

OCT 03 2019

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5D Survey Report

Apache Corporation

Field Name: *Apache NM (Nad 83 NMEZ)*
Site Name: *Palmillo 21 State Com Pad (228H,326H)*
Well Name: *Palmillo 21 State Com 228H*
File number: *13668058*
Survey: *Definitive survey*

17 March 2019




Weatherford

Palmillo 21 State Com 228H

Field Name: Apache NM (Nad 83 NMEZ)	Map Units: US ft Vertical Reference Datum (VRD): Mean Sea Level Projected Coordinate System: NAD83 / New Mexico East (ftUS) Comment:	Company Name: Apache Corporation
Site: Palmillo 21 State Com Pad (228H-326H)	Units: US ft North Reference: Grid Convergence Angle: 0.08	Position: Northing: 600678.80 US ft Latitude: 32.651229777 Easting: 585953.30 US ft Longitude: -104.188371979 Elevation above MSL: 3472.00 US ft Comment: Eddy Co., NM
Slot: Palmillo 21 State Com 228H	Position (Relative to Site Centre) +N/-S: 0.00 US ft Northing: 600678.80 US ft Latitude: 32.651229777 +E/-W: 0.00 US ft Easting: 585953.30 US ft Longitude: -104.188371979 Slot TVD Reference: Ground Elevation Elevation above MSL: 3472.00 US ft Comment:	
Well: Palmillo 21 State Com 228H	Type: Main well UWI: File Number: 13668058 Comment: H&P 482 Closure Distance: 4745.04 US ft Closure Azimuth: 84.86° Vertical Section: Position of Origin (Relative to Slot centre) +N/-S: -0.00 US ft +E/-W: 0.00 US ft Az: 84.89°	

Drill floor: Survey Name: Definitive Survey
Rig Height (Drill Floor): 26.00 US ft **Elevation above MSL:** 3498.00 US ft **Inclination:** 0.00° **Azimuth:** 0.00°

Survey Name: Definitive Survey

Date: 25/Sep/2018 **Survey Tool:** See Survey Tool Ranges below. **Comment:** **Company:**

Magnetic Model:

Model Name: MVHD **Date:** 26/Feb/2019 **Field Strength:** 48007.0 nT **Declination:** 7.30° **Dip:** 60.41°

Tie Point:

MD: 0.00 US ft **Inclination:** 0.00° **Azimuth:** 0.00° **TVD:** 0.00 US ft **North Offset:** -0.00 US ft **East Offset:** 0.00 US ft

Survey Tool Ranges:

Name	Start MD(USFt)	End MD(USFt)	Source Survey
VES GyroFlex V3	0.00	6631.00	VES Gyro

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Survey Tool Ranges:			
Name	Start MD(USFt)	End MD(USFt)	Source Survey
MWD + HDGM + MS	6631.00	7613.00	WFT MWD 04
MWD + HDGM + Sag Corr + MS + OW	7613.00	12099.00	WFT MWD 05

Wellpath created using minimum curvature.

Survey Points: (Relative to Slot centre)(TVD relative to Drill Floor)										
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	VS (US ft)	N.Offset (US ft)	E.Offset (US ft)	DLS (%/100US ft)	Northing (US ft)	Easting (US ft)	Comment
0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	600678.80	585953.30	
153.28	0.19	338.17	153.28	-0.07	0.24	-0.09	0.12	600679.04	585953.21	
247.16	0.24	350.18	247.16	-0.13	0.57	-0.19	0.07	600679.37	585953.11	
341.04	0.35	341.89	341.04	-0.21	1.04	-0.31	0.13	600679.84	585952.99	
434.92	0.81	354.48	434.91	-0.28	1.97	-0.46	0.51	600680.77	585952.84	
528.80	0.82	93.91	528.79	0.37	2.59	0.14	1.32	600681.39	585953.44	
622.68	0.76	353.19	622.66	1.02	3.16	0.74	1.30	600681.96	585954.04	
716.56	0.38	242.37	716.54	0.71	3.63	0.39	1.03	600682.43	585953.69	
810.44	0.96	232.52	810.41	-0.24	3.01	-0.51	0.63	600681.81	585952.79	
904.32	0.84	237.34	904.28	-1.51	2.16	-1.71	0.15	600680.96	585951.59	
998.20	1.67	265.94	998.14	-3.49	1.69	-3.66	1.08	600680.49	585949.64	
1092.08	3.64	280.64	1091.91	-7.73	2.15	-7.95	2.20	600680.95	585945.35	
1185.96	4.26	296.87	1185.57	-13.55	4.27	-13.99	1.36	600683.07	585939.31	
1279.84	4.24	286.66	1279.20	-19.73	6.84	-20.42	0.81	600685.64	585932.88	
1373.72	4.58	285.36	1372.80	-26.47	8.83	-27.36	0.38	600687.63	585925.94	
1467.60	5.25	290.11	1466.33	-33.87	11.30	-35.01	0.83	600690.10	585918.29	
1561.48	5.36	290.52	1559.81	-41.70	14.32	-43.15	0.12	600693.12	585910.15	
1655.36	5.49	289.46	1653.27	-49.74	17.35	-51.49	0.17	600696.15	585901.81	
1749.24	6.04	299.35	1746.68	-57.90	21.27	-60.03	1.21	600700.07	585893.27	
1843.12	7.07	307.32	1839.94	-66.24	27.19	-68.93	1.46	600705.99	585884.37	
1937.00	7.84	313.55	1933.03	-74.73	35.10	-78.17	1.19	600713.90	585875.13	
2030.88	8.18	313.81	2026.00	-83.35	44.14	-87.63	0.36	600722.94	585865.67	
2124.76	8.15	312.39	2118.92	-92.23	53.25	-97.36	0.22	600732.05	585855.94	
2218.64	8.15	322.25	2211.86	-100.32	63.00	-106.35	1.49	600741.80	585846.95	
2312.52	8.49	318.48	2304.75	-108.02	73.45	-115.02	0.68	600752.25	585838.28	
2406.40	7.37	322.79	2397.73	-115.33	83.43	-123.25	1.35	600762.23	585830.05	
2500.28	7.54	321.15	2490.82	-121.95	93.02	-130.76	0.29	600771.82	585822.54	
2594.16	7.74	330.27	2583.87	-128.01	103.31	-137.76	1.31	600782.11	585815.54	
2688.04	7.88	320.16	2676.88	-134.31	113.74	-145.02	1.47	600792.54	585808.28	
2781.92	8.47	322.50	2769.81	-141.68	124.17	-153.35	0.72	600802.97	585799.95	
2875.80	7.82	323.08	2862.74	-148.75	134.76	-161.39	0.70	600813.56	585791.91	
2969.68	7.64	324.29	2955.77	-155.29	144.93	-168.87	0.26	600823.73	585784.43	
3063.56	8.36	323.13	3048.74	-162.06	155.46	-176.61	0.79	600834.26	585776.69	
3157.44	9.08	321.50	3141.53	-169.73	166.72	-185.32	0.81	600845.52	585767.98	
3251.32	9.14	322.45	3234.23	-177.81	178.43	-194.47	0.17	600857.23	585758.83	
3345.20	8.58	320.37	3326.99	-185.78	189.73	-203.48	0.69	600868.53	585749.82	
3439.08	8.20	319.92	3419.86	-193.58	200.25	-212.26	0.41	600879.05	585741.04	
3532.96	7.00	316.17	3512.91	-201.00	209.50	-220.53	1.38	600888.30	585732.77	
3626.84	7.20	318.06	3606.07	-208.10	218.00	-228.43	0.33	600896.80	585724.87	
3720.72	7.28	327.56	3699.21	-214.36	227.40	-235.55	1.28	600906.20	585717.75	
3814.60	7.76	325.21	3792.28	-220.23	237.62	-242.36	0.61	600916.42	585710.94	
3908.48	7.82	329.89	3885.30	-226.07	248.35	-249.18	0.68	600927.15	585704.12	
4002.36	7.66	335.74	3978.32	-230.82	259.58	-254.95	0.86	600938.38	585698.35	
4096.24	7.69	332.28	4071.36	-235.29	270.85	-260.45	0.49	600949.65	585692.85	
4190.12	7.87	333.09	4164.38	-240.09	282.14	-266.28	0.22	600960.94	585687.02	
4284.00	8.36	333.52	4257.32	-244.96	293.98	-272.23	0.53	600972.78	585681.07	
4377.88	8.00	332.55	4350.24	-249.93	305.89	-278.28	0.41	600984.69	585675.02	
4471.76	7.33	329.97	4443.28	-254.94	316.87	-284.29	0.80	600995.67	585669.01	
4565.64	6.02	316.19	4536.53	-260.54	325.61	-290.70	2.19	601004.41	585662.60	
4659.52	4.63	312.83	4630.00	-266.16	331.73	-296.88	1.52	601010.53	585656.42	
4753.40	3.48	311.85	4723.65	-270.64	336.21	-301.79	1.23	601015.01	585651.51	
4847.28	2.60	303.18	4817.39	-274.26	339.28	-305.69	1.06	601018.08	585647.61	

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Survey Points: (Relative to Slot centre)(TVD relative to Drill Floor)										Comment
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	VS (US ft)	N.Offset (US ft)	E.Offset (US ft)	DLS (%/100US ft)	Northing (US ft)	Easting (US ft)	
4941.16	1.54	285.26	4911.21	-277.11	340.78	-308.69	1.31	601019.58	585644.61	
5035.04	1.19	207.71	5005.07	-278.82	340.24	-310.36	1.84	601019.04	585642.94	
5128.92	1.23	222.62	5098.93	-280.10	338.64	-311.50	0.34	601017.44	585641.80	
5222.80	1.05	214.57	5192.79	-281.39	337.19	-312.67	0.26	601015.99	585640.63	
5316.68	1.19	205.55	5286.66	-282.44	335.60	-313.57	0.24	601014.40	585639.73	
5410.56	1.18	210.46	5380.52	-283.50	333.89	-314.48	0.11	601012.69	585638.82	
5504.44	1.37	217.83	5474.37	-284.82	332.17	-315.66	0.27	601010.97	585637.64	
5598.32	1.48	246.80	5568.23	-286.74	330.81	-317.47	0.77	601009.61	585635.83	
5692.20	1.92	242.66	5662.06	-289.35	329.61	-319.98	0.49	601008.41	585633.32	
5786.08	2.21	251.86	5755.88	-292.57	328.32	-323.09	0.47	601007.12	585630.21	
5879.96	2.95	253.97	5849.67	-296.70	327.09	-327.14	0.79	601005.89	585626.16	
5973.84	3.84	253.74	5943.38	-302.16	325.54	-332.48	0.95	601004.34	585620.82	
6067.72	3.36	242.59	6037.08	-307.79	323.40	-337.94	0.90	601002.20	585615.36	
6161.60	1.66	209.07	6130.87	-311.10	320.94	-341.04	2.32	600999.74	585612.26	
6255.48	1.20	165.03	6224.72	-311.69	318.80	-341.45	1.23	600997.60	585611.85	
6349.36	1.83	97.52	6318.57	-310.06	317.66	-339.71	1.88	600996.46	585613.59	
6443.24	3.24	74.60	6412.36	-305.99	318.16	-335.66	1.82	600996.96	585617.64	
6537.12	3.00	73.48	6506.10	-300.97	319.57	-330.75	0.26	600998.37	585622.55	
6631.00	2.74	72.24	6599.87	-296.37	320.95	-326.26	0.28	600999.75	585627.04	VES Gyro Tie In
6727.00	2.35	73.78	6695.77	-292.20	322.20	-322.18	0.41	601001.00	585631.12	First WFT MWD Svy
6774.00	2.66	73.90	6742.73	-290.19	322.77	-320.21	0.66	601001.57	585633.09	
6821.00	6.24	85.69	6789.58	-286.56	323.27	-316.61	7.82	601002.07	585636.69	
6868.00	12.76	90.02	6835.91	-278.83	323.46	-308.87	13.95	601002.26	585644.43	
6916.00	19.22	94.75	6882.03	-265.75	322.80	-295.68	13.72	601001.60	585657.62	
6963.00	25.90	95.86	6925.41	-248.03	321.11	-277.74	14.24	600999.91	585675.56	
7011.00	30.89	93.31	6967.62	-225.54	319.33	-254.99	10.70	600998.13	585698.31	
7058.00	36.40	90.27	7006.74	-199.70	318.56	-228.98	12.26	600997.36	585724.32	
7105.00	42.79	89.24	7042.93	-169.86	318.71	-199.04	13.67	600997.51	585754.26	
7152.00	49.02	89.21	7075.62	-136.22	319.17	-165.31	13.26	600997.97	585787.99	
7200.00	53.52	89.92	7105.65	-98.91	319.44	-127.87	9.45	600998.24	585825.43	
7247.00	56.83	89.49	7132.48	-60.47	319.65	-89.30	7.08	600998.45	585864.00	
7295.00	58.90	89.08	7158.01	-19.95	320.15	-48.66	4.37	600998.95	585904.64	
7342.00	61.40	88.14	7181.41	20.73	321.15	-7.91	5.59	600999.95	585945.39	
7389.00	64.24	87.11	7202.87	62.49	322.88	33.86	6.35	601001.68	585987.16	
7436.00	66.16	86.33	7222.59	105.13	325.33	76.46	4.35	601004.13	586029.76	
7484.00	67.68	86.13	7241.40	149.27	328.23	120.52	3.19	601007.03	586073.82	
7531.00	69.86	86.26	7258.42	193.07	331.14	164.23	4.65	601009.94	586117.53	
7578.00	75.57	86.54	7272.38	237.91	333.95	209.00	12.16	601012.75	586162.30	
7613.00	79.80	86.68	7279.84	272.08	335.97	243.12	12.09	601014.77	586196.42	
7698.00	86.64	87.06	7289.87	356.39	340.58	327.35	8.06	601019.38	586280.65	
7792.00	87.83	86.83	7294.41	450.22	345.58	421.11	1.29	601024.38	586374.41	
7887.00	88.81	86.94	7297.19	545.12	350.74	515.93	1.04	601029.54	586469.23	
7982.00	90.42	87.00	7297.83	640.05	355.76	610.79	1.70	601034.56	586564.09	
8077.00	89.65	89.37	7297.77	734.88	358.77	705.73	2.62	601037.57	586659.03	
8171.00	90.14	88.68	7297.94	828.64	360.37	799.72	0.90	601039.17	586753.02	
8266.00	91.26	88.91	7296.78	923.41	362.37	894.69	1.20	601041.17	586847.99	
8361.00	89.09	89.54	7296.49	1018.13	363.65	989.67	2.38	601042.45	586942.97	
8455.00	88.81	89.87	7298.22	1111.78	364.14	1083.66	0.46	601042.94	587036.96	
8550.00	89.72	90.47	7299.43	1206.37	363.86	1178.65	1.15	601042.66	587131.95	
8645.00	89.02	90.85	7300.48	1300.88	362.76	1273.63	0.84	601041.56	587226.93	
8739.00	89.44	90.62	7301.74	1394.39	361.56	1367.62	0.51	601040.36	587320.92	
8834.00	88.25	88.16	7303.66	1489.06	362.57	1462.58	2.88	601041.37	587415.88	
8928.00	88.39	87.52	7306.41	1582.90	366.11	1556.48	0.70	601044.91	587509.78	
9023.00	90.77	87.05	7307.11	1677.81	370.61	1651.36	2.55	601049.41	587604.66	
9118.00	92.66	86.76	7304.27	1772.70	375.73	1746.18	2.01	601054.53	587699.48	
9212.00	92.80	87.66	7299.79	1866.52	380.30	1839.96	0.97	601059.10	587793.26	
9307.00	92.31	88.07	7295.55	1961.29	383.84	1934.80	0.67	601062.64	587888.10	

5D Survey Report

Survey Points: (Relative to Slot centre)(TVD relative to Drill Floor)										
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	VS (US ft)	N. Offset (US ft)	E. Offset (US ft)	DLS (°/100US ft)	Northing (US ft)	Easting (US ft)	Comment
9401.00	92.38	88.93	7291.71	2055.03	386.30	2028.68	0.92	601065.10	587981.98	
9496.00	90.84	89.63	7289.04	2149.71	387.49	2123.64	1.78	601066.29	588076.94	
9591.00	89.37	89.86	7288.87	2244.36	387.91	2218.63	1.57	601066.71	588171.93	
9685.00	90.42	89.52	7289.04	2338.03	388.42	2312.63	1.17	601067.22	588265.93	
9780.00	90.98	89.22	7287.88	2432.74	389.47	2407.62	0.67	601068.27	588360.92	
9874.00	90.77	89.23	7286.44	2526.46	390.74	2501.60	0.22	601069.54	588454.90	
9969.00	91.89	89.64	7284.24	2621.13	391.68	2596.56	1.26	601070.48	588549.86	
10063.00	90.35	89.64	7282.40	2714.79	392.27	2690.54	1.64	601071.07	588643.84	
10158.00	88.81	89.64	7283.10	2809.45	392.86	2785.53	1.62	601071.66	588738.83	
10253.00	88.88	89.34	7285.01	2904.13	393.71	2880.51	0.32	601072.51	588833.81	
10347.00	88.74	89.27	7286.96	2997.83	394.85	2974.48	0.17	601073.65	588927.78	
10442.00	88.74	89.26	7289.05	3092.53	396.07	3069.45	0.01	601074.87	589022.75	
10536.00	88.81	89.28	7291.06	3186.23	397.26	3163.42	0.08	601076.06	589116.72	
10631.00	89.16	89.36	7292.74	3280.94	398.39	3258.40	0.38	601077.19	589211.70	
10726.00	89.44	90.04	7293.90	3375.59	398.89	3353.39	0.77	601077.69	589306.69	
10820.00	89.86	90.68	7294.48	3469.16	398.30	3447.39	0.81	601077.10	589400.69	
10915.00	89.93	89.36	7294.65	3563.78	398.26	3542.39	1.39	601077.06	589495.69	
11009.00	90.70	88.84	7294.14	3657.52	399.74	3636.37	0.99	601078.54	589589.67	
11104.00	90.35	87.74	7293.27	3752.35	402.58	3731.32	1.22	601081.38	589684.62	
11199.00	90.28	87.53	7292.74	3847.24	406.50	3826.24	0.23	601085.30	589779.54	
11293.00	90.84	87.89	7291.82	3941.12	410.25	3920.16	0.71	601089.05	589873.46	
11388.00	90.56	88.73	7290.66	4035.94	413.05	4015.11	0.93	601091.85	589968.41	
11482.00	89.16	88.48	7290.89	4129.74	415.34	4109.08	1.51	601094.14	590062.38	
11577.00	88.67	88.50	7292.69	4224.54	417.84	4204.03	0.52	601096.64	590157.33	
11672.00	89.30	89.76	7294.38	4319.26	419.29	4299.00	1.48	601098.09	590252.30	
11766.00	89.23	88.89	7295.58	4412.97	420.39	4392.99	0.93	601099.19	590346.29	
11861.00	89.51	88.86	7296.63	4507.74	422.26	4487.96	0.30	601101.06	590441.26	
11956.00	90.07	89.25	7296.97	4602.48	423.83	4582.95	0.72	601102.63	590536.25	
12015.00	90.56	89.39	7296.65	4661.31	424.53	4641.94	0.86	601103.33	590595.24	Last WFT MWD Svy
12099.00	90.56	89.39	7295.83	4745.04	425.42	4725.94	0.00	601104.22	590679.24	TD@12099' MD/PTB