

SEP 19 2016

RECEIVED

OPERATOR Apache
WELL/LEASE Raven Federal COM 12H
COUNTY Eddy

STATE OF NEW MEXICO
DEVIATION REPORT

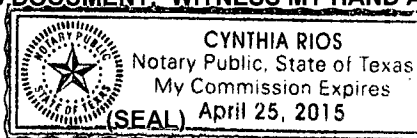
30-015-40468

250	0.50
450	1.00
521	1.30
605	0.80
689	0.70
1356	2.20
1439	2.50
1523	2.30
1607	1.80
1690	1.80
1856	1.70
2275	2.50
2359	2.20
2443	1.60
2526	1.50
2610	1.50
2861	1.50
2944	1.40
3028	1.40
3111	1.20
3191	1.50
3280	1.40
3364	1.50
3445	1.60
3545	1.60
3628	0.40
3670	1.50
3753	2.20

SIGNED BY: *Ron Scandolari*
RON SCANDOLARI, VP CONTRACT DRILLING

STATE OF TEXAS
COUNTY OF MIDLAND

ON THIS 27th DAY OF February, 2013, BEFORE ME, C RIOS, A NOTARY PUBLIC, PERSONALLY APPEARED RON SCANDOLARI, WHO ACKNOWLEDGED AND EXECUTED THIS DOCUMENT. WITNESS MY HAND AND OFFICIAL SEAL.



Cynthia Rios
NOTARY PUBLIC

SEP 19 2016

RECEIVED

OPERATOR Apache
WELL/LEASE Raven Federal Com 12H
COUNTY Eddy

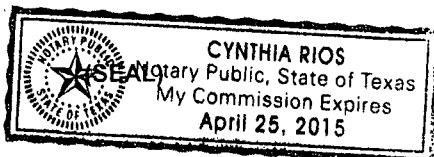
STATE OF NEW MEXICO
DEVIATION REPORT

150 1.00
293 1.00

SIGNED BY: 
RON SCANDOLARI, VP CONTRACT DRILLING

STATE OF TEXAS
COUNTY OF MIDLAND

ON THIS 8th DAY OF January, 2013, BEFORE ME, C RIOS, A NOTARY
PUBLIC, PERSONALLY APPEARED RON SCANDOLARI, WHO ACKNOWLEDGED AND EXECUTED
THIS DOCUMENT. WITNESS MY HAND AND OFFICIAL SEAL.




NOTARY PUBLIC



PHOENIX
TECHNOLOGY SERVICES

February 19, 2013

Scanned
2/27/13

Apache Corporation
Attention: Regulatory Department
2000 Post Oak Boulevard Suite 100
Houston, Texas 77056

NM OIL CONSERVATION
ARTESIA DISTRICT

SEP 19 2016

RECEIVED

Re: Apache Corporation
Raven Federal 12H
Eddy Co., NM
API #30-015-40468
Job No. 1211107

Dear Regulatory Department;

Phoenix Technology Services, Inc. has filed the Survey Data Certification, Surveys, and Lease Plat for the above referenced Well with the Texas Railroad Commission via certification online. A copy of the filing is attached for your records.

Name of Surveyor	Drainhole Number	Surveyed Depths		Dates Performed		Type of Survey
		From	To	Start	End	
Brad Hill	12H	521	10,516	01/16/13	02/13/13	MWD

Thank you for the opportunity to be of service. Please contact me if you have any questions or require additional information.

Best Regards,

Kelly Jo Walter

Kelly Jo Walter
Operations Administrator

Phoenix Technology Services SURVEY DATA CERTIFICATION



PHOENIX
TECHNOLOGY SERVICES

PHOENIX JOB NUMBER 1211107

OPERATOR Apache

WELL NAME Raven Federal Com #12H

COUNTY & STATE

Eddy, NM

API WELL NUMBER 30-015-40468

PROPOSED DIRECTION 269.61

TIE-IN DATA						
MEASURED	VERTICAL			N-S	E-W	DATA
DEPTH	DEPTH	INCLIN	AZIMUTH	COORD	COORD	SOURCE
0.0 ft	0.0 ft	0.0 ft	0.0 ft	0.00 ft	0.00 ft	Surface

FIRST SURVEY DATE	FIRST SURVEY DEPTH	INCLIN	AZIMUTH
16-Jan-13	521 ft	1.3	41.8

SURVEY INSTRUMENT TYPE
Phoenix MWD

LAST SURVEY DATE	LAST SURVEY DEPTH	INCLIN	AZIMUTH
13-Feb-13	10,516 ft	92.1	271.2

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

PROJECTED TD SURVEY DATE	PROJECTED TD SURVEY DEPTH	INCLIN	AZIMUTH
13-Feb-13	10,573 ft	92.4	271.4

Brad Hill

PRINT YOUR NAME ABOVE

Brad Hill

SIGN YOUR NAME ABOVE

MAGNETIC DECLINATION OR TOTAL GRID

TOTAL CORRECTION USED	DECLINATION
7.44	
DECLINATION OR GRID	DECLINATION

2-13-13

TODAY'S DATE

MWD SUPERVISOR 1 Brad Hill

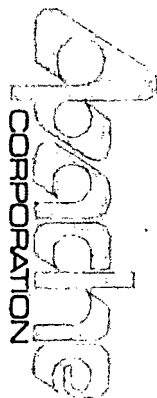
DIRECTIONAL DRILLER 1

Tim Owens

MWD SUPERVISOR 2 Matt Dice

DIRECTIONAL DRILLER 2

Ken Smith



Apache Corporation

Eddy County, NM (NAD27 NME)

Raven Federal #12H

Wellbore #1 / Job #1211107

Survey: Phoenix MWD Surveys

Phoenix Final Survey Report

13 February, 2013

NM OIL CONSERVATION
ARTESIA DISTRICT
SEP 19 2016
RECEIVED



PHOENIX
TECHNOLOGY SERVICES



Phoenix Technology Services
Phoenix Final Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #12H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3741.00usft (Basic 44)
Site:	Raven Federal	MD Reference:	KB @ 3741.00usft (Basic 44)
Well:	#12H	North Reference:	Grid
Wellbore:	Wellbore #1 / Job #1211107	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Basic 44)	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	Raven Federal
Site Position:	
From:	Map
Position Uncertainty:	0.00 usft
	Northing: 673,239.70 usft
	Easting: 633,303.50 usft
	Slot Radius: 13.3/16 "
	Latitude: 32° 51' 0.2430 N
	Longitude: 103° 53' 57.3509 W
	Grid Convergence: 0.24 °

Well	#12H
Well Position	+N/S 0.00 usft
	+E/W 0.00 usft
Position Uncertainty	0.00 usft
	Northing: 673,369.70 usft
	Easting: 633,303.50 usft
	Wellhead Elevation: usft
	Latitude: 32° 51' 1.5293 N
	Longitude: 103° 53' 57.3446 W
	Ground Level: 3,728.00 usft

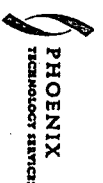
Wellbore	Wellbore #1 / Job #1211107
Magnetics	
Model Name	Sample Date
	Declination (°)
	Dip Angle (°)
	Field Strength (nT)
	IGRF2010_14
	01/16/13
	7.59
	60.67
	48,796

Design	Surveys (Basic 44)
Audit Notes:	
Version:	1.0
	Phase: ACTUAL
	Tie On Depth: 0.00
Vertical Section:	
	Depth From (TVD)
	+N/S (usft)
	+E/W (usft)
	Direction (°)
	0.00
	0.00
	269.61

Survey Program	Date	02/13/13
From (usft)	To (usft)	Survey (Wellbore)
521.00	10,573.00	Phoenix MWD Surveys (Wellbore #1 / Job
		MWD
		Description
		MWD - Standard



Phoenix Technology Services
Phoenix Final Survey Report



Company: Apache Corporation
Project: Eddy County, NM (NAD27 NME)
Site: Raven Federal
Well: #12H
Wellbore: Wellbore #1 / Job #1211107
Design: Surveys (Basic 44)

Local Co-ordinate Reference: Well #12H
TVD Reference: KB @ 3741.00usft (Basic 44)
MD Reference: KB @ 3741.00usft (Basic 44)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: GCR DB

Survey	MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	NS (usft)	EW (usft)	V. Sec (usft)	Dlog (°/100usft)	Northing (usft)	Easting (usft)
Phoenix First IMMD Survey	0.00	0.00	0.00	3,741.00	0.00	0.00	0.00	0.00	0.00	673,369.70	633,303.50
	521.00	1.30	41.80	3,220.04	520.96	4.41	3.94	-3.97	0.25	673,374.11	633,307.44
605.00	0.80		51.00	3,136.06	604.94	5.49	5.03	-5.07	0.63	673,375.19	633,308.53
689.00	0.70		71.20	3,052.07	688.93	6.02	5.87	-6.01	0.33	673,375.72	633,309.47
771.00	0.70		90.90	2,970.07	770.93	6.17	6.95	-6.99	0.29	673,375.87	633,310.45
855.00	0.60		112.20	2,886.08	854.92	6.00	7.87	-7.91	0.31	673,375.70	633,311.37
938.00	0.80		100.00	2,803.08	937.92	5.73	8.84	-8.88	0.30	673,375.43	633,312.34
1,022.00	0.80		136.60	2,719.09	1,021.91	5.21	9.82	-9.86	0.60	673,374.91	633,313.32
1,105.00	0.80		173.00	2,636.10	1,104.90	4.21	10.29	-10.32	0.60	673,373.91	633,313.79
1,189.00	1.20		181.50	2,552.11	1,188.89	2.75	10.34	-10.36	0.51	673,372.45	633,313.84
1,272.00	1.60		174.30	2,469.14	1,271.86	0.73	10.43	-10.43	0.53	673,370.43	633,313.93
1,356.00	2.20		190.10	2,385.18	1,355.82	-2.03	10.26	-10.25	0.94	673,367.67	633,313.76
1,439.00	2.50		204.00	2,302.25	1,438.75	-5.25	9.25	-9.21	0.77	673,364.45	633,312.75
1,523.00	2.30		213.50	2,218.33	1,522.67	-8.33	7.57	-7.52	0.53	673,361.37	633,311.07
1,607.00	1.80		217.90	2,134.38	1,606.62	-10.78	5.83	-5.76	0.62	673,358.92	633,309.33
1,690.00	1.80		240.00	2,051.42	1,689.58	-12.46	3.90	-3.82	0.83	673,357.24	633,307.40
1,773.00	1.70		268.60	1,968.46	1,772.54	-13.14	1.54	-1.45	1.05	673,356.56	633,305.04
1,857.00	1.80		272.90	1,884.50	1,856.50	-13.10	-1.02	1.11	0.20	673,356.60	633,302.48
1,940.00	2.20		272.60	1,801.55	1,939.45	-12.96	-3.91	4.00	0.48	673,356.74	633,299.59
2,025.00	2.60		276.60	1,716.62	2,024.38	-12.67	-7.46	7.55	0.51	673,357.03	633,296.04
2,108.00	2.70		276.60	1,633.71	2,107.29	-12.23	-11.27	11.35	0.12	673,357.47	633,292.23
2,192.00	2.40		285.30	1,549.79	2,191.21	-11.53	-14.93	15.01	0.58	673,358.17	633,288.57
2,275.00	2.50		291.20	1,466.87	2,274.13	-10.42	-18.30	18.37	0.33	673,359.28	633,285.20
2,359.00	2.20		305.60	1,382.94	2,358.06	-8.82	-21.32	21.38	0.79	673,360.88	633,282.18
2,443.00	1.60		339.70	1,298.98	2,442.02	-6.78	-23.03	23.08	1.49	673,362.92	633,280.47
2,526.00	1.50		349.40	1,216.01	2,524.99	-4.63	-23.64	23.67	0.34	673,365.07	633,279.86



Phoenix Technology Services
Phoenix Final Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #12H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3741.00usft (Basic 44)
Site:	Raven Federal	MD Reference:	KB @ 3741.00usft (Basic 44)
Well:	#12H	North Reference:	Grid
Wellbore:	Wellbore #1 / Job #1211107	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Basic 44)	Database:	GCR DB

Survey	MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	NS (usft)	EW (usft)	V. Sec (usft)	Dleg (°/100usft)	Northing (usft)	Easting (usft)
	2,610.00	1.50	18.60	1,132.04	2,608.96	-2.50	-23.49	23.50	0.90	673,367.20	633,280.01
	2,694.00	1.70	20.30	1,048.07	2,692.93	-0.29	-22.70	22.71	0.24	673,369.41	633,280.80
	2,777.00	1.70	22.60	965.11	2,775.89	2.00	-21.80	21.79	0.06	673,371.70	633,281.70
	2,861.00	1.50	33.90	881.14	2,859.86	4.06	-20.71	20.66	0.44	673,373.76	633,282.79
	2,944.00	1.40	30.10	798.17	2,942.83	5.84	-19.60	19.56	0.17	673,375.54	633,283.90
	3,028.00	1.40	33.90	714.19	3,026.81	7.58	-18.51	18.46	0.11	673,377.28	633,284.99
	3,111.00	1.20	31.50	631.21	3,109.79	9.16	-17.49	17.43	0.25	673,378.86	633,286.01
	3,195.00	1.50	39.00	547.24	3,193.76	10.77	-16.34	16.27	0.41	673,380.47	633,287.16
	3,280.00	1.40	26.80	462.27	3,278.73	12.56	-15.17	15.09	0.38	673,382.26	633,288.33
	3,364.00	1.50	25.30	378.29	3,362.71	14.47	-14.24	14.14	0.13	673,384.17	633,289.26
	3,445.00	1.60	35.70	297.32	3,443.68	16.34	-13.13	13.01	0.37	673,386.04	633,290.37
	3,545.00	1.60	34.70	197.36	3,543.64	18.63	-11.52	11.39	0.03	673,388.33	633,291.98
	3,586.00	1.00	47.10	156.37	3,584.63	19.34	-10.93	10.80	1.61	673,389.04	633,292.57
	3,628.00	0.40	157.70	114.37	3,626.63	19.45	-10.60	10.47	2.86	673,389.15	633,292.90
	3,670.00	1.50	212.00	72.38	3,668.62	18.85	-10.84	10.71	3.11	673,388.55	633,292.66
	3,753.00	2.20	226.50	-10.58	3,751.58	16.83	-12.57	12.46	1.01	673,386.53	633,290.93
	3,836.00	1.90	221.90	-93.52	3,834.52	14.71	-14.65	14.55	0.41	673,384.41	633,288.85
	3,920.00	2.00	220.50	-177.46	3,918.48	12.56	-16.53	16.44	0.13	673,382.26	633,286.97
	4,003.00	2.30	238.00	-260.42	4,001.42	10.58	-18.88	18.81	0.87	673,380.28	633,284.62
	4,087.00	3.30	264.80	-344.32	4,085.32	9.47	-22.72	22.65	1.93	673,379.17	633,280.78
	4,171.00	4.00	273.50	-428.15	4,169.15	9.43	-28.05	27.99	1.06	673,379.13	633,275.45
	4,255.00	4.00	273.90	-511.94	4,252.94	9.80	-33.90	33.83	0.03	673,379.50	633,269.60
	4,339.00	3.80	273.70	-595.75	4,336.75	10.16	-39.60	39.53	0.24	673,379.88	633,263.90
	4,422.00	3.00	268.60	-678.60	4,419.60	10.31	-44.51	44.44	1.03	673,380.01	633,258.99
	4,507.00	2.20	251.90	-763.52	4,504.52	9.75	-48.29	48.22	1.29	673,379.45	633,255.21
	4,591.00	1.10	170.60	-847.49	4,588.49	8.45	-49.69	49.63	2.75	673,378.15	633,253.81
	4,675.00	1.20	159.50	-931.47	4,672.47	6.83	-49.25	49.20	0.29	673,376.53	633,254.25



Phoenix Technology Services
Phoenix Final Survey Report



Company: Apache Corporation
Project: Eddy County, NM (NAD27 NME)
Site: Raven Federal
Well: #12H
Wellbore: Wellbore #1 / Job #1211107
Design: Surveys (Basic 44)

Local Co-ordinate Reference: Well #12H
TVD Reference: KB @ 3741.00ustf (Basic 44)
MD Reference: KB @ 3741.00ustf (Basic 44)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: GCR DB

Survey	MD (ustf)	Inc (°)	Az (azimuth) (°)	TVDSS (ustf)	TVD (ustf)	N/S (ustf)	EW (ustf)	V. Sec (ustf)	D. Leg (°/100ustf)	Northing (ustf)	Easting (ustf)
	4,758.00	1.40	168.40	-1,014.45	4,755.45	5.02	-48.74	48.71	0.34	673,374.72	633,254.76
	4,842.00	1.30	163.30	-1,098.43	4,839.43	3.10	-48.26	48.24	0.19	673,372.80	633,255.24
	4,925.00	1.50	169.30	-1,181.40	4,922.40	1.13	-47.79	47.78	0.30	673,370.83	633,255.71
	5,009.00	1.30	169.70	-1,265.38	5,006.38	-0.88	-47.41	47.42	0.24	673,368.82	633,256.09
	5,093.00	1.30	180.50	-1,348.36	5,090.36	-2.77	-47.25	47.27	0.29	673,366.93	633,256.25
	5,177.00	2.00	269.80	-1,433.33	5,174.33	-3.73	-48.73	48.75	2.82	673,365.97	633,254.77
	5,260.00	0.30	312.40	-1,516.31	5,257.31	-3.59	-50.34	50.36	2.16	673,366.11	633,255.16
	5,344.00	0.30	12.60	-1,600.31	5,341.31	-3.23	-50.45	50.47	0.36	673,366.47	633,255.05
	5,375.00	0.30	355.00	-1,631.31	5,372.31	-3.07	-50.44	50.46	0.30	673,366.63	633,255.06
	5,440.00	0.30	13.00	-1,696.31	5,437.31	-2.73	-50.42	50.43	0.14	673,366.97	633,255.08
	5,472.00	0.60	41.10	-1,728.31	5,469.31	-2.52	-50.29	50.30	1.14	673,367.18	633,255.21
	5,505.00	0.70	281.80	-1,761.31	5,502.31	-2.35	-50.37	50.39	3.40	673,367.35	633,255.13
	5,537.00	4.70	272.00	-1,793.27	5,534.27	-2.27	-51.87	51.89	12.54	673,367.43	633,251.63
	5,569.00	9.00	272.60	-1,825.03	5,566.03	-2.11	-55.69	55.70	13.44	673,367.59	633,247.81
	5,601.00	13.90	275.20	-1,856.38	5,597.38	-1.64	-62.02	62.03	15.39	673,368.06	633,241.48
	5,633.00	19.20	276.00	-1,887.05	5,628.05	-0.75	-71.09	71.09	16.58	673,368.95	633,232.41
	5,665.00	23.60	273.50	-1,916.84	5,657.84	0.20	-82.72	82.71	14.04	673,369.90	633,220.78
	5,697.00	27.50	270.00	-1,945.70	5,686.70	0.59	-86.51	96.50	13.06	673,370.29	633,206.99
	5,729.00	32.10	267.00	-1,973.46	5,714.46	0.14	-112.39	112.39	15.11	673,369.84	633,191.11
	5,761.00	37.30	267.20	-1,999.76	5,740.76	-0.78	-130.58	130.58	16.25	673,368.92	633,172.92
	5,793.00	41.70	268.00	-2,024.45	5,765.45	-1.62	-150.91	150.92	13.84	673,368.08	633,152.59
	5,825.00	46.50	268.80	-2,047.42	5,788.42	-2.24	-173.17	173.18	15.10	673,367.46	633,130.33
	5,858.00	51.70	269.40	-2,069.02	5,810.02	-2.62	-198.10	198.11	15.82	673,367.08	633,105.40
	5,890.00	57.70	270.10	-2,087.51	5,828.51	-2.73	-224.20	224.22	18.83	673,366.97	633,079.30
	5,922.00	64.00	270.30	-2,103.09	5,844.09	-2.63	-252.13	252.15	19.70	673,367.07	633,051.37
	5,954.00	69.10	270.40	-2,115.82	5,856.82	-2.45	-281.48	281.49	15.94	673,367.25	633,022.02
	5,986.00	73.10	270.20	-2,126.18	5,867.18	-2.30	-311.75	311.76	12.51	673,367.40	632,991.75



Phoenix Technology Services
Phoenix Final Survey Report



Company: Apache Corporation
Project: Eddy County, NM (NAD27 NME)
Site: Raven Federal
Well: #12H
Wellbore: Wellbore #1 / Job #211107
Design: Surveys (Basic 44)

Local Co-ordinate Reference:
TVD Reference: KB @ 3741.00usft (Basic 44)
MID Reference: KB @ 3741.00usft (Basic 44)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: GCR DB

Survey	MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	M/S (usft)	EW' (usft)	V. Sec (usft)	Dleg (°/100usft)	Northing (usft)	Easting (usft)
	6,018.00	77.40	270.20	-2,134.32	5,875.32	-2.19	-342.69	342.69	13.44	673,367.51	632,960.81
	6,050.00	82.90	270.10	-2,139.80	5,880.80	-2.11	-374.20	374.21	17.19	673,367.59	632,929.30
	6,083.00	86.70	270.10	-2,142.79	5,883.79	-2.05	-407.06	407.07	11.52	673,367.65	632,896.44
	6,115.00	90.10	269.70	-2,143.68	5,884.68	-2.10	-439.04	439.05	10.70	673,367.60	632,864.46
	6,211.00	91.80	268.40	-2,142.09	5,883.09	-3.70	-535.01	535.03	2.23	673,366.00	632,768.49
	6,308.00	89.90	267.70	-2,140.65	5,881.65	-7.00	-631.94	631.97	2.09	673,362.70	632,671.56
	6,404.00	92.20	268.60	-2,138.89	5,879.89	-10.09	-727.87	727.92	2.57	673,359.61	632,575.63
	6,500.00	90.70	268.80	-2,136.46	5,877.46	-12.27	-823.81	823.87	1.56	673,357.43	632,479.69
	6,597.00	90.70	269.70	-2,135.28	5,876.28	-13.54	-920.79	920.86	0.93	673,356.16	632,382.71
	6,693.00	89.90	270.10	-2,134.77	5,875.77	-13.71	-1,016.79	1,016.86	0.93	673,355.99	632,286.71
	6,789.00	90.70	269.90	-2,134.27	5,875.27	-13.71	-1,112.79	1,112.86	0.86	673,355.99	632,190.71
	6,885.00	89.20	270.30	-2,134.35	5,875.35	-13.54	-1,208.78	1,208.85	1.62	673,356.16	632,094.72
	6,982.00	89.90	270.50	-2,135.12	5,876.12	-12.86	-1,305.78	1,305.84	0.75	673,356.84	631,997.72
	7,078.00	90.60	270.20	-2,134.70	5,875.70	-12.28	-1,401.78	1,401.83	0.79	673,357.42	631,901.72
	7,174.00	88.80	270.10	-2,135.20	5,876.20	-12.03	-1,497.77	1,497.82	1.88	673,357.67	631,805.73
	7,270.00	89.20	269.70	-2,136.88	5,877.88	-12.19	-1,593.75	1,593.80	0.59	673,357.51	631,709.75
	7,367.00	89.10	269.30	-2,138.31	5,879.31	-13.04	-1,690.74	1,690.79	0.43	673,356.66	631,612.76
	7,463.00	89.80	269.60	-2,139.24	5,880.24	-13.96	-1,786.73	1,786.78	0.79	673,355.74	631,516.77
	7,559.00	90.90	270.60	-2,138.65	5,879.65	-13.79	-1,882.73	1,882.78	1.55	673,355.91	631,420.77
	7,656.00	91.60	268.60	-2,136.53	5,877.53	-14.47	-1,979.69	1,979.75	2.16	673,355.23	631,323.81
	7,752.00	90.30	269.30	-2,134.94	5,875.94	-16.23	-2,075.66	2,075.73	1.54	673,353.47	631,227.84
	7,847.00	90.00	269.40	-2,134.69	5,875.69	-17.31	-2,170.66	2,170.72	0.33	673,352.39	631,132.84
	7,945.00	89.80	268.80	-2,134.86	5,875.86	-18.85	-2,268.64	2,268.72	0.65	673,350.85	631,034.86
	8,041.00	88.70	269.10	-2,136.12	5,877.12	-20.61	-2,364.62	2,364.70	1.19	673,349.09	630,938.88
	8,137.00	89.50	269.20	-2,137.63	5,878.63	-22.03	-2,460.59	2,460.69	0.84	673,347.67	630,842.91
	8,233.00	90.40	270.10	-2,137.71	5,878.71	-22.62	-2,556.59	2,556.69	1.33	673,347.08	630,746.91
	8,330.00	89.60	270.20	-2,137.71	5,878.71	-22.36	-2,653.59	2,653.68	0.83	673,347.34	630,649.91



Phoenix Technology Services
Phoenix Final Survey Report



Company: Apache Corporation
Project: Eddy County, NM (NAD27 NME)
Site: Raven Federal
Well: #12H
Wellbore: Wellbore #1 / Job #1211107
Design: Surveys (Basic 44)

Local Co-ordinate Reference:
TVD Reference: KB @ 3741.00usft (Basic 44)
MD Reference: KB @ 3741.00usft (Basic 44)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: GCR DB

Survey	MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Nothing (usft)	Easting (usft)
	8,426.00	89.90	269.60	-2,138.13	5,879.13	-22.53	-2,749.59	2,749.68	0.70	673,347.17	630,553.91
	8,522.00	89.80	269.20	-2,138.38	5,879.38	-23.53	-2,845.58	2,845.68	0.43	673,346.17	630,457.92
	8,619.00	90.00	269.60	-2,138.55	5,879.55	-24.55	-2,942.58	2,942.68	0.46	673,345.15	630,360.92
	8,715.00	90.50	270.20	-2,138.13	5,879.13	-24.72	-3,038.57	3,038.67	0.81	673,344.98	630,264.93
	8,771.00	90.50	270.20	-2,137.64	5,878.64	-24.52	-3,094.57	3,094.67	0.00	673,345.18	630,208.93
	8,811.00	91.10	269.90	-2,137.09	5,878.09	-24.49	-3,134.57	3,134.66	1.68	673,345.21	630,168.93
	8,907.00	91.50	269.40	-2,134.91	5,875.91	-25.07	-3,230.54	3,230.64	0.67	673,344.63	630,072.96
	9,003.00	92.20	270.90	-2,131.81	5,872.81	-24.82	-3,326.49	3,326.58	1.72	673,344.88	629,977.01
	9,100.00	90.70	269.40	-2,129.35	5,870.35	-24.57	-3,423.45	3,423.54	2.19	673,345.13	629,880.05
	9,196.00	91.50	269.10	-2,127.51	5,868.51	-25.83	-3,519.42	3,519.52	0.89	673,343.87	629,784.08
	9,292.00	91.40	269.10	-2,125.08	5,866.08	-27.33	-3,615.38	3,615.48	0.10	673,342.37	629,688.12
	9,389.00	91.50	269.10	-2,122.63	5,863.63	-28.86	-3,712.34	3,712.45	0.10	673,340.84	629,591.16
	9,485.00	92.00	269.80	-2,119.70	5,860.70	-29.78	-3,808.29	3,808.40	0.90	673,339.92	629,495.21
	9,581.00	90.30	268.60	-2,117.77	5,858.77	-31.12	-3,904.25	3,904.38	2.17	673,338.58	629,399.25
	9,678.00	91.30	269.00	-2,116.41	5,857.41	-33.15	-4,001.22	4,001.35	1.11	673,336.55	629,302.28
	9,774.00	92.60	269.10	-2,113.15	5,854.15	-34.74	-4,097.15	4,097.29	1.36	673,334.96	629,206.35
	9,870.00	92.00	270.00	-2,109.30	5,850.30	-35.49	-4,193.07	4,193.21	1.13	673,334.21	629,110.43
	9,966.00	90.60	270.60	-2,107.12	5,848.12	-34.99	-4,289.04	4,289.18	1.59	673,334.71	629,014.46
	10,063.00	91.40	271.10	-2,105.42	5,846.42	-33.55	-4,386.01	4,386.14	0.97	673,336.15	628,917.49
	10,159.00	92.10	271.40	-2,102.49	5,843.49	-31.46	-4,481.95	4,482.06	0.79	673,338.24	628,821.55
	10,255.00	90.20	271.60	-2,100.57	5,841.57	-28.95	-4,577.89	4,577.98	1.99	673,340.75	628,725.61
	10,352.00	90.90	271.50	-2,099.63	5,840.63	-26.32	-4,674.85	4,674.92	0.73	673,343.38	628,628.65
	10,448.00	91.60	271.00	-2,097.54	5,838.54	-24.23	-4,770.80	4,770.86	0.90	673,345.47	628,532.70
	10,516.00	92.10	271.20	-2,095.35	5,836.35	-22.92	-4,838.75	4,838.80	0.79	673,346.78	628,464.75
Current MWD Survey	10,573.00	92.40	271.40	-2,093.11	5,834.11	-21.63	-4,895.69	4,895.73	0.63	673,348.07	628,407.81
Projection to bit											



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Design: Surveys (Basic 44)

Local Co-ordinate Reference:
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MD Reference: KB @ 3741.00usft (Basic 44)
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Survey Calculation Method: Grid
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Survey Annotations					
Measured Depth	Vertical Depth	Local Coordinates		Comment	
(usft)	(usft)	+N/-S (usft)	+E/-W (usft)		
521.00	520.96	4.41	3.94	Phoenix First MWD Survey	
10,516.00	5,836.35	-22.92	-4,838.75	Current MWD Survey	
10,573.00	5,834.11	-21.63	-4,895.69	Projection to bit	

Checked By: _____ Approved By: _____ Date: _____