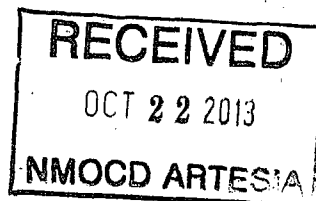




October 17, 2013

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 #23H
Eddy County, NM
API #30-015-41167
Job No. 1311257

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	Drainhole Number	Surveyed Depths		Dates Performed		Type of Survey
		From	To	Start	End	
Brad Hill	23H	569	10,303	09/27/13	10/07/13	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,

Dolly Bush

Dolly Bush
Operations Administrator

Certified mail receipt number: 7011 1570 0001 4364 8738

Phoenix Technology Services SURVEY DATA CERTIFICATION



PHOENIX JOB NUMBER 1311257

OPERATOR Apache Corporation

WELL NAME Crow Federal #23H

COUNTY & STATE Eddy County, New Mexico

API WELL NUMBER 30-015-41167

PROPOSED DIRECTION 89.59

TIE-IN DATA						
MEASURED DEPTH	VERTICAL DEPTH	INCLIN	AZIMUTH	N-S COORD	E-W COORD	DATA SOURCE
482 ft	481.98 ft	0.8	16.28	4.46 N	0.92 E	Gyrodata Surveys

FIRST SURVEY DATE	FIRST SURVEY DEPTH	INCLIN	AZIMUTH
27-Sep-13	569 ft	0.8	17.4

SURVEY INSTRUMENT TYPE
Phoenix MWD

LAST SURVEY DATE	LAST SURVEY DEPTH	INCLIN	AZIMUTH
7-Oct-13	10,303 ft	89.2	91.4

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

PROJECTED TD SURVEY DATE	PROJECTED TD SURVEY DEPTH	INCLIN	AZIMUTH
7-Oct-13	10,357 ft	89.2	91.4

Brad Hill

PRINT YOUR NAME ABOVE

Brad Hill

SIGN YOUR NAME ABOVE

MAGNETIC DECLINATION OR TOTAL GRID

TOTAL CORRECTION USED	7.25
DECLINATION OR GRID	GRID

MWD SUPERVISOR 1 Brad Hill

DIRECTIONAL DRILLER 1 Ken Smith

MWD SUPERVISOR 2 Austin Brown

DIRECTIONAL DRILLER 2 Joseph Paup

10/7/2013

TODAY'S DATE

DISTRICT I
1625 N. Freetown Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

RECEIVED
OCT 22 2013
NMOC D ARTESIA

Form C-102
Revised August 1, 2011
Submit one copy to appropriate
District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number: 30-015-41167	Pool Code: 96831	Pool Name: Cedar Lake; Glorieta - Yeso
Property Code: 308711	Property Name: CROW FEDERAL	Well Number: 23H
GRID No: 873	Operator Name: APACHE CORPORATION	Elevation: 3870'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
E	9	17-S	31-E		1650	NORTH	10	WEST	EDDY

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	9	17-S	31-E		1650	NORTH	330	EAST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
16.0			

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

DETAIL		OPERATOR CERTIFICATION I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in this land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division. <i>Sorina L. Flores</i> 8/30/12 Signature Date <i>Sorina L. Flores</i> Printed Name <i>sorina.flores@apachecorp.com</i> E-mail Address
GRID: AZ = 89°35'23" HORIZ. DIST. = 4942.6'		SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief. MAY 17, 2012 Date of Survey <i>Gary G. Eldson</i> Signature & Seal of Professional Surveyor GARY G. ELIDSON NEW MEXICO 12641 <i>Gary G. Eldson</i> 6/17/12 Certificate Number 12641 <i>Ronald J. Eldson</i> 3239 AP WSC W.O.: 12.11.0472
CORNER COORDINATES TABLE A) Y=674172.6 N X=638358.2 E B) Y=674209.2 N X=643639.5 E C) Y=672852.6 N X=638365.7 E D) Y=672888.0 N X=643646.5 E	GEODETIC COORDINATES NAD 27 NME SURFACE LOCATION Y=673843.2 N X=638370.1 E LAT.=32.851668° N LONG.=103.882758° W LAT.=32° 51' 06" N LONG.=103° 52' 58" W BOTTOM HOLE LOCATION Y=673878.5 N X=643311.4 E	



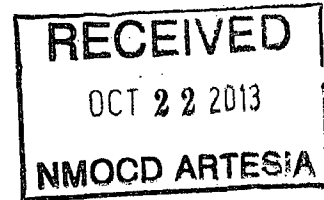
Apache Corporation

Eddy County, NM (NAD27 NME)

Crow Federal

#23H

WB1/Job #1311257



Survey: Phoenix MWD Survey

Phoenix Final Survey Report

07 October, 2013





Phoenix Technology Services

Phoenix Final Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #23H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3881.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3881.00usft (Capstar 114)
Well:	#23H	North Reference:	Grid
Wellbore:	WB1/Job #1311257	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	#23H		
Well Position	+N/-S	0.00 usft	Northing: 673,843.20 usft
	+E/-W	0.00 usft	Easting: 638,370.10 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 51' 6.00472 N
		Longitude:	103° 52' 57.92907 W
		Ground Level:	3,870.00 usft

Wellbore	WB1/Job #1311257				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010_14	09/18/13	7.50	60.66	48,730

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	89.59

Survey Program	Date 10/07/13				
From	To	Survey (Wellbore)	Tool Name	Description	
(usft)	(usft)				
100.00	482.00	Gyro Surveys (WB1/Job #1311257)	CB-GYRO-MS	Camera based gyro multishot	
569.00	10,357.00	Phoenix MWD Survey (WB1/Job #131125)	MWD	MWD - Standard	

Survey								
MD	Inc	Azi (azimuth)	TVD	N/S	E/W	V. Sec	DLeg	
(usft)	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(°/100usft)	
482.00	0.80	16.28	481.98	4.46	0.92	0.95	0.00	
Tie-on to Gyro								
569.00	0.80	17.40	568.97	5.62	1.27	1.31	0.02	
First Phoenix MWD Survey								
649.00	0.50	4.60	648.96	6.50	1.46	1.51	0.41	
734.00	0.30	255.70	733.96	6.82	1.28	1.33	0.78	
820.00	0.50	236.30	819.96	6.55	0.75	0.79	0.28	
906.00	0.30	237.40	905.96	6.22	0.25	0.29	0.23	
991.00	0.20	249.10	990.96	6.05	-0.08	-0.04	0.13	
1,076.00	0.30	267.60	1,075.95	5.99	-0.44	-0.40	0.15	
1,161.00	0.20	288.10	1,160.95	6.03	-0.80	-0.76	0.16	



Phoenix Technology Services
Phoenix Final Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #23H
Project:	Eddy County, NM (NAD27, NME)	TVD Reference:	KB @ 3881.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3881.00usft (Capstar 114)
Well:	#23H	North Reference:	Grid
Wellbore:	WB1/Job #1311257	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	GCR DB

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	
1,247.00	0.10	123.50	1,246.95	6.03	-0.88	-0.84	0.35	
1,332.00	0.00	83.90	1,331.95	5.99	-0.82	-0.78	0.12	
1,418.00	0.30	38.50	1,417.95	6.17	-0.68	-0.64	0.35	
1,502.00	0.50	67.90	1,501.95	6.48	-0.21	-0.16	0.33	
1,587.00	0.60	85.50	1,586.95	6.65	0.58	0.63	0.23	
1,673.00	0.70	94.60	1,672.94	6.64	1.55	1.60	0.17	
1,759.00	0.70	106.20	1,758.94	6.46	2.58	2.63	0.16	
1,844.00	0.60	105.40	1,843.93	6.19	3.51	3.55	0.12	
1,929.00	0.60	92.00	1,928.93	6.06	4.38	4.43	0.16	
2,015.00	0.60	91.50	2,014.92	6.03	5.28	5.33	0.01	
2,101.00	0.40	84.70	2,100.92	6.05	6.03	6.08	0.24	
2,186.00	0.40	95.50	2,185.92	6.05	6.62	6.67	0.09	
2,271.00	0.30	110.10	2,270.91	5.94	7.13	7.17	0.16	
2,357.00	0.30	98.40	2,356.91	5.83	7.56	7.60	0.07	
2,444.00	0.30	89.30	2,443.91	5.80	8.02	8.06	0.05	
2,529.00	0.20	107.40	2,528.91	5.76	8.38	8.42	0.15	
2,614.00	0.20	52.30	2,613.91	5.80	8.64	8.68	0.22	
2,700.00	0.30	47.50	2,699.91	6.05	8.92	8.97	0.12	
2,789.00	0.30	48.90	2,788.91	6.36	9.27	9.32	0.01	
2,877.00	0.00	250.40	2,876.91	6.51	9.44	9.49	0.34	
2,963.00	0.40	225.00	2,962.91	6.30	9.23	9.28	0.47	
3,048.00	0.40	235.10	3,047.90	5.92	8.78	8.82	0.08	
3,134.00	0.40	215.50	3,133.90	5.50	8.36	8.40	0.16	
3,219.00	0.50	232.40	3,218.90	5.03	7.89	7.93	0.19	
3,305.00	0.40	225.80	3,304.90	4.60	7.38	7.41	0.13	
3,391.00	0.40	214.70	3,390.90	4.14	6.99	7.02	0.09	
3,449.00	0.50	232.30	3,448.89	3.82	6.68	6.70	0.29	
3,559.00	0.60	228.60	3,558.89	3.15	5.87	5.89	0.10	
3,647.00	0.70	244.60	3,646.88	2.61	5.03	5.05	0.23	
3,733.00	0.50	257.70	3,732.88	2.30	4.19	4.21	0.28	
3,818.00	0.50	248.50	3,817.87	2.09	3.49	3.50	0.09	
3,904.00	0.70	249.20	3,903.87	1.77	2.65	2.66	0.23	
3,989.00	0.60	248.90	3,988.86	1.42	1.75	1.76	0.12	
4,075.00	0.80	256.10	4,074.86	1.11	0.74	0.75	0.25	
4,160.00	0.70	261.40	4,159.85	0.89	-0.35	-0.34	0.14	
4,246.00	0.70	263.60	4,245.84	0.76	-1.39	-1.38	0.03	
4,332.00	0.80	274.70	4,331.84	0.75	-2.51	-2.50	0.20	
4,417.00	0.80	275.90	4,416.83	0.86	-3.69	-3.68	0.02	
4,503.00	0.70	274.20	4,502.82	0.96	-4.81	-4.80	0.12	
4,588.00	0.80	270.80	4,587.81	1.00	-5.92	-5.92	0.13	
4,674.00	0.70	67.50	4,673.81	1.21	-6.04	-6.03	1.71	
4,759.00	0.70	58.90	4,758.81	1.68	-5.11	-5.10	0.12	
4,844.00	1.00	48.20	4,843.80	2.44	-4.12	-4.10	0.40	
4,933.00	1.00	30.90	4,932.78	3.63	-3.14	-3.11	0.34	



Phoenix Technology Services
Phoenix Final Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #23H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3881.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3881.00usft (Capstar 114)
Well:	#23H	North Reference:	Grid
Wellbore:	WB1/Job #1311257	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	GCR/DB

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	
5,018.00	1.10	39.90	5,017.77	4.89	-2.23	-2.20	0.23	
5,093.00	0.90	16.60	5,092.76	6.01	-1.60	-1.56	0.60	
5,114.00	1.00	20.50	5,113.75	6.34	-1.49	-1.45	0.57	
5,157.00	2.00	74.30	5,156.74	6.89	-0.64	-0.59	3.78	
5,199.00	7.10	86.30	5,198.60	7.26	2.66	2.71	12.29	
5,242.00	13.00	85.70	5,240.92	7.79	10.14	10.20	13.72	
5,285.00	19.00	84.20	5,282.23	8.86	21.94	22.00	13.99	
5,328.00	23.60	85.50	5,322.28	10.25	37.49	37.56	10.75	
5,371.00	28.30	87.90	5,360.94	11.29	56.27	56.35	11.20	
5,414.00	33.00	89.90	5,397.92	11.69	78.18	78.26	11.18	
5,456.00	37.90	91.40	5,432.13	11.39	102.53	102.61	11.85	
5,499.00	42.90	92.00	5,464.86	10.56	130.37	130.45	11.66	
5,542.00	47.70	91.50	5,495.10	9.63	160.92	160.98	11.19	
5,585.00	52.90	90.80	5,522.56	8.98	193.98	194.04	12.16	
5,628.00	57.70	90.10	5,547.03	8.70	229.32	229.38	11.24	
5,671.00	62.40	90.80	5,568.49	8.41	266.57	266.62	11.02	
5,713.00	67.20	90.70	5,586.37	7.91	304.56	304.61	11.43	
5,756.00	73.00	89.70	5,601.00	7.78	344.97	345.02	13.66	
5,799.00	79.10	88.90	5,611.36	8.29	386.68	386.73	14.30	
5,844.00	84.40	89.50	5,617.82	8.91	431.19	431.25	11.85	
5,887.00	86.10	89.30	5,621.38	9.36	474.04	474.10	3.98	
5,977.00	88.30	89.30	5,625.77	10.46	563.92	563.98	2.44	
6,062.00	88.10	89.30	5,628.44	11.49	648.87	648.94	0.24	
6,148.00	87.50	89.00	5,631.74	12.77	734.80	734.87	0.78	
6,237.00	86.80	88.20	5,636.17	14.94	823.66	823.75	1.19	
6,324.00	87.70	89.00	5,640.34	17.06	910.53	910.63	1.38	
6,410.00	87.30	89.30	5,644.09	18.34	996.44	996.55	0.58	
6,497.00	86.60	89.20	5,648.72	19.47	1,083.31	1,083.42	0.81	
6,584.00	87.30	90.70	5,653.35	19.55	1,170.19	1,170.30	1.90	
6,669.00	87.70	91.70	5,657.06	17.77	1,255.08	1,255.18	1.27	
6,754.00	87.30	92.20	5,660.77	14.88	1,339.95	1,340.03	0.75	
6,840.00	87.60	90.70	5,664.59	12.71	1,425.84	1,425.89	1.78	
6,925.00	87.50	90.30	5,668.23	11.97	1,510.76	1,510.80	0.48	
7,011.00	87.30	89.90	5,672.13	11.82	1,596.67	1,596.71	0.52	
7,096.00	87.40	89.60	5,676.06	12.19	1,681.58	1,681.62	0.37	
7,182.00	87.30	89.90	5,680.04	12.56	1,767.48	1,767.53	0.37	
7,268.00	87.20	89.90	5,684.16	12.71	1,853.39	1,853.43	0.12	
7,353.00	87.40	88.90	5,688.17	13.60	1,938.28	1,938.33	1.20	
7,439.00	87.60	88.20	5,691.92	15.78	2,024.17	2,024.24	0.85	
7,526.00	87.40	88.00	5,695.71	18.66	2,111.04	2,111.12	0.32	
7,612.00	87.30	87.50	5,699.69	22.03	2,196.89	2,196.99	0.59	
7,700.00	87.90	87.00	5,703.37	26.25	2,284.71	2,284.84	0.89	
7,785.00	88.60	88.00	5,705.97	29.95	2,369.58	2,369.74	1.44	
7,873.00	88.70	87.70	5,708.04	33.26	2,457.50	2,457.67	0.36	



Phoenix Technology Services
Phoenix Final Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #23H
Project:	Eddy County NM (NAD27 NME)	TVD Reference:	KB @ 3881.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3881.00usft (Capstar 114)
Well:	#23H	North Reference:	Grid
Wellbore:	WB1/Job #1311257	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	GCR DB

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (%/100usft)	
7,958.00	88.50	89.60	5,710.12	35.26	2,542.45	2,542.63	2.25	
8,044.00	88.60	89.60	5,712.30	35.86	2,628.42	2,628.60	0.12	
8,130.00	88.90	89.50	5,714.17	36.53	2,714.39	2,714.58	0.37	
8,215.00	88.90	89.70	5,715.80	37.13	2,799.37	2,799.57	0.24	
8,301.00	88.70	90.00	5,717.60	37.35	2,885.36	2,885.55	0.42	
8,386.00	88.90	90.10	5,719.38	37.28	2,970.34	2,970.53	0.26	
8,472.00	89.10	89.90	5,720.89	37.28	3,056.32	3,056.51	0.33	
8,557.00	89.10	89.90	5,722.22	37.43	3,141.31	3,141.50	0.00	
8,642.00	88.90	89.80	5,723.70	37.65	3,226.30	3,226.49	0.26	
8,728.00	88.90	89.50	5,725.36	38.17	3,312.28	3,312.47	0.35	
8,813.00	88.60	89.40	5,727.21	38.99	3,397.26	3,397.45	0.37	
8,899.00	88.30	89.30	5,729.54	39.96	3,483.22	3,483.42	0.37	
8,985.00	88.80	91.10	5,731.71	39.66	3,569.19	3,569.38	2.17	
9,070.00	88.50	90.90	5,733.71	38.18	3,654.15	3,654.33	0.42	
9,158.00	88.10	90.50	5,736.33	37.11	3,742.11	3,742.28	0.64	
9,244.00	87.80	90.40	5,739.40	36.43	3,828.05	3,828.21	0.37	
9,329.00	87.50	90.30	5,742.89	35.91	3,912.98	3,913.13	0.37	
9,415.00	87.30	90.40	5,746.79	35.39	3,998.89	3,999.04	0.26	
9,501.00	87.40	89.90	5,750.76	35.16	4,084.79	4,084.94	0.59	
9,586.00	87.60	90.40	5,754.47	34.94	4,169.71	4,169.85	0.63	
9,672.00	87.60	90.00	5,758.07	34.64	4,255.63	4,255.77	0.46	
9,757.00	89.10	90.70	5,760.52	34.12	4,340.60	4,340.73	1.95	
9,843.00	89.30	91.10	5,761.72	32.77	4,426.58	4,426.70	0.52	
9,929.00	89.30	90.60	5,762.77	31.49	4,512.56	4,512.67	0.58	
10,014.00	88.90	90.90	5,764.11	30.38	4,597.54	4,597.64	0.59	
10,100.00	88.90	91.00	5,765.76	28.96	4,683.51	4,683.60	0.12	
10,185.00	89.10	91.00	5,767.24	27.47	4,768.49	4,768.56	0.24	
10,271.00	89.10	90.90	5,768.59	26.05	4,854.47	4,854.53	0.12	
10,303.00	89.20	91.40	5,769.07	25.41	4,886.46	4,886.51	1.59	
Last Phoenix MWD Survey								
10,357.00	89.20	91.40	5,769.82	24.09	4,940.43	4,940.48	0.00	
Projection to TD								

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
482.00	481.98	4.46	0.92	Tie-on to Gyro
569.00	568.97	5.62	1.27	First Phoenix MWD Survey
10,303.00	5,769.07	25.41	4,886.46	Last Phoenix MWD Survey
10,357.00	5,769.82	24.09	4,940.43	Projection to TD

Checked By: _____ Approved By: _____ Date: _____