



PHOENIX
TECHNOLOGY SERVICES

November 18, 2015

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

NM OIL CONSERVATION
ARTESIA DISTRICT

JAN 19 2016

RECEIVED

Dear District 2 - Artesia

Attention: Regulatory Department

Re: Apache Corporation
Raven Federal #22H
Eddy County, NM
API #30-015-43361
Job No. 1514540

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	22H	4,819	9,277	11/07/15	11/11/15	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 5180

Phoenix Technology Services SURVEY DATA CERTIFICATION



PHOENIX JOB NUMBER

1514540

ENERGY COMPANY Apache Corp

WELL NAME

Raven Federal # 22H

COUNTY & STATE

Eddy, NM

API WELL NUMBER

30-015-43361

PROPOSED DIRECTION

99.55°

TIE-IN DATA						
MEASURED	VERTICAL			N-S	E-W	DATA
DEPTH	DEPTH	INCLIN	AZIMUTH	COORD	COORD	SOURCE
4,662.00 ft	4,661.57 ft	0.42°	98.08°	-4.92 ft	34.31 ft	Gyro

FIRST	FIRST		
SURVEY	SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
7-Nov-15	4,819.00 ft	6.7°	117.6°

SURVEY INSTRUMENT
TYPE

Phoenix MWD

LAST	LAST		
SURVEY	SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
11-Nov-15	9,277.00 ft	89.7°	89.3°

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
11-Nov-15	9,349.00 ft	89.7°	89.3°

Bernard Caldwell

PRINT YOUR NAME ABOVE

B. Caldwell

SIGN YOUR NAME ABOVE

MAGNETIC DECLINATION OR TOTAL GRID

TOTAL CORRECTION USED	7.43
DECLINATION OR GRID	GRID

November 11, 2015

TODAY'S DATE

MWD SUPERVISOR 1

Bernard Caldwell

DIRECTIONAL DRILLER 1

David Eddins

MWD SUPERVISOR 2

Steven 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

#22H

OH / Job #1514540

Survey: Phoenix MWD Surveys

Standard Survey Report

12 November, 2015



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #22H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3734.00usft (Capstar 114)
Site:	Raven Federal	MD Reference:	KB @ 3734.00usft (Capstar 114)
Well:	#22H	North Reference:	Grid
Wellbore:	OH / Job #1514540	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	#22H				
Well Position	+N/-S	0.00 usft	Northing:	672,260.00 usft	Latitude: 32° 50' 50.73718 N
	+E/-W	0.00 usft	Easting:	628,585.80 usft	Longitude: 103° 54' 52.69829 W
Position Uncertainty	0.00 usft		Wellhead Elevation:	usft	Ground Level: 3,723.00 usft

Wellbore	OH / Job #1514540				
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	10/23/2015	7.65	60.77	48,545

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	99.55

Survey Program		Date 11/12/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	4,662.00	Phoenix Gyro Surveys (OH / Job #151454)	PHX_SPT_GTD	PHX Continuous north-seeking gyro	
4,819.00	9,349.00	Phoenix MWD Surveys (OH / Job #151454)	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)
4,662.00	0.42	98.08	4,661.57	-4.92	34.31	34.65	0.00	0.00	0.00
Tie-in to Phoenix Gyros									
4,819.00	6.70	117.60	4,818.19	-9.25	43.00	43.94	4.02	4.00	12.43
First Phoenix MWD Survey									
4,861.00	13.80	118.50	4,859.49	-12.78	49.59	51.02	16.91	16.90	2.14
4,904.00	21.20	120.40	4,900.47	-19.17	60.81	63.15	17.26	17.21	4.42
4,947.00	28.80	122.90	4,939.42	-28.74	76.24	79.95	17.84	17.67	5.81
4,989.00	34.20	125.10	4,975.21	-41.03	94.40	99.90	13.14	12.86	5.24
5,032.00	37.80	126.40	5,010.00	-55.81	114.91	122.57	8.56	8.37	3.02

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #22H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3734.00usft (Capstar 114)
Site:	Raven Federal	MD Reference:	KB @ 3734.00usft (Capstar 114)
Well:	#22H	North Reference:	Grid
Wellbore:	OH / Job #1514540	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)
5,074.00	42.00	127.70	5,042.21	-72.05	136.39	146.46	10.19	10.00	3.10
5,117.00	46.90	129.30	5,072.90	-90.80	159.94	172.79	11.69	11.40	3.72
5,160.00	50.80	129.10	5,101.19	-111.26	185.03	200.92	9.08	9.07	-0.47
5,203.00	53.50	128.70	5,127.57	-132.58	211.45	230.52	6.32	6.28	-0.93
5,245.00	55.80	127.10	5,151.87	-153.61	238.48	260.66	6.30	5.48	-3.81
5,288.00	57.60	126.30	5,175.48	-175.09	267.30	292.64	4.47	4.19	-1.86
5,331.00	61.20	126.90	5,197.36	-197.15	297.00	325.60	8.46	8.37	1.40
5,374.00	64.60	126.90	5,216.95	-220.13	327.61	359.59	7.91	7.91	0.00
5,417.00	68.20	127.30	5,234.16	-243.90	359.03	394.52	8.42	8.37	0.93
5,459.00	72.80	127.60	5,248.18	-267.97	390.45	429.50	10.97	10.95	0.71
5,501.00	78.90	126.90	5,258.44	-292.61	422.86	465.54	14.61	14.52	-1.67
5,544.00	85.30	126.00	5,264.35	-317.89	457.10	503.51	15.03	14.88	-2.09
5,587.00	89.20	126.00	5,266.41	-343.14	491.84	541.96	9.07	9.07	0.00
5,715.00	86.50	121.30	5,271.21	-413.99	598.28	658.67	4.23	-2.11	-3.67
5,842.00	87.10	117.00	5,278.31	-475.74	708.99	778.10	3.41	0.47	-3.39
5,970.00	89.30	113.20	5,282.33	-529.99	824.82	901.32	3.43	1.72	-2.97
6,099.00	87.10	108.10	5,286.38	-575.45	945.43	1,027.79	4.30	-1.71	-3.95
6,226.00	87.10	107.70	5,292.81	-614.43	1,066.12	1,153.29	0.31	0.00	-0.31
6,354.00	87.30	105.80	5,299.06	-651.28	1,188.54	1,280.12	1.49	0.16	-1.48
6,482.00	88.40	102.70	5,303.86	-682.76	1,312.50	1,407.58	2.57	0.86	-2.42
6,610.00	89.30	98.70	5,306.43	-706.51	1,438.22	1,535.50	3.20	0.70	-3.13
6,738.00	88.40	93.40	5,309.01	-720.00	1,565.43	1,663.19	4.20	-0.70	-4.14
6,866.00	87.10	90.30	5,314.03	-724.13	1,693.25	1,789.92	2.62	-1.02	-2.42
6,994.00	88.10	89.90	5,319.39	-724.35	1,821.14	1,916.07	0.84	0.78	-0.31
7,122.00	88.40	89.80	5,323.30	-724.01	1,949.08	2,042.18	0.25	0.23	-0.08
7,250.00	89.20	89.80	5,325.98	-723.57	2,077.05	2,168.31	0.63	0.63	0.00
7,378.00	89.30	90.70	5,327.66	-724.13	2,205.03	2,294.61	0.71	0.08	0.70
7,506.00	87.60	88.90	5,331.12	-723.68	2,332.98	2,420.71	1.93	-1.33	-1.41
7,634.00	88.50	88.40	5,335.47	-720.67	2,460.86	2,546.32	0.80	0.70	-0.39
7,762.00	88.50	88.10	5,338.83	-716.76	2,588.76	2,671.80	0.23	0.00	-0.23
7,890.00	88.60	89.10	5,342.06	-713.63	2,716.68	2,797.43	0.78	0.08	0.78
8,018.00	89.70	90.20	5,343.96	-712.85	2,844.66	2,923.50	1.22	0.86	0.86
8,146.00	90.00	91.40	5,344.30	-714.64	2,972.64	3,050.01	0.97	0.23	0.94
8,274.00	88.90	90.40	5,345.53	-716.65	3,100.62	3,176.55	1.16	-0.86	-0.78
8,402.00	88.60	90.70	5,348.32	-717.88	3,228.58	3,302.94	0.33	-0.23	0.23
8,530.00	87.90	90.90	5,352.23	-719.66	3,356.51	3,429.39	0.57	-0.55	0.16
8,658.00	87.90	89.60	5,356.92	-720.22	3,484.42	3,555.62	1.01	0.00	-1.02
8,786.00	88.40	89.60	5,361.05	-719.33	3,612.35	3,681.63	0.39	0.39	0.00
8,914.00	87.80	89.50	5,365.30	-718.32	3,740.27	3,807.61	0.48	-0.47	-0.08
9,042.00	89.00	89.70	5,368.87	-717.43	3,868.22	3,933.64	0.95	0.94	0.16
9,170.00	90.00	88.90	5,369.99	-715.87	3,996.20	4,059.59	1.00	0.78	-0.63
9,277.00	89.70	89.30	5,370.27	-714.19	4,103.19	4,164.81	0.47	-0.28	0.37
Final Phoenix MWD Survey									
9,349.00	89.70	89.30	5,370.64	-713.31	4,175.18	4,235.66	0.00	0.00	0.00

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #22H
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Site:	Raven Federal	MD Reference:	KB @ 3734.00usft (Capstar 114)
Well:	#22H	North Reference:	Grid
Wellbore:	OH / Job #1514540	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)

Projection to TD

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4,662.00	4,661.57	-4.92	34.31	Tie-in to Phoenix Gyros
4,819.00	4,818.19	-9.25	43.00	First Phoenix MWD Survey
9,277.00	5,370.27	-714.19	4,103.19	Final Phoenix MWD Survey
9,349.00	5,370.64	-713.31	4,175.18	Projection to TD

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 Huerfano 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

JAN 19 2016

RECEIVED

DAMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-015-43361	Pool Code 96831	Pool Name Cedar Lake; Glorieta-Yeso
Property Code 393303	Property Name RAVEN FEDERAL Com	Well Number 22H
OGRIID No. 873	Operator Name APACHE CORPORATION	Elevation 3723'

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		2115	SOUTH	505	WEST	EDDY

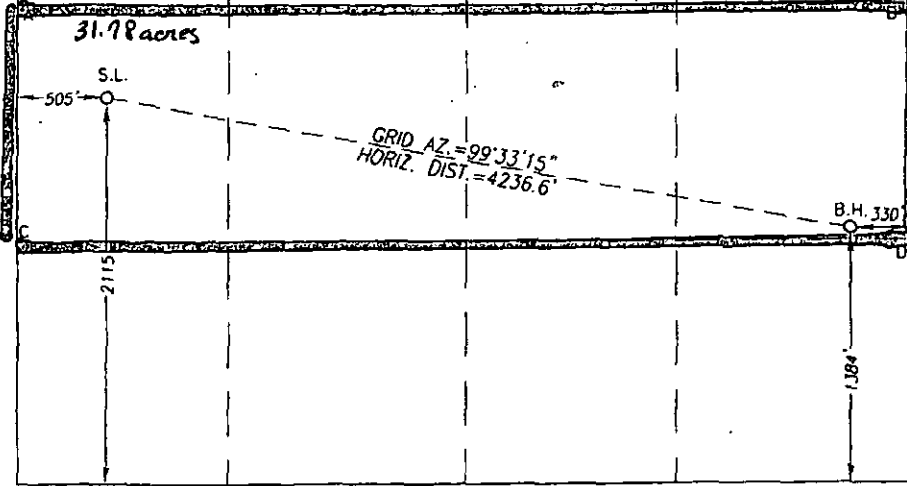
Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P. I	7	17-S	31-E		1384	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= 672323.9 N X= 669764.5 E LAT.=32.847723° N LONG.=103.915146° 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 83 NME Y= 671620.7 N X= 673942.3 E LAT.=32.845565° N LONG.=103.901552° W LAT.=32°50'44" N LONG.=103°54'06" 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. <i>Sorina L Flores</i> 2/17/15 Signature Date <i>Sorina L Flores</i> Printed Name <i>Sorina.Flores@apachecorp.com</i> E-mail Address
GEODETIC COORDINATES NAD 27 NME SURFACE LOCATION Y= 672260.0 N X= 628585.8 E LAT.=32.847427° N LONG.=103.914638° W LAT.=32°50'51" N LONG.=103°54'53" 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 27 NME Y= 671556.8 N X= 632763.7 E LAT.=32.845448° N LONG.=103.901044° W LAT.=32°50'44" N LONG.=103°54'04" W	



31.78 acres

S.L.

505'

2115'

GRID AZ = 99°33'15"

HORIZ. DIST. = 4236.6'

B.H. 330

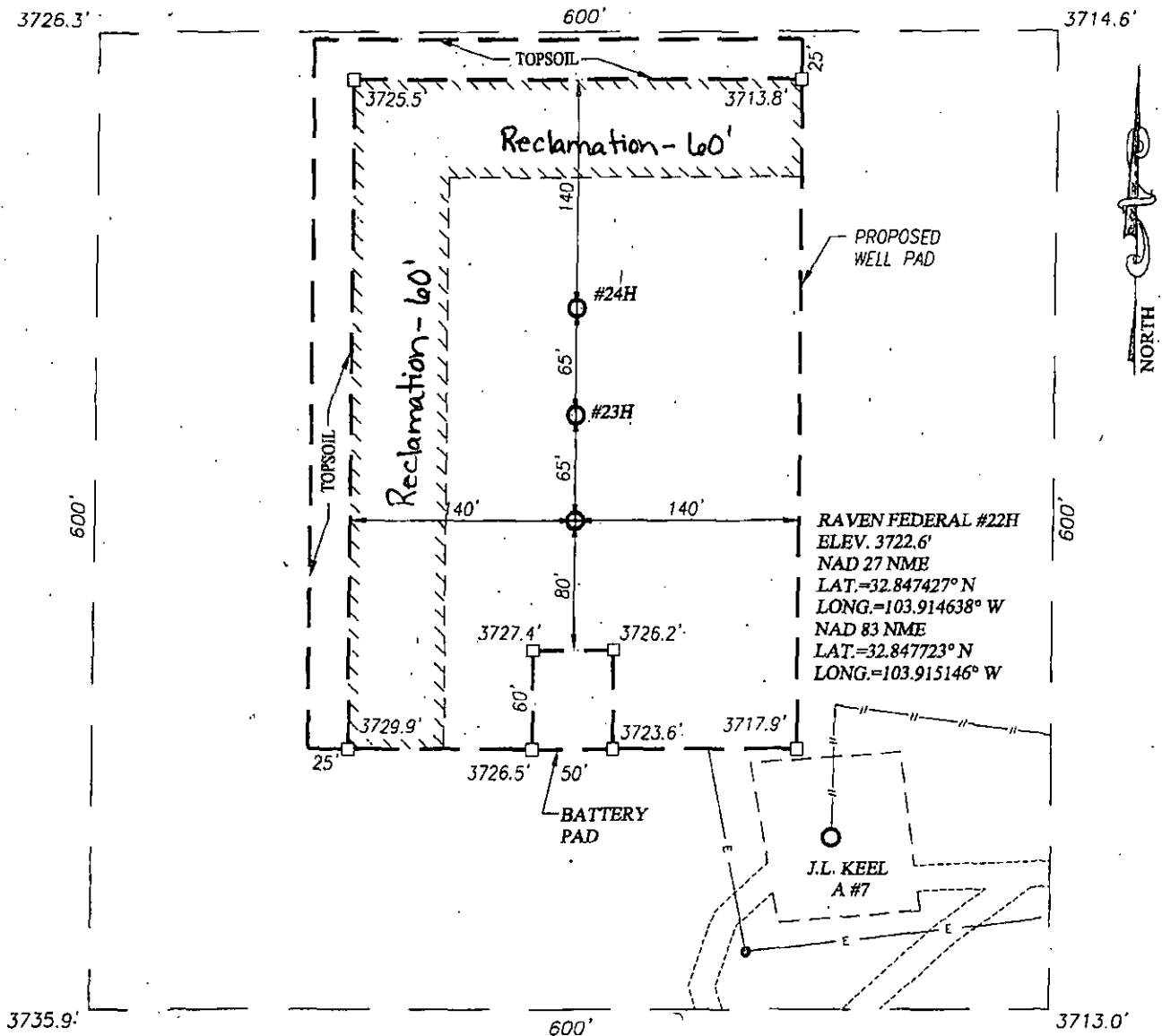
1384'

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
Professional Surveyor
3239
116/2015
Certificate Number
Garry G. Eidson 12641
Ronald J. Eidson 3239
L.S.L. REL. W.C. 15.13.0246 W.S.C. W.C. 15.13.0246

Exhibit #1C

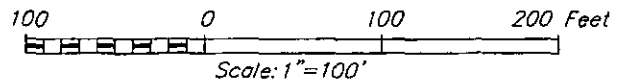


NOTE:
1) SEE "LOCATION VERIFICATION MAP"
FOR PROPOSED ROAD LOCATION.

////// DENOTES AREA TO BE RECLAIMED

DIRECTIONS TO RAVEN FEDERAL #22H:

FROM THE INTERSECTION OF U.S. HWY 82 & CO. RD. 221 (SKELLY), GO NORTH ON CO. RD. 221 APPROX. 1.45 MILES TO CALICHE LEASE ROAD, TURN RIGHT AND GO NORTHEAST APPROX. 0.6 MILES TURN LEFT AND GO NORTHWEST 0.1 MILE, THEN CONTINUE WEST SOUTHWEST APPROX. 0.2 MILES TO AN OLD INJECTION WELL. TURN RIGHT AND GO NORTHWEST 110 FEET TO THE SE COR. OF PAD.



APACHE CORPORATION

RAVEN FEDERAL #22H WELL
LOCATED 2115 FEET FROM THE SOUTH LINE
AND 505 FEET FROM THE WEST LINE OF SECTION 7,
TOWNSHIP 17 SOUTH, RANGE 31 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO



PROVIDING SURVEYING SERVICES
SINCE 1946
JOHN WEST SURVEYING COMPANY
412 N. DAL PASO HOBBS, N.M. 88240
(575) 393-3117 www.jwsc.biz
TBPLS# 10021000

Survey Date: 11/13/14

CAD Date: 12/2/14

Drawn By: LSL

W.O. No.: 15130011

Rev.:

Rel. W.O.: 14110987

Sheet 1 of 1