

Apache Corporation

Eddy County, NM (NAD27 NME)

Washington 33 State

#66 API#30-015-41706

WB1/Job #1311437

Survey: Phoenix MWD Survey

Phoenix Final Survey Report

14 November, 2013



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #66
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3697.00usft (Capstar 114)
Site:	Washington 33 State	MD Reference:	KB @ 3697.00usft (Capstar 114)
Well:	#66	North Reference:	Grid
Wellbore:	WB1/Job #1311437	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	GCR DB

Project: Eddy County, NM (NAD27 NME)			
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		Washington 33 State			
Site Position:		Northing:	653,591.90 usft	Latitude:	32° 47' 48.16208 N
From:	Map	Easting:	549,165.70 usft	Longitude:	104° 10' 23.99797 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"	Grid Convergence:	0.09 °

Well:	#66					
Well Position	+N/-S	0.00 usft	Northing:	653,591.90 usft	Latitude:	32° 47' 48.16208 N
	+E/-W	0.00 usft	Easting:	549,165.70 usft	Longitude:	104° 10' 23.99797 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,686.00 usft

Wellbore		WB1/Job #1311437			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010_14	10/21/13	7.62	60.55	48,657

Design:		Surveys (Capstar 114)		
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	14.95

Survey Program		Date	11/13/13		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
560.00	3,264.00	Phoenix MWD Survey (WB1/Job #131143)	MWD	MWD - Standard	

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
495.00	1.48	145.84	494.95	-5.29	2.84	-4.38	0.00
Tie-on to Gyro							
560.00	1.70	153.00	559.93	-6.84	3.74	-5.65	0.46
First Phoenix MWD Survey							
646.00	1.10	6.40	645.92	-7.16	4.42	-5.78	3.12
732.00	1.10	353.80	731.90	-5.52	4.42	-4.19	0.28
817.00	1.10	331.20	816.89	-3.99	3.94	-2.84	0.51
903.00	1.30	330.20	902.87	-2.42	3.06	-1.55	0.23
988.00	1.40	319.90	987.84	-0.79	1.91	-0.27	0.31
1,074.00	2.00	358.60	1,073.81	1.51	1.19	1.77	1.47
1,160.00	1.50	333.80	1,159.77	4.02	0.66	4.06	1.04
1,245.00	2.90	0.30	1,244.71	7.17	0.18	6.97	1.99

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Well:	#66	North Reference:	Grid
Wellbore:	WB1/Job #1311437	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	GCR DB

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V: Sec (usft)	DLeg (°/100usft)	
1,331.00	2.60	356.50	1,330.61	11.29	0.07	10.93	0.41	
1,419.00	3.90	359.30	1,418.46	16.28	-0.09	15.70	1.49	
1,505.00	3.50	13.20	1,504.29	21.76	0.48	21.14	1.14	
1,590.00	2.90	7.50	1,589.15	26.42	1.35	25.87	0.80	
1,676.00	4.60	22.00	1,674.97	31.77	2.93	31.45	2.25	
1,762.00	4.00	17.00	1,760.72	37.84	5.10	37.87	0.82	
1,847.00	3.50	7.90	1,845.54	43.24	6.32	43.41	0.91	
1,933.00	4.30	15.70	1,931.34	48.95	7.55	49.24	1.11	
2,018.00	4.20	9.70	2,016.11	55.08	8.94	55.52	0.54	
2,104.00	5.50	24.30	2,101.80	61.94	11.17	62.73	2.07	
2,190.00	5.50	22.70	2,187.41	69.50	14.45	70.88	0.18	
2,275.00	5.30	25.10	2,272.03	76.81	17.69	78.78	0.35	
2,361.00	5.20	25.50	2,357.67	83.93	21.05	86.52	0.12	
2,446.00	5.40	25.20	2,442.31	91.02	24.41	94.24	0.24	
2,532.00	5.10	17.70	2,527.95	98.33	27.30	102.04	0.87	
2,617.00	5.20	21.90	2,612.60	105.50	29.88	109.64	0.46	
2,702.00	4.70	22.10	2,697.29	112.30	32.63	116.92	0.59	
2,788.00	4.60	16.20	2,783.00	118.88	34.92	123.86	0.57	
2,874.00	4.20	14.10	2,868.75	125.24	36.65	130.46	0.50	
2,959.00	4.40	13.80	2,953.51	131.43	38.18	136.83	0.24	
3,045.00	4.50	11.10	3,039.25	137.94	39.62	143.49	0.27	
3,130.00	4.70	11.50	3,123.98	144.63	40.96	150.30	0.24	
3,216.00	4.70	14.50	3,209.69	151.49	42.54	157.34	0.29	
3,302.00	4.30	11.70	3,295.42	158.06	44.08	164.08	0.53	
3,387.00	3.30	19.10	3,380.24	163.49	45.52	169.70	1.31	
3,473.00	2.90	20.00	3,466.11	167.87	47.08	174.34	0.47	
3,558.00	2.90	20.40	3,551.00	171.91	48.56	178.62	0.02	
3,644.00	3.00	19.40	3,636.89	176.07	50.07	183.03	0.13	
3,730.00	3.10	17.70	3,722.77	180.41	51.52	187.60	0.16	
3,815.00	2.80	17.50	3,807.65	184.58	52.85	191.96	0.35	
3,901.00	2.90	16.50	3,893.55	188.67	54.10	196.24	0.13	
3,986.00	3.90	8.80	3,978.40	193.59	55.15	201.26	1.29	
4,072.00	3.70	8.00	4,064.21	199.23	55.98	206.92	0.24	
4,158.00	3.70	8.80	4,150.03	204.72	56.79	212.44	0.06	
4,243.00	3.60	8.00	4,234.86	210.07	57.58	217.81	0.13	
4,329.00	3.70	7.70	4,320.68	215.49	58.33	223.25	0.12	
4,414.00	3.90	9.30	4,405.49	221.06	59.17	228.84	0.27	
4,460.00	3.90	8.80	4,451.39	224.15	59.66	231.96	0.07	
Last Phoenix MWD Survey								
4,508.00	3.90	8.80	4,499.28	227.38	60.16	235.20	0.00	
Projection to TD								



Phoenix Technology Services
Phoenix Final Survey Report



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Site:	Washington 33 State	MD Reference:	KB @ 3697.00usft (Capstar 114)
Well:	#66	North Reference:	Grid
Wellbore:	WB1/Job #1311437	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	GCR DB

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
495.00	494.95	-5.29	2.84	Tie-on to Gyro
560.00	559.93	-6.84	3.74	First Phoenix MWD Survey
4,460.00	4,451.39	224.15	59.66	Last Phoenix MWD Survey
4,508.00	4,499.28	227.38	60.16	Projection to TD

Checked By: _____ Approved By: _____ Date: _____

Phoenix Technology Services SURVEY DATA CERTIFICATION



PHOENIX JOB NUMBER 1311437

OPERATOR Apache Corporation

*WELL NAME Washington 33 State #66

COUNTY & STATE

Eddy Count, New Mexico

* API WELL NUMBER 30-015-41706

PROPOSED DIRECTION 14.95

TIE-IN DATA						
MEASURED	VERTICAL			N-S	E-W	DATA
DEPTH	DEPTH	INCLIN	AZIMUTH	COORD	COORD	SOURCE
495 ft	494.95 ft	1.48	145.84	-5.29 ft	2.84 ft	Gryodata Gryo

FIRST	FIRST		
SURVEY	SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
10-Nov-13	560 ft	1.7	153.0

SURVEY INSTRUMENT
TYPE
Phoenix MWD

LAST	LAST		
SURVEY	SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
12-Nov-13	4,460 ft	3.9	8.8

TO THE BEST OF MY KNOWLEDGE I
CERTIFY THIS SURVEY DATA TO BE
TRUE AND CORRECT.

PROJECTED	PROJECTED		
TD SURVEY	TD SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
12-Nov-13	4,508 ft	3.9	8.8

Brad Hill

PRINT YOUR NAME ABOVE

Brad Hill

SIGN YOUR NAME ABOVE

MAGNETIC DECLINATION OR TOTAL GRID

TOTAL CORRECTION USED	7.53
DECLINATION OR GRID	GRID

11/12/2013

TODAY'S DATE

MWD SUPERVISOR 1

Brad Hill

DIRECTIONAL DRILLER 1

Ken Smith

MWD SUPERVISOR 2

0

DIRECTIONAL DRILLER 2

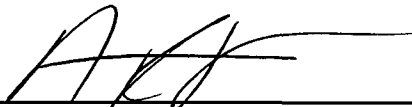
Joe Paup

1805 Brittmore Road Houston, Texas 77043 (713)3370609 (Voice), (713)337-0599 (Fax)

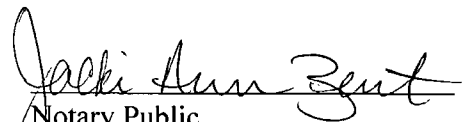
Apache Corporation
303 Veterans Airpark Lane, #3000
Midland, TX 79705

Washington 33 State #066 API#30-015-41706
Eddy County, New Mexico 570' FNL + 405' FEL ULA 33-175-28E

241	2.41	0.50	0.88	2.11	2.11
513	2.72	0.75	1.31	3.57	5.68


Archie Brown - General Manager

The attached instrument was acknowledged before me on the 21st day of November, 2013 by
Archie Brown - General Manager, CapStar Drilling, Inc.


Notary Public

