



HOBBS OCD

APR 23 2015

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Apache Corporation (873)

Lea County, NM (NAD27 NME)

WBDU 30-025-41549 UL N 16-21S37E 895' FSL
#154W +1810' FWL

WB1 / Job #1411969

Design: Surveys (Capstar 118)

Standard Survey Report

12 November, 2014



MAY 07 2015

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Company:	Apache Corporation	Local Co-ordinate Reference:	Well #154W
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB @ 3460.00usft (Capstar 118)
Site:	WBDU	MD Reference:	KB @ 3460.00usft (Capstar 118)
Well:	#154W	North Reference:	Grid
Wellbore:	WB1 / Job #1411969	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 118)	Database:	Compass 5000 GCR

Project	Lea 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	WBDU				
Site Position:		Northing:	538,109.00 usft	Latitude:	32° 28' 26.39792 N
From:	Map	Easting:	858,688.20 usft	Longitude:	103° 10' 12.95694 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.62 °

Well	#154W					
Well Position	+N/-S	0.00 usft	Northing:	538,109.00 usft	Latitude:	32° 28' 26.39792 N
	+E/-W	0.00 usft	Easting:	858,688.20 usft	Longitude:	103° 10' 12.95694 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	3,449.00 usft

Wellbore	WB1 / Job #1411969				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2014	11/6/2014	7.16	60.40	48,433

Design	Surveys (Capstar 118)				
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	66.77	

Survey Program	Date 11/12/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
88.00	1,208.00	SDI Gyro Survey (WB1 / Job #1411969)	Keeper	Keeper Standard Rate Gyro
1,208.00	6,953.00	Phoenix MWD Survey (WB1 / Job #14119)	PHX+MWD+BGGM	PHX+MWD+BGGM v3:standard declination

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
88.00	0.35	304.16	88.00	0.15	-0.22	-0.14	0.40	0.40	0.00
176.00	0.25	328.62	176.00	0.47	-0.54	-0.32	0.18	-0.11	27.80
264.00	0.30	306.49	264.00	0.77	-0.83	-0.46	0.13	0.06	-25.15
354.00	0.35	318.14	354.00	1.11	-1.20	-0.67	0.09	0.06	12.94
438.00	0.45	350.63	437.99	1.63	-1.43	-0.67	0.29	0.12	38.68
524.00	0.58	13.64	523.99	2.38	-1.38	-0.33	0.28	0.15	26.76
611.00	0.73	7.50	610.98	3.36	-1.20	0.22	0.19	0.17	-7.06
696.00	0.80	12.53	695.98	4.48	-1.00	0.84	0.11	0.08	5.92
781.00	0.56	7.60	780.97	5.47	-0.82	1.40	0.29	-0.28	-5.80

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Site:	WBDU	MD Reference:	KB @ 3460.00usft (Capstar 118)
Well:	#154W	North Reference:	Grid
Wellbore:	WB1 / Job #1411969	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 118)	Database:	Compass 5000 GCR

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)
867.00	0.50	4.85	866.97	6.26	-0.73	1.79	0.08	-0.07	-3.20
1,037.00	0.42	8.87	1,036.96	7.61	-0.57	2.47	0.05	-0.05	2.36
1,123.00	0.33	12.53	1,122.96	8.17	-0.47	2.79	0.11	-0.10	4.26
1,208.00	0.27	29.54	1,207.96	8.58	-0.32	3.09	0.13	-0.07	20.01
Tie-on SDI Gyro Survey									
1,385.00	0.40	66.00	1,384.96	9.19	0.45	4.04	0.14	0.07	20.60
First Phoenix MWD Survey									
1,428.00	1.30	74.90	1,427.95	9.38	1.06	4.67	2.11	2.09	20.70
1,556.00	2.30	68.00	1,555.89	10.72	4.84	8.68	0.80	0.78	-5.39
1,684.00	2.50	69.70	1,683.77	12.65	9.84	14.03	0.17	0.16	1.33
1,812.00	2.80	69.50	1,811.64	14.72	15.39	19.94	0.23	0.23	-0.16
1,940.00	3.20	70.20	1,939.46	17.02	21.68	26.63	0.31	0.31	0.55
2,068.00	3.50	68.90	2,067.24	19.64	28.68	34.10	0.24	0.23	-1.02
2,196.00	2.50	71.70	2,195.07	21.92	34.98	40.79	0.79	-0.78	2.19
2,324.00	2.10	62.00	2,322.96	23.90	39.70	45.91	0.44	-0.31	-7.58
2,452.00	2.60	65.20	2,450.85	26.22	44.41	51.15	0.40	0.39	2.50
2,580.00	2.30	70.50	2,578.74	28.29	49.46	56.61	0.29	-0.23	4.14
2,708.00	1.60	85.50	2,706.66	29.29	53.67	60.87	0.67	-0.55	11.72
2,836.00	1.00	51.30	2,834.63	30.13	56.32	63.64	0.75	-0.47	-26.72
2,964.00	0.80	49.30	2,962.62	31.41	57.87	65.57	0.16	-0.16	-1.56
3,092.00	0.90	56.50	3,090.60	32.55	59.38	67.41	0.11	0.08	5.63
3,263.00	0.80	67.10	3,261.58	33.75	61.60	69.92	0.11	-0.06	6.20
3,433.00	0.70	59.50	3,431.57	34.74	63.59	72.14	0.08	-0.06	-4.47
3,604.00	1.40	48.50	3,602.54	36.66	66.06	75.16	0.42	0.41	-6.43
3,732.00	1.80	52.70	3,730.49	38.91	68.83	78.59	0.33	0.31	3.28
3,860.00	1.60	51.60	3,858.43	41.24	71.83	82.27	0.16	-0.16	-0.86
4,031.00	2.20	79.30	4,029.34	43.33	76.92	87.78	0.63	0.35	16.20
4,202.00	2.10	75.80	4,200.22	44.71	83.18	94.08	0.10	-0.06	-2.05
4,372.00	2.40	87.40	4,370.09	45.64	89.76	100.48	0.32	0.18	6.82
4,543.00	2.60	76.30	4,540.93	46.72	97.11	107.66	0.31	0.12	-6.49
4,714.00	2.70	72.40	4,711.75	48.85	104.71	115.49	0.12	0.06	-2.28
4,885.00	2.60	73.20	4,882.56	51.19	112.26	123.35	0.06	-0.06	0.47
5,056.00	2.40	75.40	5,053.40	53.22	119.44	130.75	0.13	-0.12	1.29
5,226.00	2.50	78.20	5,223.24	54.87	126.52	137.90	0.09	0.06	1.65
5,397.00	2.00	87.40	5,394.11	55.77	133.15	144.35	0.36	-0.29	5.38
5,567.00	1.50	71.00	5,564.03	56.63	138.21	149.34	0.41	-0.29	-9.65
5,738.00	1.40	70.20	5,734.98	58.06	142.30	153.66	0.06	-0.06	-0.47
5,909.00	1.40	62.70	5,905.93	59.73	146.12	157.83	0.11	0.00	-4.39
6,079.00	1.50	66.70	6,075.87	61.56	150.01	162.13	0.08	0.06	2.35
6,250.00	1.20	70.40	6,246.83	63.05	153.75	166.15	0.18	-0.18	2.16
6,421.00	1.20	70.40	6,417.79	64.25	157.12	169.73	0.00	0.00	0.00
6,592.00	1.10	49.80	6,588.76	65.91	160.06	173.08	0.25	-0.06	-12.05
6,762.00	1.10	46.80	6,758.72	68.08	162.50	176.18	0.03	0.00	-1.76

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Wellbore:	WB1 / Job #1411969	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 118)	Database:	Compass 5000 GCR

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)
6,902.00	1.50	33.70	6,898.69	70.52	164.50	178.98	0.35	0.29	-9.36
Last Phoenix MWD Survey									
6,953.00	1.50	33.70	6,949.67	71.64	165.24	180.10	0.00	0.00	0.00
Projection to TD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,208.00	1,207.96	8.58	-0.32	Tie-on SDI Gyro Survey
1,385.00	1,384.96	9.19	0.45	First Phoenix MWD Survey
6,902.00	6,898.69	70.52	164.50	Last Phoenix MWD Survey
6,953.00	6,949.67	71.64	165.24	Projection to TD

Checked By: _____ Approved By: _____ Date: _____



Gyroscopic Survey Report
for
APACHE

30-025-41549
UL N 16-215-37E
895' FSL & 1810' FWL

Well Location	LEA COUNTY, NEW MEXICO
Well Name	WEST BLINEBRY DRINKARD #154W (D)
Rig Number	CAPSTAR #118
Survey Date	11/7/2014
Latitude	32.4739990°N
Longitude	103.1702660°E
North Reference	Grid North
Grid Correction	-0.47 deg
Depth Reference	RKB (11.00 ft)
Calculation Method	Minimum Curvature
Section (VS) Ref	0.00N (ft), 0.00E (ft), 0.00Azim (deg)
Definitive Survey	FINAL GYRO SURVEY
Operator(s)	NATHAN YERBY, RAD DUNN

Well Notes

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Well Name: WEST BLINEBRY DRINKARD #154W (D) 30-025-41549
Survey: FINAL GYRO SURVEY
Survey Date: 11/7/2014 UL N 16-215-37E 895' FSL + 1810' FWL

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft	Closure Distance ft	Closure Direction deg
0.00	0.00	0.00	0.00	0.00	0.00	0.00	Invalid	0.00	0.00
88.00	0.35	304.16	88.00	0.15	0.15	-0.22	0.39	0.27	304.16
176.00	0.25	328.62	176.00	0.46	0.46	-0.54	0.18	0.71	310.50
264.00	0.30	306.49	264.00	0.76	0.76	-0.82	0.13	1.12	312.70
354.00	0.35	318.14	354.00	1.10	1.10	-1.19	0.09	1.62	312.72
438.00	0.45	350.63	437.99	1.61	1.61	-1.42	0.29	2.15	318.74
524.00	0.58	13.64	523.99	2.37	2.37	-1.37	0.28	2.73	329.94
611.00	0.73	7.50	610.98	3.34	3.34	-1.19	0.20	3.55	340.36
696.00	0.80	12.53	695.98	4.46	4.46	-0.99	0.11	4.57	347.43
781.00	0.56	7.60	780.97	5.45	5.45	-0.81	0.28	5.51	351.53
867.00	0.50	4.85	866.97	6.24	6.24	-0.72	0.08	6.28	353.38
1037.00	0.42	8.87	1036.96	7.59	7.59	-0.57	0.05	7.61	355.74
1123.00	0.33	12.53	1122.96	8.15	8.15	-0.46	0.10	8.16	356.75
1208.00	0.27	29.54	1207.96	8.57	8.57	-0.31	0.13	8.57	357.94