

Apache Corporation
303 Veterans Airpark Lane, #3000
Midland, TX 79705
Cedar Lake Federal ICA 951H
Crow Federal Com #051H
Eddy County, New Mexico

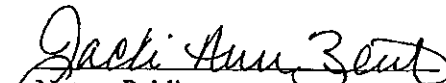
API # 30-015 43327
Sec. 9 TMS RBIE
1070 FNL, 515 FWL

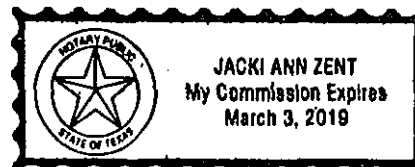
255	2.55	0.50	0.88	2.23	2.23
579	3.24	0.70	1.23	3.97	6.20
915	3.36	0.30	0.53	1.76	7.96
1214	2.99	1.50	2.63	7.85	15.81
1470	2.56	2.20	3.85	9.86	25.67
1726	2.56	1.70	2.98	7.62	33.29
1975	2.49	0.70	1.23	3.05	36.34
2232	2.57	0.40	0.70	1.80	38.13
2485	2.53	0.30	0.53	1.33	39.46
2708	2.23	0.40	0.70	1.56	41.02
2964	2.56	0.70	1.23	3.14	44.16
3213	2.49	0.60	1.05	2.61	46.77
3460	2.47	0.20	0.35	0.86	47.64
3536	0.76	0.10	0.18	0.13	47.77
3880	3.44	0.20	0.35	1.20	48.98
4136	2.56	0.50	0.88	2.24	51.22
4392	2.56	0.80	1.40	3.58	54.80
4648	2.56	0.60	1.05	2.69	57.49
4859	2.11	0.60	1.05	2.22	59.70
5004	1.45	0.80	1.40	2.03	61.73



Archie Brown - General Manager

The attached instrument was acknowledged before me on the 2nd day of November, 2015
by Archie Brown - General Manager, CapStar Drilling, Inc.


Notary Public



Apache Corporation

Eddy County, NM (NAD27 NME)

Grow-Federal

#51H—

Cedar Lake Federal CA 951H

OH / 1514486

Design: Surveys (Capstar 114)

Standard Survey Report

27 October, 2015

Phoenix Technology Services LP

Survey Report

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #51H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3887.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3887.00usft (Capstar 114)
Well:	#51H	North Reference:	Grid
Wellbore:	OH / 1514486	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	Compass 5000 GCR

Project:	Eddy County, NM (NAD27 NME)	System Datum:	Mean Sea Level
Map System:	US State Plane 1927 (Exact solution)		
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site:	Crow Federal		
Site Position:		Northing:	671,130.90 usft
From:	Map	Easting:	643,906.80 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 50' 38.92798 N
		Longitude:	103° 51' 53.16689 W
		Grid Convergence:	0.25 °

Well:	#51H		
Well Position	+N/-S	0.00 usft	Northing: 674,426.60 usft
	+E/-W	0.00 usft	Easting: 638,871.70 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 51' 11.75629 N
		Longitude:	103° 52' 52.01984 W
		Ground Level:	3,878.00 usft

Wellbore	OH / 1514486				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	10/14/2015	7.60	60.80	48,571

Design:	Surveys (Capstar 114)				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0.00	0.00	0.00	81.96	

Survey Program	Date	10/27/2015		
From	To	Survey (Wellbore)	Tool Name	Description
(usft)	(usft)			
100.00	4,893.00	Scientific Gyro Surveys (OH / 1514486)	NS-GYRO-MS	North sensing gyrocompassing m/s
4,893.00	9,906.00	Phoenix MWD Surveys (OH / 1514486)	PHX+MWD+HDGM	PHX+OWSG MWD + HDGM

Survey									
Measured Depth	Inclination	Azimuth	Vertical Depth	+N/-S	+E/-W	Vertical Section	Dogleg Rate	Build Rate	Turn Rate
(usft)	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(°/100usft)	(°/100usft)	(°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.29	287.61	100.00	0.08	-0.24	-0.23	0.29	0.29	0.00
200.00	0.39	269.89	200.00	0.15	-0.82	-0.79	0.14	0.10	-17.72
300.00	0.71	274.82	299.99	0.20	-1.76	-1.73	0.32	0.32	4.93
400.00	0.95	293.94	399.98	0.59	-3.16	-3.04	0.36	0.24	19.12
500.00	0.96	290.12	499.97	1.22	-4.70	-4.48	0.06	0.01	-3.82
600.00	0.74	288.26	599.98	1.71	-8.10	-5.80	0.22	-0.22	-1.86
700.00	0.63	284.43	699.95	2.05	-7.25	-6.89	0.12	-0.11	-3.83
800.00	0.38	303.34	799.95	2.37	-8.05	-7.64	0.30	-0.25	18.91
900.00	0.26	326.48	899.95	2.74	-8.46	-7.99	0.17	-0.12	23.12

Phoenix Technology Services LP

Survey Report

Company: Apache Corporation
Project: Eddy County, NM (NAD27 NME)
Site: Crow Federal
Well: #51H
Wellbore: OH / 1514486
Design: Surveys (Capstar 114)

Local Co-ordinate Reference: Well #51H
TVD Reference: KB @ 3887.00usft (Capstar 114)
MD Reference: KB @ 3887.00usft (Capstar 114)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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)
5,118.00	7.40	52.00	5,118.18	32.53	16.77	21.16	9.81	9.77	-10.23
5,162.00	12.10	46.40	5,160.55	37.23	22.33	27.31	11.02	10.93	-8.37
5,205.00	17.00	47.80	5,202.15	44.45	30.36	36.28	11.40	11.40	-1.40
5,247.00	22.40	50.00	5,241.68	53.73	41.04	48.16	12.98	12.66	5.24
5,290.00	27.90	51.10	5,280.59	65.32	55.16	63.75	12.84	12.79	2.58
5,332.00	33.30	52.00	5,316.73	78.60	71.91	82.19	12.90	12.88	2.14
5,375.00	38.70	53.50	5,351.50	93.88	92.03	104.25	12.72	12.56	3.49
5,418.00	43.40	54.50	5,383.92	110.46	114.87	129.19	11.04	10.93	2.33
5,460.00	48.00	55.80	5,413.25	127.62	139.54	156.02	11.17	10.95	3.10
5,503.00	52.30	57.20	5,440.80	145.82	167.07	185.82	10.31	10.00	3.26
5,546.00	57.80	57.30	5,465.42	164.88	196.70	217.83	12.79	12.79	0.23
5,589.00	62.60	57.30	5,486.79	185.04	228.09	251.73	11.16	11.16	0.00
5,631.00	67.00	57.40	5,504.66	205.53	260.08	286.27	10.48	10.48	0.24
5,674.00	71.30	57.90	5,519.98	227.03	294.02	322.89	10.06	10.00	1.16
5,717.00	75.30	58.90	5,532.32	248.60	329.10	360.63	9.57	9.30	2.33
5,759.00	79.70	59.40	5,541.41	269.62	364.29	398.42	10.54	10.48	1.19
5,803.00	83.80	59.80	5,547.72	291.65	401.84	438.68	9.38	9.32	0.91
5,846.00	87.80	59.00	5,550.87	313.48	438.75	478.28	9.49	9.30	-1.86
5,888.00	88.70	59.10	5,552.15	335.07	474.75	516.85	2.16	2.14	0.24
6,017.00	88.90	61.50	5,554.85	398.96	588.77	638.80	1.87	0.16	1.86
6,144.00	88.80	64.10	5,557.40	457.00	699.89	756.73	2.05	-0.08	2.05
6,272.00	87.50	67.90	5,561.54	509.02	816.54	879.71	3.14	-1.02	2.97
6,400.00	86.90	72.20	5,567.79	552.63	936.69	1,004.77	3.39	-0.47	3.36
6,528.00	87.00	76.40	5,574.61	587.21	1,059.71	1,131.42	3.28	0.08	3.28
6,656.00	88.30	81.40	5,579.86	611.83	1,185.17	1,259.09	4.03	1.02	3.91
6,784.00	90.20	85.80	5,581.53	628.09	1,312.32	1,386.89	3.74	1.48	3.44
6,911.00	90.30	90.00	5,580.98	630.74	1,439.21	1,513.28	3.31	0.08	3.31
7,039.00	90.60	91.50	5,579.97	629.06	1,567.19	1,639.77	1.20	0.23	1.17
7,167.00	89.70	91.80	5,579.64	625.38	1,695.13	1,765.94	0.74	-0.70	0.23
7,295.00	88.80	92.20	5,581.31	620.91	1,823.04	1,891.97	0.77	-0.70	0.31
7,423.00	87.10	91.10	5,585.89	617.23	1,950.80	2,018.05	1.58	-1.33	-0.86
7,551.00	86.90	90.80	5,592.59	615.11	2,078.71	2,144.31	0.28	-0.16	-0.23
7,679.00	86.80	89.10	5,598.63	615.22	2,206.51	2,270.87	1.33	-0.08	-1.33
7,807.00	88.00	88.80	5,604.32	617.56	2,334.39	2,397.82	1.73	1.72	-0.23
7,936.00	89.80	89.40	5,605.89	618.59	2,463.37	2,525.81	0.86	0.47	0.47
8,064.00	89.80	89.60	5,606.56	620.71	2,591.36	2,652.70	0.22	0.16	0.16
8,192.00	88.50	89.80	5,608.46	621.60	2,719.34	2,779.55	1.02	-1.02	0.00
8,320.00	88.50	90.10	5,611.70	621.94	2,847.30	2,906.30	0.40	0.08	0.39
8,448.00	88.90	90.50	5,614.49	621.27	2,975.27	3,032.91	0.39	0.23	0.31
8,577.00	88.70	89.50	5,617.19	621.27	3,104.24	3,160.62	0.79	-0.16	-0.78
8,705.00	88.90	89.90	5,619.87	621.94	3,232.21	3,287.42	0.35	0.16	0.31
8,832.00	89.10	90.30	5,622.09	621.71	3,359.19	3,413.12	0.35	0.16	0.31
8,960.00	89.60	90.90	5,623.54	620.37	3,487.17	3,539.66	0.61	0.39	0.47
9,088.00	89.70	90.80	5,624.32	618.48	3,615.15	3,666.12	0.11	0.08	-0.08

Phoenix Technology Services LP

Survey Report

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 Site: Crow Federal
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 Wellbore: OH / 1514486
 Design: Surveys (Capstar 114)

Local Co-ordinate Reference: Well #51H
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 MD Reference: KB @ 3887.00usft (Capstar 114)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 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)	Bulld Rate (°/100usft)	Turn Rate (°/100usft)
9,218.00	88.30	89.70	5,626.56	617.92	3,743.13	3,792.76	1.39	-1.08	-0.86
9,344.00	88.40	89.70	5,630.24	618.59	3,871.07	3,919.54	0.08	0.08	0.00
9,472.00	88.30	90.00	5,633.93	618.92	3,999.02	4,046.28	0.25	-0.08	0.23
9,600.00	89.20	90.10	5,636.72	618.81	4,128.99	4,172.97	0.71	0.70	0.08
9,728.00	90.50	90.00	5,637.06	618.70	4,254.98	4,299.69	1.02	1.02	-0.08
Final Phoenix MWD Survey									
9,806.00	90.50	90.00	5,635.50	618.70	4,432.98	4,475.94	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)	
4,893.00	4,892.49	26.34	8.82	Tie In to Scientific Gyro
5,076.00	5,075.37	30.18	13.59	First Phoenix MWD Survey
9,728.00	5,637.06	618.70	4,254.98	Final Phoenix MWD Survey
9,806.00	5,635.50	618.70	4,432.98	Projection to TD

Checked By: _____ Approved By: _____ Date: _____

