

Phoenix Technology Services
Design Report 31-Aug-2017 10:40:23

Apache Corporation

Cedar Lake Federal CA 304H
Eddy County, NM (NAD 83 NME)
OH / Job #61483
Surveys (Trinidad 436)

30-015-43557

Surface Loc.:

Northing: (Y) 679080.70
Easting: (X) 684936.10
RKB Elev: 3969.50'
GL Elev: 3953.00'

Survey Type Information:

H 111.00 - 598.00 PHOENIX GYRO SURVEYS : PHX_SPT_GTD
H 598.00 - 10278.00 PHOENIX MWD SURVEYS : MWD+HDGM

Measured Depth (ft)	Incl.	Azim.	Sub-Sea Depth (ft)	Vertical Depth (ft)	Local Coord (+N/-S) (ft)	(+E/-W) (ft)	UTM Coord Northings (ft)	Eastings (ft)
0	0	0	-3969.5	0	0	0	679080.7	684936.1
111	0.22	323.18	-3858.5	111	0.17	-0.13	679080.9	684936
237	1.07	8.9	-3732.51	236.99	1.53	-0.09	679082.2	684936
358	1.54	26.11	-3611.54	357.96	4.1	0.8	679084.8	684936.9
480	1.26	5.67	-3489.58	479.92	6.91	1.65	679087.6	684937.8
598	1.28	359.49	-3371.6	597.9	9.52	1.77	679090.2	684937.9
721	1.22	11.52	-3248.63	720.87	12.18	2.02	679092.9	684938.1
847	1.44	12.57	-3122.67	846.83	15.03	2.63	679095.7	684938.7
973	0.79	20.39	-2996.69	972.81	17.39	3.28	679098.1	684939.4
1100	0.36	95.36	-2869.7	1099.8	18.18	3.98	679098.9	684940.1
1226	0.37	121.51	-2743.7	1225.8	17.93	4.72	679098.6	684940.8
1353	0.42	132.96	-2616.7	1352.8	17.4	5.41	679098.1	684941.5
1480	0.28	103.83	-2489.71	1479.79	17.01	6.05	679097.7	684942.2
1606	0.87	78.5	-2363.71	1605.79	17.12	7.29	679097.8	684943.4
1733	0.09	121.77	-2236.72	1732.78	17.26	8.32	679098	684944.4
1860	0.11	117.26	-2109.72	1859.78	17.15	8.51	679097.9	684944.6
1986	0.97	188.61	-1983.72	1985.78	16.04	8.46	679096.7	684944.6
2113	0.95	210.7	-1856.74	2112.76	14.08	7.76	679094.8	684943.9
2240	0.52	226.72	-1729.75	2239.75	12.78	6.81	679093.5	684942.9
2368	0.36	344.92	-1601.75	2367.75	12.77	6.28	679093.5	684942.4
2494	0.39	282.59	-1475.76	2493.74	13.24	5.76	679093.9	684941.9
2620	0.29	320.69	-1349.76	2619.74	13.58	5.14	679094.3	684941.2

2748	0.52	285.46	-1221.76	2747.74	13.99	4.37	679094.7	684940.5
2874	0.58	301.34	-1095.77	2873.73	14.47	3.28	679095.2	684939.4
3000	0.57	293.9	-969.77	2999.73	15.06	2.16	679095.8	684938.3
3127	0.72	305.44	-842.78	3126.72	15.78	0.93	679096.5	684937
3253	0.98	308.44	-716.8	3252.7	16.9	-0.56	679097.6	684935.5
3380	0.3	322.7	-589.8	3379.7	17.84	-1.61	679098.5	684934.5
3449	0.29	269.28	-520.81	3448.69	17.99	-1.89	679098.7	684934.2
3561	0.25	352.63	-408.81	3560.69	18.22	-2.21	679098.9	684933.9
3688	0.48	88.63	-281.81	3687.69	18.51	-1.71	679099.2	684934.4
3814	0.71	106.92	-155.81	3813.69	18.3	-0.44	679099	684935.7
3940	0.89	118.81	-29.83	3939.67	17.6	1.17	679098.3	684937.3
4067	0.64	145.21	97.16	4066.66	16.54	2.43	679097.2	684938.5
4194	1.03	160.24	224.15	4193.65	14.88	3.23	679095.6	684939.3
4321	0.94	173.11	351.13	4320.63	12.78	3.74	679093.5	684939.8
4449	0.97	158.97	479.11	4448.61	10.72	4.25	679091.4	684940.4
4575	0.69	164.57	605.1	4574.6	8.99	4.84	679089.7	684940.9
4702	0.73	170.79	732.09	4701.59	7.46	5.17	679088.2	684941.3
4829	1.07	176.38	859.07	4828.57	5.48	5.37	679086.2	684941.5
4956	1.04	178.27	986.05	4955.55	3.14	5.48	679083.8	684941.6
5083	0.38	216.8	1113.04	5082.54	1.65	5.26	679082.4	684941.4
5136	0.5	190.4	1166.04	5135.54	1.28	5.12	679082	684941.2
5219	3	91.79	1249	5218.5	0.86	7.22	679081.6	684943.3
5282	10.4	77.71	1311.53	5281.03	2.02	14.44	679082.7	684950.5
5345	16.98	70.17	1372.71	5342.21	6.36	28.66	679087.1	684964.8
5409	23.38	69.24	1432.75	5402.25	14.04	49.35	679094.7	684985.5
5471	30.27	68.23	1488.05	5457.55	24.2	75.4	679104.9	685011.5
5503	33.73	70.37	1515.18	5484.68	30.18	91.26	679110.9	685027.4
5535	36.52	74.23	1541.36	5510.86	35.76	108.8	679116.5	685044.9
5566	38.14	79.17	1566.01	5535.51	40.06	127.08	679120.8	685063.2
5598	39.79	84.28	1590.9	5560.4	42.94	146.98	679123.6	685083.1
5630	42.03	88.45	1615.08	5584.58	44.25	167.89	679125	685104
5660	45.22	91.16	1636.8	5606.3	44.31	188.58	679125	685124.7
5691	50.15	92.69	1657.66	5627.16	43.53	211.48	679124.2	685147.6
5722	54.74	95.04	1676.55	5646.05	41.85	235.99	679122.6	685172.1
5754	60.56	96.6	1693.67	5663.17	39.1	262.87	679119.8	685199
5786	65.03	97.89	1708.3	5677.8	35.51	291.09	679116.2	685227.2
5817	69.98	98.79	1720.15	5689.65	31.35	319.42	679112.1	685255.5
5849	74.74	97.57	1729.85	5699.35	27.02	349.6	679107.7	685285.7
5881	79.4	96.24	1737.01	5706.51	23.27	380.55	679104	685316.7
5902	82.43	96.48	1740.32	5709.82	20.98	401.16	679101.7	685337.3
5988	92.3	99.41	1744.27	5713.77	9.11	486.13	679089.8	685422.2
6051	93.11	97.93	1741.3	5710.8	-0.38	548.33	679080.3	685484.4
6115	92.74	95.63	1738.03	5707.53	-7.92	611.8	679072.8	685547.9
6178	92.66	94.03	1735.07	5704.57	-13.22	674.5	679067.5	685610.6
6241	92.54	92.2	1732.21	5701.71	-16.64	737.34	679064.1	685673.4
6305	91.37	90.28	1730.02	5699.52	-18.02	801.29	679062.7	685737.4
6368	90.25	89.7	1729.13	5698.63	-18.01	864.28	679062.7	685800.4

6431	90.14	89.42	1728.92	5698.42	-17.53	927.28	679063.2	685863.4
6494	89.33	88.29	1729.21	5698.71	-16.27	990.26	679064.4	685926.4
6557	87.87	87.71	1730.75	5700.25	-14.07	1053.2	679066.6	685989.3
6620	88.69	88.06	1732.64	5702.14	-11.75	1116.13	679069	686052.2
6683	89.27	87.42	1733.76	5703.26	-9.26	1179.07	679071.4	686115.2
6746	88.23	87.6	1735.14	5704.64	-6.53	1242	679074.2	686178.1
6809	88.93	87.86	1736.7	5706.2	-4.03	1304.93	679076.7	686241
6873	89.5	87.94	1737.57	5707.07	-1.69	1368.88	679079	686305
6936	88.77	87.86	1738.53	5708.03	0.62	1431.83	679081.3	686367.9
6999	89.33	88.47	1739.57	5709.07	2.64	1494.79	679083.3	686430.9
7063	87.73	89.62	1741.21	5710.71	3.7	1558.75	679084.4	686494.9
7126	88.29	89.5	1743.4	5712.9	4.19	1621.71	679084.9	686557.8
7189	88.35	87.65	1745.25	5714.75	5.75	1684.66	679086.5	686620.8
7252	89.16	88.09	1746.62	5716.12	8.09	1747.61	679088.8	686683.7
7316	89.86	89.13	1747.16	5716.66	9.65	1811.58	679090.4	686747.7
7379	88.77	87.84	1747.92	5717.42	11.31	1874.55	679092	686810.7
7443	89.47	87.79	1748.9	5718.4	13.75	1938.5	679094.5	686874.6
7506	90.03	87.98	1749.17	5718.67	16.08	2001.46	679096.8	686937.6
7570	89.33	88.97	1749.53	5719.03	17.78	2065.43	679098.5	687001.5
7633	89.41	89.32	1750.22	5719.72	18.72	2128.42	679099.4	687064.5
7696	89.3	90.3	1750.93	5720.43	18.93	2191.42	679099.6	687127.5
7760	90.2	89.91	1751.21	5720.71	18.81	2255.41	679099.5	687191.5
7823	90.42	88.68	1750.87	5720.37	19.59	2318.41	679100.3	687254.5
7887	90.59	88.72	1750.31	5719.81	21.04	2382.39	679101.7	687318.5
7950	90.84	89.27	1749.52	5719.02	22.14	2445.37	679102.8	687381.5
8013	91.43	89.03	1748.27	5717.77	23.08	2508.35	679103.8	687444.5
8075	89.83	89.63	1747.59	5717.09	23.8	2570.34	679104.5	687506.4
8138	89.08	89.8	1748.19	5717.69	24.12	2633.34	679104.8	687569.4
8200	89.75	91.51	1748.82	5718.32	23.41	2695.33	679104.1	687631.4
8264	88.8	91.64	1749.63	5719.13	21.65	2759.3	679102.4	687695.4
8327	89.36	91.85	1750.65	5720.15	19.73	2822.26	679100.4	687758.4
8390	88.43	91.39	1751.86	5721.36	17.95	2885.22	679098.7	687821.3
8453	89.44	91.55	1753.03	5722.53	16.33	2948.19	679097	687884.3
8517	88.82	90.51	1754	5723.5	15.18	3012.17	679095.9	687948.3
8580	89.75	90.9	1754.79	5724.29	14.41	3075.16	679095.1	688011.3
8643	89.05	90.26	1755.45	5724.95	13.77	3138.15	679094.5	688074.3
8706	89.21	89.88	1756.41	5725.91	13.69	3201.15	679094.4	688137.3
8770	87.93	88.31	1758	5727.5	14.7	3265.12	679095.4	688201.2
8833	88.38	88.45	1760.03	5729.53	16.48	3328.06	679097.2	688264.2
8897	88.07	87.6	1762.01	5731.51	18.69	3391.99	679099.4	688328.1
8960	89.19	87.44	1763.52	5733.02	21.41	3454.91	679102.1	688391
9023	90.11	88.1	1763.9	5733.4	23.86	3517.86	679104.6	688454
9086	89.81	88.25	1763.95	5733.45	25.87	3580.83	679106.6	688516.9
9149	91.04	88.77	1763.48	5732.98	27.51	3643.8	679108.2	688579.9
9213	90.81	89.99	1762.45	5731.95	28.2	3707.79	679108.9	688643.9
9276	90.92	89.93	1761.5	5731	28.24	3770.78	679108.9	688706.9
9339	89.11	89.58	1761.48	5730.98	28.51	3833.78	679109.2	688769.9

9402	87.56	88.66	1763.31	5732.81	29.48	3896.74	679110.2	688832.8
9465	87.9	88.26	1765.81	5735.31	31.17	3959.67	679111.9	688895.8
9528	88.46	88.06	1767.81	5737.31	33.19	4022.61	679113.9	688958.7
9592	89.39	89.14	1769.01	5738.51	34.76	4086.57	679115.5	689022.7
9655	90.5	89.49	1769.07	5738.57	35.51	4149.57	679116.2	689085.7
9717	90.81	90.4	1768.36	5737.86	35.57	4211.56	679116.3	689147.7
9780	89.5	89.27	1768.19	5737.69	35.75	4274.56	679116.5	689210.7
9843	90.19	89.81	1768.36	5737.86	36.26	4337.56	679117	689273.7
9906	90.79	90.08	1767.82	5737.32	36.32	4400.56	679117	689336.7
9969	91.34	90.71	1766.65	5736.15	35.88	4463.54	679116.6	689399.6
10032	90.09	89.88	1765.86	5735.36	35.56	4526.54	679116.3	689462.6
10096	90.73	90.67	1765.41	5734.91	35.25	4590.53	679116	689526.6
10159	91.31	90.95	1764.28	5733.78	34.36	4653.52	679115.1	689589.6
10219	91.99	90.59	1762.56	5732.06	33.56	4713.48	679114.3	689649.6
10278	91.99	90.59	1760.51	5730.01	32.95	4772.45	679113.7	689708.6

All data are in feet unless otherwise stated. Directions and coordinates are relative to Grid North.
Vertical depths are relative to RKB. 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 89.580° (Grid).

Coordinate System is North American Datum 1983 US State Plane 1983, New Mexico Eastern Zone.
Grid Convergence at Surface is 0.254°.

Based upon Minimum Curvature type calculations, at a Measured Depth of 10278.00ft.,
the Bottom Hole Displacement is 4772.56ft., in the Direction of 89.580° (Grid).

Vertical Section (ft)	Dogleg Rate (°/100ft)	Annotation
0	0	
-0.13	0.2	
-0.08	0.74	
0.83	0.5	
1.7	0.47	
1.84	0.12	Tie In
2.11	0.22	First Phoenix MWD Survey
2.74	0.18	
3.41	0.53	
4.11	0.61	
4.85	0.13	
5.54	0.07	
6.18	0.17	
7.42	0.5	
8.45	0.64	
8.64	0.02	
8.58	0.75	
7.87	0.29	
6.9	0.37	
6.37	0.59	
5.85	0.31	
5.24	0.19	

4.47	0.26
3.38	0.13
2.27	0.06
1.05	0.16
-0.43	0.21
-1.48	0.55
-1.76	0.38
-2.08	0.32
-1.58	0.44
-0.3	0.23
1.29	0.19
2.56	0.34
3.33	0.35
3.83	0.19
4.33	0.19
4.9	0.23
5.22	0.07
5.41	0.28
5.51	0.04
5.28	0.61
5.13	0.44
7.23	3.75
14.45	11.94
28.71	10.8
49.45	10.01
75.57	11.14
91.48	11.38
109.06	11.14
127.37	10.98
147.29	11.28
168.21	11.03
188.9	12.32
211.79	16.32
236.29	15.98
263.15	18.65
291.35	14.42
319.64	16.19
349.79	15.31
380.71	15.12
401.3	14.47
486.18	11.97
548.32	2.68
611.73	3.64
674.39	2.54
737.2	2.91
801.13	3.51
864.12	2

927.12	0.48
990.12	2.21
1053.07	2.49
1116.02	1.42
1178.97	1.37
1241.92	1.68
1304.86	1.19
1368.83	0.9
1431.79	1.17
1494.77	1.31
1558.74	3.08
1621.7	0.91
1684.66	2.94
1747.62	1.46
1811.61	1.96
1874.59	2.68
1938.55	1.1
2001.52	0.94
2065.51	1.89
2128.5	0.57
2191.5	1.57
2255.49	1.53
2318.49	1.98
2382.48	0.27
2445.47	0.96
2508.46	1.01
2570.45	2.76
2633.44	1.22
2695.43	2.96
2759.38	1.5
2822.33	0.95
2885.28	1.65
2948.23	1.62
3012.2	1.89
3075.18	1.6
3138.17	1.51
3201.16	0.65
3265.14	3.16
3328.09	0.75
3392.03	1.41
3454.97	1.8
3517.94	1.8
3580.92	0.53
3643.91	2.12
3707.9	1.94
3770.89	0.2
3833.89	2.93

3896.85	2.86
3959.79	0.83
4022.74	0.94
4086.72	2.23
4149.72	1.85
4211.71	1.55
4274.71	2.75
4337.71	1.39
4400.7	1.04
4463.69	1.33
4526.67	2.38
4590.67	1.59
4653.64	1.02
4713.6	1.28 Final Phoenix MWD Survey
4772.56	0 Projection to TD