



L-20 T17S, R31E
1550 FSL, 970 FWL

API # 30-015-42401

Apache Corporation

Eddy County, New Mexico

Sec 20, T17-S, R31-E

Lee Federal #77

Wellbore #1

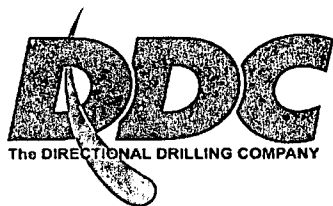
Survey: MWD Survey

DDC Survey Report

16 September, 2014

NM OIL CONSERVATION
ARTESIA DISTRICT
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Survey Certification Sheet

Apache Corporation
Company

WT-140904
Job Number

9/16/14
Date

Sec20, T17S, R31E
Lease

Lee Federal #77
Well Name

Eddy, NM
County & State

API: 30-015-42401

Surveyed from a depth of: 450 feet to 6472 feet MD

Type of Survey: MWD

Directional Supervisor/Surveyor: Anthony Carrasco

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.

Larry Wright
MWD General Manager



Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well Lee Federal #77
Project:	Eddy County, New Mexico	TVD Reference:	WELL @ 3644.0usft (Capstar #119)
Site:	Sec 20, T17-S, R31-E	MD Reference:	WELL @ 3644.0usft (Capstar #119)
Well:	Lee Federal #77	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM Compass

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 20, T17-S, R31-E		
Site Position:		Northing:	661,172.80 usft
From:	Map	Easting:	634,332.20 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 49' 0.798 N
		Longitude:	103° 53' 45.878 W
		Grid Convergence:	0.24 °

Well	Lee Federal #77		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	32° 49' 0.791 N
		Longitude:	103° 53' 48.337 W
		Ground Level:	3,633.0 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010	9/3/2014	7.38
			Dip Angle
			(°)
			60.60
			Field Strength
			(nT)
			48,613

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
			(°)
			359.70

Survey Program	Date 9/15/2014		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100.0	450.0	GYRO (Wellbore #1)	Good_gyro
634.0	6,472.0	MWD Survey (Wellbore #1)	MWD default
			Description
			Good Gyro
			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 IN @ 450' MD / 450' TVD									
450.0	0.58	233.56	450.0	0.8	-1.3	0.8	0.00	0.00	0.00
634.0	1.60	181.20	634.0	-2.3	-2.1	-2.3	0.72	0.55	-28.46
823.0	1.40	198.80	822.9	-7.1	-2.9	-7.1	0.26	-0.11	9.31
930.0	1.20	194.90	929.9	-9.4	-3.6	-9.4	0.20	-0.19	-3.64
1,025.0	1.10	193.80	1,024.9	-11.3	-4.1	-11.3	0.11	-0.11	-1.16
1,119.0	1.10	194.90	1,118.8	-13.0	-4.6	-13.0	0.02	0.00	1.17
1,214.0	0.30	67.30	1,213.8	-13.8	-4.6	-13.8	1.37	-0.84	-134.32
1,309.0	1.60	22.60	1,308.8	-12.5	-3.8	-12.5	1.48	1.37	-47.05
1,403.0	2.60	358.00	1,402.8	-9.2	-3.4	-9.1	1.41	1.06	-26.17



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Well:	Lee Federal #77	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM Compass

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)
1,498.0	4.20	358.00	1,497.6	-3.5	-3.6	-3.5	1.68	1.68	0.00
1,593.0	5.30	1.20	1,592.3	4.3	-3.6	4.4	1.19	1.16	3.37
1,688.0	5.40	1.50	1,686.8	13.2	-3.4	13.2	0.11	0.11	0.32
1,782.0	5.10	1.20	1,780.4	21.8	-3.2	21.8	0.32	-0.32	-0.32
1,878.0	5.30	0.80	1,876.0	30.5	-3.1	30.5	0.21	0.21	-0.42
1,972.0	5.40	0.80	1,969.6	39.3	-2.9	39.3	0.11	0.11	0.00
2,067.0	5.30	2.20	2,064.2	48.1	-2.7	48.1	0.17	-0.11	1.47
2,162.0	5.60	3.30	2,158.8	57.1	-2.3	57.1	0.33	0.32	1.16
2,256.0	5.80	2.20	2,252.3	66.4	-1.8	66.5	0.24	0.21	-1.17
2,351.0	6.30	2.60	2,346.8	76.4	-1.4	76.5	0.53	0.53	0.42
2,446.0	6.30	1.90	2,441.2	86.9	-1.0	86.9	0.08	0.00	-0.74
2,540.0	7.20	1.20	2,534.6	97.9	-0.7	97.9	0.96	0.96	-0.74
2,635.0	8.30	357.30	2,628.7	110.7	-0.9	110.7	1.28	1.16	-4.11
2,730.0	9.50	358.00	2,722.6	125.4	-1.5	125.4	1.27	1.26	0.74
2,825.0	10.20	359.40	2,816.2	141.6	-1.9	141.6	0.78	0.74	1.47
2,919.0	9.70	0.80	2,908.7	157.9	-1.8	157.9	0.59	-0.53	1.49
3,014.0	10.00	1.50	3,002.3	174.1	-1.5	174.1	0.34	0.32	0.74
3,109.0	10.60	2.90	3,095.8	191.1	-0.9	191.1	0.68	0.63	1.47
3,203.0	10.00	4.70	3,188.3	207.9	0.3	207.9	0.72	-0.64	1.91
3,329.0	9.50	6.40	3,312.5	229.1	2.3	229.1	0.46	-0.40	1.35
3,465.0	9.70	10.00	3,446.6	251.5	5.6	251.5	0.47	0.15	2.65
3,529.0	10.20	9.60	3,509.6	262.4	7.4	262.4	0.79	0.78	-0.63
3,623.0	10.20	3.30	3,602.1	279.0	9.3	278.9	1.19	0.00	-6.70
3,718.0	9.50	355.90	3,695.7	295.2	9.2	295.1	1.52	-0.74	-7.79
3,813.0	9.00	354.90	3,789.5	310.4	8.0	310.4	0.55	-0.53	-1.05
3,907.0	9.00	353.40	3,882.3	325.0	6.5	325.0	0.25	0.00	-1.60
4,002.0	9.00	353.10	3,976.2	339.8	4.8	339.8	0.05	0.00	-0.32
4,097.0	9.10	353.40	4,070.0	354.6	3.0	354.6	0.12	0.11	0.32
4,192.0	9.30	352.70	4,163.8	369.7	1.2	369.7	0.24	0.21	-0.74
4,287.0	9.30	353.40	4,257.5	384.9	-0.7	384.9	0.12	0.00	0.74
4,381.0	9.30	353.40	4,350.3	400.0	-2.4	400.0	0.00	0.00	0.00
4,476.0	9.50	353.10	4,444.0	415.4	-4.3	415.5	0.22	0.21	-0.32
4,571.0	9.50	2.20	4,537.7	431.1	-4.9	431.1	1.58	0.00	9.58
4,665.0	8.80	1.50	4,630.5	446.0	-4.4	446.0	0.75	-0.74	-0.74
4,854.0	9.00	3.30	4,817.2	475.2	-3.2	475.2	0.18	0.11	0.95
5,044.0	9.00	5.40	5,004.9	504.8	-0.9	504.8	0.17	0.00	1.11
5,234.0	9.50	355.90	5,192.4	535.3	-0.7	535.3	0.84	0.26	-5.00
5,423.0	9.10	357.00	5,379.0	565.8	-2.6	565.8	0.23	-0.21	0.58
5,611.0	9.00	356.30	5,564.6	595.3	-4.3	595.3	0.08	-0.05	-0.37
5,801.0	8.40	351.70	5,752.4	623.8	-7.2	623.9	0.48	-0.32	-2.42
5,991.0	9.10	355.20	5,940.2	652.5	-10.5	652.6	0.46	0.37	1.84
6,180.0	10.40	357.70	6,126.5	684.5	-12.4	684.5	0.72	0.69	1.32
6,370.0	10.70	349.90	6,313.3	719.0	-16.2	719.1	0.77	0.16	-4.11



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6,422.0	10.70	349.20	6,364.4	728.5	-18.0	728.6	0.25	0.00	-1.35
TD @ 6472' MD / 6413.5' TVD									
6,472.0	10.70	349.20	6,413.5	737.6	-19.7	737.7	0.00	0.00	0.00

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
450.0	450.0	0.8	-1.3	TIE IN @ 450' MD / 450' TVD
6,472.0	6,413.5	737.6	-19.7	TD @ 6472' MD / 6413.5' TVD

Checked By: _____	Approved By: _____	Date: _____
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