

Results of Directional Survey

API number:	30-025-41160	DD
OGRID:		Operator: APACHE CORP
		Property: NORTHEAST DRINKARD UNIT # 285

surface	ULSTR:	O	02	T 21S	R 37E
				3325 FSL	2085 FEL

BH Loc	ULSTR:	O	30	T 19S	R 37E
7060 MD		7047.6	TVD	3579 FSL	2345 FEL

Top Perf/OH	ULSTR:	O	02	T 21S	R 37E
5765 MD		5755.6	TVD	3518 FSL	2281 FEL

Bot Perf/OH	ULSTR:	O	30	T 19S	R 37E
6853 MD		6946.0	TVD	3571 FSL	2337 FEL

	MD	N/S	E/W	VD
	5747	191.96	-195.56	5737.66
TOP PERFS/OH	5765	192.88	-196.36	5755.62
	5809	195.14	-198.32	5799.52
	6809	243.71	-249.75	6921.73
BOT PERFS/OH	6853	245.71	-251.71	6945.98
	6934	249.39	-255.31	6990.62

NEXT TO LAST	7003	252.04	-258.19	6990.62
LAST READING	7060	254.01	-260.43	7047.55
TD	7060	254.01	-260.43	7047.55

Surface Location	3325 FS	2085 FE
Projected BHL	3579 FS	2345 FE
Location of		
Top Perfs/OH	3518 FS	2281 FE
Bottom Perfs/OH	3571 FS	2337 FE

SUMMARY of Subsurface Locations

Surface Location	O-02-21S-37E	3325 FS	2085 FE	Vert. Depth
Top Perfs/OH	O-02-21S-37E	3518 FS	2281 FE	5755.62
Bottom Perfs/OH	O-30-19S-37E	3571 FS	2337 FE	6945.98
Projected TD	O-30-19S-37E	3579 FS	2345 FE	7047.55

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Apache Corporation

Lea County, NM (NAD83 NME)

NEDU

#285

WB1/Job #1311139

Survey: Phoenix MWD Survey

Phoenix Final Survey Report

11 October, 2013





Phoenix Technology Services
Phoenix Final Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #285
Project:	Lea County, NM (NAD83 NME)	TVD Reference:	KB @ 3512.00usft (Silver Oak 5)
Site:	NEDU	MD Reference:	KB @ 3512.00usft (Silver Oak 5)
Well:	#285	North Reference:	Grid
Wellbore:	WB1/Job #1311139	Survey Calculation Method:	Minimum Curvature
Design:	Survey (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	#285		
Well Position	+N/-S	0.00 usft	Northing: 551,310.42 usft
	+E/-W	0.00 usft	Easting: 911,664.58 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
			Ground Level: 3,494.00 usft

Wellbore	WB1/Job #1311139				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010_14	08/29/13	7.13	60.47	48,614

Design	Survey (Silver Oak 5)			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	269.96

Survey Program	Date: 10/11/13				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	1,340.00	Gyrodata Survey (WB1/Job #1311139)	CB-GYRO-MS	Camera based gyro multishot	
1,340.00	7,060.00	Phoenix MWD Survey (WB1/Job #1311139)	MWD	MWD - Standard	

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
1,340.00	0.77	235.46	1,339.96	-3.93	-4.94	4.94	0.00
First Phoenix MWD Survey							
1,435.00	1.00	241.00	1,434.95	-4.70	-6.19	6.19	0.26
1,498.00	0.70	233.60	1,497.94	-5.19	-6.98	6.98	0.51
1,560.00	1.00	257.20	1,559.93	-5.54	-7.81	7.81	0.73
1,623.00	1.80	285.10	1,622.91	-5.40	-9.30	9.30	1.63
1,685.00	2.10	285.90	1,684.88	-4.83	-11.33	11.34	0.49
1,747.00	2.40	293.70	1,746.83	-4.00	-13.61	13.62	0.69
1,810.00	2.90	302.50	1,809.76	-2.62	-16.17	16.17	1.02
1,872.00	2.90	306.30	1,871.68	-0.84	-18.75	18.75	0.31
1,935.00	3.60	321.80	1,934.58	1.65	-21.26	21.26	1.77



Phoenix Technology Services

Phoenix Final Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #285
Project:	Lea County, NM (NAD83 NME)	TVD Reference:	KB @ 3512.00usft (Silver Oak 5)
Site:	NEDU	MD Reference:	KB @ 3512.00usft (Silver Oak 5)
Well:	#285	North Reference:	Grid
Wellbore:	WB1/Job #1311139	Survey Calculation Method:	Minimum Curvature
Design:	Survey (Silver Oak 5)	Database:	GCR-DB

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
1,997.00	4.00	331.40	1,996.45	5.08	-23.50	23.50	1.21
2,060.00	3.80	330.00	2,059.30	8.82	-25.60	25.59	0.35
2,123.00	3.80	328.60	2,122.16	12.41	-27.73	27.72	0.15
2,185.00	4.00	323.50	2,184.02	15.90	-30.08	30.07	0.65
2,247.00	4.50	319.40	2,245.85	19.49	-32.95	32.94	0.94
2,310.00	4.40	322.40	2,308.66	23.28	-36.04	36.02	0.40
2,372.00	4.20	325.60	2,370.48	27.03	-38.77	38.75	0.50
2,435.00	4.00	326.30	2,433.32	30.77	-41.29	41.27	0.33
2,497.00	3.80	324.10	2,495.18	34.23	-43.70	43.67	0.40
2,560.00	4.00	315.40	2,558.03	37.49	-46.46	46.44	0.99
2,622.00	3.50	316.90	2,619.90	40.41	-49.27	49.25	0.82
2,685.00	3.30	314.10	2,682.79	43.07	-51.89	51.86	0.41
2,747.00	3.50	315.50	2,744.68	45.66	-54.50	54.47	0.35
2,810.00	3.50	314.80	2,807.56	48.39	-57.21	57.18	0.07
2,935.00	3.90	308.30	2,932.30	53.71	-63.25	63.22	0.46
3,060.00	3.50	309.30	3,057.04	58.77	-69.54	69.51	0.32
3,185.00	3.90	305.50	3,181.78	63.65	-75.96	75.92	0.38
3,310.00	4.00	310.50	3,306.49	68.95	-82.73	82.69	0.29
3,435.00	3.50	301.10	3,431.22	73.75	-89.32	89.27	0.63
3,560.00	3.70	311.60	3,555.97	78.40	-95.60	95.55	0.55
3,685.00	3.60	301.90	3,680.72	83.15	-101.95	101.89	0.50
3,748.00	3.60	306.60	3,743.60	85.38	-105.21	105.16	0.47
3,810.00	4.10	312.00	3,805.46	88.02	-108.42	108.37	1.00
3,873.00	4.00	313.30	3,868.30	91.04	-111.70	111.64	0.22
3,935.00	4.20	320.30	3,930.14	94.27	-114.72	114.66	0.87
3,998.00	4.40	324.80	3,992.96	98.02	-117.59	117.52	0.62
4,060.00	4.00	325.50	4,054.80	101.74	-120.18	120.12	0.65
4,123.00	3.80	324.00	4,117.65	105.24	-122.65	122.59	0.36
4,185.00	3.90	324.90	4,179.51	108.63	-125.07	125.00	0.19
4,248.00	3.70	325.90	4,242.37	112.06	-127.45	127.37	0.33
4,310.00	3.60	324.90	4,304.25	115.31	-129.69	129.61	0.19
4,372.00	3.60	325.10	4,366.12	118.50	-131.92	131.84	0.02
4,435.00	3.60	320.60	4,429.00	121.65	-134.31	134.23	0.45
4,560.00	4.60	317.60	4,553.68	128.39	-140.18	140.10	0.82
4,686.00	4.40	317.40	4,679.29	135.68	-146.86	146.77	0.16
4,811.00	4.20	318.20	4,803.94	142.62	-153.15	153.06	0.17
4,936.00	4.20	318.00	4,928.60	149.43	-159.27	159.17	0.01
5,061.00	3.90	318.10	5,053.29	156.00	-165.17	165.07	0.24
5,186.00	4.40	321.90	5,177.96	162.94	-170.97	170.86	0.46
5,311.00	4.20	321.30	5,302.61	170.28	-176.79	176.68	0.16
5,436.00	4.00	319.60	5,427.29	177.17	-182.47	182.36	0.19
5,561.00	3.60	319.80	5,552.02	183.49	-187.83	187.72	0.32
5,622.00	3.30	317.00	5,612.91	186.24	-190.27	190.15	0.56
5,685.00	3.60	316.30	5,675.79	188.99	-192.87	192.75	0.48
5,747.00	3.80	319.20	5,737.66	191.96	-195.56	195.43	0.44



Phoenix Technology Services
Phoenix Final Survey Report



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Project:	Lea County, NM (NAD83 NME)	TVD Reference:	KB @ 3512.00usft (Silver Oak 5)
Site:	NEDU	MD Reference:	KB @ 3512.00usft (Silver Oak 5)
Well:	#285	North Reference:	Grid
Wellbore:	WB1/Job #1311139	Survey Calculation Method:	Minimum Curvature
Design:	Survey (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)	
5,809.00	4.00	318.90	5,799.52	195.14	-198.32	198.20	0.32	
5,872.00	4.80	316.50	5,862.33	198.71	-201.58	201.45	1.30	
5,934.00	4.70	316.30	5,924.12	202.43	-205.12	204.99	0.16	
6,059.00	4.20	316.60	6,048.74	209.46	-211.80	211.67	0.40	
6,184.00	4.20	315.10	6,173.41	216.02	-218.18	218.04	0.09	
6,309.00	3.80	314.90	6,298.10	222.19	-224.34	224.20	0.32	
6,434.00	3.90	307.90	6,422.82	227.72	-230.63	230.49	0.38	
6,560.00	4.00	308.20	6,548.52	233.07	-237.47	237.32	0.08	
6,685.00	3.60	308.80	6,673.25	238.23	-243.95	243.80	0.32	
6,809.00	3.80	317.70	6,796.99	243.71	-249.75	249.60	0.49	
6,934.00	3.50	313.40	6,921.73	249.39	-255.31	255.15	0.32	
7,003.00	3.00	311.50	6,990.62	252.04	-258.19	258.03	0.74	
Last Phoenix MWD Survey								
7,060.00	3.00	311.50	7,047.55	254.01	-260.43	260.27	0.00	
Projection to TD								

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
1,340.00	1,339.96	-3.93	-4.94	First Phoenix MWD Survey	
7,003.00	6,990.62	252.04	-258.19	Last Phoenix MWD Survey	
7,060.00	7,047.55	254.01	-260.43	Projection to TD	

Checked By: _____	Approved By: _____	Date: _____
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PO Box 1370
Artesia, NM 88211-1370
(575) 748-1288

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NOV 13 2013

RECEIVED

October 14, 2013

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

30-025-41160
RE: Northeast Drinkard Unit #285
3600' FSL & 2350' FEL
Sec. 2, T21S, R37E
Lea County, New Mexico

Dear Sir,

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

Very truly yours,

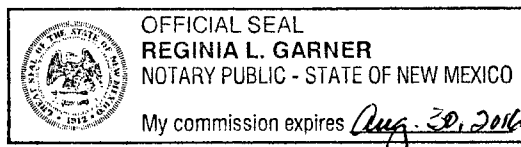
A handwritten signature in cursive script, appearing to read "Chris Graham".

Chris Graham
Drilling Superintendent

State of New Mexico }
County of Eddy }

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

A handwritten signature in cursive script, appearing to read "Regina L. Garner".

Notary Public

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

Northeast Drinkard Unit 285

RE: ~~30-025-41160~~
Northeast Drinkard Unit #285
3600' FSL & 2350' FEL
Sec. 2, T21S, R37E
Lea County, New Mexico

Date	Depth	Deviation	Direction
10/5/2013	143	0.40	0.00
10/6/2013	361	0.30	0.00
10/6/2013	596	0.10	0.00
10/6/2013	811	0.20	0.00
10/6/2013	1029	0.80	0.00
10/6/2013	1061	0.40	0.00
10/6/2013	1312	0.60	0.00
10/7/2013	1435	1.00	0.00
10/7/2013	1498	0.70	233.60
10/7/2013	1560	0.10	257.20
10/7/2013	1685	2.10	285.90
10/7/2013	1747	2.40	293.70
10/7/2013	1810	2.90	302.50
10/7/2013	1872	2.90	306.30
10/7/2013	1935	3.60	321.80
10/8/2013	2304	4.50	319.40
10/8/2013	2679	3.50	316.90
10/8/2013	2867	3.50	314.80
10/8/2013	3117	3.50	309.30
10/8/2013	3242	3.90	305.50
10/8/2013	3435	3.50	301.10
10/8/2013	3435	3.50	301.10
10/8/2013	3685	3.60	301.90
10/8/2013	3873	4.00	313.30
10/9/2013	3992	4.20	320.30
10/9/2013	4242	3.90	324.90
10/9/2013	4492	3.60	320.60
10/9/2013	4559	4.60	317.60
10/9/2013	4685	4.40	317.40
10/9/2013	4810	4.20	318.20
10/9/2013	4935	4.20	318.00
10/9/2013	5060	3.90	318.10
10/9/2013	5310	4.20	321.30
10/9/2013	5560	3.60	319.80
10/10/2013	5679	3.30	317.00
10/10/2013	5866	4.00	318.90
10/10/2013	5991	4.70	316.30
10/10/2013	6059	4.20	316.60
10/10/2013	6184	4.20	315.10
10/10/2013	6309	3.80	314.90
10/10/2013	6434	3.90	307.90
10/10/2013	6560	4.00	308.20
10/10/2013	6685	3.60	308.80
10/10/2013	6809	3.80	317.70
10/11/2013	6991	3.50	313.40
10/11/2013	7060	3.00	311.50

EOF