



Apache Corporation

Eddy County, NM (NAD27 NME)

Crow Federal

#24H API # 30-015-41168

WB1/Job #1311334

NM OIL CONSERVATION
ARTESIA DISTRICT

JUL 17 2014

RECEIVED

Survey: Phoenix MWD Survey

Phoenix Final Survey Report

22 October, 2013



PHOENIX
TECHNOLOGY SERVICES



Phoenix Technology Services

Phoenix Final Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #24H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3880.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3880.00usft (Capstar 114)
Well:	#24H	North Reference:	Grid
Wellbore:	WB1/Job #1311334	Survey Calculation Method:	Minimum Curvature
Design:	Survey (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:	#24H		
Well Position	+N/-S	0.00 usft	Northing:
	+E/-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 51' 6.30158 N
		Longitude:	103° 52' 57.92992 W
		Ground Level:	3,869.00 usft

Wellbore:	WB1/Job #1311334		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010_14	08/08/12	7.64
			Dip Angle
			(°)
			60.68
			Field Strength
			(nT)
			48,842

Design:	Survey (Capstar 114)		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
		Direction	(°)
		89.59	

Survey Program	Date 10/22/13		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100.00	478.00	Gyrodata Survey (WB1/Job #1311334)	CB-GYRO-MS
614.00	10,858.00	Phoenix MWD Survey (WB1/Job #131133)	MWD
			Description
			Camera based gyro multishot
			MWD - Standard

Survey			
MD	Inc	Azi (azimuth)	TVD
(usft)	(°)	(°)	(usft)
478.00	0.73	18.41	477.98
			N/S
			(usft)
			E/W
			(usft)
			V. Sec
			(usft)
			Dleg
			(°/100usft)
			0.00
Tie-on to Gyrodata			
614.00	0.70	12.20	613.97
			6.00
			0.38
			0.42
			0.06
First Phoenix MWD Survey			
660.00	0.70	322.50	659.96
			6.50
			0.26
			0.31
			1.28
			7.19
			-1.13
			-1.08
			1.23
			831.00
			2.80
			263.30
			830.89
			7.22
			-4.31
			-4.26
			1.74
			916.00
			3.40
			265.70
			915.76
			6.79
			-8.88
			-8.83
			0.72
			1,002.00
			3.60
			268.80
			1,001.60
			6.54
			-14.12
			-14.08
			0.32
			1,087.00
			3.60
			273.30
			1,086.43
			6.64
			-19.46
			-19.41
			0.33
			1,172.00
			3.50
			277.00
			1,171.27
			7.11
			-24.70
			-24.64
			0.29



Phoenix Technology Services

Phoenix Final Survey Report



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Site:	Crow Federal	MD Reference:	KB @ 3880.00usft (Capstar 114)
Well:	#24H	North Reference:	Grid
Wellbore:	WB1/Job #1311334	Survey Calculation Method:	Minimum Curvature
Design:	Survey (Capstar 114)	Database:	GCR DB

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	D Leg (%/100usft)
1,260.00	3.20	281.40	1,259.12	7.92	-29.77	-29.71	0.45
1,348.00	2.90	277.60	1,347.00	8.70	-34.38	-34.32	0.41
1,433.00	1.80	253.80	1,431.92	8.61	-37.80	-37.74	1.70
1,519.00	1.40	228.70	1,517.89	7.54	-39.88	-39.83	0.93
1,605.00	1.30	182.00	1,603.87	5.88	-40.71	-40.66	1.25
1,690.00	1.60	177.60	1,688.84	3.73	-40.69	-40.66	0.38
1,775.00	0.40	251.70	1,773.83	2.45	-40.92	-40.90	1.81
1,860.00	0.40	283.60	1,858.83	2.42	-41.49	-41.48	0.26
1,946.00	0.70	293.90	1,944.82	2.71	-42.27	-42.25	0.37
2,032.00	0.60	272.80	2,030.82	2.94	-43.20	-43.17	0.30
2,117.00	0.90	276.10	2,115.81	3.03	-44.30	-44.28	0.36
2,203.00	0.90	284.10	2,201.80	3.27	-45.63	-45.61	0.15
2,288.00	1.10	278.30	2,286.79	3.55	-47.09	-47.06	0.26
2,374.00	1.00	289.40	2,372.77	3.92	-48.61	-48.58	0.26
2,459.00	1.10	291.50	2,457.76	4.47	-50.07	-50.04	0.13
2,545.00	1.20	295.10	2,543.74	5.15	-51.65	-51.61	0.14
2,631.00	1.40	300.00	2,629.72	6.06	-53.38	-53.33	0.27
2,716.00	1.40	304.40	2,714.69	7.16	-55.13	-55.08	0.13
2,801.00	0.80	299.30	2,799.68	8.04	-56.51	-56.45	0.71
2,887.00	0.90	293.00	2,885.67	8.60	-57.65	-57.59	0.16
2,972.00	1.00	303.90	2,970.66	9.27	-58.88	-58.82	0.24
3,058.00	1.00	301.00	3,056.64	10.08	-60.15	-60.08	0.06
3,143.00	1.10	314.40	3,141.63	11.03	-61.37	-61.29	0.31
3,229.00	1.30	313.70	3,227.61	12.28	-62.66	-62.57	0.23
3,314.00	1.30	319.80	3,312.59	13.68	-63.98	-63.88	0.16
3,400.00	1.40	323.70	3,398.57	15.28	-65.23	-65.12	0.16
3,451.00	1.60	327.20	3,449.55	16.38	-65.99	-65.87	0.43
3,564.00	1.60	325.10	3,562.50	19.00	-67.75	-67.61	0.05
3,650.00	0.20	123.20	3,648.49	19.90	-68.31	-68.16	2.08
3,735.00	0.30	108.90	3,733.49	19.75	-67.97	-67.83	0.14
3,821.00	0.70	81.40	3,819.49	19.75	-67.24	-67.10	0.53
3,909.00	1.20	106.90	3,907.48	19.56	-65.83	-65.69	0.73
3,994.00	1.10	107.90	3,992.46	19.05	-64.20	-64.06	0.12
4,080.00	1.10	103.80	4,078.45	18.60	-62.61	-62.48	0.09
4,166.00	1.20	100.40	4,164.43	18.24	-60.92	-60.79	0.14
4,251.00	0.60	115.40	4,249.42	17.89	-59.65	-59.52	0.75
4,337.00	1.00	128.60	4,335.41	17.23	-58.65	-58.53	0.51
4,422.00	1.10	139.20	4,420.39	16.15	-57.54	-57.42	0.26
4,508.00	1.10	125.20	4,506.38	15.05	-56.33	-56.22	0.31
4,593.00	0.90	132.00	4,591.37	14.13	-55.16	-55.06	0.27
4,679.00	1.10	123.90	4,677.35	13.22	-53.98	-53.88	0.28
4,764.00	1.20	119.10	4,762.34	12.33	-52.52	-52.43	0.16
4,850.00	1.20	125.60	4,848.32	11.37	-51.00	-50.92	0.16
4,935.00	1.10	110.90	4,933.30	10.56	-49.52	-49.44	0.37



Phoenix Technology Services

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Site:	Crow Federal	MD Reference:	KB @ 3880.00usft (Capstar 114)
Well:	#24H	North Reference:	Grid
Wellbore:	WB1/Job #1311334	Survey Calculation Method:	Minimum Curvature
Design:	Survey (Capstar 114)	Database:	GCR DB

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
5,021.00	1.50	133.30	5,019.28	9.50	-47.93	-47.86	0.74
5,106.00	1.40	139.10	5,104.25	7.95	-46.44	-46.38	0.21
5,195.00	0.40	126.90	5,193.24	6.94	-45.48	-45.43	1.14
5,280.00	0.60	129.80	5,278.24	6.48	-44.90	-44.85	0.24
5,366.00	0.50	139.90	5,364.23	5.90	-44.31	-44.27	0.16
5,451.00	0.50	116.20	5,449.23	5.45	-43.74	-43.70	0.24
5,537.00	0.50	112.20	5,535.23	5.15	-43.05	-43.02	0.04
5,556.00	0.80	106.50	5,554.22	5.08	-42.85	-42.81	1.61
5,585.00	0.60	82.80	5,583.22	5.04	-42.51	-42.47	1.20
5,628.00	4.00	84.80	5,626.18	5.20	-40.79	-40.75	7.91
5,670.00	8.30	86.40	5,667.93	5.53	-36.30	-36.26	10.25
5,713.00	13.10	86.60	5,710.17	6.01	-28.34	-28.29	11.16
5,756.00	17.80	88.00	5,751.60	6.53	-16.90	-16.85	10.96
5,799.00	22.40	91.30	5,791.98	6.57	-2.13	-2.08	11.01
5,843.00	27.60	92.10	5,831.84	6.01	16.45	16.49	11.84
5,889.00	33.10	90.90	5,871.52	5.42	39.68	39.72	12.03
5,932.00	39.60	90.30	5,906.13	5.16	65.15	65.18	15.14
5,975.00	46.00	90.50	5,937.67	4.96	94.35	94.38	14.89
6,018.00	51.20	90.20	5,966.10	4.76	126.59	126.62	12.10
6,060.00	55.80	90.40	5,991.07	4.58	160.34	160.37	10.96
6,103.00	60.20	90.50	6,013.85	4.30	196.80	196.83	10.23
6,146.00	64.60	90.60	6,033.77	3.93	234.90	234.92	10.23
6,188.00	69.50	90.70	6,050.14	3.49	273.56	273.58	11.67
6,231.00	74.70	90.50	6,063.35	3.06	314.46	314.47	12.10
6,274.00	79.70	90.90	6,072.88	2.55	356.37	356.38	11.66
6,318.00	84.80	90.40	6,078.81	2.06	399.96	399.96	11.65
6,403.00	87.20	89.80	6,084.74	1.91	484.74	484.74	2.91
6,491.00	86.50	89.20	6,089.57	2.68	572.60	572.61	1.05
6,579.00	88.70	89.70	6,093.26	3.52	660.52	660.53	2.56
6,665.00	88.30	89.60	6,095.51	4.05	746.49	746.50	0.48
6,750.00	88.90	89.10	6,097.59	5.01	831.45	831.47	0.92
6,835.00	88.30	88.60	6,099.66	6.72	916.41	916.44	0.92
6,921.00	87.60	88.10	6,102.74	9.19	1,002.32	1,002.36	1.00
7,006.00	89.60	88.80	6,104.82	11.49	1,087.26	1,087.31	2.49
7,092.00	89.10	88.40	6,105.79	13.59	1,173.23	1,173.29	0.74
7,178.00	88.80	89.70	6,107.37	15.01	1,259.20	1,259.27	1.55
7,263.00	88.00	89.10	6,109.74	15.90	1,344.16	1,344.24	1.18
7,353.00	89.10	89.70	6,112.02	16.85	1,434.12	1,434.21	1.39
7,439.00	88.70	89.40	6,113.67	17.52	1,520.11	1,520.19	0.58
7,525.00	88.30	89.00	6,115.92	18.72	1,606.07	1,606.16	0.66
7,612.00	87.70	88.60	6,118.96	20.54	1,692.99	1,693.10	0.83
7,697.00	88.60	89.40	6,121.70	22.03	1,777.94	1,778.05	1.42
7,783.00	88.00	89.70	6,124.25	22.70	1,863.89	1,864.01	0.78
7,868.00	87.50	89.60	6,127.59	23.22	1,948.83	1,948.94	0.60



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Well:	#24H	North Reference:	Grid
Wellbore:	WB1/Job #1311334	Survey Calculation Method:	Minimum Curvature
Design:	Survey (Capstar 114)	Database:	GCR DB

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
7,954.00	89.10	89.10	6,130.14	24.19	2,034.78	2,034.90	1.95
8,039.00	88.50	89.10	6,131.92	25.53	2,119.75	2,119.88	0.71
8,125.00	88.90	91.00	6,133.87	25.45	2,205.73	2,205.85	2.26
8,210.00	88.40	90.90	6,135.87	24.05	2,290.69	2,290.80	0.60
8,296.00	88.20	90.70	6,138.42	22.85	2,376.64	2,376.75	0.33
8,381.00	87.50	90.70	6,141.61	21.81	2,461.58	2,461.67	0.82
8,467.00	89.10	90.50	6,144.16	20.91	2,547.53	2,547.62	1.87
8,556.00	88.80	90.50	6,145.80	20.13	2,636.51	2,636.59	0.34
8,641.00	88.60	90.30	6,147.72	19.54	2,721.49	2,721.56	0.33
8,727.00	88.40	90.40	6,149.98	19.01	2,807.46	2,807.52	0.26
8,812.00	89.60	90.10	6,151.46	18.64	2,892.44	2,892.50	1.46
8,898.00	88.70	89.40	6,152.73	19.02	2,978.43	2,978.49	1.33
8,983.00	90.00	89.50	6,153.70	19.83	3,063.42	3,063.48	1.53
9,069.00	89.30	89.20	6,154.22	20.81	3,149.41	3,149.48	0.89
9,154.00	88.70	88.80	6,155.71	22.29	3,234.38	3,234.46	0.85
9,240.00	90.00	88.60	6,156.68	24.24	3,320.36	3,320.44	1.53
9,326.00	89.60	88.10	6,156.98	26.72	3,406.32	3,406.42	0.74
9,411.00	90.90	89.40	6,156.61	28.57	3,491.29	3,491.41	2.16
9,497.00	90.50	88.40	6,155.56	30.22	3,577.27	3,577.40	1.25
9,582.00	90.20	89.00	6,155.04	32.15	3,662.25	3,662.38	0.79
9,668.00	89.80	88.50	6,155.04	34.03	3,748.23	3,748.37	0.74
9,753.00	89.80	88.50	6,155.34	36.25	3,833.20	3,833.36	0.00
9,839.00	90.10	90.60	6,155.41	36.93	3,919.19	3,919.35	2.47
9,925.00	89.80	90.50	6,155.49	36.10	4,005.18	4,005.34	0.37
10,010.00	89.70	90.10	6,155.86	35.66	4,090.18	4,090.33	0.49
10,095.00	89.40	90.20	6,156.53	35.44	4,175.18	4,175.33	0.37
10,180.00	89.10	89.80	6,157.64	35.44	4,260.17	4,260.32	0.59
10,266.00	88.50	89.10	6,159.44	36.26	4,346.15	4,346.30	1.07
10,351.00	88.20	89.00	6,161.89	37.67	4,431.10	4,431.26	0.37
10,437.00	87.90	89.30	6,164.82	38.94	4,517.04	4,517.20	0.49
10,524.00	87.30	89.00	6,168.46	40.23	4,603.95	4,604.13	0.77
10,612.00	86.80	89.20	6,172.99	41.61	4,691.83	4,692.00	0.61
10,697.00	86.20	88.50	6,178.18	43.32	4,776.65	4,776.84	1.08
10,783.00	85.80	88.60	6,184.18	45.49	4,862.41	4,862.61	0.48
10,805.00	85.60	88.80	6,185.83	45.99	4,884.35	4,884.55	1.28
Last Phoenix MWD Survey							
10,858.00	85.60	88.80	6,189.89	47.09	4,937.18	4,937.39	0.00
Projection to TD							



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Site:	Crow Federal	MD Reference:	KB @ 3880.00usft (Capstar 114)
Well:	#24H	North Reference:	Grid
Wellbore:	WB1/Job #1311334	Survey Calculation Method:	Minimum Curvature
Design:	Survey (Capstar 114)	Database:	GCR DB

Survey Annotations:				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		N/S (usft)	E/W (usft)	
478.00	477.98	4.37	-0.07	Tie-on to Gyrodata
614.00	613.97	6.00	0.38	First Phoenix MWD Survey
10,805.00	6,185.83	45.99	4,884.35	Last Phoenix MWD Survey
10,858.00	6,189.89	47.09	4,937.18	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) 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 30-15-41168	Pool Code 26770	Pool Name FREN; GLORIETA-YESO
Property Code 308711	Property Name CROW FEDERAL	Well Number 24H
OGRID No. 873	Operator Name APACHE CORPORATION	Elevation 3869'

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		1620	NORTH	10	WEST	EDDY

As-Drilled Bottom Hole Location If Different From Surface

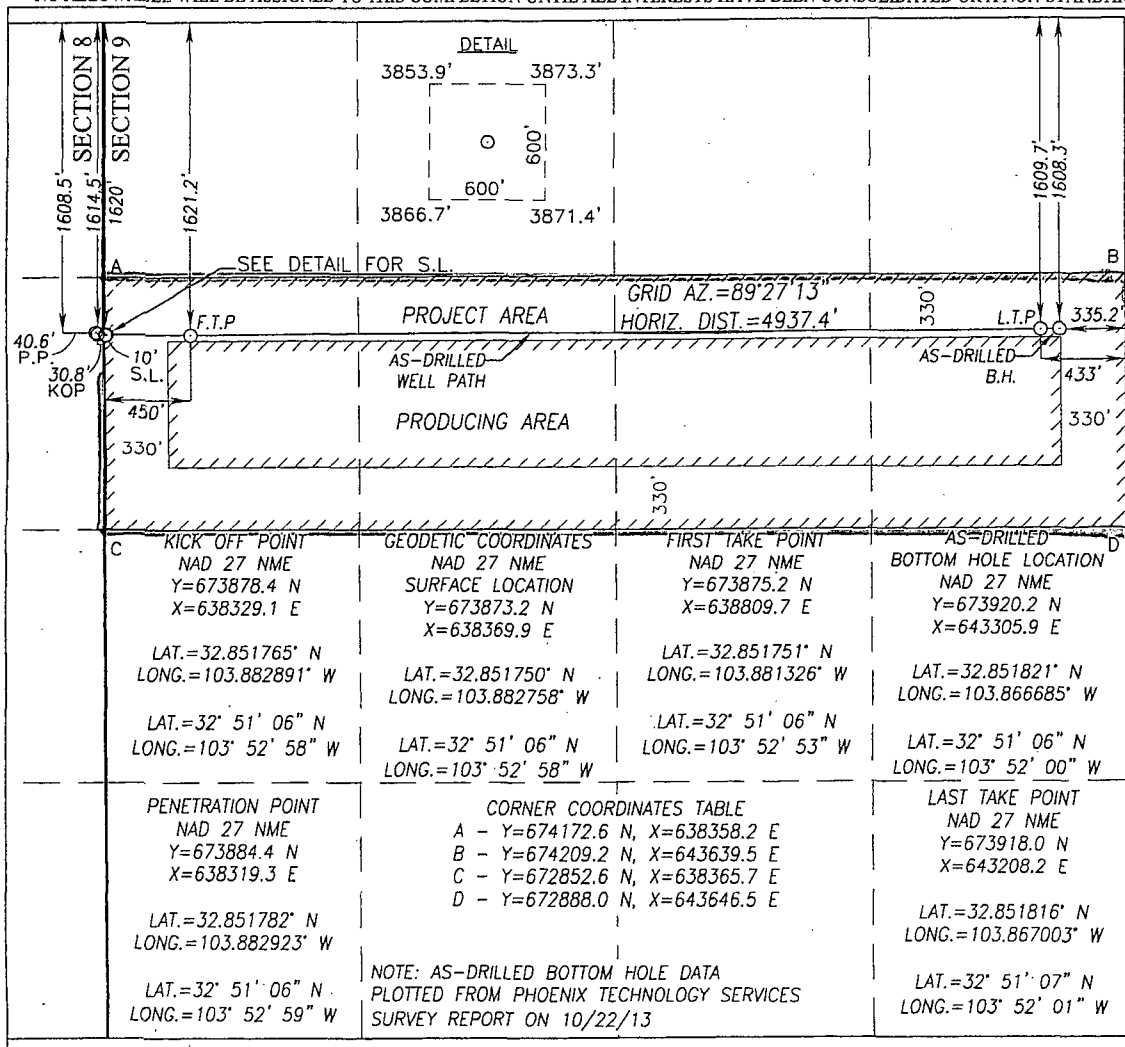
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	9	17-S	31-E		1608.3	NORTH	335.2	EAST	EDDY

Penetration Point Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	8	17-S	31-E		1608.5	NORTH	40.6	EAST	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



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.

Signature: *Fatima Vasquez* Date: 04/30/14

Printed Name: Fatima Vasquez

E-mail Address: Fatima.Vasquez@apache Corp.com

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: Signature: Gary G. Eidson Professional Surveyor:

GARY G. EIDSON
NEW MEXICO
12641
Certificate Number: Gary G. Eidson 12641
Ronald J. Eidson 3239
ACK REL NW 1/4, 10/22/13 WSC W.O.: 14.13.0151