



Apache Corporation

Eddy County, New Mexico (NAD 83)

Sec 32, T17S, R28E

AB State 647 #9

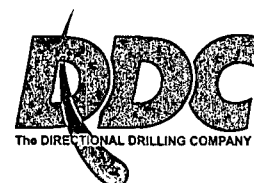
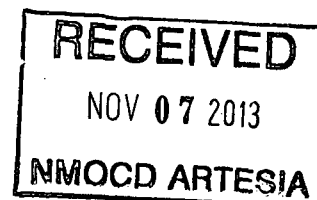
Wellbore #1

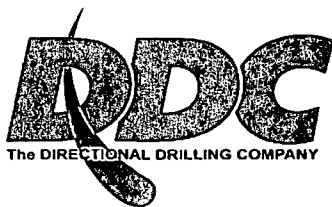
API # 30-0K-41493

Survey: MWD

DDC Survey Report

12 September, 2013





Survey Certification Sheet

Apache Corporation
Company

WT-13694
Job Number

9/12/13
Date

Sec32, T17S, R28E
Lease

AB State 647 #9
Well Name

Eddy, NM
County & State

API: 30-015-41493

Surveyed from a depth of: 400 feet to 5077 feet MD

Type of Survey: MWD

Directional Supervisor/Surveyor: Jeff James

The data and calculations for this survey have been checked by me and conform to the standards and procedures set forth by **The Directional Drilling Company (DDC)**. This report represents a true and correct Directional survey of this well based on the original data obtained at the well site. Wellbore Coordinates are calculated using minimum curvature.

Digitally signed by Larry Wright
DN: cn=Larry Wright, o=The
Directional Drilling Company,
ou=GM of Guidance Services,
email=larryw@directionaldrillers.
com, c=US
Date: 2013.09.16 15:55:26 -05'00'

Larry Wright
MWD General Manager



DDC
Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well AB State 647 #9
Project:	Eddy County, New Mexico (NAD 83)	TVD Reference:	WELL @ 3686.0usft (Capstar #118)
Site:	Sec 32, T17S, R28E	MD Reference:	WELL @ 3686.0usft (Capstar #118)
Well:	AB State 647 #9	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Project	Eddy County, New Mexico (NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Sec 32, T17S, R28E				
Site Position:		Northing:	651,211.44 usft	Latitude:	32° 47' 24.499 N
From:	Map	Easting:	582,974.92 usft	Longitude:	104° 11' 52.221 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.07 °

Well	AB State 647 #9					
Well Position	+N/-S	0.0 usft	Northing:	649,935.62 usft	Latitude:	32° 47' 11.876 N
	+E/-W	0.0 usft	Easting:	582,929.90 usft	Longitude:	104° 11' 52.767 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	3,675.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	8/27/2013	7.65	60.54	48,664

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	244.82	

Survey Program	Date 9/12/2013				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	400.0	Gyro (Wellbore #1)			
449.0	5,077.0	MWD (Wellbore #1)	MWD default	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)
Tie into Gyro @ 400' MD / 400' TVD									
400.0	0.56	212.64	400.0	-3.5	-1.7	3.0	0.00	0.00	0.00
449.0	0.40	199.90	449.0	-3.9	-1.9	3.3	0.39	-0.33	-26.00
537.0	0.50	220.10	537.0	-4.5	-2.2	3.9	0.21	0.11	22.95
566.0	0.40	225.70	566.0	-4.6	-2.4	4.1	0.38	-0.34	19.31
608.0	0.70	315.70	608.0	-4.6	-2.7	4.3	1.92	0.71	214.29
651.0	1.60	288.60	651.0	-4.2	-3.4	4.9	2.39	2.09	-63.02
694.0	2.60	269.00	693.9	-4.0	-4.9	6.2	2.83	2.33	-45.58
736.0	3.60	269.00	735.9	-4.0	-7.2	8.3	2.38	2.38	0.00
779.0	3.50	268.40	778.8	-4.1	-9.9	10.7	0.25	-0.23	-1.40



DDC
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Site:	Sec 32, T17S, R28E	MD Reference:	WELL @ 3686.0usft (Capstar #118)
Well:	AB State 647 #9	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

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)	
822.0	3.30	270.00	821.7	-4.1	-12.4	13.0	0.51	-0.47	3.72	
865.0	3.30	269.10	864.6	-4.2	-14.9	15.3	0.12	0.00	-2.09	
907.0	3.80	261.20	906.6	-4.4	-17.5	17.7	1.66	1.19	-18.81	
950.0	4.50	259.10	949.4	-4.9	-20.6	20.7	1.67	1.63	-4.88	
993.0	4.50	258.80	992.3	-5.6	-23.9	24.0	0.05	0.00	-0.70	
1,035.0	4.50	255.40	1,034.2	-6.3	-27.1	27.2	0.64	0.00	-8.10	
1,078.0	4.80	250.00	1,077.0	-7.4	-30.4	30.6	1.23	0.70	-12.56	
1,121.0	5.40	242.20	1,119.9	-8.9	-33.9	34.5	2.13	1.40	-18.14	
1,164.0	6.20	239.60	1,162.7	-11.0	-37.7	38.8	1.96	1.86	-6.05	
1,206.0	6.50	239.10	1,204.4	-13.4	-41.7	43.4	0.73	0.71	-1.19	
1,249.0	6.20	238.20	1,247.1	-15.9	-45.7	48.1	0.74	-0.70	-2.09	
1,292.0	6.20	237.10	1,289.9	-18.4	-49.7	52.7	0.28	0.00	-2.56	
1,334.0	6.60	239.80	1,331.6	-20.8	-53.6	57.4	1.19	0.95	6.43	
1,377.0	7.00	245.20	1,374.3	-23.1	-58.2	62.5	1.75	0.93	12.56	
1,420.0	7.60	246.50	1,417.0	-25.4	-63.1	67.9	1.45	1.40	3.02	
1,462.0	7.80	245.60	1,458.6	-27.7	-68.3	73.6	0.56	0.48	-2.14	
1,505.0	8.10	247.70	1,501.2	-30.0	-73.7	79.5	0.97	0.70	4.88	
1,548.0	8.40	249.10	1,543.7	-32.3	-79.5	85.7	0.84	0.70	3.26	
1,591.0	8.90	248.40	1,586.2	-34.6	-85.5	92.1	1.19	1.16	-1.63	
1,633.0	9.20	248.00	1,627.7	-37.1	-91.6	98.7	0.73	0.71	-0.95	
1,676.0	9.00	248.20	1,670.2	-39.6	-98.0	105.5	0.47	-0.47	0.47	
1,719.0	8.70	248.00	1,712.7	-42.1	-104.1	112.1	0.70	-0.70	-0.47	
1,761.0	9.30	244.40	1,754.2	-44.8	-110.1	118.7	1.96	1.43	-8.57	
1,804.0	9.30	242.80	1,796.6	-47.8	-116.3	125.6	0.60	0.00	-3.72	
1,847.0	9.10	242.40	1,839.0	-51.0	-122.4	132.5	0.49	-0.47	-0.93	
1,889.0	9.00	242.20	1,880.5	-54.1	-128.3	139.1	0.25	-0.24	-0.48	
1,932.0	8.80	241.90	1,923.0	-57.2	-134.2	145.7	0.48	-0.47	-0.70	
1,975.0	8.50	241.20	1,965.5	-60.3	-139.8	152.2	0.74	-0.70	-1.63	
2,018.0	8.40	239.80	2,008.0	-63.4	-145.3	158.5	0.53	-0.23	-3.26	
2,060.0	8.30	237.80	2,049.6	-66.5	-150.6	164.6	0.73	-0.24	-4.76	
2,103.0	8.20	236.80	2,092.1	-69.9	-155.7	170.7	0.41	-0.23	-2.33	
2,146.0	8.20	236.80	2,134.7	-73.2	-160.9	176.8	0.00	0.00	0.00	
2,188.0	8.10	236.10	2,176.3	-76.5	-165.8	182.6	0.34	-0.24	-1.67	
2,231.0	8.20	236.80	2,218.8	-79.9	-170.9	188.7	0.33	0.23	1.63	
2,274.0	7.90	234.90	2,261.4	-83.3	-175.9	194.6	0.93	-0.70	-4.42	
2,316.0	7.90	234.20	2,303.0	-86.6	-180.6	200.3	0.23	0.00	-1.67	
2,359.0	7.80	234.70	2,345.6	-90.0	-185.4	206.1	0.28	-0.23	1.16	
2,402.0	7.60	235.60	2,388.2	-93.3	-190.1	211.8	0.54	-0.47	2.09	
2,444.0	7.30	238.20	2,429.9	-96.3	-194.7	217.1	1.07	-0.71	6.19	
2,487.0	7.00	237.00	2,472.5	-99.2	-199.2	222.5	0.78	-0.70	-2.79	
2,530.0	6.20	240.70	2,515.3	-101.7	-203.4	227.4	2.11	-1.86	8.60	
2,573.0	5.40	246.50	2,558.0	-103.7	-207.3	231.7	2.30	-1.86	13.49	
2,615.0	5.20	248.00	2,599.9	-105.2	-210.9	235.6	0.58	-0.48	3.57	



DDC
Survey Report



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Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

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)	
2,658.0	5.30	248.20	2,642.7	-106.6	-214.5	239.5	0.24	0.23	0.47	
2,700.0	5.40	247.70	2,684.5	-108.1	-218.2	243.4	0.26	0.24	-1.19	
2,743.0	4.80	245.40	2,727.3	-109.6	-221.7	247.2	1.47	-1.40	-5.35	
2,786.0	4.20	244.70	2,770.2	-111.1	-224.7	250.6	1.40	-1.40	-1.63	
2,829.0	4.20	245.60	2,813.1	-112.4	-227.6	253.8	0.15	0.00	2.09	
2,871.0	4.10	244.90	2,855.0	-113.6	-230.3	256.8	0.27	-0.24	-1.67	
2,914.0	3.80	242.60	2,897.9	-115.0	-233.0	259.8	0.79	-0.70	-5.35	
2,957.0	3.60	242.40	2,940.8	-116.2	-235.5	262.5	0.47	-0.47	-0.47	
2,999.0	2.90	245.90	2,982.7	-117.3	-237.6	264.9	1.73	-1.67	8.33	
3,042.0	2.40	243.50	3,025.7	-118.1	-239.4	266.9	1.19	-1.16	-5.58	
3,085.0	2.50	241.50	3,068.6	-119.0	-241.0	268.7	0.31	0.23	-4.65	
3,127.0	1.80	231.50	3,110.6	-119.8	-242.3	270.3	1.88	-1.67	-23.81	
3,170.0	1.40	212.00	3,153.6	-120.7	-243.2	271.4	1.56	-0.93	-45.35	
3,212.0	1.20	205.10	3,195.6	-121.5	-243.6	272.2	0.60	-0.48	-16.43	
3,255.0	0.50	167.40	3,238.6	-122.1	-243.8	272.6	2.00	-1.63	-87.67	
3,298.0	0.50	145.00	3,281.6	-122.5	-243.6	272.6	0.45	0.00	-52.09	
3,340.0	0.30	97.00	3,323.6	-122.6	-243.4	272.4	0.89	-0.48	-114.29	
3,383.0	0.50	87.00	3,366.6	-122.6	-243.1	272.2	0.49	0.47	-23.26	
3,469.0	0.70	64.00	3,452.6	-122.4	-242.3	271.3	0.36	0.23	-26.74	
3,554.0	0.60	38.50	3,537.5	-121.8	-241.5	270.4	0.36	-0.12	-30.00	
3,640.0	0.60	38.70	3,623.5	-121.1	-240.9	269.6	0.00	0.00	0.23	
3,725.0	0.40	30.30	3,708.5	-120.5	-240.5	268.9	0.25	-0.24	-9.88	
3,810.0	0.50	24.80	3,793.5	-119.9	-240.2	268.4	0.13	0.12	-6.47	
3,896.0	0.60	2.10	3,879.5	-119.1	-240.0	267.9	0.28	0.12	-26.40	
3,981.0	0.40	6.90	3,964.5	-118.4	-240.0	267.5	0.24	-0.24	5.65	
4,067.0	0.30	358.30	4,050.5	-117.8	-240.0	267.3	0.13	-0.12	-10.00	
4,152.0	0.10	12.00	4,135.5	-117.5	-239.9	267.2	0.24	-0.24	16.12	
4,238.0	0.30	61.90	4,221.5	-117.4	-239.7	266.9	0.29	0.23	58.02	
4,323.0	0.20	96.70	4,306.5	-117.3	-239.4	266.5	0.21	-0.12	40.94	
4,408.0	0.50	79.30	4,391.5	-117.2	-238.9	266.1	0.37	0.35	-20.47	
4,494.0	0.50	85.10	4,477.5	-117.1	-238.1	265.3	0.06	0.00	6.74	
4,579.0	0.60	80.90	4,562.5	-117.0	-237.3	264.6	0.13	0.12	-4.94	
4,664.0	0.60	78.90	4,647.5	-116.9	-236.5	263.7	0.02	0.00	-2.35	
4,749.0	0.70	74.00	4,732.5	-116.6	-235.5	262.8	0.13	0.12	-5.76	
4,835.0	0.40	352.80	4,818.5	-116.2	-235.0	262.1	0.87	-0.35	-94.42	
4,920.0	0.30	3.50	4,903.5	-115.7	-235.1	262.0	0.14	-0.12	12.59	
5,006.0	0.70	36.20	4,989.5	-115.0	-234.7	261.4	0.55	0.47	38.02	
TD @ 5077' MD / 5061' TVD										
5,077.0	0.70	36.20	5,060.5	-114.3	-234.2	260.6	0.00	0.00	0.00	



DDC
Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well AB State 647 #9
Project:	Eddy County, New Mexico (NAD 83)	TVD Reference:	WELL @ 3686.0usft (Capstar #118)
Site:	Sec 32, T17S, R28E	MD Reference:	WELL @ 3686.0usft (Capstar #118)
Well:	AB State 647 #9	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
400.0	400.0	-3.5	-1.7	Tie into Gyro @ 400' MD / 400' TVD
5,077.0	5,060.5	-114.3	-234.2	TD @ 5077' MD / 5061' TVD

Checked By: _____ Approved By: _____ Date: _____

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

AB State 647 #009
Eddy County, New Mexico

APF # 3-015-41493

SL: 1080' FSL - 2535' FNL; N - 32 - 175 - 28E

243
541

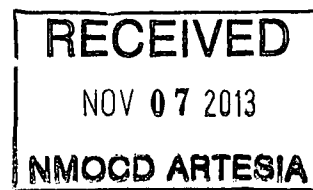
2.43
2.98

0.50
0.50

0.88
0.88

2.13
2.61

2.13
4.73



A handwritten signature in black ink, appearing to be "Archie Brown", written over a horizontal line.

Archie Brown - General Manager

The attached instrument was acknowledged before me on the 23rd day of September, 2013 by
Archie Brown - General Manager, CapStar Drilling, Inc.

A handwritten signature in black ink, appearing to be "Jacki Ann Zent", written over a horizontal line.
Notary Public

