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

Crow Federal Com #048H
Eddy County, New Mexico

API # 30-015-43409
Sec. 10 17S & R31E
470' FNL & 330' FEL
Cedar Lake Fed CA 148H

485	4.85	1.10	1.93	9.34	9.34
697	2.12	1.40	2.45	5.19	14.53
909	2.12	1.10	1.93	4.08	18.61
1207	2.98	1.00	1.75	5.22	23.83
1505	2.98	0.60	1.05	3.13	26.96
1803	2.98	0.90	1.58	4.69	31.65
2101	2.98	0.90	1.58	4.69	36.34
2389	2.88	0.40	0.70	2.02	38.36
2698	3.09	0.40	0.70	2.16	40.52
3039	3.41	0.60	1.05	3.58	44.10
3294	2.55	0.30	0.53	1.34	45.44
3465	1.71	1.00	1.75	2.99	48.43
3528	0.63	0.30	0.53	0.33	48.76
3871	3.43	0.20	0.35	1.20	49.96
4126	2.55	0.10	0.18	0.45	50.41
4425	2.99	0.80	1.40	4.19	54.60
4723	2.98	0.70	1.23	3.65	58.25
4800	0.77	0.10	0.18	0.13	58.38
4861	0.61	3.10	5.43	3.31	61.69

Archie Brown - General Manager

The attached instrument was acknowledged before me on the 10th day of December, 2015 by Archie Brown - General Manager, CapStar Drilling, Inc.

Jacki Ann Zent
Notary Public

NOTARY PUBLIC STATE OF TEXAS
JACKI ANN ZENT
My Commission Expires
March 3, 2019

Apache
EXPLORING WHAT'S POSSIBLE

Apache Corporation

Eddy County, NM (NAD27 NME)
Crow Federal
#48H

OH / Job #1514660

Survey: Phoenix MWD Surveys

Standard Survey Report

06 December, 2015

PHOENIX
TECHNOLOGY SERVICES

Phoenix Technology Services LP

Survey Report

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #48H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3958.00usft (Capstar 119)
Site:	Crow Federal	MD Reference:	KB @ 3958.00usft (Capstar 119)
Well:	#48H	North Reference:	Grid
Wellbore:	OH / Job #1514660	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 Crow Federal

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

Well #48H

Well Position	+N/-S	0.00 usft	Northing:	675,094.10 usft	Latitude:	32° 51' 17.93529 N
	+E/-W	0.00 usft	Easting:	648,585.00 usft	Longitude:	103° 50' 58.11927 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,947.00 usft

Wellbore OH / Job #1514660

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	11/23/2015	7.52	60.83	48,578

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	269.61

Survey Program Date 12/6/2015

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
82.00	4,740.00	Scientific Gyro Surveys (OH / Job #151466	CB-GYRO-MS	Camera based gyro multishot
4,819.00	9,741.00	Phoenix MWD Surveys (OH / Job #151466	PHX+MWD+HDGM	PHX+OWSG 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)
4,740.00	0.40	299.83	4,739.61	11.40	-14.58	14.50	0.00	0.00	0.00
Tie In to Scientific Gyro Surveys									
4,819.00	0.50	299.90	4,818.61	11.71	-15.12	15.04	0.13	0.13	0.09
First Phoenix MWD Survey									
4,861.00	3.10	268.00	4,860.58	11.76	-16.41	16.33	6.40	6.19	-75.95
4,904.00	7.00	269.40	4,903.41	11.69	-20.20	20.12	9.07	9.07	3.26
4,946.00	11.30	273.70	4,944.86	11.93	-26.86	26.78	10.36	10.24	10.24
4,989.00	15.60	274.20	4,986.67	12.63	-36.84	36.75	10.00	10.00	1.16
5,031.00	20.40	272.90	5,026.61	13.41	-49.79	49.70	11.47	11.43	-3.10

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #48H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3958.00usft (Capstar 119)
Site:	Crow Federal	MD Reference:	KB @ 3958.00usft (Capstar 119)
Well:	#48H	North Reference:	Grid
Wellbore:	OH / Job #1514660	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)
5,074.00	24.70	271.40	5,066.31	14.01	-66.26	66.17	10.09	10.00	-3.49
5,116.00	29.20	269.90	5,103.74	14.21	-85.29	85.19	10.84	10.71	-3.57
5,159.00	33.70	268.60	5,140.41	13.90	-107.72	107.62	10.58	10.47	-3.02
5,201.00	38.60	268.50	5,174.32	13.27	-132.48	132.39	11.67	11.67	-0.24
5,244.00	43.60	268.10	5,206.71	12.43	-160.72	160.64	11.64	11.63	-0.93
5,287.00	48.40	267.70	5,236.57	11.29	-191.62	191.54	11.18	11.16	-0.93
5,329.00	53.50	267.90	5,263.02	10.04	-224.21	224.13	12.15	12.14	0.48
5,372.00	60.10	267.60	5,286.56	8.62	-260.14	260.08	15.36	15.35	-0.70
5,414.00	67.90	267.00	5,304.95	6.84	-297.82	297.76	18.62	18.57	-1.43
5,457.00	76.50	267.00	5,318.09	4.70	-338.67	338.63	20.00	20.00	0.00
5,499.00	83.90	267.80	5,325.23	2.83	-379.98	379.95	17.72	17.62	1.90
5,540.00	83.60	267.70	5,329.69	1.23	-420.71	420.69	0.77	-0.73	-0.24
5,582.00	86.70	268.10	5,333.24	-0.31	-462.52	462.51	7.44	7.38	0.95
5,625.00	88.10	268.50	5,335.19	-1.58	-505.46	505.46	3.39	3.26	0.93
5,668.00	88.20	268.50	5,336.58	-2.71	-548.42	548.43	0.23	0.23	0.00
5,795.00	89.90	269.00	5,338.69	-5.48	-675.37	675.39	1.40	1.34	0.39
5,923.00	90.40	268.60	5,338.35	-8.16	-803.34	803.38	0.50	0.39	-0.31
6,050.00	91.40	269.30	5,336.36	-10.48	-930.30	930.35	0.96	0.79	0.55
6,178.00	91.90	269.30	5,332.67	-12.05	-1,058.24	1,058.29	0.39	0.39	0.00
6,306.00	90.80	271.00	5,329.66	-11.71	-1,186.19	1,186.25	1.58	-0.86	1.33
6,434.00	90.60	271.50	5,328.09	-8.92	-1,314.15	1,314.18	0.42	-0.16	0.39
6,476.00	90.30	270.70	5,327.76	-8.11	-1,356.14	1,356.17	2.03	-0.71	-1.90
6,519.00	90.00	270.50	5,327.65	-7.66	-1,399.14	1,399.16	0.84	-0.70	-0.47
6,561.00	89.80	270.80	5,327.72	-7.19	-1,441.14	1,441.15	0.86	-0.48	0.71
6,604.00	89.60	271.20	5,327.95	-6.44	-1,484.13	1,484.14	1.04	-0.47	0.93
6,647.00	89.70	270.70	5,328.21	-5.72	-1,527.12	1,527.13	1.19	0.23	-1.16
6,689.00	90.20	270.80	5,328.25	-5.17	-1,569.12	1,569.12	1.21	1.19	0.24
6,732.00	90.00	270.80	5,328.17	-4.57	-1,612.12	1,612.11	0.47	-0.47	0.00
6,774.00	89.90	270.60	5,328.21	-4.06	-1,654.11	1,654.10	0.53	-0.24	-0.48
6,817.00	90.00	269.20	5,328.25	-4.13	-1,697.11	1,697.10	3.26	0.23	-3.26
6,860.00	89.70	269.00	5,328.36	-4.81	-1,740.11	1,740.10	0.84	-0.70	-0.47
6,902.00	90.10	269.70	5,328.43	-5.29	-1,782.10	1,782.10	1.92	0.95	1.67
6,945.00	91.30	269.70	5,327.91	-5.51	-1,825.10	1,825.09	2.79	2.79	0.00
6,988.00	91.00	269.70	5,327.04	-5.74	-1,868.09	1,868.09	0.70	-0.70	0.00
7,030.00	90.80	269.90	5,326.38	-5.88	-1,910.08	1,910.08	0.67	-0.48	0.48
7,073.00	90.80	270.40	5,325.78	-5.77	-1,953.08	1,953.07	1.16	0.00	1.16
7,115.00	90.80	270.50	5,325.20	-5.44	-1,995.07	1,995.06	0.24	0.00	0.24
7,158.00	90.80	271.00	5,324.60	-4.88	-2,038.07	2,038.05	1.16	0.00	1.16
7,200.00	90.50	270.90	5,324.12	-4.18	-2,080.06	2,080.04	0.75	-0.71	-0.24
7,243.00	90.70	270.90	5,323.67	-3.51	-2,123.05	2,123.02	0.47	0.47	0.00
7,285.00	90.30	269.30	5,323.30	-3.43	-2,165.05	2,165.02	3.93	-0.95	-3.81
7,328.00	90.20	269.20	5,323.12	-4.00	-2,208.04	2,208.02	0.33	-0.23	-0.23
7,370.00	90.40	268.90	5,322.90	-4.69	-2,250.04	2,250.02	0.86	0.48	-0.71

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #48H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3958.00usft (Capstar 119)
Site:	Crow Federal	MD Reference:	KB @ 3958.00usft (Capstar 119)
Well:	#48H	North Reference:	Grid
Wellbore:	OH / Job #1514660	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)
7,413.00	91.20	268.10	5,322.30	-5.82	-2,293.02	2,293.00	2.63	1.86	-1.86
7,456.00	91.50	268.00	5,321.28	-7.28	-2,335.98	2,335.98	0.74	0.70	-0.23
7,498.00	91.60	268.40	5,320.15	-8.60	-2,377.94	2,377.95	0.98	0.24	0.95
7,541.00	91.60	268.60	5,318.95	-9.72	-2,420.91	2,420.92	0.46	0.00	0.47
7,584.00	91.80	268.50	5,317.67	-10.81	-2,463.88	2,463.90	0.52	0.47	-0.23
7,626.00	92.20	269.10	5,316.21	-11.69	-2,505.84	2,505.87	1.72	0.95	1.43
7,669.00	92.30	269.60	5,314.52	-12.18	-2,548.81	2,548.83	1.18	0.23	1.16
7,711.00	91.50	269.90	5,313.12	-12.36	-2,590.78	2,590.81	2.03	-1.90	0.71
7,754.00	90.90	269.50	5,312.22	-12.59	-2,633.77	2,633.80	1.68	-1.40	-0.93
7,796.00	91.10	269.80	5,311.49	-12.84	-2,675.77	2,675.79	0.86	0.48	0.71
7,839.00	91.40	269.80	5,310.55	-12.99	-2,718.76	2,718.78	0.70	0.70	0.00
7,881.00	91.80	270.20	5,309.38	-12.99	-2,760.74	2,760.76	1.35	0.95	0.95
7,924.00	91.80	270.00	5,308.03	-12.92	-2,803.72	2,803.74	0.46	0.00	-0.47
7,967.00	91.20	269.70	5,306.90	-13.03	-2,846.70	2,846.73	1.56	-1.40	-0.70
8,009.00	90.90	269.30	5,306.13	-13.40	-2,888.69	2,888.72	1.19	-0.71	-0.95
8,052.00	91.30	269.00	5,305.31	-14.03	-2,931.68	2,931.71	1.16	0.93	-0.70
8,095.00	91.50	269.40	5,304.26	-14.64	-2,974.66	2,974.70	1.04	0.47	0.93
8,137.00	91.50	270.10	5,303.16	-14.82	-3,016.65	3,016.68	1.67	0.00	1.67
8,179.00	91.00	270.20	5,302.24	-14.71	-3,058.64	3,058.67	1.21	-1.19	0.24
8,222.00	90.00	270.60	5,301.87	-14.41	-3,101.64	3,101.66	2.50	-2.33	0.93
8,264.00	89.60	270.70	5,302.01	-13.93	-3,143.63	3,143.65	0.98	-0.95	0.24
8,307.00	88.80	270.40	5,302.61	-13.52	-3,186.63	3,186.64	1.99	-1.86	-0.70
8,350.00	88.60	270.50	5,303.59	-13.18	-3,229.61	3,229.63	0.52	-0.47	0.23
8,392.00	88.60	270.20	5,304.62	-12.92	-3,271.60	3,271.61	0.71	0.00	-0.71
8,435.00	88.90	270.70	5,305.55	-12.59	-3,314.59	3,314.60	1.36	0.70	1.16
8,478.00	89.50	270.20	5,306.15	-12.25	-3,357.58	3,357.59	1.82	1.40	-1.16
8,520.00	89.80	269.60	5,306.41	-12.32	-3,399.58	3,399.59	1.60	0.71	-1.43
8,563.00	89.30	269.50	5,306.75	-12.66	-3,442.58	3,442.59	1.19	-1.16	-0.23
8,605.00	89.80	269.20	5,307.08	-13.14	-3,484.57	3,484.58	1.39	1.19	-0.71
8,648.00	90.00	269.10	5,307.15	-13.78	-3,527.57	3,527.58	0.52	0.47	-0.23
8,691.00	90.20	269.40	5,307.08	-14.34	-3,570.57	3,570.58	0.84	0.47	0.70
8,733.00	90.70	268.50	5,306.75	-15.11	-3,612.56	3,612.58	2.45	1.19	-2.14
8,776.00	92.20	268.50	5,305.66	-16.23	-3,655.53	3,655.55	3.49	3.49	0.00
8,818.00	92.20	268.50	5,304.05	-17.33	-3,697.48	3,697.51	0.00	0.00	0.00
8,861.00	93.20	268.50	5,302.02	-18.46	-3,740.42	3,740.46	2.33	2.33	0.00
8,904.00	93.30	268.80	5,299.58	-19.47	-3,783.34	3,783.38	0.73	0.23	0.70
8,946.00	93.10	268.70	5,297.24	-20.38	-3,825.26	3,825.31	0.53	-0.48	-0.24
8,989.00	92.90	268.70	5,294.99	-21.36	-3,868.19	3,868.25	0.47	-0.47	0.00
9,031.00	93.00	269.20	5,292.83	-22.12	-3,910.13	3,910.19	1.21	0.24	1.19
9,074.00	92.70	268.90	5,290.69	-22.84	-3,953.07	3,953.13	0.99	-0.70	-0.70
9,116.00	92.80	268.80	5,288.68	-23.68	-3,995.01	3,995.08	0.34	0.24	-0.24
9,159.00	92.50	268.90	5,286.69	-24.54	-4,037.96	4,038.03	0.74	-0.70	0.23
9,202.00	92.30	269.00	5,284.89	-25.33	-4,080.91	4,080.99	0.52	-0.47	0.23
9,244.00	91.90	268.60	5,283.35	-26.21	-4,122.88	4,122.96	1.35	-0.95	-0.95

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Site:	Crow Federal	MD Reference:	KB @ 3958.00usft (Capstar 119)
Well:	#48H	North Reference:	Grid
Wellbore:	OH / Job #1514660	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)
9,287.00	91.80	268.90	5,281.96	-27.14	-4,165.84	4,165.93	0.74	-0.23	0.70
9,330.00	91.40	268.70	5,280.76	-28.04	-4,208.82	4,208.91	1.04	-0.93	-0.47
9,372.00	91.30	268.80	5,279.77	-28.96	-4,250.80	4,250.89	0.34	-0.24	0.24
9,415.00	91.40	268.80	5,278.76	-29.86	-4,293.77	4,293.88	0.23	0.23	0.00
9,457.00	92.20	269.30	5,277.44	-30.56	-4,335.75	4,335.85	2.25	1.90	1.19
9,500.00	92.20	269.30	5,275.79	-31.08	-4,378.71	4,378.82	0.00	0.00	0.00
9,542.00	92.10	269.40	5,274.21	-31.56	-4,420.68	4,420.79	0.34	-0.24	0.24
9,585.00	91.80	269.40	5,272.75	-32.01	-4,463.65	4,463.77	0.70	-0.70	0.00
9,628.00	91.70	269.80	5,271.43	-32.31	-4,506.63	4,506.75	0.96	-0.23	0.93
9,666.00	91.50	269.70	5,270.37	-32.47	-4,544.62	4,544.73	0.59	-0.53	-0.26
Final Phoenix MWD Survey									
9,741.00	91.50	269.70	5,268.41	-32.87	-4,619.59	4,619.71	0.00	0.00	0.00
Projection to TD									

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
4,740.00	4,739.61	11.40	-14.58	Tie In to Scientific Gyro Surveys
4,819.00	4,818.61	11.71	-15.12	First Phoenix MWD Survey
9,666.00	5,270.37	-32.47	-4,544.62	Final Phoenix MWD Survey
9,741.00	5,268.41	-32.87	-4,619.59	Projection to TD

Checked By: _____ Approved By: _____ Date: _____

Phoenix Technology Services
Survey Report 06-Dec-2015 06:37:15

Apache Corporation

Crow Federal #48H
Eddy County, NM (NAD27 NME)
OH / Job #1514660
Phoenix MWD Surveys

Surface Loc.:
Northing: (Y) 675094.10
Easting: (X) 648585.00
KB Elev: 3958.00'
GL Elev: 3947.00'

Survey Type Information:
H 82.00 - 4740.00 SCIENTIFIC GYRO SURVEYS : CB-GYRO-MS
H 4819.00 - 9741.00 PHOENIX MWD SURVEYS : PHX+MWD+HDGM

Measured Depth (ft)	Incl.	Azim.	Sub-Sea Depth (ft)	Vertical Depth (ft)	Local Coo (+N/-S) (ft)	(+E/-W) (ft)	UTM Coor Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Annotation
4740	0.4	299.83	781.61	4739.61	11.4	-14.58	675105.5	648570.4	14.5	0	Tie In to Scientific Gyro Surveys
4819	0.5	299.9	860.6	4818.6	11.71	-15.12	675105.8	648569.9	15.04	0.13	First Phoenix MWD Survey
4861	3.1	268	902.58	4860.58	11.76	-16.41	675105.9	648568.6	16.33	6.4	
4904	7	269.4	945.41	4903.41	11.69	-20.2	675105.8	648564.8	20.12	9.07	
4946	11.3	273.7	986.86	4944.86	11.93	-26.86	675106	648558.1	26.78	10.36	
4989	15.6	274.2	1028.67	4986.67	12.63	-36.84	675106.7	648548.2	36.75	10	
5031	20.4	272.9	1068.61	5026.61	13.41	-49.79	675107.5	648535.2	49.7	11.47	
5074	24.7	271.4	1108.31	5066.31	14.01	-66.26	675108.1	648518.7	66.17	10.09	
5116	29.2	269.9	1145.74	5103.74	14.21	-85.29	675108.3	648499.7	85.19	10.84	
5159	33.7	268.6	1182.41	5140.41	13.9	-107.72	675108	648477.3	107.62	10.58	
5201	38.6	268.5	1216.32	5174.32	13.27	-132.48	675107.4	648452.5	132.39	11.67	
5244	43.6	268.1	1248.71	5206.71	12.43	-160.72	675106.5	648424.3	160.64	11.64	
5287	48.4	267.7	1278.57	5236.57	11.29	-191.62	675105.4	648393.4	191.54	11.18	
5329	53.5	267.9	1305.02	5263.02	10.04	-224.21	675104.1	648360.8	224.13	12.15	
5372	60.1	267.6	1328.55	5286.55	8.62	-260.14	675102.7	648324.9	260.08	15.36	
5414	67.9	267	1346.95	5304.95	6.84	-297.82	675100.9	648287.2	297.76	18.62	
5457	76.5	267	1360.09	5318.09	4.7	-338.67	675098.8	648246.3	338.63	20	
5499	83.9	267.8	1367.23	5325.23	2.83	-379.98	675096.9	648205	379.95	17.72	
5540	83.6	267.7	1371.69	5329.69	1.23	-420.71	675095.3	648164.3	420.69	0.77	
5582	86.7	268.1	1375.24	5333.24	-0.31	-462.52	675093.8	648122.5	462.51	7.44	
5625	88.1	268.5	1377.19	5335.19	-1.58	-505.46	675092.5	648079.5	505.46	3.39	
5668	88.2	268.5	1378.58	5336.58	-2.71	-548.42	675091.4	648036.6	548.43	0.23	
5795	89.9	269	1380.69	5338.69	-5.48	-675.37	675088.6	647909.6	675.39	1.4	
5923	90.4	268.6	1380.35	5338.35	-8.16	-803.34	675085.9	647781.7	803.38	0.5	
6050	91.4	269.3	1378.36	5336.36	-10.48	-930.3	675083.6	647654.7	930.35	0.96	
6178	91.9	269.3	1374.67	5332.67	-12.05	-1058.24	675082.1	647526.8	1058.29	0.39	
6306	90.8	271	1371.66	5329.66	-11.71	-1186.19	675082.4	647398.8	1186.25	1.58	
6434	90.6	271.5	1370.09	5328.09	-8.92	-1314.15	675085.2	647270.9	1314.18	0.42	
6476	90.3	270.7	1369.76	5327.76	-8.11	-1356.14	675086	647228.9	1356.17	2.03	
6519	90	270.5	1369.65	5327.65	-7.66	-1399.14	675086.4	647185.9	1399.16	0.84	
6561	89.8	270.8	1369.72	5327.72	-7.19	-1441.14	675086.9	647143.9	1441.15	0.86	
6604	89.6	271.2	1369.95	5327.95	-6.44	-1484.13	675087.7	647100.9	1484.14	1.04	
6647	89.7	270.7	1370.21	5328.21	-5.72	-1527.12	675088.4	647057.9	1527.13	1.19	
6689	90.2	270.8	1370.25	5328.25	-5.17	-1569.12	675088.9	647015.9	1569.12	1.21	
6732	90	270.8	1370.17	5328.17	-4.57	-1612.12	675089.5	646972.9	1612.11	0.47	
6774	89.9	270.6	1370.21	5328.21	-4.06	-1654.11	675090	646930.9	1654.1	0.53	
6817	90	269.2	1370.25	5328.25	-4.13	-1697.11	675090	646887.9	1697.1	3.26	
6860	89.7	269	1370.36	5328.36	-4.81	-1740.11	675089.3	646844.9	1740.1	0.84	
6902	90.1	269.7	1370.43	5328.43	-5.29	-1782.1	675088.8	646802.9	1782.1	1.92	
6945	91.3	269.7	1369.91	5327.91	-5.51	-1825.1	675088.6	646759.9	1825.09	2.79	

6988	91	269.7	1369.04	5327.04	-5.74	-1868.09	675088.4	646716.9	1868.09	0.7
7030	90.8	269.9	1368.38	5326.38	-5.88	-1910.08	675088.2	646674.9	1910.08	0.67
7073	90.8	270.4	1367.78	5325.78	-5.77	-1953.08	675088.3	646631.9	1953.07	1.16
7115	90.8	270.5	1367.2	5325.2	-5.44	-1995.07	675088.7	646589.9	1995.06	0.24
7158	90.8	271	1366.6	5324.6	-4.88	-2038.07	675089.2	646546.9	2038.05	1.16
7200	90.5	270.9	1366.12	5324.12	-4.18	-2080.06	675089.9	646504.9	2080.04	0.75
7243	90.7	270.9	1365.67	5323.67	-3.51	-2123.05	675090.6	646462	2123.02	0.47
7285	90.3	269.3	1365.3	5323.3	-3.43	-2165.05	675090.7	646420	2165.02	3.93
7328	90.2	269.2	1365.12	5323.12	-4	-2208.04	675090.1	646377	2208.02	0.33
7370	90.4	268.9	1364.9	5322.9	-4.69	-2250.04	675089.4	646335	2250.02	0.86
7413	91.2	268.1	1364.3	5322.3	-5.82	-2293.02	675088.3	646292	2293	2.63
7456	91.5	268	1363.28	5321.28	-7.28	-2335.98	675086.8	646249	2335.98	0.74
7498	91.6	268.4	1362.15	5320.15	-8.6	-2377.94	675085.5	646207.1	2377.95	0.98
7541	91.6	268.6	1360.95	5318.95	-9.72	-2420.91	675084.4	646164.1	2420.92	0.46
7584	91.8	268.5	1359.67	5317.67	-10.81	-2463.88	675083.3	646121.1	2463.9	0.52
7626	92.2	269.1	1358.2	5316.2	-11.69	-2505.84	675082.4	646079.2	2505.87	1.72
7669	92.3	269.6	1356.52	5314.52	-12.18	-2548.81	675081.9	646036.2	2548.83	1.18
7711	91.5	269.9	1355.12	5313.12	-12.36	-2590.78	675081.7	645994.2	2590.81	2.03
7754	90.9	269.5	1354.22	5312.22	-12.59	-2633.77	675081.5	645951.2	2633.8	1.68
7796	91.1	269.8	1353.49	5311.49	-12.84	-2675.77	675081.3	645909.2	2675.79	0.86
7839	91.4	269.8	1352.55	5310.55	-12.99	-2718.76	675081.1	645866.2	2718.78	0.7
7881	91.8	270.2	1351.38	5309.38	-12.99	-2760.74	675081.1	645824.3	2760.76	1.35
7924	91.8	270	1350.03	5308.03	-12.92	-2803.72	675081.2	645781.3	2803.74	0.46
7967	91.2	269.7	1348.9	5306.9	-13.03	-2846.7	675081.1	645738.3	2846.73	1.56
8009	90.9	269.3	1348.13	5306.13	-13.4	-2888.69	675080.7	645696.3	2888.72	1.19
8052	91.3	269	1347.31	5305.31	-14.03	-2931.68	675080.1	645653.3	2931.71	1.16
8095	91.5	269.4	1346.26	5304.26	-14.64	-2974.66	675079.5	645610.3	2974.7	1.04
8137	91.5	270.1	1345.16	5303.16	-14.82	-3016.65	675079.3	645568.4	3016.68	1.67
8179	91	270.2	1344.24	5302.24	-14.71	-3058.64	675079.4	645526.4	3058.67	1.21
8222	90	270.6	1343.87	5301.87	-14.41	-3101.64	675079.7	645483.4	3101.66	2.5
8264	89.6	270.7	1344.01	5302.01	-13.93	-3143.63	675080.2	645441.4	3143.65	0.98
8307	88.8	270.4	1344.61	5302.61	-13.52	-3186.63	675080.6	645398.4	3186.64	1.99
8350	88.6	270.5	1345.59	5303.59	-13.18	-3229.61	675080.9	645355.4	3229.63	0.52
8392	88.6	270.2	1346.62	5304.62	-12.92	-3271.6	675081.2	645313.4	3271.61	0.71
8435	88.9	270.7	1347.55	5305.55	-12.59	-3314.59	675081.5	645270.4	3314.6	1.36
8478	89.5	270.2	1348.15	5306.15	-12.25	-3357.58	675081.9	645227.4	3357.59	1.82
8520	89.8	269.6	1348.41	5306.41	-12.32	-3399.58	675081.8	645185.4	3399.59	1.6
8563	89.3	269.5	1348.75	5306.75	-12.66	-3442.58	675081.4	645142.4	3442.59	1.19
8605	89.8	269.2	1349.08	5307.08	-13.14	-3484.57	675081	645100.4	3484.58	1.39
8648	90	269.1	1349.15	5307.15	-13.78	-3527.57	675080.3	645057.4	3527.58	0.52
8691	90.2	269.4	1349.08	5307.08	-14.34	-3570.57	675079.8	645014.4	3570.58	0.84
8733	90.7	268.5	1348.75	5306.75	-15.11	-3612.56	675079	644972.4	3612.58	2.45
8776	92.2	268.5	1347.66	5305.66	-16.23	-3655.53	675077.9	644929.5	3655.55	3.49
8818	92.2	268.5	1346.05	5304.05	-17.33	-3697.48	675076.8	644887.5	3697.51	0
8861	93.2	268.5	1344.02	5302.02	-18.46	-3740.42	675075.6	644844.6	3740.46	2.33
8904	93.3	268.8	1341.58	5299.58	-19.47	-3783.34	675074.6	644801.7	3783.38	0.73
8946	93.1	268.7	1339.24	5297.24	-20.38	-3825.26	675073.7	644759.7	3825.31	0.53
8989	92.9	268.7	1336.99	5294.99	-21.36	-3868.19	675072.7	644716.8	3868.25	0.47
9031	93	269.2	1334.83	5292.83	-22.12	-3910.13	675072	644674.9	3910.19	1.21
9074	92.7	268.9	1332.69	5290.69	-22.84	-3953.07	675071.3	644631.9	3953.13	0.99
9116	92.8	268.8	1330.68	5288.68	-23.68	-3995.01	675070.4	644590	3995.08	0.34
9159	92.5	268.9	1328.69	5286.69	-24.54	-4037.96	675069.6	644547	4038.03	0.74
9202	92.3	269	1326.89	5284.89	-25.33	-4080.91	675068.8	644504.1	4080.99	0.52
9244	91.9	268.6	1325.35	5283.35	-26.21	-4122.88	675067.9	644462.1	4122.96	1.35
9287	91.8	268.9	1323.96	5281.96	-27.14	-4165.84	675067	644419.2	4165.93	0.74
9330	91.4	268.7	1322.76	5280.76	-28.04	-4208.82	675066.1	644376.2	4208.91	1.04
9372	91.3	268.8	1321.77	5279.77	-28.96	-4250.8	675065.1	644334.2	4250.89	0.34
9415	91.4	268.8	1320.76	5278.76	-29.86	-4293.77	675064.2	644291.2	4293.88	0.23
9457	92.2	269.3	1319.44	5277.44	-30.56	-4335.75	675063.5	644249.3	4335.85	2.25
9500	92.2	269.3	1317.79	5275.79	-31.08	-4378.71	675063	644206.3	4378.82	0
9542	92.1	269.4	1316.21	5274.21	-31.56	-4420.68	675062.5	644164.3	4420.79	0.34
9585	91.8	269.4	1314.75	5272.75	-32.01	-4463.65	675062.1	644121.4	4463.77	0.7
9628	91.7	269.8	1313.43	5271.43	-32.31	-4506.63	675061.8	644078.4	4506.75	0.96
9666	91.5	269.7	1312.37	5270.37	-32.47	-4544.62	675061.6	644040.4	4544.73	0.59 Final Phoenix MWD Survey
9741	91.5	269.7	1310.41	5268.41	-32.87	-4619.59	675061.2	643965.4	4619.71	0 Projection to TD

All data are in feet unless otherwise stated. Directions and coordinates are relative to Grid North.
Vertical depths are relative to KB. Northings and Eastings are relative to Well.

The Dogleg Severity is in Degrees per 100 feet.
Vertical Section is from Slot and calculated along an Azimuth of 269.612° (Grid).

Coordinate System is NAD 1927 (NADCON CONUS) US State Plane 1927 (Exact solution), New Mexico East 3001.
Grid Convergence at Surface is 0.263°.

Based upon Minimum Curvature type calculations, at a Measured Depth of 9741.00ft.,
the Bottom Hole Displacement is 4619.71ft., in the Direction of 269.612° (Grid).

PHOENIX
TECHNOLOGY SERVICES

December 14, 2015

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
Crow Federal #48H
Eddy County, NM
API #30-015-43409
Job No. 1514660

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	48H	4,819	9,666	11/30/15	11/05/15	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 5210

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