

OCT 03 2019



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Report Date: 3/28/2019

Customer: Apache

Job Name: 13668064

Well Name: Palmillo 21 State Com 326H

Field: Bone Spring

Rig: H&P 482

Rig Loc: Eddy Co., NM

SURVEY REPORT

Survey Calculation Method: Minimum Curvature						
Magnetic Reference	Target Direction	Total Magnetic Field	Magnetic Dip Angle	Magnetic Declination	Grid Convergence	Total Correction
Grid North	84.77 deg	48002 nT	60.41 deg	7.30 deg	0.08 deg	7.22 deg
Survey Tie-On	Depth	INC	AZ	TVD	NS	EW
	0.00 ft	0.00 deg	0.00 deg	0.00 ft	0.00 ft	0.00 ft

Depth (ft)	Inc (deg)	Azm (deg)	TVD (ft)	Well Head		VSect (ft)	Dogleg (deg/100ft)
				NS (ft)	EW (ft)		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
53.08	0.27	289.74	53.08	0.04	-0.12	-0.11	0.51
147.64	0.28	287.25	147.64	0.19	-0.55	-0.53	0.02
242.20	0.44	310.26	242.20	0.49	-1.05	-1.00	0.22
336.76	0.75	325.22	336.75	1.23	-1.68	-1.56	0.36
431.32	1.17	331.65	431.30	2.59	-2.49	-2.24	0.46
525.88	1.53	332.31	525.83	4.56	-3.53	-3.10	0.38
620.44	1.56	327.03	620.36	6.76	-4.82	-4.18	0.15
715.00	1.55	323.62	714.88	8.86	-6.28	-5.44	0.10
809.56	1.66	322.52	809.41	10.98	-7.87	-6.84	0.12
904.12	1.65	321.86	903.93	13.14	-9.54	-8.31	0.02
998.68	1.69	319.00	998.45	15.26	-11.30	-9.86	0.10
1093.24	1.71	311.63	1092.96	17.25	-13.27	-11.64	0.23
1187.80	1.82	310.25	1187.48	19.16	-15.47	-13.66	0.12
1282.36	1.88	307.61	1281.99	21.08	-17.84	-15.85	0.11
1376.92	2.03	307.00	1376.49	23.03	-20.41	-18.23	0.16
1471.48	2.55	311.18	1470.98	25.42	-23.33	-20.92	0.58
1566.04	3.40	316.83	1565.41	28.85	-26.83	-24.09	0.95
1660.60	4.31	316.18	1659.76	33.46	-31.21	-28.03	0.96
1755.16	5.69	321.12	1753.95	39.68	-36.62	-32.85	1.53
1849.72	6.98	317.32	1847.94	47.55	-43.45	-38.94	1.43
1944.28	8.16	318.88	1941.67	56.83	-51.76	-46.37	1.27
2038.84	9.56	322.80	2035.10	68.14	-60.92	-54.46	1.61
2133.40	9.93	323.23	2128.30	80.92	-70.55	-62.88	0.40
2227.96	10.08	323.02	2221.42	94.07	-80.41	-71.50	0.16
2322.52	10.17	322.05	2314.50	107.26	-90.52	-80.37	0.20
2417.08	10.34	321.53	2407.55	120.49	-100.93	-89.53	0.20
2511.64	10.48	323.10	2500.56	134.01	-111.38	-98.70	0.33
2606.20	10.72	321.72	2593.50	147.79	-121.99	-108.01	0.37
2700.76	10.43	318.27	2686.46	161.08	-133.13	-117.90	0.74
2795.32	9.29	319.89	2779.62	173.31	-143.75	-127.35	1.24
2889.88	9.08	318.22	2872.97	184.71	-153.64	-136.16	0.36
2984.44	9.33	321.31	2966.31	196.25	-163.40	-144.83	0.59
3079.00	9.83	316.19	3059.55	208.06	-173.78	-154.09	1.04
3173.56	10.75	317.74	3152.59	220.42	-185.30	-164.44	1.02

Depth (ft)	Inc (deg)	Azm (deg)	TVD (ft)	Well Head		Vsect (ft)	Dogleg (deg/100ft)
				NS (ft)	EW (ft)		
8046.00	6.98	86.73	8009.37	341.23	-308.66	-276.27	8.29
8093.00	13.82	84.81	8055.57	341.90	-300.20	-267.79	14.57
8141.00	20.21	85.37	8101.45	343.09	-286.22	-253.75	13.32
8188.00	26.82	86.20	8144.52	344.45	-267.52	-235.01	14.08
8236.00	31.66	86.97	8186.39	345.84	-244.13	-211.58	10.11
8283.00	37.13	86.75	8225.16	347.29	-217.63	-185.06	11.64
8330.00	41.95	85.30	8261.40	349.39	-187.79	-155.16	10.44
8377.00	46.95	85.73	8294.94	351.95	-154.99	-122.26	10.66
8425.00	52.02	85.52	8326.11	354.74	-118.61	-85.78	10.57
8472.00	56.82	86.10	8353.45	357.53	-80.50	-47.58	10.26
8520.00	60.59	86.16	8378.38	360.29	-39.59	-6.58	7.85
8567.00	64.39	86.65	8400.08	362.90	2.01	35.08	8.14
8614.00	68.75	87.13	8418.77	365.24	45.06	78.17	9.32
8661.00	72.38	88.00	8434.41	367.12	89.34	122.43	7.92
8709.00	75.50	88.06	8447.68	368.70	135.43	168.47	6.50
8756.00	78.95	87.66	8458.07	370.42	181.23	214.24	7.39
8803.00	81.85	87.93	8465.91	372.20	227.53	260.51	6.20
8850.00	84.26	88.32	8471.59	373.72	274.16	307.08	5.19
8922.00	86.71	88.45	8477.26	375.75	345.90	378.71	3.41
9017.00	89.30	90.69	8480.57	376.46	440.82	473.30	3.60
9111.00	88.18	90.13	8482.64	375.79	534.80	566.82	1.33
9206.00	88.88	90.39	8485.07	375.35	629.76	661.36	0.79
9300.00	89.79	90.31	8486.16	374.78	723.75	754.90	0.97
9395.00	89.79	89.09	8486.51	375.28	818.75	849.55	1.28
9490.00	90.00	88.38	8486.69	377.37	913.73	944.32	0.78
9584.00	89.09	87.79	8487.43	380.52	1007.67	1038.16	1.15
9679.00	89.51	89.26	8488.59	382.96	1102.63	1132.95	1.61
9773.00	88.81	89.46	8489.97	384.01	1196.61	1226.63	0.77
9868.00	87.20	89.96	8493.28	384.49	1291.55	1321.22	1.77
9963.00	88.04	90.30	8497.22	384.28	1386.47	1415.72	0.95
10057.00	88.39	90.54	8500.15	383.59	1480.42	1509.22	0.45
10152.00	89.09	90.66	8502.24	382.59	1575.39	1603.71	0.75
10246.00	88.32	90.50	8504.36	381.64	1669.36	1697.20	0.84
10341.00	88.04	90.14	8507.38	381.11	1764.31	1791.71	0.48
10435.00	88.46	89.23	8510.25	381.63	1858.26	1885.31	1.07
10530.00	89.44	89.34	8511.99	382.81	1953.24	1980.00	1.04
10625.00	90.28	89.56	8512.23	383.73	2048.23	2074.68	0.91
10719.00	90.77	89.36	8511.36	384.61	2142.23	2168.37	0.56
10814.00	88.74	87.89	8511.77	386.89	2237.19	2263.14	2.64
10908.00	88.95	87.34	8513.66	390.80	2331.09	2357.01	0.63
11003.00	89.44	89.01	8515.00	393.83	2426.03	2451.83	1.83
11098.00	90.00	89.55	8515.46	395.02	2521.02	2546.53	0.82
11192.00	90.42	89.14	8515.12	396.09	2615.01	2640.23	0.62
11287.00	89.86	89.77	8514.89	397.00	2710.01	2734.91	0.89
11381.00	90.07	90.09	8514.94	397.11	2804.01	2828.53	0.41
11476.00	89.58	89.09	8515.23	397.79	2899.00	2923.19	1.17
11571.00	89.02	88.73	8516.40	399.60	2993.98	3017.94	0.70
11665.00	89.79	88.40	8517.37	401.95	3087.94	3111.72	0.89
11760.00	89.16	89.85	8518.24	403.40	3182.92	3206.44	1.66
11855.00	89.09	90.30	8519.69	403.28	3277.91	3301.03	0.48

Depth (ft)	Inc (deg)	Azm (deg)	TVD (ft)	Well Head		VSect (ft)	Dogleg (deg/100ft)
				NS (ft)	EW (ft)		
11949.00	89.37	90.48	8520.96	402.64	3371.90	3394.56	0.35
12044.00	89.79	90.91	8521.65	401.49	3466.89	3489.05	0.63
12138.00	89.37	89.63	8522.34	401.04	3560.88	3582.62	1.43
12233.00	89.23	88.85	8523.50	402.30	3655.87	3677.32	0.83
12327.00	89.79	89.21	8524.31	403.90	3749.85	3771.06	0.71
12422.00	91.12	89.38	8523.55	405.06	3844.84	3865.76	1.41
12516.00	90.14	88.57	8522.52	406.75	3938.82	3959.49	1.35
12611.00	89.51	88.35	8522.81	409.30	4033.78	4054.30	0.70
12705.00	89.79	88.68	8523.38	411.74	4127.75	4148.09	0.46
12799.00	89.86	89.07	8523.67	413.58	4221.73	4241.85	0.42
12894.00	90.28	89.33	8523.55	414.91	4316.72	4336.57	0.52
12988.00	89.37	90.26	8523.84	415.24	4410.72	4430.20	1.38
13083.00	88.95	90.67	8525.23	414.47	4505.70	4524.72	0.62
13178.00	89.30	89.20	8526.68	414.58	4600.69	4619.33	1.59
*13269.00 ↓	89.37	89.08	8527.74	415.95	4691.67	4710.05	0.15
↓ Projected to Total Depth:							
13344.00 ✓	89.37	89.08	8528.57	417.15	4766.66	4784.84	0.00

* Weatherford surveys from 7,952.00 ft MD to 13,269.00 ft MD. *

* TD at 13,344.00 ft MD. *

* The total correction is 7.22 deg relative to Grid North. *