

Apache Corporation

Eddy County, NM (NAD 83 NME)

Palmillo 14-15 State

#3H

30-015-44045

OH / Job #61177

NM OIL CONSERVATION
ARTESIA DISTRICT

SEP 25 2017

RECEIVED

Design: Surveys (H&P 482)

Standard Survey Report

17 July, 2017

**Please provide signature
page for directional survey**



Phoenix Technology Services LP
Survey Report



Com
Pro
Site
W
W
Des

Well #3H
GL + KB @ 3488 00usft (H&P 482)
GL + KB @ 3488 00usft (H&P 482)
Grid
Minimum Curvature
Compass 5000 GCR

ro	E)		
a	e 98	System Datum:	Mean Sea Level
o	98		
a	E e o		

ask : 601,823.50 usft Latitude: 32 39' 15.60898 N
lon U : 595,664.40 usft Longitude: 104 9' 24.52874 W
0.00 sft : 13-3/16 " Grid Convergence: 0 10

Well #3H
Well Position +N-S 0.00 sft Northing: 605,213.90 usft Latitude: 32 39' 49.16020 N
+E-W 0. sft Easting: 595,636.80 usft Longitude: 104 9' 25.95551 W
Position Uncertainty 0 0 R Wellhead Elevation 0 00 usft Ground Level: 3 482 00 usft

Wellbore OH / Job #61177
Magnetics Model Name Sample Date Declination () Dip Angle (°) Field Strength (nT)
HDGM 6/ 0/20 7 60 53 46,188

Design Surveys (H&P 482)
Audit Notes:
Version: 1.0 Phase: ACTUAL Tie On Dept 0 00
Vertical Section: Depth From (TVD) +N-S +E-W Direction
(usft) (usft) (usft) (°)
0 00

Survey Program Date 7/17/2017

ray (Wellbore)	Tool Name	Description
100 00 snk Gyros (OH / Job #61177)	SPT_GTD	Continuous north-seeking gyro
6 792 00 snk MWD Surveys (OH / Job #61177)	MWD+HDGM	OWSG Rev 2 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 47	2 3	100 00	0 13	-0 39	0 39	0 47	0 47	0 00
200 00	0 42	57	200 00	0 47	-0 48	0 48	0 79	-0 05	126 34
300 00	0 46	2 9	300 00	0 39	0 48	0 48	0 90	0 06	171 02
400 00	1 20	2 7	399 99	-0 82	1 28	1 28	0 75	0 2	16 88
500 00	0 78	1 0 75	499 97	-2 43	-1 50	1 79	0 82	-0 1	27 96
600 00	0 73	1 29	599 96	3 74	-1 5	1 65	0 20	-0 6	14 46
700 00	0 37	1 77	699 96	-4 58	-1 7	1 26	0 47	-0 6	33 52
800 00	0 52	92	799 95	-4 81	-0 7	0 57	0 34	0 5	-40 59
900 00	0 19	1	899 95	-4 77	0 03	0 04	0 35	-0 33	22 77

Phoenix Technology Services LP
Survey Report



Company: Apache Corporation
Project: Eddy County, NM (NAD 83 NME)
Site: Palmto 14-15 State
Well: #3H
Wellbore: OH / Job #81177
Design: Surveys (H&P 482)

Local Co-ordinate Reference: Well #3H
TVD Reference: GL + KB @ 3488 00usft (H&P 482)
MD Reference: GL + KB @ 3488 00usft (H&P 482)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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	0.10	338.81	998.95	-4.63	0.16	0.16	0.22	-0.09	90.60
1,100.00	0.15	64.23	1,099.95	-4.48	0.23	0.23	0.16	0.05	75.42
1,200.00	0.13	71.84	1,199.95	-4.36	0.45	0.45	0.05	-0.02	17.61
1,300.00	0.25	25.26	1,299.95	-4.13	0.65	0.65	0.19	0.12	-46.58
1,400.00	0.26	91.22	1,399.95	-3.94	0.97	0.97	0.28	0.01	65.96
1,500.00	0.29	160.80	1,499.95	-4.18	1.28	1.28	0.31	0.03	69.58
1,600.00	0.34	81.26	1,599.95	-4.36	1.65	1.65	0.40	0.05	79.54
1,700.00	0.34	64.25	1,699.95	-4.20	2.21	2.22	0.10	0.00	17.01
1,800.00	0.22	147.00	1,799.95	-4.23	2.59	2.59	0.38	-0.12	82.75
1,900.00	0.39	95.42	1,899.94	-4.43	3.03	3.03	0.31	0.17	51.58
2,000.00	0.44	60.30	1,999.94	-4.27	3.70	3.70	0.25	0.05	35.12
2,100.00	0.66	62.39	2,099.94	-3.81	4.55	4.55	0.22	0.22	2.09
2,200.00	0.40	55.99	2,199.93	-3.35	5.35	5.35	0.27	-0.26	6.40
2,300.00	0.44	46.74	2,299.93	-2.89	5.91	5.92	0.08	0.04	9.25
2,400.00	0.37	72.25	2,399.93	-2.53	6.50	6.50	0.19	-0.07	25.51
2,500.00	0.50	107.75	2,499.93	-2.56	7.22	7.23	0.29	0.13	35.50
2,600.00	0.45	65.75	2,599.92	-2.54	8.00	8.00	0.34	-0.05	-42.00
2,700.00	0.23	51.16	2,699.92	-2.25	8.51	8.51	0.23	-0.22	-14.59
2,800.00	0.34	40.25	2,799.92	-1.90	8.86	8.86	0.12	0.11	-10.91
2,900.00	0.37	38.26	2,899.92	-1.42	9.25	9.25	0.03	0.03	-1.99
3,000.00	0.41	31.56	2,999.91	-0.86	9.64	9.64	0.06	0.04	-6.60
3,100.00	0.24	14.10	3,099.91	-0.35	9.88	9.88	0.20	-0.17	-17.56
3,200.00	0.46	5.06	3,199.91	0.25	9.96	9.96	0.23	0.22	-9.04
3,300.00	0.45	43.89	3,299.91	0.64	10.27	10.27	0.30	-0.01	38.83
3,400.00	0.37	137.96	3,399.91	0.98	10.76	10.76	0.60	-0.06	94.07
3,500.00	0.20	121.10	3,499.91	0.65	11.13	11.13	0.19	-0.17	-16.86
3,600.00	0.22	206.54	3,599.90	0.39	11.19	11.19	0.29	0.02	85.44
3,700.00	0.26	196.30	3,699.90	0.00	11.04	11.04	0.06	0.04	-10.24
3,800.00	1.17	284.51	3,799.90	0.03	9.99	9.99	1.19	0.91	88.21
3,900.00	1.10	264.53	3,699.88	0.20	8.04	8.04	0.40	-0.07	-19.98
4,000.00	0.94	223.21	3,599.86	-0.49	6.53	6.53	0.74	-0.16	-41.32
4,100.00	1.23	253.33	4,099.85	-1.40	4.94	4.94	0.63	0.29	30.12
4,200.00	1.07	243.47	4,199.83	-2.12	3.07	3.08	0.25	-0.16	-9.66
4,300.00	0.76	350.93	4,299.82	-1.86	2.13	2.14	1.49	-0.31	107.48
4,400.00	0.65	14.81	4,399.81	-0.68	2.17	2.18	0.31	-0.11	23.88
4,500.00	0.65	12.64	4,499.80	0.42	2.44	2.44	0.02	0.00	-2.17
4,600.00	0.59	332.28	4,599.80	1.43	2.33	2.33	0.43	-0.06	-40.36
4,700.00	0.50	346.95	4,699.79	2.31	1.99	1.99	0.17	-0.09	14.67
4,800.00	0.44	346.60	4,799.79	3.11	1.80	1.80	0.06	-0.06	-0.35
4,900.00	0.47	330.66	4,899.79	3.84	1.51	1.51	0.13	0.03	-15.94
5,000.00	0.52	318.35	4,999.78	4.54	1.01	1.01	0.12	0.05	-12.31
5,100.00	0.62	338.85	5,099.78	5.38	0.51	0.51	0.23	0.10	20.50
5,200.00	0.87	351.68	5,199.77	6.64	0.21	0.21	0.30	0.25	12.83

Phoenix Technology Services LP

Survey Report



Company: Apache Corporation
 Project: Eddy County, NM (NAD 83 NME)
 Site: Palmillo 14-16 State
 Well: #3H
 Wellbore: OH / Job #61177
 Design: Surveys (H&P 482)

Local Co-ordinate Reference: Well #3H
 TVD Reference: GL + KB @ 3488 00usft (H&P 482)
 MD Reference: GL + KB @ 3488 00usft (H&P 482)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: Compass 5000 GCR

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/S (usft)	+E/W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,300.00	0.76	336.92	5,289.76	8.00	-0.16	-0.16	0.24	-0.11	-14.76
5,400.00	0.92	345.46	5,399.75	9.39	-0.62	-0.63	0.20	0.16	8.56
5,500.00	1.43	263.81	5,499.73	10.02	-2.06	-2.07	1.59	0.51	-81.87
5,600.00	1.76	264.32	5,599.70	9.73	-4.83	-4.84	0.33	0.33	0.71
5,700.00	1.42	272.79	5,699.66	9.64	-7.60	-7.60	0.41	-0.34	8.47
5,800.00	1.37	224.32	5,799.63	8.85	-9.67	-9.67	1.15	-0.05	-48.47
5,900.00	1.82	182.05	5,899.60	6.41	-10.56	-10.56	1.22	0.45	-42.27
6,000.00	1.86	180.32	5,999.54	3.20	-10.63	-10.63	0.07	0.04	-1.73
6,100.00	2.08	178.17	6,099.48	-0.24	-10.58	-10.58	0.23	0.22	-2.15
6,200.00	0.25	83.94	6,199.46	-2.03	-10.30	-10.30	2.11	-1.63	-94.23
6,300.00	0.36	269.01	6,299.46	-2.07	-10.40	-10.40	0.61	0.11	175.07
6,400.00	0.47	236.85	6,399.46	-2.35	-11.05	-11.05	0.19	0.11	-22.16
6,500.00	0.45	235.37	6,499.46	-2.80	-11.71	-11.71	0.02	-0.02	-1.48
6,600.00	0.73	224.35	6,599.45	-3.48	-12.48	-12.48	0.30	0.28	-11.02
6,631.00	0.79	227.84	6,630.45	-3.76	-12.78	-12.78	0.24	0.19	11.26
Tie In									
6,792.00	6.52	93.16	6,791.13	-5.01	-4.46	-4.46	4.41	3.55	-83.95
First Phoenix MWD Survey									
6,839.00	12.62	85.52	6,837.45	-4.76	3.33	3.33	13.23	12.98	-16.26
6,865.00	19.13	84.58	6,862.63	-3.63	16.13	16.13	13.86	13.85	-2.00
6,933.00	25.36	83.69	6,926.11	-1.80	33.81	33.81	13.27	13.26	-1.89
6,980.00	31.69	83.00	6,987.39	0.82	56.09	56.09	13.49	13.47	-1.47
7,027.00	36.90	86.16	7,006.21	3.26	82.44	82.44	11.72	11.09	6.77
7,074.00	39.19	89.70	7,043.22	4.28	111.38	111.38	6.71	4.87	7.49
7,121.00	42.50	93.05	7,078.78	3.52	142.10	142.10	8.44	7.04	7.13
7,168.00	45.74	92.39	7,112.51	1.97	174.77	174.77	6.98	6.89	-1.40
7,215.00	47.69	89.73	7,144.74	1.35	208.98	208.97	5.85	4.15	-5.66
7,262.00	48.76	89.53	7,178.05	1.58	244.03	244.02	2.30	2.28	-0.43
7,309.00	50.31	91.83	7,206.55	1.14	279.77	279.77	4.97	3.30	4.89
7,356.00	53.47	93.30	7,235.56	-0.52	316.71	316.71	7.16	6.72	3.13
7,403.00	56.31	95.68	7,262.59	-3.55	355.03	355.03	7.33	6.04	5.06
7,450.00	61.65	97.09	7,286.80	-8.04	395.04	395.05	11.65	11.36	3.00
7,497.00	68.11	94.31	7,306.75	-12.23	437.36	437.37	14.75	13.74	-5.91
7,544.00	74.54	92.14	7,321.79	-14.72	481.79	481.80	14.36	13.68	-4.62
7,591.00	80.72	91.22	7,331.86	-16.06	527.66	527.66	13.29	13.15	-1.96
7,611.00	82.24	91.40	7,334.82	-16.51	547.43	547.44	7.65	7.60	0.90
7,688.00	86.50	92.07	7,342.37	-18.84	624.01	624.01	5.60	5.53	0.87
7,719.00	87.01	91.65	7,344.13	-19.84	654.94	654.95	2.13	1.65	-1.35
7,814.00	86.78	93.93	7,349.27	-24.46	749.68	749.69	2.41	0.24	2.40
7,909.00	87.54	94.04	7,353.98	-31.05	844.34	844.35	0.81	0.80	0.12
8,003.00	87.62	92.68	7,357.95	-36.65	938.09	938.10	1.45	0.09	-1.45
8,098.00	87.57	91.26	7,361.93	-39.82	1,032.95	1,032.96	1.49	0.05	-1.49
8,193.00	85.52	89.08	7,367.66	-40.11	1,127.76	1,127.76	3.14	2.16	-2.26
8,287.00	85.80	88.14	7,374.77	-37.84	1,221.46	1,221.48	1.05	0.30	-1.01

Phoenix Technology Services LP Survey Report



Company: Apache Corporation
Project: Eddy County, NM (NAD 83 NME)
Site: Palmilla 14-15 State
Well: #3H
Wellbore: OH / Job #61177
Design: Surveys (H&P 482)

Local Co-ordinate Reference: Well #3H
TVD Reference: GL + KB @ 3488 00usft (H&P 482)
MD Reference: GL + KB @ 3488 00usft (H&P 482)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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)
8,382.00	86.19	88.27	7,381.41	-34.86	1,316.19	1,316.20	0.43	0.41	0.14
8,477.00	84.12	88.46	7,389.43	-32.17	1,410.80	1,410.81	2.19	-2.18	0.20
8,571.00	83.95	88.10	7,399.20	-29.37	1,504.25	1,504.26	0.42	-0.18	-0.38
8,666.00	84.85	89.34	7,408.47	-27.26	1,598.77	1,598.78	1.81	0.95	1.31
8,760.00	86.53	89.21	7,415.54	-26.07	1,692.49	1,692.50	1.79	1.79	-0.14
8,855.00	86.98	89.97	7,420.91	-25.39	1,787.34	1,787.35	0.93	0.47	0.80
8,949.00	87.62	89.03	7,425.34	-24.57	1,881.23	1,881.24	1.21	0.68	-1.00
9,044.00	86.14	89.43	7,430.51	-23.30	1,976.08	1,976.09	1.61	-1.56	0.42
9,138.00	86.30	88.89	7,436.71	-21.92	2,069.86	2,069.87	0.60	0.17	-0.57
9,233.00	86.78	88.50	7,442.44	-19.76	2,164.66	2,164.67	0.65	0.51	-0.41
9,328.00	87.20	87.66	7,447.43	-16.56	2,259.48	2,259.48	0.99	0.44	-0.88
9,422.00	89.75	88.14	7,449.93	-13.14	2,353.37	2,353.38	2.76	2.71	0.51
9,517.00	91.17	87.85	7,449.17	-8.82	2,448.31	2,448.31	1.53	1.49	-0.31
9,611.00	90.00	89.70	7,448.21	-7.81	2,542.28	2,542.28	2.33	-1.24	1.97
9,706.00	87.62	91.15	7,450.18	-8.51	2,637.25	2,637.25	2.93	-2.51	1.53
9,800.00	87.93	90.98	7,453.83	-10.26	2,731.16	2,731.16	0.38	0.33	-0.18
9,895.00	88.88	90.72	7,456.48	-11.67	2,826.11	2,826.11	1.04	1.00	-0.27
9,990.00	87.79	90.53	7,459.24	-12.70	2,921.06	2,921.07	1.18	-1.15	-0.20
10,084.00	88.69	90.22	7,462.12	-13.32	3,015.02	3,015.02	1.01	0.96	-0.33
10,179.00	89.52	90.06	7,463.81	-13.55	3,110.00	3,110.01	0.89	0.87	-0.17
10,274.00	90.39	89.35	7,463.68	-13.06	3,205.00	3,205.00	1.18	0.92	-0.76
10,368.00	90.73	90.52	7,462.76	-12.95	3,298.99	3,299.00	1.30	0.36	1.24
10,463.00	90.78	90.31	7,461.51	-13.64	3,393.98	3,393.99	0.23	0.05	-0.22
10,557.00	88.36	91.49	7,462.20	-15.12	3,487.98	3,487.97	2.85	-2.55	1.26
10,652.00	88.66	91.11	7,464.65	-17.27	3,582.90	3,582.91	0.50	0.29	-0.40
10,746.00	88.91	91.00	7,466.65	-18.00	3,676.87	3,676.87	0.28	0.27	-0.12
10,841.00	89.78	90.43	7,467.73	-20.19	3,771.85	3,771.86	1.09	0.92	-0.60
10,936.00	88.52	88.36	7,469.14	-20.01	3,866.84	3,866.84	1.74	-1.33	-1.13
11,030.00	88.21	88.62	7,471.82	-18.36	3,960.78	3,960.79	0.85	-0.33	-0.79
11,125.00	88.32	88.40	7,474.70	-15.89	4,055.71	4,055.71	0.26	0.12	-0.23
11,219.00	88.63	88.01	7,477.20	-12.95	4,149.63	4,149.63	0.53	0.33	-0.41
11,314.00	89.61	86.84	7,478.66	-8.68	4,244.52	4,244.52	1.61	1.03	-1.23
11,408.00	88.93	87.55	7,479.86	-4.08	4,338.40	4,338.40	1.05	-0.72	0.76
11,503.00	86.39	88.51	7,483.74	-0.62	4,433.25	4,433.25	2.86	-2.67	1.01
11,598.00	85.88	91.40	7,490.14	-0.74	4,528.03	4,528.03	3.08	-0.54	3.04
11,692.00	86.25	91.45	7,496.59	-3.07	4,621.78	4,621.78	0.40	0.39	0.05
11,787.00	87.31	91.25	7,501.93	-5.31	4,716.60	4,716.60	1.14	1.12	-0.21
11,881.00	88.29	90.71	7,505.54	-8.91	4,810.51	4,810.52	1.19	1.04	-0.57
11,976.00	89.16	91.04	7,507.85	-8.36	4,905.48	4,905.48	0.98	0.92	0.35
12,070.00	89.72	91.00	7,508.57	-10.04	4,999.46	4,999.46	0.60	0.60	-0.04
12,165.00	88.15	89.88	7,510.34	-10.77	5,094.43	5,094.44	2.03	-1.65	-1.18
12,260.00	86.51	89.36	7,514.76	-10.14	5,189.33	5,189.33	1.81	-1.73	-0.55
12,357.00	86.50	89.25	7,520.67	-8.96	5,286.14	5,286.14	0.11	-0.01	-0.11

Phoenix Technology Services LP

Survey Report



Company: Apache Corporation
 Project: Eddy County, NM (NAD 83 NME)
 Site: Palmillo 14-15 State
 Well: #3H
 Wellbore: OH / Job #81177
 Design: Surveys (H&P 482)

Local Co-ordinate Reference: Well #3H
 TVD Reference: G + KB @ 3488.00usft (H&P 4 2)
 MD Reference: G + KB @ 3488.00usft (H&P 4)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 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)
Final Phoenix MWD Survey									
12,385.00	86.50	89.25	7,522.38	-8.60	5,314.08	5,314.09	0.00	0.00	0.00
HL Crossing: 12385' MD, 86.50° Inc, 89.25° Azm									
12,423.00	86.50	89.25	7,524.70	-8.10	5,352.01	5,352.01	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)	
6,631.00	6,630.45	-3.76	-12.78	Tie In
6,792.00	6,791.13	-5.01	-4.46	First Phoenix MWD Survey
12,357.00	7,520.67	-8.96	5,288.14	Final Phoenix MWD Survey
12,385.00	7,522.38	-8.60	5,314.08	HL Crossing 12385' D 86.50 Inc 89.25 Azm
12,423.00	7,524.70	-8.10	5,352.01	Projection to TD

