



PHOENIX
TECHNOLOGY SERVICES

October 5, 2015

15- 43248

Oil Conservation Division
State of New Mexico
811 S. First St.
Artesia, New Mexico 88210

Dear District 2 - Artesia

Attention: Regulatory Department

Re: Apache Corporation
NFE Federal #59H
Eddy County, NM
API #30-015-43248
Job No. 1514081

NM OIL CONSERVATION

ARTESIA DISTRICT

OCT 13 2015

RECEIVED

Enclosed please find the Survey Data Certification, and the original Plat and one copy of the Survey Report performed on the above referenced Well by Phoenix Technology Services, Inc. (P-5 No. 664171). Other information required by your office is as follows:

Name & Title of Surveyor	Drain Hole Number	Surveyed Depths		Dates Performed		Type of Survey
		From	To	Start	End	
Mike Miller	59H	4,557	10,042	08/23/15	08/28/15	MWD

A certified plat on which the bottom hole location is oriented both to the surface location and to the lease lines (or unit lines in case of pooling) is attached to the survey report. If any other information is required, please contact the undersigned at the letterhead address and phone number.

Best Regards,

Claudia Carreon

Claudia Carreon
Operations Administrator

Certified mail receipt number: 7015 0640 0000 9907 5111

Phoenix Technology Services SURVEY DATA CERTIFICATION



PHOENIX JOB NUMBER 1514081

OPERATOR Apache

WELL NAME NFE Federal #59H

COUNTY & STATE Eddy County, NM

API WELL NUMBER 30-015-43248

PROPOSED DIRECTION 258.57

TIE-IN DATA						
MEASURED	VERTICAL			N-S	E-W	DATA
DEPTH	DEPTH	INCLIN	AZIMUTH	COORD	COORD	SOURCE
4,538.95 ft	4,538.80 ft	0.58	313.80	5.66 ft	-7.76 ft	Gyro

FIRST	FIRST		
SURVEY	SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
23-Aug-15	4,557.00 ft	0.30	334.90

SURVEY INSTRUMENT
TYPE
Phoenix MWD

LAST	LAST		
SURVEY	SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
28-Aug-15	10,042.00 ft	92.50	270.00

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
28-Aug-15	10,132.00 ft	92.50	270.00

Mike Miller

PRINT YOUR NAME ABOVE

Mike Miller

SIGN YOUR NAME ABOVE

MAGNETIC DECLINATION OR TOTAL GRID

TOTAL CORRECTION USED	7.37
DECLINATION OR GRID	GRID

28-Aug-15

TODAY'S DATE

MWD SUPERVISOR 1 Mike Miller

DIRECTIONAL DRILLER 1 Ian Hobbs

MWD SUPERVISOR 2 Jay Conyers

DIRECTIONAL DRILLER 2 Richard Byars



Apache Corporation

Eddy County, NM (NAD27 NME)

NFE Federal

#59H

OH / Job #1514081

Survey: Phoenix MWD Surveys

Standard Survey Report

28 August, 2015





Phoenix Technology Services LP

Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #59H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3849.00usft (Capstar 119)
Site:	NFE Federal	MD Reference:	KB @ 3849.00usft (Capstar 119)
Well:	#59H	North Reference:	Grid
Wellbore:	OH / Job #1514081	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 119)	Database:	Compass 5000 GCR

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	NFE Federal		
Site Position:		Northing:	673,264.70 usft
From:	Map	Easting:	633,303.50 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 51' 0.49036 N
		Longitude:	103° 53' 57.34966 W
		Grid Convergence:	0.24 °

Well	#59H		
Well Position	+N/-S	0.00 usft	Northing:
	+E/-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 50' 47.43862 N
		Longitude:	103° 52' 58.30891 W
		Ground Level:	3,838.00 usft

Wellbore	OH / Job #1514081				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	8/19/2015	7.62	60.80	48,586

Design	Surveys (Capstar 119)			
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	258.57

Survey Program	Date 8/28/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
108.14	4,538.95	Phoenix Gyro Surveys (OH / Job #151408	PHX_SPT_GTD	PHX Continuous north-seeking gyro
4,599.00	10,132.00	Phoenix MWD Surveys (OH / Job #151408	PHX+MWD+HDGM	PHX+MWD+HDGM

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)	
4,538.95	0.58	313.80	4,538.80	5.66	-7.76	6.48	0.00	0.00	0.00	
Tie In to Phoenix Gyros										
4,557.00	0.30	334.90	4,556.85	5.77	-7.85	6.55	1.77	-1.55	116.90	
First Phoenix MWD Survey										
4,599.00	2.20	224.20	4,598.84	5.29	-8.45	7.24	5.53	4.52	-263.57	
4,641.00	7.10	223.80	4,640.69	2.84	-10.81	10.04	11.67	11.67	-0.95	
4,682.00	12.10	222.50	4,681.11	-2.16	-15.47	15.60	12.21	12.20	-3.17	
4,724.00	16.80	225.90	4,721.77	-9.63	-22.81	24.27	11.37	11.19	8.10	
4,765.00	21.70	226.00	4,760.46	-19.03	-32.52	35.65	11.95	11.95	0.24	



Phoenix Technology Services LP

Survey Report



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Site:	NFE Federal	MD Reference:	KB @ 3849.00usft (Capstar 119)
Well:	#59H	North Reference:	Grid
Wellbore:	OH / Job #1514081	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 119)	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)
4,808.00	27.00	225.70	4,799.62	-31.38	-45.24	50.56	12.33	12.33	-0.70
4,849.00	29.60	222.30	4,835.72	-45.37	-58.72	66.54	7.46	6.34	-8.29
4,891.00	30.50	216.80	4,872.08	-61.58	-72.09	82.86	6.90	2.14	-13.10
4,933.00	35.50	217.40	4,907.30	-79.81	-85.89	100.00	11.93	11.90	1.43
4,974.00	40.90	218.50	4,939.51	-99.79	-101.48	119.25	13.27	13.17	2.68
5,016.00	45.50	215.10	4,970.12	-122.82	-118.67	140.65	12.27	10.95	-8.10
5,058.00	49.30	215.50	4,998.54	-148.05	-136.53	163.16	9.07	9.05	0.95
5,101.00	54.20	216.80	5,025.16	-175.30	-156.45	188.09	11.64	11.40	3.02
5,144.00	59.70	219.50	5,048.60	-203.61	-178.73	215.53	13.83	12.79	6.28
5,186.00	65.00	222.40	5,068.09	-231.68	-203.12	245.00	14.02	12.62	6.90
5,229.00	70.40	225.50	5,084.40	-260.29	-230.73	277.73	14.22	12.56	7.21
5,271.00	74.20	228.40	5,097.17	-287.59	-259.97	311.80	11.19	9.05	6.90
5,314.00	78.40	229.50	5,107.35	-315.01	-291.47	348.11	10.08	9.77	2.56
5,357.00	84.00	229.50	5,113.93	-342.60	-323.76	385.24	13.02	13.02	0.00
5,399.00	89.10	228.60	5,116.46	-370.07	-355.42	421.71	12.33	12.14	-2.14
5,442.00	91.10	227.40	5,116.38	-398.84	-387.37	458.73	5.42	4.65	-2.79
5,484.00	91.60	227.00	5,115.39	-427.37	-418.18	494.58	1.52	1.19	-0.95
5,612.00	92.80	226.60	5,110.48	-514.92	-511.42	603.32	0.99	0.94	-0.31
5,740.00	90.50	228.40	5,106.79	-601.35	-605.74	712.90	2.28	-1.80	1.41
5,868.00	88.60	237.00	5,107.80	-678.84	-707.46	827.95	6.88	-1.48	6.72
5,996.00	90.50	243.20	5,108.81	-742.61	-818.36	949.29	5.07	1.48	4.84
6,124.00	91.20	247.80	5,106.91	-795.67	-934.79	1,073.93	3.63	0.55	3.59
6,251.00	91.70	250.20	5,103.69	-841.17	-1,053.30	1,199.11	1.93	0.39	1.89
6,379.00	91.90	254.30	5,099.67	-880.16	-1,175.12	1,326.24	3.21	0.16	3.20
6,507.00	92.30	256.70	5,094.98	-912.19	-1,298.95	1,453.96	1.90	0.31	1.88
6,634.00	90.70	260.90	5,091.65	-936.84	-1,423.46	1,580.88	3.54	-1.26	3.31
6,762.00	91.90	265.90	5,088.75	-951.54	-1,550.54	1,708.35	4.02	0.94	3.91
6,890.00	92.20	268.00	5,084.17	-958.35	-1,678.27	1,834.90	1.66	0.23	1.64
7,018.00	91.60	268.70	5,079.92	-962.03	-1,806.14	1,960.97	0.72	-0.47	0.55
7,145.00	91.70	269.60	5,076.27	-963.92	-1,933.07	2,085.76	0.71	0.08	0.71
7,273.00	90.60	270.40	5,073.70	-963.92	-2,061.05	2,211.19	1.06	-0.86	0.63
7,401.00	90.30	269.80	5,072.69	-963.69	-2,189.04	2,336.60	0.52	-0.23	-0.47
7,529.00	91.70	269.90	5,070.46	-964.03	-2,317.02	2,462.11	1.10	1.09	0.08
7,656.00	90.80	269.50	5,067.69	-964.69	-2,443.98	2,586.69	0.78	-0.71	-0.31
7,784.00	91.70	269.70	5,064.90	-965.59	-2,571.95	2,712.29	0.72	0.70	0.16
7,912.00	91.30	269.70	5,061.54	-966.26	-2,699.90	2,837.84	0.31	-0.31	0.00
8,039.00	89.20	269.90	5,060.99	-966.70	-2,826.89	2,962.40	1.66	-1.65	0.16
8,167.00	90.90	269.70	5,060.88	-967.15	-2,954.89	3,087.95	1.34	1.33	-0.16
8,296.00	89.40	269.40	5,060.54	-968.16	-3,083.88	3,214.58	1.19	-1.16	-0.23
8,424.00	90.70	269.60	5,060.43	-969.28	-3,211.87	3,340.26	1.03	1.02	0.16
8,552.00	91.90	268.20	5,057.53	-971.73	-3,339.81	3,466.14	1.44	0.94	-1.09
8,679.00	90.50	268.40	5,054.87	-975.50	-3,466.72	3,591.28	1.11	-1.10	0.16
8,807.00	92.00	268.20	5,052.07	-979.29	-3,594.63	3,717.41	1.18	1.17	-0.16

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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)	
8,935.00	90.50	268.70	5,049.28	-982.76	-3,722.55	3,843.48	1.24	-1.17	0.39	
9,063.00	92.00	268.40	5,046.49	-985.99	-3,850.48	3,969.51	1.20	1.17	-0.23	
9,190.00	91.10	269.40	5,043.05	-988.43	-3,977.40	4,094.40	1.06	-0.71	0.79	
9,318.00	91.00	270.30	5,040.71	-988.77	-4,105.38	4,219.90	0.71	-0.08	0.70	
9,446.00	90.90	270.30	5,038.59	-988.10	-4,233.36	4,345.21	0.08	-0.08	0.00	
9,574.00	92.20	269.60	5,035.12	-988.21	-4,361.31	4,470.65	1.15	1.02	-0.55	
9,702.00	91.70	270.80	5,030.77	-987.76	-4,489.23	4,595.95	1.02	-0.39	0.94	
9,829.00	90.10	270.70	5,028.77	-986.10	-4,616.20	4,720.07	1.26	-1.26	-0.08	
9,957.00	91.60	270.40	5,026.87	-984.87	-4,744.18	4,845.26	1.20	1.17	-0.23	
10,042.00	92.50	270.00	5,023.83	-984.57	-4,829.12	4,928.46	1.16	1.06	-0.47	
Last Phoenix MWD Survey										
10,132.00	92.50	270.00	5,019.91	-984.57	-4,919.04	5,016.59	0.00	0.00	0.00	
Projection to TD										

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
4,538.95	4,538.80	5.66	-7.76	Tie In to Phoenix Gyros	
4,557.00	4,556.85	5.77	-7.85	First Phoenix MWD Survey	
10,042.00	5,023.83	-984.57	-4,829.12	Last Phoenix MWD Survey	
10,132.00	5,019.91	-984.57	-4,919.04	Projection to TD	

Checked By: _____	Approved By: _____	Date: _____
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