



PHOENIX
TECHNOLOGY SERVICES

December 10, 2015

Oil Conservation Division
State of New Mexico
811 S. First St.
Artesia, New Mexico 88210

NM OIL CONSERVATION
ARTESIA DISTRICT

JAN 19 2016

Dear District 2 - Artesia

RECEIVED

Attention: Regulatory Department

Re: Apache Corporation
Raven Federal Com #23H
Eddy County, NM
API #30-015-43362
Job No. 1514630

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	
Bernard Caldwell	23H	4,349	8,701	11/22/15	11/25/15	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

Phoenix Technology Services SURVEY DATA CERTIFICATION



PHOENIX JOB NUMBER

1514630

ENERGY COMPANY

Apache Corp

WELL NAME

Raven Federal Com #23H

COUNTY & STATE

Eddy County, NM

API WELL NUMBER

30-015-43362

PROPOSED DIRECTION

89.98°

TIE-IN DATA						
MEASURED	VERTICAL			N-S	E-W	DATA
DEPTH	DEPTH	INCLIN	AZIMUTH	COORD	COORD	SOURCE
4,118. ft	4,117.87 ft	0.73°	16.48°	9.27 ft	.45 ft	Gyro

FIRST	FIRST		
SURVEY	SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
22-Nov-15	4,349.00 ft	2.2°	84.5°

SURVEY INSTRUMENT

TYPE

Phoenix MWD

LAST	LAST		
SURVEY	SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
25-Nov-15	8,701.00 ft	88.7°	90.9°

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

PROJECTED	PROJECTED		
TD SURVEY	TD SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
25-Nov-15	8,765.00 ft	88.7°	90.9°

Bernard Caldwell

PRINT YOUR NAME ABOVE

Bernard Caldwell

SIGN YOUR NAME ABOVE

MAGNETIC DECLINATION OR TOTAL GRID

TOTAL CORRECTION USED	7.42
DECLINATION OR GRID	GRID

11/26/15

TODAY'S DATE

MWD SUPERVISOR 1

Bernard Caldwell

DIRECTIONAL DRILLER 1

David Eddins

MWD SUPERVISOR 2

Steve Poer

DIRECTIONAL DRILLER 2

Brad Jones

12329 Cutten Rd., Houston, Texas 777066

(713)337-0600 (Voice), (713)337-0599 (Fax)



NM OIL CONSERVATION
ARTESIA DISTRICT
JAN 19 2016

RECEIVED

Apache Corporation

Eddy County, NM (NAD27 NME)

Raven Federal

#23H

OH / Job #1514630

Survey: Phoenix MWD Surveys

Standard Survey Report

26 November, 2015



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #23H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3733.00usft (Capstar 114)
Site:	Raven Federal	MD Reference:	KB @ 3733.00usft (Capstar 114)
Well:	#23H	North Reference:	Grid
Wellbore:	OH / Job #1514630	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	Raven Federal		
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Site Position:		Northing:	673,239.70 usft	Latitude:	32° 51' 0.24298 N
From:	Map	Easting:	633,303.50 usft	Longitude:	103° 53' 57.35087 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.24 °

Well	#23H					
Well Position	+N/-S	0.00 usft	Northing:	672,324.90 usft	Latitude:	32° 50' 51.37938 N
	+E/-W	0.00 usft	Easting:	628,585.60 usft	Longitude:	103° 54' 52.69762 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,722.00 usft

Wellbore	OH / Job #1514630				
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	10/29/2015	7.65	60.77	48,543

Design	Surveys (Capstar 114)				
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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	89.98

Survey Program		Date 11/26/2015		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	4,118.00	Phoenix Gyro Surveys (OH / Job #151463)	CB-GYRO-MS	Camera based gyro multishot
4,349.00	8,765.00	Phoenix MWD Surveys (OH / Job #151463)	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)
	4,118.00	0.73	16.48	4,117.87	9.27	0.45	0.46	0.00	0.00	0.00
Tie In to Phoenix Gyro Surveys	4,349.00	2.20	84.50	4,348.80	11.11	5.28	5.29	0.88	0.64	29.45
First Phoenix MWD Survey	4,392.00	8.70	94.40	4,391.58	10.94	9.35	9.36	15.22	15.12	23.02
	4,434.00	15.10	92.00	4,432.66	10.51	18.00	18.00	15.28	15.24	-5.71
	4,477.00	21.50	92.00	4,473.46	10.03	31.48	31.49	14.88	14.88	0.00
	4,520.00	27.00	94.80	4,512.66	8.94	49.10	49.10	13.06	12.79	6.51
	4,562.00	32.30	97.10	4,549.14	6.76	69.75	69.75	12.90	12.62	5.48

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #23H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3733.00usft (Capstar 114)
Site:	Raven Federal	MD Reference:	KB @ 3733.00usft (Capstar 114)
Well:	#23H	North Reference:	Grid
Wellbore:	OH / Job #1514630	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)
4,605.00	36.90	98.70	4,584.53	3.38	93.92	93.93	10.90	10.70	3.72
4,648.00	41.20	98.50	4,617.92	-0.67	120.70	120.70	10.00	10.00	-0.47
4,690.00	45.30	99.30	4,648.50	-5.13	149.13	149.13	9.85	9.76	1.90
4,733.00	49.90	99.50	4,677.49	-10.31	180.45	180.44	10.70	10.70	0.47
4,776.00	54.10	98.70	4,703.96	-15.66	213.90	213.89	9.88	9.77	-1.86
4,818.00	59.00	97.80	4,727.10	-20.68	248.57	248.56	11.80	11.67	-2.14
4,861.00	64.30	97.50	4,747.51	-25.72	286.06	286.05	12.34	12.33	-0.70
4,904.00	66.80	97.60	4,765.31	-30.86	324.86	324.85	5.82	5.81	0.23
4,946.00	70.60	98.80	4,780.56	-36.44	363.58	363.57	9.43	9.05	2.86
4,989.00	74.30	99.70	4,793.53	-43.04	404.04	404.03	8.83	8.60	2.09
5,032.00	80.30	99.70	4,802.98	-50.10	445.37	445.35	13.95	13.95	0.00
5,080.00	85.40	98.50	4,808.95	-57.63	492.38	492.36	10.91	10.63	-2.50
5,123.00	87.30	96.60	4,811.69	-63.27	534.92	534.90	6.24	4.42	-4.42
5,251.00	87.40	94.30	4,817.61	-75.41	662.20	662.17	1.80	0.08	-1.80
5,379.00	87.60	92.10	4,823.19	-82.55	789.87	789.84	1.72	0.16	-1.72
5,507.00	87.80	88.40	4,828.33	-83.10	917.74	917.71	2.89	0.16	-2.89
5,635.00	88.80	87.80	4,832.13	-78.86	1,045.61	1,045.58	0.91	0.78	-0.47
5,763.00	87.80	87.50	4,835.92	-73.62	1,173.45	1,173.42	0.82	-0.78	-0.23
5,891.00	87.70	87.10	4,840.95	-67.59	1,301.20	1,301.18	0.32	-0.08	-0.31
6,019.00	89.80	89.30	4,843.74	-63.57	1,429.10	1,429.07	2.38	1.64	1.72
6,147.00	90.30	91.10	4,843.63	-64.02	1,557.09	1,557.07	1.46	0.39	1.41
6,275.00	88.40	90.10	4,845.08	-65.36	1,685.07	1,685.04	1.68	-1.48	-0.78
6,399.00	86.30	88.70	4,850.81	-64.06	1,808.92	1,808.89	2.03	-1.69	-1.13
6,526.00	87.50	87.30	4,857.68	-59.64	1,935.65	1,935.63	1.45	0.94	-1.10
6,655.00	88.60	87.20	4,862.07	-53.45	2,064.42	2,064.40	0.86	0.85	-0.08
6,782.00	89.10	86.50	4,864.62	-46.48	2,191.20	2,191.19	0.68	0.39	-0.55
6,910.00	87.80	87.20	4,868.08	-39.44	2,318.96	2,318.95	1.15	-1.02	0.55
7,038.00	88.60	88.90	4,872.10	-35.09	2,446.82	2,446.81	1.47	0.63	1.33
7,167.00	89.30	89.00	4,874.47	-32.73	2,575.77	2,575.76	0.55	0.54	0.08
7,295.00	89.50	89.00	4,875.81	-30.49	2,703.75	2,703.74	0.16	0.16	0.00
7,422.00	89.20	88.50	4,877.25	-27.72	2,830.71	2,830.70	0.46	-0.24	-0.39
7,550.00	88.60	87.80	4,879.71	-23.59	2,958.62	2,958.61	0.72	-0.47	-0.55
7,678.00	88.30	88.30	4,883.17	-19.24	3,086.49	3,086.49	0.46	-0.23	0.39
7,806.00	87.50	87.70	4,887.86	-14.77	3,214.33	3,214.32	0.78	-0.63	-0.47
7,934.00	87.00	87.60	4,894.00	-9.53	3,342.07	3,342.07	0.40	-0.39	-0.08
8,062.00	88.00	88.30	4,899.58	-4.96	3,469.87	3,469.87	0.95	0.78	0.55
8,190.00	88.20	89.30	4,903.83	-2.28	3,597.77	3,597.77	0.80	0.16	0.78
8,319.00	88.50	89.30	4,907.54	-0.70	3,726.70	3,726.70	0.23	0.23	0.00
8,447.00	87.70	89.10	4,911.78	1.08	3,854.62	3,854.62	0.64	-0.63	-0.16
8,574.00	90.50	92.00	4,913.78	-0.14	3,981.57	3,981.57	3.17	2.20	2.28
8,701.00	88.70	90.90	4,914.67	-3.35	4,108.52	4,108.52	1.66	-1.42	-0.87
Final Phoenix MWD Survey									
8,765.00	88.70	90.90	4,916.12	-4.36	4,172.50	4,172.50	0.00	0.00	0.00
Projection to TD									

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #23H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3733.00usft (Capstar 114)
Site:	Raven Federal	MD Reference:	KB @ 3733.00usft (Capstar 114)
Well:	#23H	North Reference:	Grid
Wellbore:	OH / Job #1514630	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)
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Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4,118.00	4,117.87	9.27	0.45	Tie in to Phoenix Gyro Surveys
4,349.00	4,348.80	11.11	5.28	First Phoenix MWD Survey
8,701.00	4,914.67	-3.35	4,108.52	Final Phoenix MWD Survey
8,765.00	4,916.12	-4.36	4,172.50	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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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) 746-1283 Fax: (575) 746-9720

DISTRICT III
1000 Rio Hrazos 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

NM OIL CONSERVATION

ARTESIA DISTRICT

Form C-102

Revised August 1, 2011

JAN 19 2016 Submit one copy to appropriate District Office

RECEIVED DAMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-015-43362	Pool Code 96831	Pool Name Cedar Lake; Glorieta - Yeso
Property Code 39330	Property Name RAVEN FEDERAL Com	Well Number 23H
OGRID No. 873	Operator Name APACHE CORPORATION	Elevation 3722'

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	7	17-S	31-E		2180	SOUTH	505	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	7	17-S	31-E		2154	SOUTH	330	EAST	EDDY

Dedicated Acres 151.78	Joint or Infill	Consolidation Code	Order No.
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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

GEODETIC COORDINATES NAD 83 NME SURFACE LOCATION Y= 672388.9 N X= 669764.3 E LAT.=32.847723° N LONG.=103.915146° W LAT.=32°50'52" N LONG.=103°54'55" W	CORNER COORDINATES TABLE NAD 83 NME A - Y=672845.7 N, X=669257.9 E B - Y=672878.9 N, X=674265.0 E C - Y=671525.9 N, X=669262.1 E D - Y=671559.1 N, X=674272.6 E	BOTTOM HOLE LOCATION NAD 83 NME Y= 672390.5 N X= 673937.9 E LAT.=32.847681° N LONG.=103.901556° W LAT.=32°50'52" N LONG.=103°54'06" W
GEODETIC COORDINATES NAD 27 NME SURFACE LOCATION Y= 672324.9 N X= 628585.6 E LAT.=32.847606° N LONG.=103.914638° W LAT.=32°50'51" N LONG.=103°54'53" W	CORNER COORDINATES TABLE NAD 27 NME A - Y=672781.8 N, X=628079.2 E B - Y=672814.9 N, X=633086.4 E C - Y=671462.0 N, X=628083.4 E D - Y=671495.1 N, X=633093.9 E	BOTTOM HOLE LOCATION NAD 27 NME Y= 672326.6 N X= 632759.2 E LAT.=32.847564° N LONG.=103.901048° W LAT.=32°50'51" N LONG.=103°54'04" W

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 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

Sorina L Flores 2/17/15
Signature Date

Sorina L Flores
Printed Name

sorina.flores@apachecorp.com
E-mail Address

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.

NOVEMBER 13, 2014

Date of Survey

Signature & Seal of Professional Surveyor:

Ronald J. Eidson 02/16/2015

RONALD J. EIDSON
NEW MEXICO
3239

Certificate Number: 12641
Ronald J. Eidson 3239

LSL REL. W.O. 15.13.0249

