

PHOENIX
TECHNOLOGY SERVICES

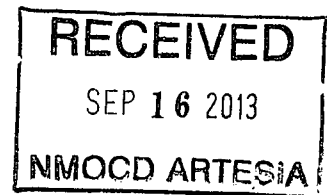
September 13, 2013

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 #17H
Eddy County, NM
API #30-015-40991
Job No. 1311090



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	Drainhole Number	Surveyed Depths		Dates Performed		Type of Survey
		From	To	Start	End	
Matt Dice	17H	534	10,242	08/26/13	09/05/13	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,

Sonya Thomas

Sonya Thomas
Operations Administrator

Certified mail receipt number: 7011 1570 0001 4364 8677

Phoenix Technology Services SURVEY DATA CERTIFICATION



PHOENIX
TECHNOLOGY SERVICES

PHOENIX JOB NUMBER

1311090

OPERATOR

Apache Corporation

WELL NAME

Crow Federal 17H

COUNTY & STATE

Eddy, NM

API WELL NUMBER

30-015-40991

PROPOSED DIRECTION

89.63

TIE-IN DATA						
MEASURED	VERTICAL			N-S	E-W	DATA
DEPTH	DEPTH	INCLIN	AZIMUTH	COORD	COORD	SOURCE
ft	.00 ft	.0 ft	.0 ft	.00 ft	.00 ft	Surface

FIRST SURVEY	FIRST SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
26-Aug-13	534 ft	0.2	58.4

SURVEY INSTRUMENT
TYPE
Phoenix MWD

LAST SURVEY	LAST SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
5-Sep-13	10,242 ft	90.2	89.3

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

RECEIVED
SEP 16 2013
NMOCD ARTESIA

PROJECTED TD SURVEY	PROJECTED TD SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
5-Sep-13	10,303 ft	90.2	89.3

Matt Dice

PRINT YOUR NAME ABOVE

Matt Dice

SIGN YOUR NAME ABOVE

MAGNETIC DECLINATION OR TOTAL GRID

TOTAL CORRECTION USED	
7.26	
DECLINATION OR GRID	GRID

9/5/2013
TODAY'S DATE

MWD SUPERVISOR 1

Matt Dice

DIRECTIONAL DRILLER 1

Ken Smith

MWD SUPERVISOR 2

Brad Hill

DIRECTIONAL DRILLER 2

Matt Boyt

1805 Brittmore Road

Houston, Texas 77043

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



Apache Corporation

Eddy County, NM (NAD27 NME)

Crow Federal

#17H

WB1/Job #1311090

Survey: Pheonix MWD Survey

Apache Corporation

06 September, 2013



Apache Corporation

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #17H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3848.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3848.00usft (Capstar 114)
Well:	#17H	North Reference:	Grid
Wellbore:	WB1/Job #1311090	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	Compass 5000 GCR DB

Project	Eddy County, NM (NAD27 NME)
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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	#17H
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Well Position	+N/-S	0.00 usft	Northing:	671,987.60 usft	Latitude:	32° 50' 47.63874 N
	+E/-W	0.00 usft	Easting:	638,480.60 usft	Longitude:	103° 52' 56.72661 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,837.00 usft

Wellbore	WB1/Job #1311090
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010_14	08/21/13	7.51	60.65	48,735

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	89.63	



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #17H
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Site:	Crow Federal	MD Reference:	KB @ 3848.00usft (Capstar 114)
Well:	#17H	North Reference:	Grid
Wellbore:	WB1/Job #1311090	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	Compass 5000 GCR DB

Survey Program		Date	09/06/13		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	400.00	Gyrodata Survey (WB1/Job #1311090)	CB-GYRO-MS	Camera based gyro multishot	
455.00	10,303.00	Phoenix MWD Survey (WB1/Job #131109)	MWD	MWD - Standard	

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)	
400.00	0.29	25.41	-3,448.00	400.00	0.62	-0.98	-0.97	0.00	671,988.22	638,479.62	
455.00	0.27	41.22	-3,393.00	455.00	0.84	-0.83	-0.83	0.14	671,988.44	638,479.77	
First Phoenix MWD Survey											
534.00	0.20	58.40	-3,314.00	534.00	1.06	-0.59	-0.58	0.12	671,988.66	638,480.01	
577.00	0.30	66.00	-3,271.00	577.00	1.14	-0.42	-0.42	0.24	671,988.74	638,480.18	
653.00	0.80	273.20	-3,195.01	652.99	1.25	-0.77	-0.76	1.42	671,988.85	638,479.83	
738.00	1.90	272.00	-3,110.03	737.97	1.33	-2.77	-2.76	1.29	671,988.93	638,477.83	
824.00	2.40	276.80	-3,024.09	823.91	1.60	-5.99	-5.97	0.62	671,989.20	638,474.61	
909.00	3.30	279.10	-2,939.20	908.80	2.20	-10.17	-10.15	1.07	671,989.80	638,470.43	
995.00	3.60	280.30	-2,853.35	994.65	3.07	-15.27	-15.25	0.36	671,990.67	638,465.33	
1,084.00	3.20	279.90	-2,764.51	1,083.49	4.00	-20.47	-20.44	0.45	671,991.60	638,460.13	
1,169.00	3.90	282.90	-2,679.67	1,168.33	5.05	-25.62	-25.59	0.85	671,992.65	638,454.98	
1,255.00	2.70	272.90	-2,593.82	1,254.18	5.80	-30.49	-30.46	1.54	671,993.40	638,450.11	
1,341.00	2.60	270.70	-2,507.91	1,340.09	5.93	-34.47	-34.43	0.17	671,993.53	638,446.13	
1,426.00	2.80	271.80	-2,423.00	1,425.00	6.02	-38.47	-38.43	0.24	671,993.62	638,442.13	
1,512.00	1.50	245.60	-2,337.07	1,510.93	5.62	-41.60	-41.56	1.86	671,993.22	638,439.00	
1,598.00	0.90	218.10	-2,251.08	1,596.92	4.62	-43.04	-43.01	0.95	671,992.22	638,437.56	
1,682.00	0.90	220.00	-2,167.09	1,680.91	3.60	-43.87	-43.84	0.04	671,991.20	638,436.73	
1,766.00	0.90	209.40	-2,083.10	1,764.90	2.52	-44.62	-44.60	0.20	671,990.12	638,435.98	
1,857.00	0.90	217.80	-1,992.12	1,855.88	1.33	-45.40	-45.40	0.14	671,988.93	638,435.20	
1,943.00	0.90	220.70	-1,906.13	1,941.87	0.29	-46.26	-46.26	0.05	671,987.89	638,434.34	



Apache Corporation

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #17H
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Site:	Crow Federal	MD Reference:	KB @ 3848.00usft (Capstar 114)
Well:	#17H	North Reference:	Grid
Wellbore:	WB1/Job #1311090	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	Compass 5000 GCR DB

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (%/100usft)	Northing (usft)	Easting (usft)	
2,028.00	0.90	225.40	-1,821.14	2,026.86	-0.69	-47.17	-47.17	0.09	671,986.91	638,433.43	
2,114.00	0.90	230.10	-1,735.15	2,112.85	-1.60	-48.17	-48.18	0.09	671,986.00	638,432.43	
2,199.00	0.90	237.10	-1,650.16	2,197.84	-2.39	-49.24	-49.26	0.13	671,985.21	638,431.36	
2,284.00	0.90	242.70	-1,565.17	2,282.83	-3.06	-50.40	-50.41	0.10	671,984.54	638,430.20	
2,370.00	0.90	251.40	-1,479.18	2,368.82	-3.58	-51.64	-51.66	0.16	671,984.02	638,428.96	
2,456.00	1.00	256.00	-1,393.19	2,454.81	-3.98	-53.00	-53.03	0.15	671,983.62	638,427.60	
2,541.00	1.00	257.30	-1,308.20	2,539.80	-4.32	-54.45	-54.47	0.03	671,983.28	638,426.15	
2,627.00	1.60	201.30	-1,222.22	2,625.78	-5.60	-55.62	-55.65	1.55	671,982.00	638,424.98	
2,713.00	0.90	193.60	-1,136.24	2,711.76	-7.38	-56.21	-56.26	0.84	671,980.22	638,424.39	
2,801.00	0.70	21.80	-1,048.25	2,799.75	-7.55	-56.17	-56.22	1.81	671,980.05	638,424.43	
2,887.00	1.00	18.80	-962.26	2,885.74	-6.35	-55.74	-55.78	0.35	671,981.25	638,424.86	
2,972.00	1.10	19.40	-877.27	2,970.73	-4.88	-55.23	-55.26	0.12	671,982.72	638,425.37	
3,058.00	1.20	21.80	-791.29	3,056.71	-3.27	-54.62	-54.64	0.13	671,984.33	638,425.98	
3,143.00	1.20	20.40	-706.31	3,141.69	-1.61	-53.98	-53.99	0.03	671,985.99	638,426.62	
3,229.00	1.20	23.00	-620.33	3,227.67	0.07	-53.31	-53.31	0.06	671,987.67	638,427.29	
3,315.00	1.40	25.90	-534.35	3,313.65	1.84	-52.50	-52.49	0.24	671,989.44	638,428.10	
3,400.00	1.40	24.00	-449.37	3,398.63	3.72	-51.62	-51.60	0.05	671,991.32	638,428.98	
3,450.00	1.50	19.70	-399.39	3,448.61	4.90	-51.16	-51.12	0.30	671,992.50	638,429.44	
3,529.00	1.40	22.90	-320.41	3,527.59	6.76	-50.43	-50.39	0.16	671,994.36	638,430.17	
3,615.00	1.60	322.70	-234.44	3,613.56	8.68	-50.75	-50.69	1.76	671,996.28	638,429.85	
3,701.00	1.50	207.80	-148.46	3,699.54	8.64	-52.00	-51.95	3.04	671,996.24	638,428.60	
3,786.00	1.30	181.90	-63.48	3,784.52	6.69	-52.55	-52.51	0.77	671,994.29	638,428.05	
3,872.00	1.20	184.40	22.50	3,870.50	4.82	-52.66	-52.62	0.13	671,992.42	638,427.94	
3,957.00	1.60	169.70	107.47	3,955.47	2.77	-52.51	-52.49	0.63	671,990.37	638,428.09	
4,043.00	2.20	186.20	193.43	4,041.43	-0.06	-52.47	-52.47	0.94	671,987.54	638,428.13	
4,128.00	0.60	190.50	278.40	4,126.40	-2.12	-52.73	-52.74	1.89	671,985.48	638,427.87	
4,213.00	1.20	86.90	363.39	4,211.39	-2.50	-51.92	-51.94	1.72	671,985.10	638,428.68	



Apache Corporation

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Site:	Crow Federal	MD Reference:	KB @ 3848.00usft (Capstar 114)
Well:	#17H	North Reference:	Grid
Wellbore:	WB1/Job #1311090	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	Compass 5000 GCR DB

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	N/S (usft)	E/W (usft)	V:Sec (usft)	DLeg (%/100usft)	Northing (usft)	Easting (usft)	
4,300.00	1.10	79.80	450.37	4,298.37	-2.31	-50.19	-50.21	0.20	671,985.29	638,430.41	
4,385.00	1.10	87.50	535.36	4,383.36	-2.13	-48.57	-48.59	0.17	671,985.47	638,432.03	
4,476.00	1.10	88.70	626.34	4,474.34	-2.07	-46.83	-46.84	0.03	671,985.53	638,433.77	
4,563.00	1.10	89.00	713.33	4,561.33	-2.04	-45.16	-45.17	0.01	671,985.56	638,435.44	
4,648.00	1.10	88.90	798.31	4,646.31	-2.01	-43.53	-43.54	0.00	671,985.59	638,437.07	
4,736.00	1.00	76.30	886.30	4,734.30	-1.81	-41.94	-41.95	0.29	671,985.79	638,438.66	
4,823.00	1.00	71.40	973.28	4,821.28	-1.39	-40.48	-40.49	0.10	671,986.21	638,440.12	
4,908.00	1.00	63.00	1,058.27	4,906.27	-0.81	-39.12	-39.12	0.17	671,986.79	638,441.48	
4,994.00	0.90	55.60	1,144.26	4,992.26	-0.09	-37.89	-37.89	0.18	671,987.51	638,442.71	
5,079.00	0.90	50.10	1,229.25	5,077.25	0.71	-36.83	-36.82	0.10	671,988.31	638,443.77	
5,119.00	0.90	43.10	1,269.24	5,117.24	1.15	-36.37	-36.36	0.27	671,988.75	638,444.23	
5,162.00	1.50	86.20	1,312.23	5,160.23	1.43	-35.58	-35.57	2.43	671,989.03	638,445.02	
5,205.00	7.30	96.40	1,355.09	5,203.09	1.16	-32.30	-32.29	13.56	671,988.76	638,448.30	
5,247.00	13.30	89.40	1,396.39	5,244.39	0.92	-24.81	-24.80	14.57	671,988.52	638,455.79	
5,290.00	18.60	85.30	1,437.73	5,285.73	1.53	-13.02	-13.01	12.59	671,989.13	638,467.58	
5,333.00	23.30	86.40	1,477.87	5,325.87	2.63	2.31	2.33	10.97	671,990.23	638,482.91	
5,376.00	27.40	87.50	1,516.72	5,364.72	3.59	20.69	20.71	9.60	671,991.19	638,501.29	
5,418.00	31.90	88.90	1,553.22	5,401.22	4.23	41.45	41.48	10.84	671,991.83	638,522.05	
5,461.00	36.80	89.80	1,588.71	5,436.71	4.49	65.70	65.73	11.46	671,992.09	638,546.30	
5,504.00	41.20	90.40	1,622.11	5,470.11	4.44	92.76	92.78	10.27	671,992.04	638,573.36	
5,548.00	45.80	90.50	1,654.02	5,502.02	4.20	123.04	123.06	10.46	671,991.80	638,603.64	
5,594.00	52.00	90.30	1,684.25	5,532.25	3.96	157.68	157.70	13.48	671,991.56	638,638.28	
5,637.00	56.80	90.20	1,709.27	5,557.27	3.81	192.64	192.66	11.16	671,991.41	638,673.24	
5,680.00	61.50	90.80	1,731.32	5,579.32	3.48	229.54	229.56	11.00	671,991.08	638,710.14	
5,723.00	66.50	91.30	1,750.16	5,598.16	2.77	268.17	268.18	11.67	671,990.37	638,748.77	
5,765.00	71.80	90.80	1,765.10	5,613.10	2.05	307.40	307.40	12.67	671,989.65	638,788.00	
5,808.00	77.90	89.30	1,776.34	5,624.34	2.02	348.88	348.89	14.58	671,989.62	638,829.48	



Apache Corporation

Company: Apache Corporation
Project: Eddy County NM (NAD27 NME)
Site: Crow Federal
Well: #17H
Wellbore: WB1/Job #1311090
Design: Surveys (Capstar 114)

Local Co-ordinate Reference: Well #17H
TVD Reference: KB @ 3848.00usft (Capstar 114)
MD Reference: KB @ 3848.00usft (Capstar 114)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Compass 5000 GCR DB

Survey										
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
5,850.00	83.50	88.50	1,783.12	5,631.12	2.82	390.31	390.32	13.47	671,990.42	638,870.91
5,936.00	86.00	88.60	1,790.99	5,638.99	4.99	475.91	475.93	2.91	671,992.59	638,956.51
6,021.00	87.10	89.90	1,796.10	5,644.10	6.10	560.75	560.77	2.00	671,993.70	639,041.35
6,107.00	88.30	90.40	1,799.56	5,647.56	5.87	646.67	646.70	1.51	671,993.47	639,127.27
6,193.00	88.80	90.70	1,801.73	5,649.73	5.05	732.64	732.66	0.68	671,992.65	639,213.24
6,278.00	88.90	91.20	1,803.44	5,651.44	3.64	817.61	817.62	0.60	671,991.24	639,298.21
6,368.00	88.90	91.00	1,805.17	5,653.17	1.91	907.58	907.57	0.22	671,989.51	639,388.18
6,453.00	89.20	91.20	1,806.58	5,654.58	0.28	992.55	992.53	0.42	671,987.88	639,473.15
6,537.00	88.40	89.90	1,808.33	5,656.33	-0.53	1,076.53	1,076.50	1.82	671,987.07	639,557.13
6,623.00	88.50	90.10	1,810.66	5,658.66	-0.53	1,162.50	1,162.47	0.26	671,987.07	639,643.10
6,708.00	87.60	89.00	1,813.55	5,661.55	0.14	1,247.44	1,247.42	1.67	671,987.74	639,728.04
6,794.00	87.60	88.10	1,817.15	5,665.15	2.31	1,333.34	1,333.33	1.05	671,989.91	639,813.94
6,879.00	87.60	88.50	1,820.71	5,668.71	4.83	1,418.23	1,418.23	0.47	671,992.43	639,898.83
6,965.00	87.70	88.60	1,824.24	5,672.24	7.01	1,504.13	1,504.14	0.16	671,994.61	639,984.73
7,050.00	87.90	88.40	1,827.50	5,675.50	9.23	1,589.04	1,589.06	0.33	671,996.83	640,069.64
7,135.00	88.00	88.60	1,830.54	5,678.54	11.46	1,673.95	1,673.99	0.26	671,999.06	640,154.55
7,220.00	88.10	88.60	1,833.44	5,681.44	13.53	1,758.88	1,758.93	0.12	672,001.13	640,239.48
7,306.00	87.90	88.60	1,836.44	5,684.44	15.63	1,844.80	1,844.86	0.23	672,003.23	640,325.40
7,391.00	87.20	89.20	1,840.07	5,688.07	17.26	1,929.70	1,929.78	1.08	672,004.86	640,410.30
7,476.00	87.30	89.30	1,844.15	5,692.15	18.37	2,014.60	2,014.68	0.17	672,005.97	640,495.20
7,561.00	87.30	89.00	1,848.15	5,696.15	19.63	2,099.50	2,099.58	0.35	672,007.23	640,580.10
7,648.00	87.20	89.10	1,852.33	5,700.33	21.07	2,186.38	2,186.47	0.16	672,008.67	640,666.98
7,733.00	87.20	88.90	1,856.48	5,704.48	22.55	2,271.27	2,271.37	0.24	672,010.15	640,751.87
7,818.00	87.40	88.70	1,860.48	5,708.48	24.33	2,356.16	2,356.26	0.33	672,011.93	640,836.76
7,903.00	87.10	88.20	1,864.56	5,712.56	26.63	2,441.03	2,441.15	0.69	672,014.23	640,921.63
7,988.00	88.70	90.10	1,867.68	5,715.68	27.89	2,525.95	2,526.08	2.92	672,015.49	641,006.55
8,072.00	88.90	90.00	1,869.44	5,717.44	27.82	2,609.93	2,610.06	0.27	672,015.42	641,090.53



Apache Corporation

Company: Apache Corporation
Project: Eddy County, NM (NAD27/NME)
Site: Crow Federal
Well: #17H
Wellbore: WB1/Job #1311090
Design: Surveys (Capstar 114)

Local Co-ordinate Reference: Well #17H
TVD Reference: KB @ 3848.00usft (Capstar 114)
MD Reference: KB @ 3848.00usft (Capstar 114)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Compass 5000 GCR: DB

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)	
8,159.00	88.80	89.70	1,871.18	5,719.18	28.04	2,696.92	2,697.04	0.36	672,015.64	641,177.52	
8,244.00	89.10	90.10	1,872.74	5,720.74	28.19	2,781.90	2,782.03	0.59	672,015.79	641,262.50	
8,328.00	89.30	89.20	1,873.91	5,721.91	28.70	2,865.89	2,866.02	1.10	672,016.30	641,346.49	
8,413.00	88.70	91.40	1,875.40	5,723.40	28.26	2,950.87	2,950.99	2.68	672,015.86	641,431.47	
8,498.00	88.40	90.50	1,877.55	5,725.55	26.85	3,035.83	3,035.94	1.12	672,014.45	641,516.43	
8,583.00	88.70	90.90	1,879.70	5,727.70	25.81	3,120.80	3,120.90	0.59	672,013.41	641,601.40	
8,671.00	88.70	90.10	1,881.69	5,729.69	25.04	3,208.77	3,208.87	0.91	672,012.64	641,689.37	
8,756.00	89.10	90.00	1,883.33	5,731.33	24.97	3,293.76	3,293.85	0.49	672,012.57	641,774.36	
8,840.00	89.00	89.70	1,884.72	5,732.72	25.19	3,377.74	3,377.84	0.38	672,012.79	641,858.34	
8,925.00	89.20	90.10	1,886.05	5,734.05	25.34	3,462.73	3,462.82	0.53	672,012.94	641,943.33	
9,010.00	89.30	89.80	1,887.17	5,735.17	25.41	3,547.73	3,547.82	0.37	672,013.01	642,028.33	
9,094.00	88.20	89.40	1,889.00	5,737.00	26.00	3,631.70	3,631.79	1.39	672,013.60	642,112.30	
9,179.00	88.20	89.50	1,891.67	5,739.67	26.81	3,716.66	3,716.75	0.12	672,014.41	642,197.26	
9,263.00	88.40	89.90	1,894.16	5,742.16	27.25	3,800.62	3,800.71	0.53	672,014.85	642,281.22	
9,347.00	88.30	89.80	1,896.58	5,744.58	27.47	3,884.58	3,884.68	0.17	672,015.07	642,365.18	
9,431.00	88.60	88.00	1,898.85	5,746.85	29.09	3,968.53	3,968.64	2.17	672,016.69	642,449.13	
9,519.00	89.30	88.30	1,900.46	5,748.46	31.93	4,056.47	4,056.59	0.87	672,019.53	642,537.07	
9,611.00	88.20	90.10	1,902.47	5,750.47	33.21	4,148.44	4,148.56	2.29	672,020.81	642,629.04	
9,700.00	88.50	90.10	1,905.03	5,753.03	33.06	4,237.40	4,237.52	0.34	672,020.66	642,718.00	
9,788.00	88.70	90.30	1,907.18	5,755.18	32.75	4,325.37	4,325.49	0.32	672,020.35	642,805.97	
9,880.00	88.60	89.90	1,909.35	5,757.35	32.59	4,417.35	4,417.46	0.45	672,020.19	642,897.95	
9,971.00	88.30	89.30	1,911.81	5,759.81	33.22	4,508.31	4,508.43	0.74	672,020.82	642,988.91	
10,062.00	88.70	89.30	1,914.20	5,762.20	34.33	4,599.27	4,599.40	0.44	672,021.93	643,079.87	
10,150.00	89.10	89.30	1,915.88	5,763.88	35.41	4,687.25	4,687.38	0.45	672,023.01	643,167.85	
10,242.00	90.20	89.30	1,916.45	5,764.45	36.53	4,779.24	4,779.37	1.20	672,024.13	643,259.84	
Last Phoenix MWD Survey											



Apache Corporation

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #17H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3848.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3848.00usft (Capstar 114)
Well:	#17H	North Reference:	Grid
Wellbore:	WB1/Job #1311090	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	Compass 5000 GCR DB

Survey										
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
10,303.00	90.20	89.30	1,916.23	5,764.23	37.28	4,840.23	4,840.37	0.00	672,024.88	643,320.83
Projection to TD										

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
455.00	455.00	0.84	-0.83	First Phoenix MWD Survey
10,242.00	5,764.45	36.53	4,779.24	Last Phoenix MWD Survey
10,303.00	5,764.23	37.28	4,840.23	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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