



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

RECEIVED

Dear District 2 - Artesia

Attention: Regulatory Department

Re: Apache Corporation
Crow Federal #47H
Eddy County, NM
API #30-015-43408
Job No. 1514595

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	
Mike Miller	47H	5,245	10,124	11/14/15	11/20/15	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 1514595

OPERATOR Apache

WELL NAME Crow Federal #47H

COUNTY & STATE

Eddy County, NM

API WELL NUMBER 30-015-43408

PROPOSED DIRECTION

269.61

TIE-IN DATA						
MEASURED	VERTICAL			N-S	E-W	DATA
DEPTH	DEPTH	INCLIN	AZIMUTH	COORD	COORD	SOURCE
5,207. ft	5,206.37 ft	0.25	318.72	-19.09 ft	11.96 ft	Gyro

FIRST	FIRST		
SURVEY	SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
14-Nov-15	5,245.00 ft	0.20	321.60

SURVEY INSTRUMENT

TYPE

Phoenix MWD

LAST	LAST		
SURVEY	SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
20-Nov-15	10,124.00 ft	90.90	268.80

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
20-Nov-15	10,199.00 ft	90.90	268.80

Mike Miller

PRINT YOUR NAME ABOVE

Mike Miller

SIGN YOUR NAME ABOVE

MAGNETIC DECLINATION OR TOTAL GRID

TOTAL CORRECTION USED	7.27
DECLINATION OR GRID	GRID

11/20/2015

TODAY'S DATE

MWD SUPERVISOR 1

Mike Miller

DIRECTIONAL DRILLER 1

Steven Hawkins

MWD SUPERVISOR 2

Bill Oehlert

DIRECTIONAL DRILLER 2

Michael Crall

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)

Crow Federal

#47H

OH / Job #1514595

Survey: Phoenix MWD Surveys

Standard Survey Report

21 November, 2015



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #47H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3957.00usft (Capstar 119)
Site:	Crow Federal	MD Reference:	KB @ 3957.00usft (Capstar 119)
Well:	#47H	North Reference:	Grid
Wellbore:	OH / Job #1514595	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 119)	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		
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Site Position:		Northing:	671,130.90 usft	Latitude:	32° 50' 38.92796 N
From:	Map	Easting:	643,906.80 usft	Longitude:	103° 51' 53.16689 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.25 °

Well	#47H				
Well Position	+N/-S	0.00 usft	Northing:	675,049.10 usft	Latitude: 32° 51' 17.49000 N
	+E/-W	0.00 usft	Easting:	648,585.30 usft	Longitude: 103° 50' 58.11817 W
Position Uncertainty	0.00 usft		Wellhead Elevation:	usft	Ground Level: 3,946.00 usft

Wellbore	OH / Job #1514595				
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	11/9/2015	7.53	60.83	48,583

Design	Surveys (Capstar 119)				
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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	269.61

Survey Program	Date 11/21/2015				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
82.00	5,207.00	Scientific Gyros (OH / Job #1514595)	NS-GYRO-MS	North sensing gyrocompassing m/s	
5,245.00	10,199.00	Phoenix MWD Surveys (OH / Job #1514595)	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)
	5,207.00	0.25	318.72	5,206.37	-19.09	11.96	-11.83	0.00	0.00	0.00
Tie In to Scientific Gyros										
	5,245.00	0.20	321.60	5,244.37	-18.98	11.86	-11.73	0.13	-0.13	7.58
First Phoenix MWD Survey										
	5,287.00	3.30	274.00	5,286.34	-18.83	10.61	-10.48	7.54	7.38	-113.33
	5,330.00	8.40	273.90	5,329.10	-18.53	6.24	-6.12	11.86	11.86	-0.23
	5,373.00	12.80	279.60	5,371.36	-17.53	-1.59	1.71	10.51	10.23	13.26
	5,415.00	16.20	280.20	5,412.02	-15.71	-11.95	12.06	8.10	8.10	1.43
	5,458.00	20.80	279.50	5,452.78	-13.39	-25.39	25.48	10.71	10.70	-1.63

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #47H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3957.00usft (Capstar 119)
Site:	Crow Federal	MD Reference:	KB @ 3957.00usft (Capstar 119)
Well:	#47H	North Reference:	Grid
Wellbore:	OH / Job #1514595	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 119)	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)
5,500.00	26.10	279.90	5,491.30	-10.57	-41.86	41.93	12.62	12.62	0.95
5,543.00	29.70	278.50	5,529.30	-7.36	-61.72	61.77	8.51	8.37	-3.26
5,585.00	34.20	275.90	5,564.93	-4.61	-83.76	83.79	11.20	10.71	-6.19
5,628.00	38.30	271.90	5,599.60	-2.93	-109.12	109.13	11.00	9.53	-9.30
5,671.00	42.90	271.80	5,632.24	-2.02	-137.08	137.09	10.70	10.70	-0.23
5,713.00	46.80	272.30	5,662.01	-0.96	-166.67	166.67	9.32	9.29	1.19
5,756.00	52.10	272.30	5,689.96	0.35	-199.31	199.30	12.33	12.33	0.00
5,798.00	57.80	271.50	5,714.07	1.48	-233.66	233.64	13.66	13.57	-1.90
5,841.00	63.60	270.60	5,735.10	2.16	-271.13	271.11	13.61	13.49	-2.09
5,884.00	69.60	270.60	5,752.17	2.57	-310.58	310.55	13.95	13.95	0.00
5,926.00	75.70	270.50	5,764.69	2.96	-350.65	350.62	14.53	14.52	-0.24
5,970.00	82.00	269.80	5,773.19	3.07	-393.79	393.76	14.40	14.32	-1.59
6,013.00	85.40	270.60	5,777.91	3.22	-436.53	436.49	8.12	7.91	1.86
6,056.00	85.80	270.70	5,781.21	3.70	-479.40	479.36	0.96	0.93	0.23
6,183.00	87.80	271.40	5,788.30	6.03	-606.17	606.11	1.67	1.57	0.55
6,311.00	89.90	271.30	5,790.87	9.04	-734.10	734.02	1.64	1.64	-0.08
6,438.00	93.80	270.10	5,786.77	10.59	-861.00	860.91	3.21	3.07	-0.94
6,566.00	93.90	268.50	5,778.17	9.03	-988.70	988.61	1.25	0.08	-1.25
6,694.00	93.20	269.00	5,770.25	6.25	-1,116.42	1,116.35	0.67	-0.55	0.39
6,822.00	92.50	269.50	5,763.88	4.57	-1,244.25	1,244.19	0.67	-0.55	0.39
6,949.00	91.10	267.00	5,759.90	0.70	-1,371.11	1,371.08	2.26	-1.10	-1.97
7,077.00	91.10	267.30	5,757.44	-5.67	-1,498.93	1,498.94	0.23	0.00	0.23
7,205.00	91.20	267.30	5,754.87	-11.69	-1,626.76	1,626.81	0.08	0.08	0.00
7,331.00	90.10	268.90	5,753.44	-15.87	-1,752.68	1,752.75	1.54	-0.87	1.27
7,459.00	90.50	269.30	5,752.77	-17.88	-1,880.66	1,880.74	0.44	0.31	0.31
7,587.00	90.70	270.00	5,751.43	-18.66	-2,008.65	2,008.73	0.57	0.16	0.55
7,714.00	90.60	270.80	5,749.99	-17.78	-2,135.64	2,135.71	0.63	-0.08	0.63
7,842.00	90.80	271.50	5,748.42	-15.21	-2,263.60	2,263.65	0.57	0.16	0.55
7,970.00	88.40	269.40	5,749.32	-14.20	-2,391.58	2,391.62	2.49	-1.88	-1.64
8,097.00	88.00	269.60	5,753.31	-15.31	-2,518.51	2,518.56	0.35	-0.31	0.16
8,225.00	89.50	269.90	5,756.10	-15.87	-2,646.48	2,646.52	1.20	1.17	0.23
8,353.00	89.50	270.10	5,757.22	-15.87	-2,774.47	2,774.52	0.16	0.00	0.16
8,481.00	90.90	270.10	5,756.77	-15.65	-2,902.47	2,902.51	1.09	1.09	0.00
8,608.00	90.80	270.10	5,754.89	-15.42	-3,029.45	3,029.49	0.08	-0.08	0.00
8,736.00	91.20	271.40	5,752.65	-13.75	-3,157.42	3,157.44	1.06	0.31	1.02
8,864.00	89.50	270.20	5,751.87	-11.96	-3,285.40	3,285.40	1.63	-1.33	-0.94
8,991.00	90.50	269.40	5,751.87	-12.41	-3,412.39	3,412.40	1.01	0.79	-0.63
9,119.00	90.20	269.10	5,751.09	-14.08	-3,540.38	3,540.39	0.33	-0.23	-0.23
9,247.00	91.10	269.90	5,749.64	-15.20	-3,668.37	3,668.38	0.94	0.70	0.63
9,375.00	92.50	270.10	5,745.62	-15.20	-3,796.30	3,796.31	1.10	1.09	0.16
9,502.00	92.60	270.20	5,739.96	-14.87	-3,923.17	3,923.18	0.11	0.08	0.08
9,630.00	92.20	269.00	5,734.60	-15.76	-4,051.05	4,051.07	0.99	-0.31	-0.94
9,757.00	92.00	268.30	5,729.95	-18.75	-4,177.93	4,177.96	0.57	-0.16	-0.55

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #47H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3957.00usft (Capstar 119)
Site:	Crow Federal	MD Reference:	KB @ 3957.00usft (Capstar 119)
Well:	#47H	North Reference:	Grid
Wellbore:	OH / Job #1514595	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 119)	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)	
9,885.00	91.40	268.50	5,726.15	-22.32	-4,305.83	4,305.88	0.49	-0.47	0.16	
10,012.00	91.10	268.80	5,723.38	-25.31	-4,432.76	4,432.83	0.33	-0.24	0.24	
10,124.00	90.90	268.80	5,721.43	-27.66	-4,544.72	4,544.80	0.18	-0.18	0.00	
Final Phoenix MWD Survey										
10,199.00	90.90	268.80	5,720.25	-29.23	-4,619.69	4,619.78	0.00	0.00	0.00	
Projection to TD										

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
5,207.00	5,206.37	-19.09	11.96	Tie In to Scientific Gyros	
5,245.00	5,244.37	-18.98	11.86	First Phoenix MWD Survey	
10,124.00	5,721.43	-27.66	-4,544.72	Final Phoenix MWD Survey	
10,199.00	5,720.25	-29.23	-4,619.69	Projection to TD	

NM OIL CONSERVATION

ARTESIA DISTRICT

Form C-102

Revised August 1, 2011

Submit one copy to appropriate District Office

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) 334-6175 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

JAN 19 2016

RECEIVED

AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-015 43408	Pool Code 26770	Pool Name Fren; Glorieta - Yeso
Property Code 3087H 313404	Property Name CROW FEDERAL COM	Well Number 47H
OGRID No. 873	Operator Name APACHE CORPORATION	Elevation 3946'

Surface Location

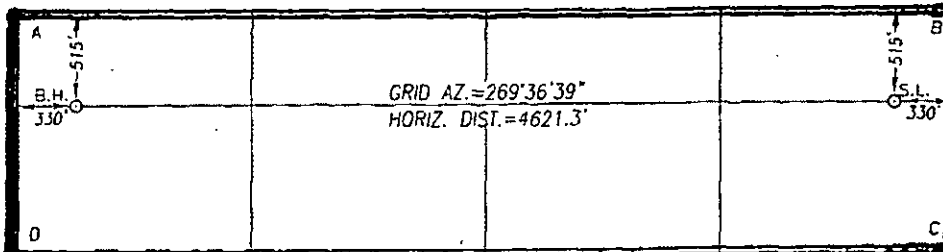
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	10	17-S	31-E		515	NORTH	330	EAST	EDDY

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
D	10	17-S	31-E		515	NORTH	330	WEST	EDDY

Dedicated Acres 160	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



CORNER COORDINATES TABLE NAD 27 NME

A - Y=675530.4 N, X=643632.5 E
B - Y=675566.2 N, X=648912.4 E
C - Y=674246.0 N, X=648919.7 E
D - Y=674209.2 N, X=643639.5 E

CORNER COORDINATES TABLE NAD 83 NME

A - Y=675594.6 N, X=684811.0 E
B - Y=675630.4 N, X=690090.8 E
C - Y=674310.1 N, X=690098.2 E
D - Y=674273.3 N, X=684818.1 E

GEODETIC COORDINATES
NAD 27 NME
BOTTOM HOLE LOCATION
Y=675017.8 N
X=643965.1 E
LAT.=32.854830° N
LONG.=103.864522° W
LAT.=32° 51' 17" N
LONG.=103° 51' 52" W

GEODETIC COORDINATES
NAD 83 NME
BOTTOM HOLE LOCATION
Y=675081.9 N
X=685143.7 E
LAT.=32.854947° N
LONG.=103.865029° W
LAT.=32° 51' 18" N
LONG.=103° 51' 54" W

GEODETIC COORDINATES
NAD 27 NME
SURFACE LOCATION
Y=675049.1 N
X=648585.3 E
LAT.=32.854858° N
LONG.=103.849477° W
LAT.=32° 51' 17" N
LONG.=103° 50' 58" W

GEODETIC COORDINATES
NAD 83 NME
SURFACE LOCATION
Y=675113.3 N
X=689763.8 E
LAT.=32.854976° N
LONG.=103.849984° W
LAT.=32° 51' 18" N
LONG.=103° 51' 00" 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 3/10/15
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.

APR 13 2016
Date of Survey
Signature & Seal of Professional Surveyor

3239
REGISTERED PROFESSIONAL SURVEYOR
NEW MEXICO

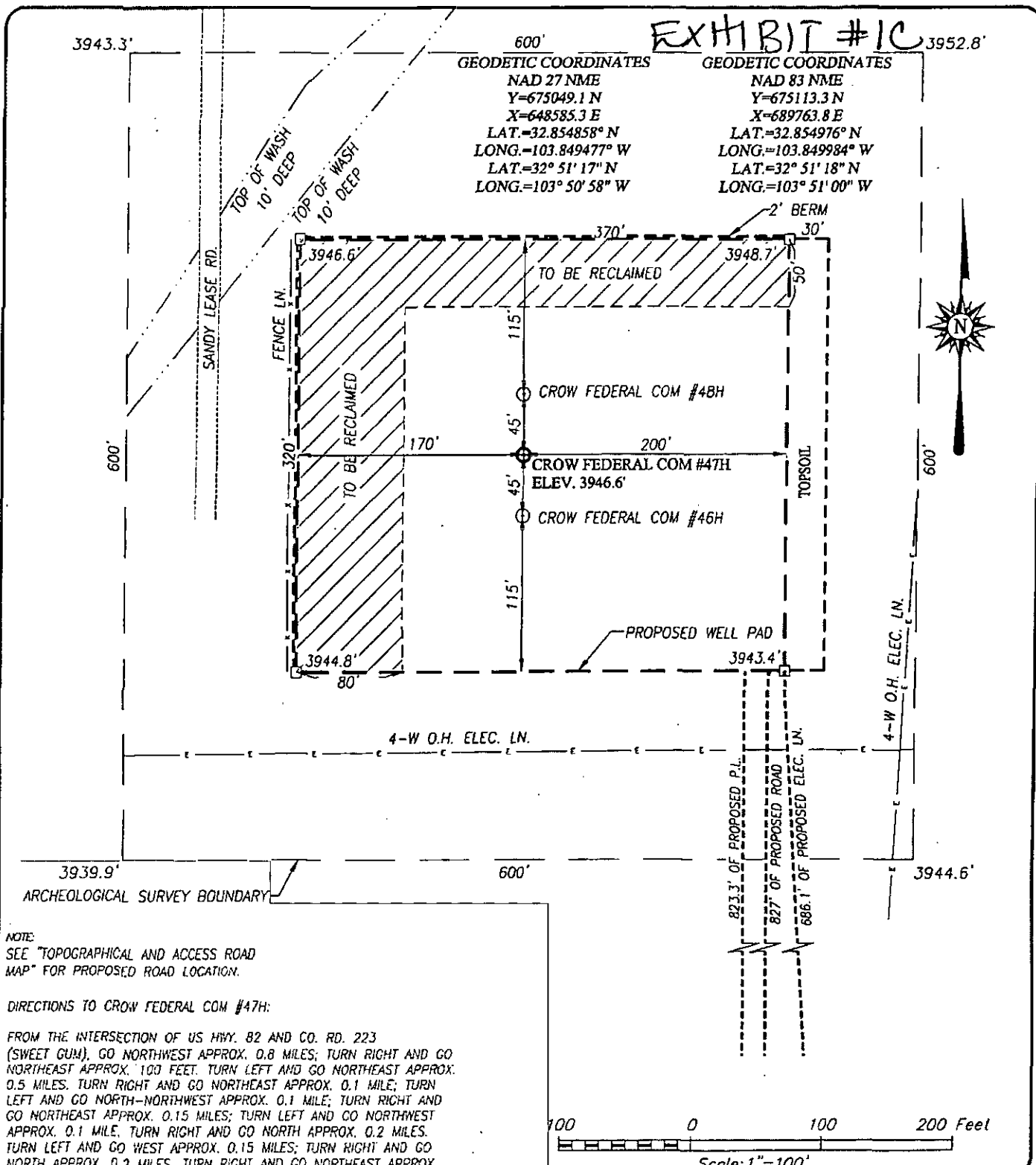
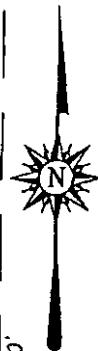
Certificate Number
Gary G. Eidson 12641
Ronald J. Eidson 3239

ACK JWSC W.O.: 15.13.0337

EXHIBIT #1C

600'
 GEODETIC COORDINATES
 NAD 27 NME
 Y=675049.1 N
 X=648585.3 E
 LAT.=32.854858° N
 LONG.=103.849477° W
 LAT.=32° 51' 17" N
 LONG.=103° 50' 58" W

3952.8'
 GEODETIC COORDINATES
 NAD 83 NME
 Y=675113.3 N
 X=689763.8 E
 LAT.=32.854976° N
 LONG.=103.849984° W
 LAT.=32° 51' 18" N
 LONG.=103° 51' 00" W



NOTE:
 SEE "TOPOGRAPHICAL AND ACCESS ROAD
 MAP" FOR PROPOSED ROAD LOCATION.

DIRECTIONS TO CROW FEDERAL COM #47H:

FROM THE INTERSECTION OF US HWY. 82 AND CO. RD. 223
 (SWEET GUM), GO NORTHWEST APPROX. 0.8 MILES; TURN RIGHT AND GO
 NORTHEAST APPROX. 100 FEET. TURN LEFT AND GO NORTHEAST APPROX.
 0.5 MILES. TURN RIGHT AND GO NORTHEAST APPROX. 0.1 MILE; TURN
 LEFT AND GO NORTH-NORTHWEST APPROX. 0.1 MILE; TURN RIGHT AND
 GO NORTHEAST APPROX. 0.15 MILES; TURN LEFT AND GO NORTHWEST
 APPROX. 0.1 MILE. TURN RIGHT AND GO NORTH APPROX. 0.2 MILES.
 TURN LEFT AND GO WEST APPROX. 0.15 MILES; TURN RIGHT AND GO
 NORTH APPROX. 0.2 MILES. TURN RIGHT AND GO NORTHEAST APPROX.
 0.1 MILE. TURN LEFT AND GO NORTH APPROX. 0.7 MILES. TURN RIGHT
 AND GO EAST APPROX. 0.5 MILES. TURN RIGHT AND GO SOUTH APPROX.
 0.2 MILES. TURN LEFT AND GO EAST APPROX. 0.8 MILES TO THE
 EXISTING CROW FEDERAL COM #25H, #26H & #27H WELL PAD. AT THE
 NORTHEAST CORNER OF THIS WELL PAD, FOLLOW ROAD SURVEY NORTH
 APPROX. 827 FEET TO THE SOUTHEAST CORNER OF THE LOCATION.



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

APACHE CORPORATION

CROW FEDERAL COM #47H WELL
 LOCATED 560 FEET FROM THE NORTH LINE
 AND 330 FEET FROM THE EAST LINE OF SECTION 10,
 TOWNSHIP 17 SOUTH, RANGE 31 EAST, N.M.P.M.,
 EDDY COUNTY, NEW MEXICO

Survey Date: 4/2/14	CAD Date: 3/5/15	Drawn By: ACK
W.O. No.: 15130337	Rev: 3/11/15	Rel. W.O.: 14110363
Sheet 1 of 1		