

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

AAO Federal #016
Eddy County, New Mexico

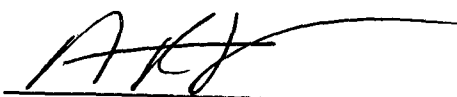
30-015-42026
W 3, Sec 1, T18S, R27E, 1300' FWL, 2456' FWL

254	2.54	0.50	0.88	2.22	2.22
380	1.26	0.75	1.31	1.65	3.88

NM OIL CONSERVATION
ARTESIA DISTRICT

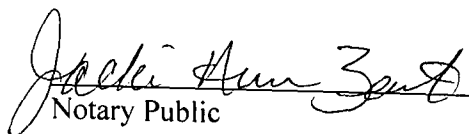
OCT 01 2014

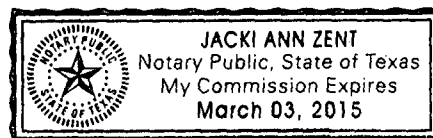
RECEIVED



Archie Brown - General Manager

The attached instrument was acknowledged before me on the 7th day of April, 2014 by
Archie Brown - General Manager, CapStar Drilling, Inc.


Notary Public





NM OIL CONSERVATION
ARTESIA DISTRICT

OCT 01 2014

RECEIVED

Apache Corporation

Eddy County, New Mexico

Sec 1, T18S, R27E

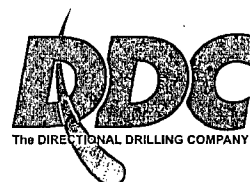
AAO Federal #16

Wellbore #1

Survey: MWD

DDC Survey Report

25 March, 2014





Survey Certification Sheet

Apache Corporation
Company

WT-140260
Job Number

3/27/14
Date

Sec1, T18S, R27E
Lease

AAO FEDERAL #16
Well Name

Eddy, NM
County & State

API: 30-015-42026

Surveyed from a depth of: 349 feet to 4555 feet MD

Type of Survey: MWD

Directional Supervisor/Surveyor: Marty White

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.c
om, c=US
Date: 2014.03.28 10:45:47 -05'00'

Larry Wright
MWD General Manager



DDC
Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well AAO Federal #16
Project:	Eddy County, New Mexico	TVD Reference:	WELL @ 3620.0usft (Capstar #118)
Site:	Sec 1, T18S, R27E	MD Reference:	WELL @ 3620.0usft (Capstar #118)
Well:	AAO Federal #16	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		
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	Sec 1, T18S, R27E		
Site Position:		Northing:	645,438.80 usft
From:	Map	Easting:	530,705.90 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 46' 27.708 N
		Longitude:	104° 14' 0.354 W
		Grid Convergence:	0.05 °

Well	AAO Federal #16		
Well Position	+N-S	0.0 usft	Northing:
	+E-W	0.0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft
		Latitude:	32° 46' 46.738 N
		Longitude:	104° 13' 56.088 W
		Ground Level:	3,609.0 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010	3/7/2014	7.60
			Dip Angle
			(°)
			60.52
			Field Strength
			(nT)
			48,604

Design	Wellbore #1		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N-S	+E-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction
			(°)
			203.52

Survey Program	Date: 3/25/2014		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100.0	349.0	GYRO (Wellbore #1)	Good_gyro
398.0	4,555.0	MWD (Wellbore #1)	MWD default
			Description
			Good Gyro
			MWD - Standard

Survey									
Measured	Inclination	Azimuth	Vertical	+N-S	+E-W	Vertical	Dogleg	Build	Turn
Depth	(°)	(°)	Depth	(usft)	(usft)	Section	Rate	Rate	Rate
(usft)			(usft)			(usft)	(°/100usft)	(°/100usft)	(°/100usft)
TIE IN @ 349' MD / 349' TVD									
349.0	0.43	208.33	349.0	-1.2	-1.1	1.5	0.00	0.00	0.00
398.0	0.30	120.80	398.0	-1.4	-1.1	1.7	1.05	-0.27	-178.63
426.0	0.60	212.60	426.0	-1.5	-1.1	1.9	2.43	1.07	327.86
456.0	1.10	229.40	456.0	-1.9	-1.4	2.3	1.84	1.67	56.00
484.0	2.20	228.00	484.0	-2.4	-2.0	3.0	3.93	3.93	-5.00
511.0	2.90	219.90	511.0	-3.3	-2.8	4.1	2.91	2.59	-30.00
540.0	3.30	214.80	539.9	-4.5	-3.8	5.7	1.67	1.38	-17.59
596.0	4.10	213.30	595.8	-7.5	-5.8	9.2	1.44	1.43	-2.68
612.0	6.20	210.80	611.7	-8.7	-6.5	10.6	13.20	13.13	-15.63



DDC
Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well AAO Federal #16
Project:	Eddy County New Mexico	TVD Reference:	WELL @ 3620.0usft (Capstar #118)
Site:	Sec 1, T18S, R27E	MD Reference:	WELL @ 3620.0usft (Capstar #118)
Well:	AAO Federal #16	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000 - Single User 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)
654.0	7.90	208.50	653.4	-13.2	-9.1	15.8	4.10	4.05	-5.48
697.0	8.00	208.00	696.0	-18.5	-11.9	21.7	0.28	0.23	-1.16
740.0	7.80	208.50	738.6	-23.7	-14.7	27.6	0.49	-0.47	1.16
787.0	7.70	208.50	785.2	-29.2	-17.7	33.9	0.21	-0.21	0.00
825.0	7.30	206.60	822.8	-33.6	-20.0	38.8	1.24	-1.05	-5.00
868.0	9.50	206.60	865.4	-39.3	-22.8	45.1	5.12	5.12	0.00
911.0	10.90	191.80	907.7	-46.4	-25.3	52.6	6.88	3.26	-34.42
953.0	10.80	192.30	948.9	-54.1	-26.9	60.4	0.33	-0.24	1.19
996.0	10.70	192.20	991.2	-62.0	-28.6	68.2	0.24	-0.23	-0.23
1,039.0	10.60	191.60	1,033.4	-69.8	-30.2	76.0	0.35	-0.23	-1.40
1,081.0	10.10	197.30	1,074.8	-77.1	-32.1	83.5	2.71	-1.19	13.57
1,124.0	9.60	196.60	1,117.1	-84.1	-34.3	90.8	1.20	-1.16	-1.63
1,167.0	9.10	197.10	1,159.6	-90.8	-36.3	97.7	1.18	-1.16	1.16
1,209.0	8.70	198.30	1,201.1	-97.0	-38.3	104.2	1.05	-0.95	2.86
1,252.0	8.30	198.50	1,243.6	-103.0	-40.3	110.5	0.93	-0.93	0.47
1,295.0	7.70	195.90	1,286.2	-108.7	-42.0	116.5	1.63	-1.40	-6.05
1,337.0	7.80	197.30	1,327.8	-114.1	-43.7	122.1	0.51	0.24	3.33
1,380.0	8.70	196.90	1,370.3	-120.0	-45.5	128.2	2.10	2.09	-0.93
1,423.0	8.80	198.80	1,412.8	-126.3	-47.5	134.7	0.71	0.23	4.42
1,465.0	9.90	199.20	1,454.3	-132.7	-49.7	141.5	2.62	2.62	0.95
1,508.0	9.90	198.00	1,496.6	-139.7	-52.1	148.9	0.48	0.00	-2.79
1,551.0	9.70	199.40	1,539.0	-146.6	-54.4	156.2	0.72	-0.47	3.26
1,594.0	9.90	203.40	1,581.4	-153.5	-57.1	163.5	1.65	0.47	9.30
1,636.0	10.00	203.40	1,622.7	-160.1	-60.0	170.7	0.24	0.24	0.00
1,678.0	9.90	201.60	1,664.1	-166.8	-62.7	178.0	0.78	-0.24	-4.29
1,722.0	10.10	203.60	1,707.4	-173.9	-65.7	185.6	0.91	0.45	4.55
1,764.0	10.50	206.40	1,748.8	-180.7	-68.8	193.1	1.53	0.95	6.67
1,807.0	10.50	207.80	1,791.1	-187.7	-72.4	201.0	0.59	0.00	3.26
1,849.0	10.60	206.80	1,832.3	-194.5	-75.9	208.6	0.50	0.24	-2.38
1,892.0	10.40	204.80	1,874.6	-201.5	-79.4	216.5	0.97	-0.47	-4.65
1,935.0	10.40	204.10	1,916.9	-208.6	-82.6	224.2	0.29	0.00	-1.63
1,977.0	10.60	204.30	1,958.2	-215.6	-85.7	231.9	0.48	0.48	0.48
2,020.0	10.50	203.80	2,000.5	-222.8	-88.9	239.8	0.32	-0.23	-1.16
2,063.0	10.70	203.90	2,042.8	-230.0	-92.1	247.7	0.47	0.47	0.23
2,105.0	10.70	202.90	2,084.0	-237.2	-95.2	255.5	0.44	0.00	-2.38
2,148.0	10.90	204.10	2,126.3	-244.6	-98.4	263.5	0.70	0.47	2.79
2,164.0	10.90	203.80	2,142.0	-247.3	-99.6	266.5	0.35	0.00	-1.88
2,233.0	11.00	205.50	2,209.7	-259.2	-105.1	279.6	0.49	0.14	2.46
2,276.0	11.20	206.10	2,251.9	-266.7	-108.7	287.9	0.54	0.47	1.40
2,319.0	11.20	206.10	2,294.1	-274.2	-112.4	296.3	0.00	0.00	0.00
2,362.0	11.30	206.20	2,336.3	-281.7	-116.1	304.6	0.24	0.23	0.23
2,404.0	11.80	207.80	2,377.4	-289.2	-119.9	313.0	1.41	1.19	3.81
2,447.0	11.90	209.00	2,419.5	-297.0	-124.1	321.8	0.62	0.23	2.79



DDC
Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well AAO Federal #16
Project:	Eddy County, New Mexico	TVD Reference:	WELL @ 3620.0usft (Capstar #118)
Site:	Sec 11 T18S R27E	MD Reference:	WELL @ 3620.0usft (Capstar #118)
Well:	AAO Federal #16	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1; Single User 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)
2,490.0	10.60	207.80	2,461.7	-304.3	-128.1	330.2	3.07	-3.02	-2.79
2,532.0	9.50	208.20	2,503.0	-310.8	-131.5	337.5	2.62	-2.62	0.95
2,575.0	9.40	206.90	2,545.4	-317.1	-134.8	344.5	0.55	-0.23	-3.02
2,618.0	8.90	205.70	2,587.9	-323.2	-137.8	351.4	1.24	-1.16	-2.79
2,660.0	8.40	206.60	2,629.4	-328.9	-140.6	357.7	1.23	-1.19	2.14
2,703.0	8.60	206.80	2,671.9	-334.6	-143.5	364.0	0.47	0.47	0.47
2,745.0	8.50	205.20	2,713.5	-340.2	-146.2	370.3	0.61	-0.24	-3.81
2,788.0	8.00	206.80	2,756.0	-345.7	-148.9	376.4	1.28	-1.16	3.72
2,831.0	7.70	209.70	2,798.6	-350.9	-151.7	382.3	1.16	-0.70	6.74
2,874.0	7.20	214.00	2,841.3	-355.6	-154.6	387.8	1.74	-1.16	10.00
2,916.0	6.40	208.50	2,883.0	-359.9	-157.2	392.7	2.45	-1.90	-13.10
2,959.0	6.00	202.50	2,925.7	-364.0	-159.2	397.3	1.77	-0.93	-13.95
3,002.0	4.80	197.10	2,968.5	-367.8	-160.6	401.4	3.03	-2.79	-12.56
3,045.0	3.60	202.20	3,011.4	-370.8	-161.6	404.5	2.92	-2.79	11.86
3,087.0	3.40	212.20	3,053.3	-373.1	-162.8	407.1	1.53	-0.48	23.81
3,130.0	3.10	211.90	3,096.3	-375.2	-164.1	409.5	0.70	-0.70	-0.70
3,173.0	1.90	206.20	3,139.2	-376.8	-165.0	411.3	2.85	-2.79	-13.26
3,215.0	0.30	137.30	3,181.2	-377.5	-165.3	412.1	4.32	-3.81	-164.05
3,258.0	0.90	23.40	3,224.2	-377.3	-165.1	411.8	2.46	1.40	-264.88
3,301.0	0.90	357.60	3,267.2	-376.6	-164.9	411.1	0.93	0.00	-60.00
3,344.0	1.10	359.30	3,310.2	-375.9	-165.0	410.5	0.47	0.47	3.95
3,386.0	0.80	358.10	3,352.2	-375.2	-165.0	409.8	0.72	-0.71	-2.86
3,429.0	1.10	0.01	3,395.2	-374.5	-165.0	409.2	0.70	0.70	4.43
3,472.0	0.90	347.40	3,438.2	-373.7	-165.1	408.5	0.69	-0.47	-29.31
3,514.0	0.90	344.20	3,480.2	-373.1	-165.2	408.0	0.12	0.00	-7.62
3,557.0	1.10	351.10	3,523.2	-372.3	-165.4	407.4	0.54	0.47	16.05
3,600.0	1.10	11.30	3,566.2	-371.5	-165.4	406.6	0.90	0.00	46.98
3,643.0	1.10	1.30	3,609.2	-370.7	-165.3	405.9	0.45	0.00	-23.26
3,685.0	1.10	357.90	3,651.2	-369.9	-165.3	405.1	0.16	0.00	-8.10
3,728.0	1.10	0.01	3,694.1	-369.1	-165.3	404.4	0.09	0.00	4.90
3,771.0	0.90	18.80	3,737.1	-368.3	-165.2	403.7	0.89	-0.47	43.71
3,813.0	1.30	38.00	3,779.1	-367.7	-164.8	402.9	1.28	0.95	45.71
3,856.0	1.10	38.50	3,822.1	-366.9	-164.2	402.0	0.47	-0.47	1.16
3,899.0	1.30	39.20	3,865.1	-366.2	-163.7	401.1	0.47	0.47	1.63
3,942.0	1.10	54.20	3,908.1	-365.6	-163.0	400.3	0.86	-0.47	34.88
3,984.0	1.40	50.50	3,950.1	-365.1	-162.3	399.5	0.74	0.71	-8.81
4,027.0	1.10	38.70	3,993.1	-364.4	-161.6	398.6	0.92	-0.70	-27.44
4,070.0	1.30	25.90	4,036.1	-363.6	-161.2	397.7	0.78	0.47	-29.77
4,113.0	1.30	20.60	4,079.1	-362.8	-160.8	396.8	0.28	0.00	-12.33
4,155.0	1.30	29.60	4,121.0	-361.9	-160.4	395.8	0.49	0.00	21.43
4,198.0	1.40	23.60	4,164.0	-361.0	-159.9	394.8	0.40	0.23	-13.95
4,241.0	1.00	54.20	4,207.0	-360.3	-159.4	394.0	1.72	-0.93	71.16
4,283.0	0.60	58.20	4,249.0	-360.0	-158.9	393.5	0.96	-0.95	9.52



DDC
Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well AAO Federal #16
Project:	Eddy County New Mexico	TVD Reference:	WELL @ 3620.0usft (Capstar #118)
Site:	Sec.1, T18S, R27E	MD Reference:	WELL @ 3620.0usft (Capstar #118)
Well:	AAO Federal #16	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User 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)
4,326.0	0.70	48.70	4,292.0	-359.7	-158.5	393.0	0.34	0.23	-22.09
4,369.0	0.80	53.80	4,335.0	-359.3	-158.1	392.6	0.28	0.23	11.86
4,412.0	1.10	31.70	4,378.0	-358.8	-157.6	391.9	1.09	0.70	-51.40
4,454.0	1.10	44.00	4,420.0	-358.2	-157.1	391.1	0.56	0.00	29.29
4,500.0	1.10	36.80	4,466.0	-357.5	-156.6	390.3	0.30	0.00	-15.65
TD @ 4555' MD / 4521' TVD									
4,555.0	1.00	21.10	4,521.0	-356.6	-156.1	389.3	0.55	-0.18	-28.55

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
349.0	349.0	-1.2	-1.1	TIE IN @ 349' MD / 349' TVD
4,555.0	4,521.0	-356.6	-156.1	TD @ 4555' MD / 4521' TVD

Checked By: _____	Approved By: _____	Date: _____
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