



PHOENIX
TECHNOLOGY SERVICES

June 25, 2014

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 #26H
Eddy County, NM
API #30-015-41942
Job No. 1311119

NM OIL CONSERVATION
ARTESIA DISTRICT
JUN 27 2014
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	
Brad Hill	26H	688	10,181	03/31/14	04/10/14	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,

Dana Robinson

Dana Robinson
Operations Administrator
Certified mail receipt number: _____

7011 1570 0001 4365 2148

Phoenix Technology Services SURVEY DATA CERTIFICATION



PHOENIX JOB NUMBER 1311119

OPERATOR Apache Corporation

WELL NAME Crow Federal #26H

COUNTY & STATE Eddy County, NM

API WELL NUMBER 30-015-41942

PROPOSED DIRECTION 269.61

TIE-IN DATA						
MEASURED	VERTICAL			N-S	E-W	DATA
DEPTH	DEPTH	INCLIN	AZIMUTH	COORD	COORD	SOURCE
600 ft	599.99 ft	0.39 ft	108.1 ft	-0.56 ft	3.60 ft	Gyro

0.56

FIRST SURVEY	FIRST SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
31-Mar-14	688 ft	0.29 ft	247.7

SURVEY INSTRUMENT
TYPE

Phoenix MWD

LAST SURVEY	LAST SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
10-Apr-14	10,181 ft	90.6	269.1

TO THE BEST OF MY KNOWLEDGE I
CERTIFY THIS SURVEY DATA TO BE
TRUE AND CORRECT.

PROJECTED TD SURVEY	PROJECTED TD SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
10-Apr-14	10,251 ft	90.6	269.1

Brad Hill

PRINT YOUR NAME ABOVE

Brad Hill

SIGN YOUR NAME ABOVE

MAGNETIC DECLINATION OR TOTAL GRID

TOTAL CORRECTION USED	7.16
DECLINATION OR GRID	GRID

4/11/2014

TODAY'S DATE

MWD SUPERVISOR 1

Bradley Hill

DIRECTIONAL DRILLER 1

Richard Thurman

MWD SUPERVISOR 2

August Holt

DIRECTIONAL DRILLER 2

Jeff Lambert

1805 Brittmore Road

Houston, Texas 77043

(713)3370609 (Voice), (713)337-0599 (Fax)



EXPLORING WHAT'S POSSIBLE

30-015-41942

Apache Corporation

Eddy County, NM (NAD27 NME)

Crow Federal

#26H

WB1/Job #1311119

Survey: Phoenix MWD Survey

Standard Survey Report

04 June, 2014

NM OIL CONSERVATION
ARTESIA DISTRICT

JUN 27 2014

RECEIVED



PHOENIX
TECHNOLOGY SERVICES



Phoenix Technology Services Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #26H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3952.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3952.00usft (Capstar 114)
Well:	#26H	North Reference:	Grid
Wellbore:	WB1/Job #1311119	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	GCR DB

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
From:	Map	Easting:	643,906.80 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 50' 38.92796 N
		Longitude:	103° 51' 53.16689 W
		Grid Convergence:	0.25 °

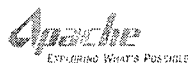
Well	#26H		
Well Position	+N/-S	0.00 usft	Northing:
	+E/-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 51' 6.26282 N
		Longitude:	103° 50' 58.10525 W
		Ground Level:	3,941.00 usft

Wellbore	WB1/Job #1311119		
Magnetics	Model Name	Sample Date	Declination
	IGRF2010_14	03/28/14	7.42
			Dip Angle
			60.65
			Field Strength
			48,681

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
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction
			(°)
			269.61

Survey Program	Date 06/04/14		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100.00	688.00	Gyro Survey (WB1/Job #1311119)	CB-GYRO-MS
808.00	10,251.00	Phoenix MWD Survey (WB1/Job #1311119)	MWD
			Description
			Camera based gyro multishot
			MWD - Standard

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)
	600.00	0.39	108.05	599.99	-0.56	3.60	-3.60	0.00	0.00	0.00
	Tie-on to Gyro Survey									
	688.00	0.29	247.65	687.99	-0.74	3.68	-3.68	0.73	-0.11	158.64
	First Phoenix MWD Survey									
	808.00	0.30	260.30	807.98	-0.91	3.09	-3.09	0.05	0.01	10.54
	936.00	0.30	255.70	935.98	-1.05	2.44	-2.43	0.02	0.00	-3.59
	1,067.00	0.30	265.10	1,066.98	-1.16	1.76	-1.75	0.04	0.00	7.18
	1,196.00	0.20	22.20	1,195.98	-0.98	1.51	-1.50	0.33	-0.08	90.78
	1,324.00	0.30	47.70	1,323.98	-0.55	1.84	-1.84	0.12	0.08	19.92

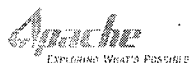


Phoenix Technology Services Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #26H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3952.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3952.00usft (Capstar 114)
Well:	#26H	North Reference:	Grid
Wellbore:	WB1/Job #1311119	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	GCR DB

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)	
1,452.00	0.60	15.80	1,451.98	0.32	2.27	-2.28	0.30	0.23	-24.92	
1,581.00	0.50	39.20	1,580.97	1.41	2.81	-2.82	0.19	-0.08	18.14	
1,709.00	0.90	55.50	1,708.96	2.41	3.99	-4.01	0.35	0.31	12.73	
1,838.00	1.00	65.40	1,837.94	3.45	5.85	-5.88	0.15	0.08	7.67	
1,966.00	0.80	23.80	1,965.93	4.73	7.23	-7.26	0.52	-0.16	-32.50	
2,094.00	1.40	326.50	2,093.91	6.85	6.73	-6.77	0.92	0.47	-44.77	
2,223.00	2.70	308.00	2,222.82	10.04	3.46	-3.53	1.12	1.01	-14.34	
2,354.00	3.80	298.40	2,353.61	14.00	-2.79	2.69	0.93	0.84	-7.33	
2,482.00	3.90	293.00	2,481.32	17.72	-10.53	10.40	0.29	0.08	-4.22	
2,611.00	2.20	290.70	2,610.14	20.31	-16.88	16.74	1.32	-1.32	-1.78	
2,739.00	2.10	288.60	2,738.05	21.93	-21.40	21.25	0.10	-0.08	-1.64	
2,867.00	2.20	286.50	2,865.95	23.37	-25.98	25.82	0.10	0.08	-1.64	
2,996.00	2.10	278.40	2,994.86	24.42	-30.69	30.52	0.25	-0.08	-6.28	
3,124.00	1.60	269.20	3,122.80	24.74	-34.80	34.63	0.45	-0.39	-7.19	
3,252.00	1.40	264.50	3,250.75	24.56	-38.14	37.97	0.18	-0.16	-3.67	
3,381.00	1.40	271.90	3,379.72	24.47	-41.29	41.12	0.14	0.00	5.74	
3,448.00	1.30	263.90	3,446.70	24.41	-42.86	42.69	0.32	-0.15	-11.94	
3,587.00	1.40	251.20	3,585.66	23.70	-46.03	45.87	0.23	0.07	-9.14	
3,715.00	1.00	183.20	3,713.64	22.08	-47.58	47.43	1.08	-0.31	-53.13	
3,844.00	1.40	129.10	3,842.61	19.96	-46.42	46.28	0.89	0.31	-41.94	
3,972.00	1.20	115.70	3,970.58	18.39	-44.00	43.87	0.28	-0.16	-10.47	
4,100.00	1.40	121.70	4,098.55	16.99	-41.46	41.34	0.19	0.16	4.69	
4,232.00	1.00	121.20	4,230.52	15.55	-39.10	38.99	0.30	-0.30	-0.38	
4,360.00	1.00	117.30	4,358.50	14.45	-37.15	37.05	0.05	0.00	-3.05	
4,489.00	1.10	110.20	4,487.48	13.51	-34.99	34.90	0.13	0.08	-5.50	
4,617.00	1.00	122.00	4,615.45	12.49	-32.89	32.80	0.19	-0.08	9.22	
4,745.00	0.70	51.90	4,743.44	12.39	-31.33	31.24	0.79	-0.23	-54.77	
4,873.00	0.80	52.30	4,871.43	13.41	-30.01	29.91	0.08	0.08	0.31	
5,005.00	1.00	358.80	5,003.42	15.13	-29.30	29.20	0.63	0.15	-40.53	
5,133.00	1.20	358.00	5,131.39	17.59	-29.37	29.25	0.16	0.16	-0.63	
5,261.00	1.30	2.20	5,259.36	20.38	-29.36	29.22	0.11	0.08	3.28	
5,329.00	1.40	3.00	5,327.34	21.98	-29.29	29.14	0.15	0.15	1.18	
5,395.00	2.20	303.70	5,393.32	23.48	-30.30	30.14	2.90	1.21	-89.85	
5,438.00	6.70	272.90	5,436.18	24.07	-33.49	33.33	11.49	10.47	-71.63	
5,480.00	11.30	270.00	5,477.65	24.19	-40.06	39.89	11.00	10.95	-6.90	
5,523.00	15.40	268.20	5,519.48	24.01	-49.98	49.82	9.58	9.53	-4.19	
5,566.00	20.50	265.50	5,560.38	23.24	-63.20	63.05	12.01	11.86	-6.28	
5,609.00	25.90	263.60	5,599.88	21.61	-80.06	79.91	12.68	12.56	-4.42	
5,652.00	31.70	262.80	5,637.55	19.14	-100.62	100.48	13.52	13.49	-1.86	
5,694.00	37.80	263.50	5,672.04	16.30	-124.37	124.26	14.55	14.52	1.67	
5,737.00	43.60	266.40	5,704.63	13.87	-152.29	152.19	14.18	13.49	6.74	
5,780.00	48.70	268.30	5,734.41	12.46	-183.26	183.17	12.28	11.86	4.42	
5,823.00	52.90	267.80	5,761.58	11.32	-216.55	216.47	9.81	9.77	-1.16	



Phoenix Technology Services Survey Report



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Site:	Crow Federal	MD Reference:	KB @ 3952.00usft (Capstar 114)
Well:	#26H	North Reference:	Grid
Wellbore:	WBI/Job #1311119	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	GCR DB

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)	
5,865.00	57.40	267.40	5,785.58	9.88	-250.98	250.91	10.74	10.71	-0.95	
5,908.00	62.70	267.60	5,807.04	8.25	-288.19	288.13	12.33	12.33	0.47	
5,953.00	67.30	267.90	5,826.05	6.66	-328.93	328.88	10.24	10.22	0.67	
5,996.00	72.80	266.40	5,840.72	4.64	-369.28	369.24	13.20	12.79	-3.49	
6,039.00	75.60	266.70	5,852.42	2.15	-410.58	410.55	6.55	6.51	0.70	
6,082.00	80.90	267.30	5,861.18	-0.05	-452.60	452.59	12.40	12.33	1.40	
6,124.00	86.90	267.80	5,865.64	-1.84	-494.31	494.31	14.33	14.29	1.19	
6,167.00	91.30	268.70	5,866.31	-3.15	-537.27	537.28	10.44	10.23	2.09	
6,295.00	92.00	268.60	5,862.63	-6.16	-665.18	665.21	0.55	0.55	-0.08	
6,424.00	92.00	268.50	5,858.13	-9.42	-794.06	794.11	0.08	0.00	-0.08	
6,552.00	91.20	269.30	5,854.55	-11.88	-921.99	922.05	0.88	-0.63	0.63	
6,680.00	92.00	269.10	5,850.98	-13.67	-1,049.92	1,049.99	0.64	0.63	-0.16	
6,808.00	90.20	270.00	5,848.52	-14.67	-1,177.89	1,177.96	1.57	-1.41	0.70	
6,936.00	90.30	268.60	5,847.96	-16.24	-1,305.88	1,305.96	1.10	0.08	-1.09	
7,064.00	90.20	270.60	5,847.40	-17.13	-1,433.87	1,433.95	1.56	-0.08	1.56	
7,192.00	90.60	270.40	5,846.51	-16.01	-1,561.86	1,561.93	0.35	0.31	-0.16	
7,323.00	91.00	270.70	5,844.68	-14.75	-1,692.84	1,692.90	0.38	0.31	0.23	
7,451.00	91.20	270.90	5,842.22	-12.97	-1,820.80	1,820.85	0.22	0.16	0.16	
7,579.00	90.90	270.20	5,839.88	-11.74	-1,948.77	1,948.81	0.59	-0.23	-0.55	
7,707.00	90.00	269.40	5,838.87	-12.19	-2,076.77	2,076.80	0.94	-0.70	-0.63	
7,836.00	90.30	269.40	5,838.54	-13.54	-2,205.76	2,205.80	0.23	0.23	0.00	
7,967.00	91.00	269.00	5,837.05	-15.37	-2,336.74	2,336.79	0.62	0.53	-0.31	
8,095.00	90.90	268.50	5,834.93	-18.16	-2,464.69	2,464.75	0.40	-0.08	-0.39	
8,223.00	90.90	269.10	5,832.92	-20.84	-2,592.64	2,592.73	0.47	0.00	0.47	
8,355.00	91.40	269.00	5,830.27	-23.03	-2,724.60	2,724.69	0.39	0.38	-0.08	
8,483.00	91.50	269.00	5,827.03	-25.26	-2,852.54	2,852.64	0.08	0.08	0.00	
8,612.00	91.30	269.10	5,823.88	-27.40	-2,981.48	2,981.60	0.17	-0.16	0.08	
8,740.00	90.90	270.00	5,821.42	-28.40	-3,109.45	3,109.57	0.77	-0.31	0.70	
8,869.00	91.40	270.20	5,818.83	-28.18	-3,238.43	3,238.54	0.42	0.39	0.16	
9,000.00	91.10	270.80	5,815.97	-27.03	-3,369.39	3,369.49	0.51	-0.23	0.46	
9,128.00	91.30	271.10	5,813.29	-24.91	-3,497.34	3,497.43	0.28	0.16	0.23	
9,256.00	91.10	271.80	5,810.61	-21.67	-3,625.27	3,625.34	0.57	-0.16	0.55	
9,385.00	90.60	270.80	5,808.70	-18.75	-3,754.22	3,754.26	0.87	-0.39	-0.78	
9,513.00	90.80	270.70	5,807.13	-17.07	-3,882.20	3,882.23	0.17	0.16	-0.08	
9,642.00	90.60	269.80	5,805.56	-16.51	-4,011.19	4,011.21	0.71	-0.16	-0.70	
9,770.00	91.30	269.60	5,803.44	-17.18	-4,139.17	4,139.19	0.57	0.55	-0.16	
9,898.00	90.80	269.50	5,801.09	-18.19	-4,267.14	4,267.17	0.40	-0.39	-0.08	
10,027.00	89.90	268.90	5,800.30	-19.99	-4,396.13	4,396.16	0.84	-0.70	-0.47	
10,155.00	90.40	268.10	5,799.97	-23.34	-4,524.08	4,524.14	0.74	0.39	-0.63	
10,181.00	90.60	269.10	5,799.74	-23.97	-4,550.07	4,550.13	3.92	0.77	3.85	
Last Phoenix MWD Survey										
10,251.00	90.60	269.10	5,799.01	-25.07	-4,620.06	4,620.12	0.00	0.00	0.00	
Projection to TD										



Phoenix Technology Services Survey Report



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Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
600.00	599.99	-0.56	3.60	Tie-on to Gyro Survey
688.00	687.99	-0.74	3.68	First Phoenix MWD Survey
10,181.00	5,799.74	-23.97	-4,550.07	Last Phoenix MWD Survey
10,251.00	5,799.01	-25.07	-4,620.06	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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