



PHOENIX
TECHNOLOGY SERVICES

March 9, 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 #43H
Eddy County, NM
API #30-015-42745
Job No. 1512791

NM OIL CONSERVATION
ARTESIA DISTRICT
MAR 16 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	
Lindsey Cantrell	43H	5,258	10,451	01/28/15	02/02/15	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: _____

7014 2120 0004 3423 7187

Phoenix Technology Services
SURVEY DATA CERTIFICATION



PHOENIX JOB NUMBER

1512791

Energy Company

Apache

WELL NAME

Crow Federal #43H

COUNTY & STATE

Eddy, NM

API WELL NUMBER

30-015-42745

PROPOSED DIRECTION

89.59

TIE-IN DATA

MEASURED DEPTH	VERTICAL DEPTH	INCLIN	AZIMUTH	N-S COORD	E-W COORD	DATA SOURCE
5,200.00 ft	5,199.68 ft	0.35	260.80	-6.08	4.40 ft	GYRO

FIRST SURVEY DATE	FIRST SURVEY DEPTH	INCLIN	AZIMUTH
28-Jan-15	5,258.00 ft	0.30	205.10

SURVEY INSTRUMENT
TYPE

Phoenix MWD

LAST SURVEY DATE	LAST SURVEY DEPTH	INCLIN	AZIMUTH
2-Feb-15	10,451.00 ft	88.50	88.00

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
2-Feb-15	10,521.00 ft	88.50	88.00

Lindsey Cantrell

PRINT YOUR NAME ABOVE

Lindsey Cantrell

SIGN YOUR NAME ABOVE

2/3/2015

TODAY'S DATE

MAGNETIC DECLINATION OR TOTAL GRID

TOTAL CORRECTION USED	7.27
DECLINATION OR GRID	GRID

MWD SUPERVISOR 1

Lindsey Cantrell

DIRECTIONAL DRILLER 1

Gabriel Welborn

MWD SUPERVISOR 2

Burton Fowles

DIRECTIONAL DRILLER 2

Joshua Ashley

12329 Cutten Rd.,

Houston, Texas 77066

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



Apache Corporation

Eddy County, NM (NAD27 NME)

Crow Federal

#43H

WB1 / Job #1512791

Survey: Phoenix MWD Survey

Standard Survey Report

02 March, 2015



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #43H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3951.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3951.00usft (Capstar 114)
Well:	#43H	North Reference:	Grid
Wellbore:	WB1 / Job #1512791	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	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
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	#43H		
Well Position	+N/-S	0.00 usft	Northing: 677,827.80 usft
	+E/-W	0.00 usft	Easting: 643,628.60 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 51' 45.20631 N
		Longitude:	103° 51' 56.08012 W
		Ground Level:	3,940.00 usft

Wellbore	WB1 / Job #1512791				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2014	1/28/2015	7.50	60.63	48,551

Design	Surveys (Capstar 114)			
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	89.61

Survey Program	Date	3/2/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	5,200.00	Phoenix Gyro Survey (WB1 / Job #151279	NS-GYRO-MS	North sensing gyrocompassing m/s	
5,258.00	10,521.00	Phoenix MWD Survey (WB1 / Job #15127	PHX+MWD+BGGM	PHX+MWD+BGGM v3:standard declination	

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)	
5,200.00	0.35	260.80	5,199.68	-6.08	4.40	4.36	0.00	0.00	0.00	
Tie-on to Gyro Survey										
5,258.00	0.30	205.10	5,257.68	-6.25	4.16	4.12	0.53	-0.09	-96.03	
First Phoenix MWD Survey										
5,300.00	1.20	99.60	5,299.68	-6.42	4.55	4.50	3.12	2.14	-251.19	
5,343.00	5.30	85.20	5,342.60	-6.33	6.97	6.93	9.65	9.53	-33.49	
5,386.00	10.10	80.50	5,385.20	-5.54	12.67	12.63	11.25	11.16	-10.93	
5,429.00	15.60	80.70	5,427.11	-3.98	22.10	22.08	12.79	12.79	0.47	
5,471.00	20.80	79.90	5,466.99	-1.76	35.03	35.01	12.39	12.38	-1.90	

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #43H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3951.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3951.00usft (Capstar 114)
Well:	#43H	North Reference:	Grid
Wellbore:	WB1 / Job #1512791	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	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)
5,514.00	26.40	80.80	5,506.38	1.11	51.99	52.00	13.05	13.02	2.09
5,557.00	31.80	82.60	5,543.94	4.10	72.68	72.71	12.72	12.56	4.19
5,599.00	36.20	87.30	5,578.76	6.11	96.06	96.10	12.20	10.48	11.19
5,645.00	41.90	91.60	5,614.47	6.32	125.01	125.05	13.71	12.39	9.35
5,688.00	46.20	94.20	5,645.37	4.78	154.86	154.89	10.85	10.00	6.05
5,730.00	50.60	92.70	5,673.25	2.91	186.20	186.21	10.81	10.48	-3.57
5,773.00	55.80	90.30	5,699.00	2.03	220.60	220.61	12.89	12.09	-5.58
5,816.00	61.60	90.40	5,721.33	1.80	257.33	257.33	13.49	13.49	0.23
5,859.00	67.80	89.80	5,739.70	1.74	296.18	296.19	14.47	14.42	-1.40
5,901.00	74.90	89.70	5,753.12	1.91	335.95	335.96	16.91	16.90	-0.24
5,944.00	80.80	90.50	5,762.17	1.84	377.97	377.98	13.84	13.72	1.86
5,987.00	82.20	90.80	5,768.53	1.36	420.50	420.49	3.33	3.26	0.70
6,072.00	86.50	90.40	5,776.89	0.47	505.06	505.05	5.08	5.06	-0.47
6,161.00	91.10	90.60	5,778.76	-0.31	594.01	593.99	5.17	5.17	0.22
6,246.00	90.20	90.90	5,777.79	-1.42	679.00	678.97	1.12	-1.06	0.35
6,332.00	89.80	90.50	5,777.79	-2.47	764.99	764.96	0.66	-0.47	-0.47
6,418.00	89.50	90.50	5,778.32	-3.22	850.99	850.94	0.35	-0.35	0.00
6,503.00	89.30	89.90	5,779.21	-3.52	935.98	935.93	0.74	-0.24	-0.71
6,589.00	88.80	89.50	5,780.63	-3.07	1,021.97	1,021.92	0.74	-0.58	-0.47
6,674.00	90.40	90.00	5,781.23	-2.69	1,106.96	1,106.92	1.97	1.88	0.59
6,762.00	90.60	90.00	5,780.46	-2.69	1,194.96	1,194.91	0.23	0.23	0.00
6,848.00	90.60	89.90	5,779.56	-2.62	1,280.95	1,280.90	0.12	0.00	-0.12
6,933.00	91.20	89.30	5,778.22	-2.03	1,365.94	1,365.89	1.00	0.71	-0.71
7,022.00	91.40	89.20	5,776.20	-0.86	1,454.91	1,454.87	0.25	0.22	-0.11
7,107.00	91.00	89.40	5,774.42	0.18	1,539.88	1,539.85	0.53	-0.47	0.24
7,196.00	89.90	88.30	5,773.72	1.96	1,628.86	1,628.84	1.75	-1.24	-1.24
7,281.00	89.80	88.50	5,773.95	4.34	1,713.83	1,713.82	0.26	-0.12	0.24
7,367.00	90.20	88.60	5,773.95	6.51	1,799.80	1,799.80	0.48	0.47	0.12
7,453.00	89.60	90.40	5,774.10	7.26	1,885.79	1,885.80	2.21	-0.70	2.09
7,538.00	89.40	90.80	5,774.84	6.37	1,970.78	1,970.78	0.53	-0.24	0.47
7,624.00	89.30	89.60	5,775.81	6.07	2,056.78	2,056.77	1.40	-0.12	-1.40
7,715.00	89.20	89.20	5,777.01	7.03	2,147.76	2,147.76	0.45	-0.11	-0.44
7,801.00	88.80	88.40	5,778.51	8.83	2,233.73	2,233.74	1.04	-0.47	-0.93
7,886.00	88.80	89.40	5,780.29	10.46	2,318.69	2,318.71	1.18	0.00	1.18
7,971.00	88.60	89.30	5,782.22	11.42	2,403.67	2,403.69	0.26	-0.24	-0.12
8,057.00	88.40	89.20	5,784.47	12.55	2,489.63	2,489.66	0.26	-0.23	-0.12
8,142.00	88.20	88.70	5,786.99	14.10	2,574.58	2,574.61	0.63	-0.24	-0.59
8,228.00	88.10	88.70	5,789.76	16.05	2,660.51	2,660.56	0.12	-0.12	0.00
8,313.00	89.10	89.00	5,791.84	17.76	2,745.47	2,745.52	1.23	1.18	-0.35
8,399.00	88.80	88.70	5,793.42	19.49	2,831.44	2,831.50	0.49	-0.35	-0.35
8,485.00	90.40	88.60	5,794.02	21.51	2,917.41	2,917.49	1.86	1.86	-0.12
8,573.00	90.50	88.00	5,793.33	24.12	3,005.36	3,005.46	0.69	0.11	-0.68
8,659.00	90.00	89.20	5,792.95	26.22	3,091.34	3,091.44	1.51	-0.58	1.40

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #43H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3951.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3951.00usft (Capstar 114)
Well:	#43H	North Reference:	Grid
Wellbore:	WB1 / Job #1512791	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	Compass 5000 GCR

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)
8,744.00	90.00	88.90	5,792.95	27.63	3,176.32	3,176.44	0.35	0.00	-0.35
8,830.00	89.90	89.60	5,793.03	28.76	3,262.32	3,262.44	0.82	-0.12	0.81
8,915.00	90.10	90.00	5,793.03	29.05	3,347.32	3,347.44	0.53	0.24	0.47
9,001.00	90.30	89.90	5,792.73	29.13	3,433.32	3,433.43	0.26	0.23	-0.12
9,087.00	90.40	89.90	5,792.20	29.28	3,519.31	3,519.43	0.12	0.12	0.00
9,172.00	90.50	90.30	5,791.53	29.13	3,604.31	3,604.43	0.49	0.12	0.47
9,258.00	90.70	89.90	5,790.63	28.98	3,690.31	3,690.42	0.52	0.23	-0.47
9,343.00	90.60	90.30	5,789.67	28.83	3,775.30	3,775.41	0.49	-0.12	0.47
9,429.00	90.60	90.00	5,788.77	28.61	3,861.29	3,861.40	0.35	0.00	-0.35
9,515.00	90.30	89.70	5,788.09	28.83	3,947.29	3,947.40	0.49	-0.35	-0.35
9,600.00	90.30	89.00	5,787.65	29.80	4,032.28	4,032.39	0.82	0.00	-0.82
9,685.00	90.10	89.40	5,787.35	30.98	4,117.28	4,117.39	0.53	-0.24	0.47
9,771.00	89.90	89.00	5,787.35	32.18	4,203.27	4,203.39	0.52	-0.23	-0.47
9,856.00	89.60	88.30	5,787.72	34.19	4,288.24	4,288.38	0.90	-0.35	-0.82
9,945.00	89.70	87.90	5,788.27	37.14	4,377.19	4,377.34	0.46	0.11	-0.45
10,031.00	89.80	89.30	5,788.64	39.24	4,463.16	4,463.33	1.63	0.12	1.63
10,116.00	89.70	88.90	5,789.01	40.57	4,548.15	4,548.32	0.49	-0.12	-0.47
10,201.00	89.50	88.90	5,789.60	42.21	4,633.13	4,633.31	0.24	-0.24	0.00
10,286.00	89.10	88.70	5,790.64	43.99	4,718.11	4,718.30	0.53	-0.47	-0.24
10,369.00	88.50	88.20	5,792.38	46.23	4,801.06	4,801.26	0.94	-0.72	-0.60
10,451.00	88.50	88.00	5,794.53	48.95	4,882.99	4,883.21	0.24	0.00	-0.24
Last Phoenix MWD Survey									
10,521.00	88.50	88.00	5,796.36	51.39	4,952.92	4,953.15	0.00	0.00	0.00
Projection to Bit									

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,200.00	5,199.68	-6.08	4.40	Tie-on to Gyro Survey
5,258.00	5,257.68	-6.25	4.16	First Phoenix MWD Survey
10,451.00	5,794.53	48.95	4,882.99	Last Phoenix MWD Survey
10,521.00	5,796.36	51.39	4,952.92	Projection to Bit

Checked By: _____	Approved By: _____	Date: _____
-------------------	--------------------	-------------

DISTRICT I
1625 N. French 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

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
Property Code	Property Name CROW FEDERAL	
	Well Number 43H	
OGRID No.	Operator Name APACHE CORPORATION	
	Elevation 3909'	

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	4	17-S	31-E		2298	SOUTH	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
I	4	17-S	31-E		2298	SOUTH	330	EAST	EDDY
Dedicated Acres		Joint or Infill		Consolidation Code		Order No.			

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

CORNER COORDINATES TABLE Ⓐ - Y=678131.4 N, X=638335.7 E Ⓑ - Y=678167.7 N, X=643616.4 E Ⓒ - Y=676812.0 N, X=638343.2 E Ⓓ - Y=676849.1 N, X=643624.5 E	GEODETIC COORDINATES NAD 27 NME SURFACE LOCATION Y=677790.1 N X=638347.6 E LAT.=32.862517° N LONG.=103.882776° W LAT.=32° 51' 45" N LONG.=103° 52' 58" W BOTTOM HOLE LOCATION Y=677825.4 N X=643288.6 E	OPERATOR CERTIFICATION <i>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 the 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> Signature _____ Date _____ Printed Name _____ E-mail Address _____
SURVEYOR CERTIFICATION <i>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.</i> MAY 1, 2012 Date of Survey _____ Signature & Seal of Professional Surveyor: _____		
Certificate Number: Gary Eidson 12641 Ronald J. Eidson 3239 DSS JWSC W.O.: 12.11.0822		