

Results of Directional Survey

API number:	30-025-41038	DD
OGRID:		Operator: APACHE CORP
		Property: NORTH MONUMENT G/SA UNIT # 386

surface	ULSTR:	K	20	T 19S	R 37E
				1615 FSL	1575 FWL

BH Loc	ULSTR:	L	20	T 19S	R 37E
4080 MD		4048.4	TVD	1351 FSL	1289 FWL

Top Perf/OH	ULSTR:	K	20	T 19S	R 37E
3733 MD		3706.4	TVD	1393 FSL	1329 FWL

Bot Perf/OH	ULSTR:	L	20	T 19S	R 37E
3960 MD		3930.3	TVD	1366 FSL	1304 FWL

	MD	N/S	E/W	VD
	3692	-217.18	-241.55	3665.84
TOP PERFS/OH	3733	-221.78	-245.92	3706.35
	3820	-231.54	-255.19	3792.30
	3948	-247.00	-269.91	3918.50
BOT PERFS/OH	3960	-248.55	-271.41	3930.31
	4030	-257.59	-280.14	3999.17

NEXT TO LAST	4030	-257.59	-280.14	3999.17
LAST READING	4080	-263.91	-286.46	4048.36
TD	4080	-263.91	-286.46	4048.36

Surface Location	1615 FS	1575 FW
Projected BHL	1351 FS	1289 FW
Location of		
Top Perfs/OH	1393 FS	1329 FW
Bottom Perfs/OH	1366 FS	1304 FW

SUMMARY of Subsurface Locations

Surface Location	K-20-19S-37E	1615 FS	1575 FW	Vert. Depth
Top Perfs/OH	K-20-19S-37E	1393 FS	1329 FW	3706.35
Bottom Perfs/OH	L-20-19S-37E	1366 FS	1304 FW	3930.31
Projected TD	L-20-19S-37E	1351 FS	1289 FW	4048.36

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HOBBS OCD

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Apache Corporation

Lea County, NM (NAD83 NME)

NMGSAU

#386

ARI # 30-025-41038

OH / Job #1310454

Survey: MWD Phoenix

Standard Survey Report

04 June, 2013





Phoenix Technology Services

Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #386
Project:	Lea County, NM (NAD83 NME)	TVD Reference:	KB @ 3653.00usft (Capstar 120)
Site:	NMGSAU	MD Reference:	KB @ 3653.00usft (Capstar 120)
Well:	#386	North Reference:	True
Wellbore:	OH / Job #1310454	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 120)	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:	NMGSAU		
Site Position:		Northing:	582,973.08 usft
From:	Map	Easting:	870,597.88 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 35' 53.144391 N
		Longitude:	103° 15' 51.083480 W
		Grid Convergence:	0.58 °

Well:	#386		
Well Position	+N/-S	0.00 usft	Northing:
	+E/-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 38' 34.821971 N
		Longitude:	103° 16' 37.418006 W
		Ground Level:	3,642.00 usft

Wellbore:	OH / Job #1310454				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010_14	05/28/13	7.24	60.57	48,703

Design:	Surveys (Capstar 120)				
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	227.21	

Survey Program	Date	06/04/13			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	1,300.00	ELine Gyro Survey (OH / Job #1310454)	NS-GYRO-MS	North sensing gyrocompassing m/s	
1,387.00	4,080.00	MWD Phoenix (OH / Job #1310454)	MWD	MWD - Standard	

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)	
1,300.00	0.86	38.66	1,299.90	8.12	9.21	-12.28	0.00	0.00	0.00	
Tie-on to Gyro										
1,387.00	0.70	211.30	1,386.89	8.18	9.34	-12.41	1.79	-0.18	198.44	
First Phoenix MWD Survey										
1,515.00	5.90	226.90	1,514.64	3.01	4.13	-5.08	4.09	4.06	12.19	
1,643.00	6.00	227.90	1,641.95	-5.97	-5.64	8.19	0.11	0.08	0.78	
1,771.00	6.80	226.80	1,769.15	-15.64	-16.12	22.46	0.63	0.63	-0.86	
1,899.00	9.80	228.60	1,895.79	-28.04	-29.82	40.93	2.35	2.34	1.41	
2,027.00	9.00	228.20	2,022.07	-41.91	-45.46	61.83	0.63	-0.63	-0.31	



Phoenix Technology Services

Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #386
Project:	Lea County, NM (NAD83 NME)	TVD Reference:	KB @ 3653.00usft (Capstar 120)
Site:	NMGSAU	MD Reference:	KB @ 3653.00usft (Capstar 120)
Well:	#386	North Reference:	True
Wellbore:	OH / Job #1310454	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 120)	Database:	GCR DB

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)
2,155.00	9.90	232.40	2,148.34	-55.30	-61.64	82.80	0.89	0.70	3.28
2,283.00	9.60	232.60	2,274.49	-68.50	-78.84	104.38	0.24	-0.23	0.16
2,411.00	9.20	231.50	2,400.77	-81.35	-95.32	125.21	0.34	-0.31	-0.86
2,539.00	8.70	233.80	2,527.21	-93.44	-111.14	145.04	0.48	-0.39	1.80
2,667.00	7.50	235.10	2,653.93	-103.93	-125.81	162.93	0.95	-0.94	1.02
2,795.00	7.20	230.90	2,780.88	-113.77	-138.88	179.21	0.48	-0.23	-3.28
2,924.00	8.50	226.10	2,908.67	-125.48	-152.03	196.81	1.13	1.01	-3.72
3,052.00	8.80	222.50	3,035.22	-139.26	-165.46	216.02	0.48	0.23	-2.81
3,180.00	9.10	223.90	3,161.66	-153.77	-179.09	235.89	0.29	0.23	1.09
3,308.00	10.80	225.40	3,287.73	-169.49	-194.65	257.98	1.34	1.33	1.17
3,436.00	10.40	225.10	3,413.54	-186.06	-211.37	281.51	0.32	-0.31	-0.23
3,564.00	9.80	224.20	3,539.56	-202.03	-227.15	303.94	0.48	-0.47	-0.70
3,692.00	9.00	222.80	3,665.84	-217.18	-241.55	324.80	0.65	-0.63	-1.09
3,820.00	8.80	224.30	3,792.30	-231.54	-255.19	344.56	0.24	-0.16	1.17
3,948.00	10.40	223.00	3,918.50	-247.00	-269.91	365.86	1.26	1.25	-1.02
4,030.00	10.30	225.00	3,999.17	-257.59	-280.14	380.57	0.45	-0.12	2.44
Last Phoenix MWD Survey									
4,080.00	10.30	225.00	4,048.36	-263.91	-286.46	389.50	0.00	0.00	0.00
Projection to TD									

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,300.00	1,299.90	8.12	9.21	Tie-on to Gyro
1,387.00	1,386.89	8.18	9.34	First Phoenix MWD Survey
4,030.00	3,999.17	-257.59	-280.14	Last Phoenix MWD Survey
4,080.00	4,048.36	-263.91	-286.46	Projection to TD

Checked By: _____ Approved By: _____ Date: _____