Survey: Phoenix MWD Surveys

Phoenix Final Survey Report

12 November, 2013



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #278D
Project:	Lea County, NM (NAD83 NME)	TVD Reference:	KB @ 3492.00usft (Silver Oak 5)
Site:	NEDU	MD Reference:	KB @ 3492.00usft (Silver Oak 5)
Well:	#278D	North Reference:	Grid
Wellbore:	WB1/Job #1311480	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 5)	Database:	GCR DB

Project:	Lea County, NM (NAD83 NME)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	NEDU				
Site Position:		Northing:	549,246.17 usft	Latitude:	32° 30' 15.55234 N
From:	Map	Easting:	907,874.81 usft	Longitude:	103° 8' 39.81023 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"	Grid Convergence:	0.64 °

Well	#278D					
Well Position	+N/-S	0.00 usft	Northing:	550,343.68 usft	Latitude:	32° 30' 26.38663 N
	+E/-W	0.00 usft	Easting:	908,091.80 usft	Longitude:	103° 8' 37.13383 W
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,474.00 usft	

Wellbore	WB1/Job #1311480				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010_14	10/30/13	7.11	60.46	48,594

Design:	Surveys (Silver Oak 5)				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0.00	0.00	0.00	306.18	

Survey Program		Date	11/12/13		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	1,575.00	Gyro Surveys (WB1/Job #1311480)	CB-GYRO-MS	Camera based gyro multishot	
1,630.00	6,965.00	Phoenix MWD Surveys (WB1/Job #131148)	MWD	MWD - Standard	

Survey	MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
	1,575.00	0.05	207.69	1,574.98	1.47	-4.77	4.72	0.00
Tie-on								
	1,630.00	0.20	70.80	1,629.98	1.48	-4.70	4.67	0.43
First Phoenix MWD Survey								
	1,693.00	0.50	91.00	1,692.98	1.52	-4.32	4.38	0.51
	1,756.00	0.70	87.30	1,755.98	1.53	-3.66	3.85	0.32
	1,818.00	0.80	80.70	1,817.97	1.62	-2.85	3.26	0.21
	1,881.00	1.00	92.50	1,880.96	1.66	-1.87	2.49	0.43
	1,912.00	1.00	88.80	1,911.96	1.66	-1.33	2.05	0.21
	2,006.00	2.40	18.30	2,005.92	3.54	0.11	2.00	2.42
	2,100.00	4.30	351.50	2,099.76	8.90	0.21	5.09	2.57



Phoenix Technology Services

Phoenix Final Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #278D
Project:	Lea County, NM (NAD83 NME)	TVD Reference:	KB @ 3492.00usft (Silver Oak 5)
Site:	NEDU	MD Reference:	KB @ 3492.00usft (Silver Oak 5)
Well:	#278D	North Reference:	Grid
Wellbore:	WB1/Job #1311480	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 5)	Database:	GCR DB

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg. (°/100usft)
2,194.00	4.70	338.30	2,193.48	15.96	-1.74	10.83	1.18
2,287.00	3.90	324.00	2,286.22	22.06	-5.01	17.06	1.43
2,381.00	3.40	312.20	2,380.03	26.52	-8.95	22.88	0.96
2,475.00	3.00	306.90	2,473.88	29.87	-12.98	28.11	0.53
2,568.00	2.60	310.40	2,566.77	32.70	-16.53	32.65	0.47
2,631.00	3.70	300.60	2,629.67	34.66	-19.37	36.10	1.94
2,725.00	4.30	284.60	2,723.45	37.09	-25.39	42.39	1.34
2,818.00	3.30	292.60	2,816.24	39.00	-31.24	48.24	1.21
2,912.00	2.20	346.30	2,910.15	41.79	-34.16	52.25	2.84
3,005.00	1.90	346.90	3,003.09	45.03	-34.94	54.78	0.32
3,099.00	1.60	261.90	3,097.05	46.36	-36.59	56.90	2.53
3,193.00	3.40	237.10	3,190.96	44.66	-40.23	58.84	2.19
3,286.00	5.10	270.70	3,283.72	43.21	-46.68	63.19	3.17
3,380.00	4.70	271.00	3,377.37	43.33	-54.71	69.74	0.43
3,474.00	4.20	282.90	3,471.09	44.17	-61.91	76.05	1.11
3,568.00	4.10	318.00	3,564.86	47.43	-67.52	82.50	2.66
3,662.00	3.70	316.50	3,658.64	52.13	-71.85	88.77	0.44
3,756.00	4.50	297.00	3,752.41	56.01	-77.23	95.40	1.70
3,850.00	4.40	296.70	3,846.12	59.30	-83.73	102.59	0.11
3,944.00	4.10	296.10	3,939.86	62.40	-89.97	109.46	0.32
4,038.00	4.60	297.90	4,033.59	65.64	-96.32	116.50	0.55
4,131.00	6.20	301.30	4,126.18	69.99	-103.91	125.19	1.75
4,225.00	6.10	301.70	4,219.64	75.26	-112.50	135.23	0.12
4,318.00	6.00	301.20	4,312.12	80.37	-120.86	145.00	0.12
4,412.00	4.50	303.10	4,405.72	84.93	-128.15	153.57	1.61
4,506.00	3.50	328.70	4,499.50	89.40	-132.73	159.91	2.15
4,599.00	3.20	313.00	4,592.34	93.59	-136.10	165.11	1.03
4,693.00	3.40	301.50	4,686.19	96.84	-140.40	170.49	0.73
4,786.00	3.90	297.80	4,779.00	99.75	-145.55	176.37	0.59
4,881.00	3.90	297.70	4,873.78	102.76	-151.27	182.76	0.01
4,974.00	4.00	298.10	4,966.56	105.76	-156.93	189.10	0.11
5,068.00	3.90	298.00	5,060.33	108.80	-162.64	195.51	0.11
5,162.00	4.30	311.60	5,154.10	112.65	-168.10	202.18	1.12
5,256.00	4.00	311.00	5,247.85	117.14	-173.21	208.96	0.32
5,350.00	3.80	308.20	5,341.63	121.21	-178.13	215.34	0.29
5,443.00	3.60	307.90	5,434.44	124.91	-182.86	221.34	0.22
5,537.00	3.30	307.10	5,528.27	128.36	-187.34	226.99	0.32
5,631.00	2.90	307.00	5,622.13	131.42	-191.40	232.07	0.43
5,725.00	3.80	296.40	5,715.97	134.24	-196.09	237.52	1.16
5,818.00	3.70	294.00	5,808.77	136.83	-201.59	243.49	0.20
5,912.00	3.60	292.90	5,902.58	139.21	-207.08	249.33	0.13
6,006.00	4.70	309.90	5,996.33	142.83	-212.76	256.04	1.74
6,100.00	4.60	309.20	6,090.03	147.68	-218.63	263.65	0.12
6,194.00	4.40	310.80	6,183.74	152.42	-224.28	271.01	0.25

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #278D
Project:	Lea County, NM (NAD83 NME)	TVD Reference:	KB @ 3492.00usft (Silver Oak 5)
Site:	NEDU	MD Reference:	KB @ 3492.00usft (Silver Oak 5)
Well:	#278D	North Reference:	Grid
Wellbore:	WB1/Job #1311480	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 5)	Database:	GCR DB

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	
6,288.00	4.30	309.30	6,277.47	157.01	-229.74	278.12	0.16	
6,382.00	4.00	308.10	6,371.22	161.26	-235.05	284.92	0.33	
6,475.00	3.70	305.60	6,464.01	165.01	-240.04	291.16	0.37	
6,569.00	3.60	306.40	6,557.82	168.53	-244.88	297.14	0.12	
6,663.00	3.40	307.70	6,651.64	171.98	-249.46	302.88	0.23	
6,757.00	3.30	310.10	6,745.48	175.43	-253.74	308.37	0.18	
6,850.00	3.00	308.40	6,838.34	178.67	-257.69	313.47	0.34	
6,910.00	2.90	309.70	6,898.26	180.61	-260.09	316.55	0.20	
Current Survey								
6,965.00	2.90	309.70	6,953.19	182.39	-262.23	319.33	0.00	
Projection to Bit								

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
1,575.00	1,574.98	1.47	-4.77	Tie-on	
1,630.00	1,629.98	1.48	-4.70	First Phoenix MWD Survey	
6,910.00	6,898.26	180.61	-260.09	Current Survey	
6,965.00	6,953.19	182.39	-262.23	Projection to Bit	

Checked By: _____ Approved By: _____ Date: _____

WELL DETAILS									
	+N/-S	+E/-W	Northing	Ground Level	3474.00	Latitude	Longitude		
	0.00	0.00	550343.68	Easting	908091.80	32° 30' 28.38663 N	103° 8' 37.13383 W		

SECTION DETAILS									
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	YFace	VSeal
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2000.00	0.00	0.00	2000.00	0.00	0.00	0.00	0.00	0.00
3	2191.48	3.83	306.18	2191.33	3.78	-5.16	2.00	306.18	6.40
4	6960.79	3.83	306.18	6960.00	191.80	-262.28	0.00	0.00	324.93

Annotation: KOP Start DLS 2.00 TFO 306.18
Start 4769.32 hold at 2191.48 MD
TD at 6960.79

DESIGN TARGET DETAILS									
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape	
PBHL-NEDU #278D	6950.00	191.80	-262.28	550355.49	907829.52	32° 30' 28.31317 N	103° 8' 40.17114 W	Circle (Radius: 25.00)	

- plan hits target center

LEGEND	
—	#278D, WB1/Job #1311480, Surveys (Silver Oak 5) V0
—	Plan #1 10-30-13

Map System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone Name: New Mexico Eastern Zone
Local Origin: Well #278D, Grid North
Latitude: 32° 30' 26.38663 N
Longitude: 103° 8' 37.13383 W
Grid East: 908091.80
Grid North: 550343.68
Scale Factor: 1.000
Geomagnetic Model: IGRF2010_14
Sample Date: 30-Oct-13
Magnetic Declination: 7.11°
Dip Angle from Horizontal: 60.46°
Magnetic Field Strength: 48594
To convert a Magnetic Direction to a Grid Direction, Add 6.47°
To convert a Magnetic Direction to a True Direction, Add 7.11° East
To convert a True Direction to a Grid Direction, Subtract 0.64°

FORMATION TOP DETAILS				
TVDPath	MDPath	Formation	DipAngle	DipDir
1332.00	1332.00	Rustler	0.00	
1376.00	1376.00	T. Salt	0.00	
2496.00	2496.82	Tensil	0.00	
2635.00	2636.14	Yates	0.00	
2890.00	2891.71	Seven Rivers	0.00	
3456.00	3458.97	Queen	0.00	
3798.00	3801.74	Grayburg	0.00	
4114.00	4118.45	San Andres	0.00	
5257.00	5264.00	Glorieta	0.00	
5319.00	5326.14	Paddock	0.00	
5658.00	5665.90	Blinebry	0.00	
6138.00	6146.97	Tubb	0.00	
6590.00	6599.99	Drinkard	0.00	
6842.00	6852.55	Abo	0.00	

