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Cedar Lake Federal CA 722H

Apache Corporation

Eddy County, NM (NAD27 NME)

Raven Federal

#22H

OH / Job #1514540

Design: Surveys (Capstar 114)

Standard Survey Report

12 November, 2015

*final survey
mwd + syno
tie on*

NM OIL CONSERVATION
ARTESIA DISTRICT

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Phoenix Technology Services LP

Survey Report



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				
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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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.43	161.38	100.00	-0.36	0.12	0.18	0.43	0.43	0.00
200.00	0.57	288.73	200.00	-0.55	-0.23	-0.14	0.90	0.14	127.35
300.00	0.94	242.65	299.99	-0.77	-1.43	-1.28	0.68	0.37	-46.08
400.00	1.06	132.38	399.98	-1.77	-1.48	-1.16	1.64	0.12	-110.27
500.00	1.05	128.12	499.96	-2.96	-0.07	0.42	0.08	-0.01	-4.26
600.00	1.02	120.74	599.95	-3.98	1.41	2.05	0.14	-0.03	-7.38
700.00	0.99	116.98	699.93	-4.83	2.95	3.71	0.07	-0.03	-3.76
800.00	0.96	110.35	799.92	-5.51	4.50	5.36	0.12	-0.03	-6.63
900.00	0.84	346.77	899.91	-5.09	5.12	5.89	1.59	-0.12	-123.58

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)
1,000.00	1.13	77.14	999.90	-4.15	5.92	6.52	1.41	0.29	90.37
1,100.00	1.20	81.91	1,099.88	-3.79	7.91	8.43	0.12	0.07	4.77
1,200.00	1.27	81.91	1,199.86	-3.48	10.05	10.49	0.07	0.07	0.00
1,300.00	1.41	95.37	1,299.83	-3.44	12.37	12.77	0.34	0.14	13.46
1,400.00	1.37	105.80	1,399.80	-3.88	14.74	15.18	0.26	-0.04	10.43
1,500.00	1.31	113.55	1,499.77	-4.67	16.94	17.48	0.19	-0.06	7.75
1,600.00	1.20	114.80	1,599.75	-5.56	18.94	19.60	0.11	-0.11	1.25
1,700.00	1.14	117.83	1,699.73	-6.46	20.77	21.56	0.09	-0.06	3.03
1,800.00	1.04	120.32	1,799.71	-7.39	22.43	23.35	0.11	-0.10	2.49
1,900.00	0.88	134.04	1,899.70	-8.38	23.77	24.83	0.28	-0.16	13.72
2,000.00	0.75	124.26	1,999.69	-9.28	24.86	26.06	0.19	-0.13	-9.78
2,100.00	0.69	96.97	2,099.68	-9.72	26.00	27.25	0.34	-0.06	-27.29
2,200.00	0.66	257.50	2,199.68	-9.92	26.04	27.32	1.33	-0.03	160.53
2,300.00	0.62	114.40	2,299.67	-10.27	25.97	27.31	1.21	-0.04	-143.10
2,400.00	0.62	99.55	2,399.67	-10.58	26.99	28.37	0.16	0.00	-14.85
2,500.00	0.59	88.41	2,499.66	-10.66	28.04	29.42	0.12	-0.03	-11.14
2,600.00	0.60	236.26	2,599.66	-10.93	28.12	29.55	1.14	0.01	147.85
2,700.00	0.46	220.84	2,699.66	-11.53	27.42	28.96	0.20	-0.14	-15.42
2,800.00	0.45	133.21	2,799.65	-12.10	27.45	29.07	0.63	-0.01	-87.63
2,900.00	0.36	135.15	2,899.65	-12.59	27.95	29.66	0.09	-0.09	1.94
3,000.00	0.39	34.28	2,999.65	-12.53	28.37	30.05	0.58	0.03	-100.87
3,100.00	0.26	290.31	3,099.65	-12.17	28.35	29.97	0.52	-0.13	-103.97
3,200.00	0.12	347.00	3,199.65	-11.99	28.11	29.71	0.22	-0.14	56.69
3,300.00	0.36	334.10	3,299.65	-11.61	27.95	29.49	0.24	0.24	-12.90
3,400.00	0.55	51.68	3,399.65	-11.03	28.19	29.63	0.59	0.19	77.58
3,500.00	0.64	358.82	3,499.64	-10.17	28.55	29.85	0.54	0.09	-52.86
3,600.00	0.59	141.63	3,599.64	-10.02	28.86	30.12	1.17	-0.05	142.81
3,700.00	0.73	26.17	3,699.64	-9.85	29.46	30.69	1.12	0.14	-115.46
3,800.00	0.89	323.50	3,799.63	-8.65	29.28	30.31	0.85	0.16	-62.67
3,900.00	0.86	28.17	3,899.62	-7.37	29.17	29.99	0.94	-0.03	64.67
4,000.00	0.91	30.16	3,999.61	-6.02	29.93	30.51	0.06	0.05	1.99
4,100.00	0.93	35.20	4,099.59	-4.67	30.79	31.14	0.08	0.02	5.04
4,200.00	0.47	45.16	4,199.59	-3.72	31.55	31.73	0.47	-0.46	9.96
4,300.00	0.66	136.82	4,299.58	-3.85	32.24	32.43	0.82	0.19	91.66
4,400.00	0.81	53.74	4,399.58	-3.85	33.20	33.38	0.98	0.15	-83.08
4,500.00	0.50	153.50	4,499.57	-3.82	33.97	34.13	1.02	-0.31	99.76
4,600.00	0.48	186.55	4,599.57	-4.63	34.11	34.41	0.28	-0.02	33.05
4,662.00	0.42	98.08	4,661.57	-4.92	34.31	34.65	1.02	-0.10	-142.69
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

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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)
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
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



Phoenix Technology Services LP

Survey Report



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)
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
Projection to TD									

Design 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: _____

Project: Eddy County, NM (NAD27 NME)
 Site: Raven Federal
 Well: #22H
 Wellbore: OH / Job #1514540
 Design: Plan #5 11-07-15
 Rig: Capstar 114



Geometric Model
 True North: 0.23°
 Magnetic North: 7.42°
 Magnetic Field
 Strength: 48544.8nT
 Dip Angle: 60.77°
 Date: 10/23/2015
 Model: HDGM

WELL DETAILS

Well	Wellbore	Well ID	Well Name	Well Type	Well Status	Well Depth	Well Length	Well Diameter	Well Completion	Well Production
OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH

SECTION DETAILS

Section	Section Name	Section ID	Section Type	Section Status	Section Depth	Section Length	Section Diameter	Section Completion	Section Production
1	OH	OH	OH	OH	OH	OH	OH	OH	OH

DESIGN TARGET DETAILS

Design	Design Name	Design ID	Design Type	Design Status	Design Depth	Design Length	Design Diameter	Design Completion	Design Production
OH	OH	OH	OH	OH	OH	OH	OH	OH	OH

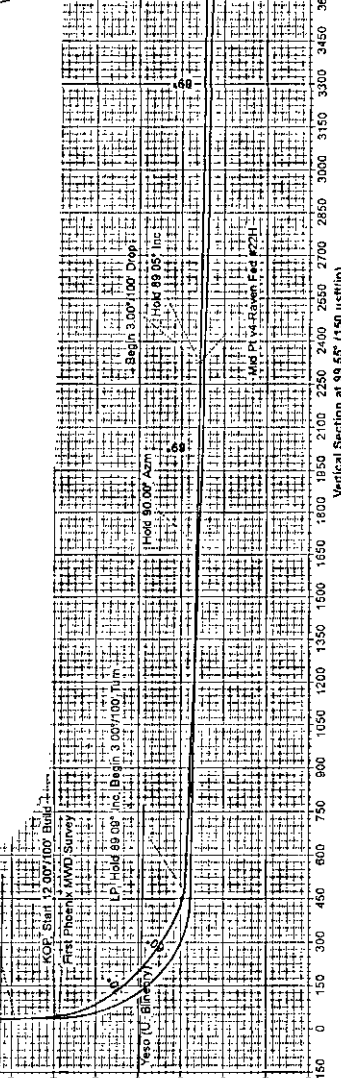
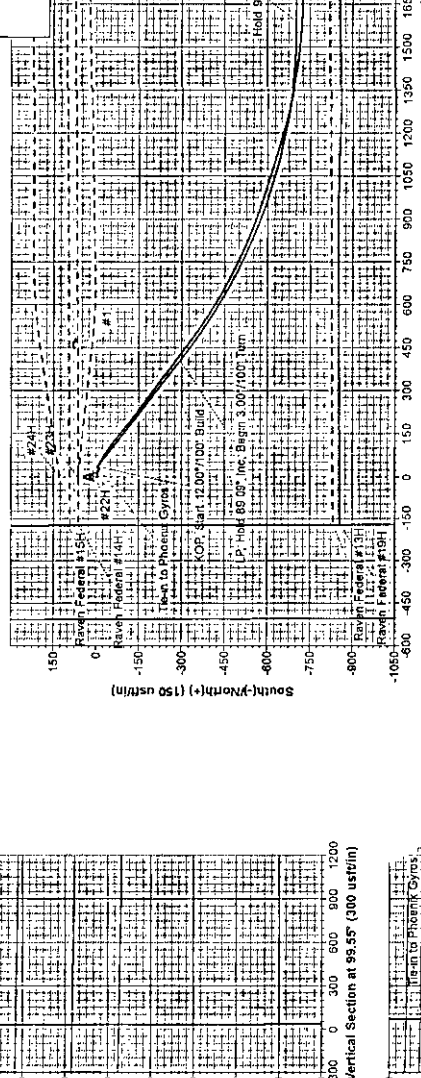
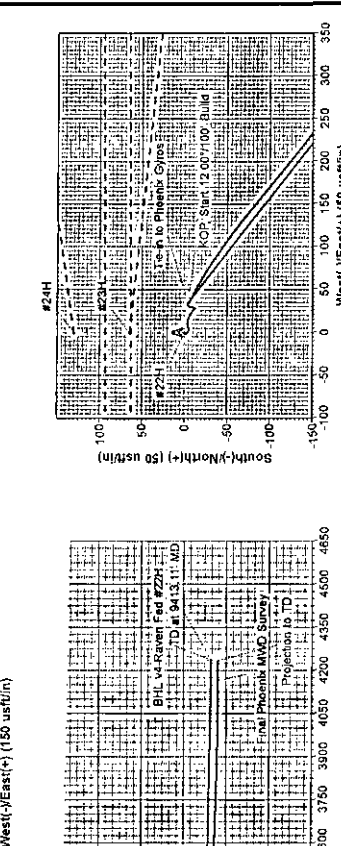
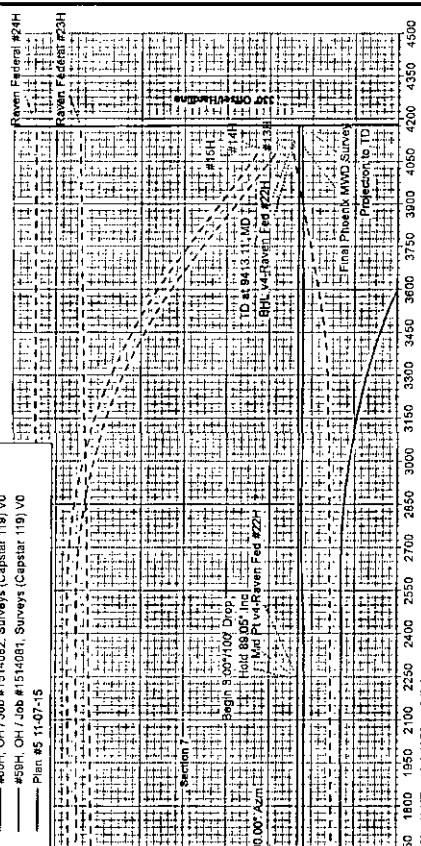
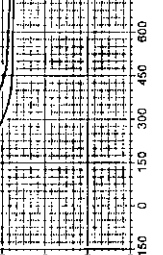
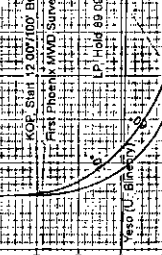
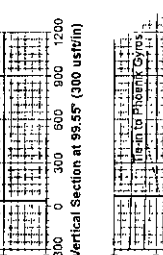
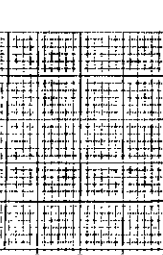
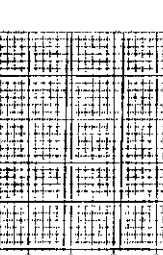
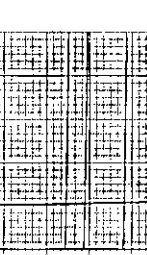
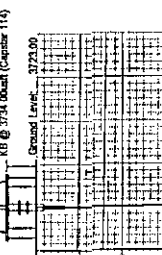
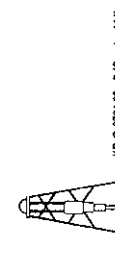
FORMATION TOP DETAILS

Formation	Formation Name	Formation ID	Formation Type	Formation Status	Formation Depth	Formation Length	Formation Diameter	Formation Completion	Formation Production
OH	OH	OH	OH	OH	OH	OH	OH	OH	OH

LEGEND

Legend	Legend Name	Legend ID	Legend Type	Legend Status	Legend Depth	Legend Length	Legend Diameter	Legend Completion	Legend Production
OH	OH	OH	OH	OH	OH	OH	OH	OH	OH

Map System: US State Plane 1927 (Exact solution)
 Datum: NAD 1927 (NADCON CONUS)
 Ellipsoid: Clarke 1866
 Zone Name: New Mexico East 3001
 Local Origin: Well #22H, Grid North
 Latitude: 32° 50' 50.73718 N
 Longitude: 103° 54' 52.68629 W
 Grid East: 625585.80
 Grid North: 672250.00
 Scale Factor: 1.000
 Geomagnetic Model: HDGM
 Simple Data: True North: 0.23°
 Magnetic Field Strength: 48544.8nT
 Dip Angle from Horizontal: 60.77°
 Magnetic Field Strength: 48544.8nT
 To convert a Magnetic Direction to a Grid Direction, Add 7.42°
 To convert a Magnetic Direction to a True Direction, Add 7.65° East
 To convert a True Direction to a Grid Direction, Subtract 0.23°



Phoenix Technology Services
Design Report 12-Nov-2015 07:21:12

Apache Corporation

Raven Federal #22H
Eddy County, NM (NAD27 NME)
OH / Job #1514540
Surveys (Capstar 114)

Surface Loc.:
Northing: (Y) 672260.00
Easting: (X) 628585.80
KB Elev: 3734.00'
GL Elev: 3723.00'

Survey Type Information:
H 100.00 - 4662.00 PHOENIX GYRO SURVEYS : PHX_SPT_GTD
H 4819.00 - 9349.00 PHOENIX MWD SURVEYS : PHX+MWD+HDGM

Measured Depth (ft)	Incl.	Azim.	Sub-Sea Depth (ft)	Vertical Depth (ft)	Local Coor (+N/-S) (ft)	(+E/-W) (ft)	UTM Coor Northings (ft)	Eastings (ft)
0	0	0	-3734	0	0	0	672260	628585.8
100	0.43	161.38	-3634	100	-0.36	0.12	672259.6	628585.9
200	0.57	288.73	-3534	200	-0.55	-0.23	672259.5	628585.6
300	0.94	242.65	-3434.01	299.99	-0.77	-1.43	672259.2	628584.4
400	1.06	132.38	-3334.02	399.98	-1.77	-1.48	672258.2	628584.3
500	1.05	128.12	-3234.04	499.96	-2.96	-0.07	672257	628585.7
600	1.02	120.74	-3134.05	599.95	-3.98	1.41	672256	628587.2
700	0.99	116.98	-3034.07	699.93	-4.83	2.95	672255.2	628588.8
800	0.96	110.35	-2934.08	799.92	-5.51	4.5	672254.5	628590.3
900	0.84	346.77	-2834.09	899.91	-5.09	5.12	672254.9	628590.9
1000	1.13	77.14	-2734.1	999.9	-4.15	5.92	672255.9	628591.7
1100	1.2	81.91	-2634.12	1099.88	-3.79	7.91	672256.2	628593.7
1200	1.27	81.91	-2534.14	1199.86	-3.48	10.05	672256.5	628595.9
1300	1.41	95.37	-2434.17	1299.83	-3.44	12.37	672256.6	628598.2
1400	1.37	105.8	-2334.2	1399.8	-3.88	14.74	672256.1	628600.5
1500	1.31	113.55	-2234.23	1499.77	-4.67	16.94	672255.3	628602.7
1600	1.2	114.8	-2134.25	1599.75	-5.56	18.94	672254.4	628604.7
1700	1.14	117.83	-2034.27	1699.73	-6.46	20.77	672253.5	628606.6
1800	1.04	120.32	-1934.29	1799.71	-7.39	22.43	672252.6	628608.2
1900	0.88	134.04	-1834.3	1899.7	-8.38	23.77	672251.6	628609.6
2000	0.75	124.26	-1734.31	1999.69	-9.28	24.86	672250.7	628610.7
2100	0.69	96.97	-1634.32	2099.68	-9.72	26	672250.3	628611.8

2200	0.66	257.5	-1534.32	2199.68	-9.92	26.04	672250.1	628611.8
2300	0.62	114.4	-1434.33	2299.67	-10.27	25.97	672249.7	628611.8
2400	0.62	99.55	-1334.33	2399.67	-10.58	26.99	672249.4	628612.8
2500	0.59	88.41	-1234.34	2499.66	-10.66	28.04	672249.3	628613.8
2600	0.6	236.26	-1134.34	2599.66	-10.93	28.12	672249.1	628613.9
2700	0.46	220.84	-1034.34	2699.66	-11.53	27.42	672248.5	628613.2
2800	0.45	133.21	-934.35	2799.65	-12.1	27.45	672247.9	628613.3
2900	0.36	135.15	-834.35	2899.65	-12.59	27.95	672247.4	628613.8
3000	0.39	34.28	-734.35	2999.65	-12.53	28.37	672247.5	628614.2
3100	0.26	290.31	-634.35	3099.65	-12.17	28.35	672247.8	628614.2
3200	0.12	347	-534.35	3199.65	-11.99	28.11	672248	628613.9
3300	0.36	334.1	-434.35	3299.65	-11.61	27.95	672248.4	628613.8
3400	0.55	51.68	-334.35	3399.65	-11.03	28.19	672249	628614
3500	0.64	358.82	-234.36	3499.64	-10.17	28.55	672249.8	628614.4
3600	0.59	141.63	-134.36	3599.64	-10.02	28.86	672250	628614.7
3700	0.73	26.17	-34.36	3699.64	-9.85	29.46	672250.2	628615.3
3800	0.89	323.5	65.63	3799.63	-8.65	29.28	672251.4	628615.1
3900	0.86	28.17	165.62	3899.62	-7.37	29.17	672252.6	628615
4000	0.91	30.16	265.61	3999.61	-6.02	29.93	672254	628615.7
4100	0.93	35.2	365.59	4099.59	-4.67	30.79	672255.3	628616.6
4200	0.47	45.16	465.59	4199.59	-3.72	31.55	672256.3	628617.4
4300	0.66	136.82	565.58	4299.58	-3.85	32.24	672256.2	628618
4400	0.81	53.74	665.58	4399.58	-3.85	33.2	672256.2	628619
4500	0.5	153.5	765.57	4499.57	-3.82	33.97	672256.2	628619.8
4600	0.48	186.55	865.57	4599.57	-4.63	34.11	672255.4	628619.9
4662	0.42	98.08	927.57	4661.57	-4.92	34.31	672255.1	628620.1
4819	6.7	117.6	1084.19	4818.19	-9.25	43	672250.8	628628.8
4861	13.8	118.5	1125.49	4859.49	-12.78	49.59	672247.2	628635.4
4904	21.2	120.4	1166.47	4900.47	-19.17	60.81	672240.8	628646.6
4947	28.8	122.9	1205.42	4939.42	-28.74	76.24	672231.3	628662
4989	34.2	125.1	1241.21	4975.21	-41.03	94.4	672219	628680.2
5032	37.8	126.4	1276	5010	-55.81	114.91	672204.2	628700.7
5074	42	127.7	1308.21	5042.21	-72.05	136.39	672188	628722.2
5117	46.9	129.3	1338.9	5072.9	-90.8	159.94	672169.2	628745.7
5160	50.8	129.1	1367.19	5101.19	-111.26	185.03	672148.7	628770.8
5203	53.5	128.7	1393.57	5127.57	-132.58	211.45	672127.4	628797.3
5245	55.8	127.1	1417.87	5151.87	-153.61	238.48	672106.4	628824.3
5288	57.6	126.3	1441.48	5175.48	-175.09	267.3	672084.9	628853.1
5331	61.2	126.9	1463.36	5197.36	-197.15	297	672062.9	628882.8
5374	64.6	126.9	1482.95	5216.95	-220.13	327.61	672039.9	628913.4
5417	68.2	127.3	1500.16	5234.16	-243.9	359.03	672016.1	628944.8
5459	72.8	127.6	1514.18	5248.18	-267.97	390.45	671992	628976.3
5501	78.9	126.9	1524.44	5258.44	-292.61	422.86	671967.4	629008.7
5544	85.3	126	1530.35	5264.35	-317.89	457.1	671942.1	629042.9
5587	89.2	126	1532.41	5266.41	-343.14	491.84	671916.9	629077.6
5715	86.5	121.3	1537.21	5271.21	-413.99	598.28	671846	629184.1
5842	87.1	117	1544.31	5278.31	-475.74	708.99	671784.3	629294.8

5970	89.3	113.2	1548.33	5282.33	-529.99	824.82	671730	629410.6
6099	87.1	108.1	1552.38	5286.38	-575.45	945.43	671684.6	629531.2
6226	87.1	107.7	1558.81	5292.81	-614.43	1066.12	671645.6	629651.9
6354	87.3	105.8	1565.06	5299.06	-651.28	1188.54	671608.7	629774.3
6482	88.4	102.7	1569.86	5303.86	-682.76	1312.5	671577.2	629898.3
6610	89.3	98.7	1572.43	5306.43	-706.51	1438.22	671553.5	630024
6738	88.4	93.4	1575.01	5309.01	-720	1565.43	671540	630151.2
6866	87.1	90.3	1580.03	5314.03	-724.13	1693.25	671535.9	630279.1
6994	88.1	89.9	1585.39	5319.39	-724.35	1821.14	671535.7	630406.9
7122	88.4	89.8	1589.3	5323.3	-724.01	1949.08	671536	630534.9
7250	89.2	89.8	1591.98	5325.98	-723.57	2077.05	671536.4	630662.9
7378	89.3	90.7	1593.66	5327.66	-724.13	2205.03	671535.9	630790.8
7506	87.6	88.9	1597.12	5331.12	-723.68	2332.98	671536.3	630918.8
7634	88.5	88.4	1601.47	5335.47	-720.67	2460.86	671539.3	631046.7
7762	88.5	88.1	1604.83	5338.83	-716.76	2588.76	671543.2	631174.6
7890	88.6	89.1	1608.06	5342.06	-713.63	2716.68	671546.4	631302.5
8018	89.7	90.2	1609.96	5343.96	-712.85	2844.66	671547.2	631430.5
8146	90	91.4	1610.3	5344.3	-714.64	2972.64	671545.4	631558.4
8274	88.9	90.4	1611.53	5345.53	-716.65	3100.62	671543.4	631686.4
8402	88.6	90.7	1614.32	5348.32	-717.88	3228.58	671542.1	631814.4
8530	87.9	90.9	1618.23	5352.23	-719.66	3356.51	671540.3	631942.3
8658	87.9	89.6	1622.92	5356.92	-720.22	3484.42	671539.8	632070.2
8786	88.4	89.6	1627.05	5361.05	-719.33	3612.35	671540.7	632198.2
8914	87.8	89.5	1631.3	5365.3	-718.32	3740.27	671541.7	632326.1
9042	89	89.7	1634.87	5368.87	-717.43	3868.22	671542.6	632454
9170	90	88.9	1635.99	5369.99	-715.87	3996.2	671544.1	632582
9277	89.7	89.3	1636.27	5370.27	-714.19	4103.19	671545.8	632689
9349	89.7	89.3	1636.64	5370.64	-713.31	4175.18	671546.7	632761

All data are in feet unless otherwise stated. Directions and coordinates are relative to Grid North.
Vertical depths are relative to KB. Northings and Eastings are relative to Well.

The Dogleg Severity is in Degrees per 100 feet.
Vertical Section is from Slot and calculated along an Azimuth of 99.550° (Grid).

Coordinate System is NAD 1927 (NADCON CONUS) US State Plane 1927 (Exact solution), New Mexico E;
Grid Convergence at Surface is 0.227°.

Based upon Minimum Curvature type calculations, at a Measured Depth of 9349.00ft.,
the Bottom Hole Displacement is 4235.67ft., in the Direction of 99.550° (Grid).

Vertical Section	Dogleg Rate	Annotation
(ft)	(°/100ft)	
0	0	
0.18	0.43	
-0.14	0.9	
-1.28	0.68	
-1.16	1.64	
0.42	0.08	
2.05	0.14	
3.71	0.07	
5.36	0.12	
5.89	1.59	
6.52	1.41	
8.43	0.12	
10.49	0.07	
12.77	0.34	
15.18	0.26	
17.48	0.19	
19.6	0.11	
21.56	0.09	
23.35	0.11	
24.83	0.28	
26.06	0.19	
27.25	0.34	

27.32	1.33
27.31	1.21
28.37	0.16
29.42	0.12
29.55	1.14
28.96	0.2
29.07	0.63
29.66	0.09
30.05	0.58
29.97	0.52
29.71	0.22
29.49	0.24
29.63	0.59
29.85	0.54
30.12	1.17
30.69	1.12
30.31	0.85
29.99	0.94
30.51	0.06
31.14	0.08
31.73	0.47
32.43	0.82
33.38	0.98
34.13	1.02
34.41	0.28
34.65	1.02 Tie-in to Phoenix Gyros
43.94	4.02 First Phoenix MWD Survey
51.02	16.91
63.15	17.26
79.95	17.84
99.9	13.14
122.57	8.56
146.46	10.19
172.79	11.69
200.92	9.08
230.52	6.32
260.66	6.3
292.64	4.47
325.6	8.46
359.59	7.91
394.52	8.42
429.5	10.97
465.54	14.61
503.51	15.03
541.96	9.07
658.67	4.23
778.1	3.41

901.32	3.43
1027.79	4.3
1153.29	0.31
1280.12	1.49
1407.58	2.57
1535.5	3.2
1663.19	4.2
1789.92	2.62
1916.07	0.84
2042.18	0.25
2168.31	0.62
2294.61	0.71
2420.71	1.93
2546.32	0.8
2671.8	0.23
2797.43	0.78
2923.5	1.22
3050.01	0.97
3176.55	1.16
3302.94	0.33
3429.39	0.57
3555.62	1.01
3681.63	0.39
3807.61	0.48
3933.64	0.95
4059.59	1
4164.81	0.47 Final Phoenix MWD Survey
4235.66	0 Projection to TD

ast 3001.