



Weatherford

Drilling Services
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Apache Corporation
303 Veterans Airpark Lane
Midland, TX, 79705

Date: September 23, 2019

Attention: Taylor Thetford

Re: Apache Corporation
Well: Black and Tan 27 Fed Com 405H
Lea County, New Mexico

Enclosed, please find the original survey performed on the referenced well by Precision Energy Services, Inc. (P-5 No. 676004), a Weatherford company. Other information required by your office is as follows:

<u>Name & Title Of Surveyor</u>	<u>Well Number</u>	<u>Surveyed Depths</u>	<u>Dates Performed</u>	<u>Type of Survey</u>
Cory Snyder	405H	10,940 MD	9/18/2019	Measurement
MWD Ops. Coordinator		16,335 MD	9/23/2019	While Drilling

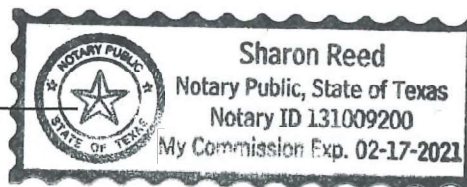
A notarized plan vs. actual is attached to the survey report. If any other information is required, please contact the undersigned at the letterhead address and phone number.

Cory Snyder
MWD Ops. Coordinator

On this, the 24 day of September, 2019, before me a notary public, the undersigned officer, personally appeared Cory Snyder, known to me (or satisfactorily proven) to be the person whose name is subscribed to the within instrument, and acknowledged that he executed the same for the purposes therein contained.

In witness hereof, I hereunto set my hand and official seal.

Notary Public



5D Survey Report



5D Survey Report

Apache Corporation

Field Name: *Apache NM (Nad 83 NMEZ)*
Site Name: *Black & Tan 27 Fed Com Pad 3*
Well Name: *Black and Tan 27 Fed Com 405H*
File number: *13841048*
Survey: *Definitive survey*

23 September 2019





Black and Tan 27 Fed Com 405H

Field Name: Apache NM (Nad 83 NMEZ)	Map Units: US ft		Company Name: Apache Corporation	
	Vertical Reference Datum (VRD): Mean Sea Level			
	Projected Coordinate System: NAD83 / New Mexico East (ftUS)			
	Comment:			
Site: Black & Tan 27 Fed Com Pad 3	Units: US ft	North Reference: Grid	Convergence Angle: 0.42	
	Position:	Northing: 560146.00 US ft	Latitude: 32.537436611	
		Easting: 783862.20 US ft	Longitude: -103.546350856	
	Elevation above MSL: 3714.00 US ft			
Comment: Lea Co., NM				
Slot: Black & Tan 27 Fed Com 405H	Position (Relative to Site Centre)			
	+N/-S: 0.30 US ft	Northing: 560146.30 US ft	Latitude: 32.537436621	
	+E/-W: 40.10 US ft	Easting: 783902.30 US ft	Longitude: -103.546220736	
	Slot TVD Reference: Ground Elevation			
Elevation above MSL: 3715.00 US ft				
Comment:				
Well: Black and Tan 27 Fed Com 405H	Type: Main well		UWI:	
	File Number: 13841048	Comment:		
	Closure Distance: 5016.76US ft		Closure Azimuth: 4.22°	
	Vertical Section: Position of Origin (Relative to Slot centre)			
+N/-S: -0.00 US ft		+E/-W: 0.00 US ft		Az: 7.81°

Drill floor: Survey Name: Definitive Survey
Rig Height (Drill Floor): 26.00 US ft **Elevation above MSL:** 3741.00 US ft **Inclination:** 0.00° **Azimuth:** 0.00°

Survey Name: Definitive Survey

Date: 22/Aug/2018 **Survey Tool:** See Survey Tool Ranges below. **Comment:** **Company:**

Magnetic Model:

Model Name: IFR **Date:** 29/Aug/2019 **Field Strength:** 48157.9 nT **Declination:** 6.60° **Dip:** 60.47°

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
GYRO_GC_WIR+DPIPE_GYD	0.00	10842.00	GyroData Gyro
MWD + IFR + Sag Corr + MS	10842.00	11672.00	WFT MWD 04
MWD + IFR + Sag Corr + MS	11672.00	16400.00	WFT MWD 05

5D Survey Report

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
10842.00	1.87	250.49	10808.54	-110.77	-169.68	421.93	0.98	559976.62	784324.23	Tieon GyroData Gyro
10940.00	3.05	248.54	10906.45	-112.78	-171.17	417.99	1.21	559975.13	784320.29	First WFT MWD Svy
10987.00	2.85	294.97	10953.40	-113.05	-171.13	415.77	4.96	559975.17	784318.07	
11034.00	9.70	345.68	11000.11	-109.03	-166.79	413.73	17.44	559979.51	784316.03	
11081.00	18.36	352.16	11045.67	-98.21	-155.60	411.73	18.70	559990.70	784314.03	
11129.00	26.58	355.74	11089.99	-80.40	-137.37	409.90	17.35	560008.93	784312.20	
11176.00	33.88	358.25	11130.57	-57.16	-113.76	408.72	15.76	560032.54	784311.02	
11223.00	39.17	358.03	11168.33	-29.60	-85.81	407.81	11.26	560060.49	784310.11	
11270.00	43.88	356.71	11203.50	1.03	-54.70	406.36	10.19	560091.60	784308.66	
11317.00	46.90	354.88	11236.51	33.75	-21.33	403.90	7.00	560124.97	784306.20	
11364.00	50.44	353.94	11267.54	68.07	13.78	400.45	7.68	560160.08	784302.75	
11411.00	54.19	353.52	11296.27	104.14	50.75	396.39	8.01	560197.05	784298.69	
11458.00	57.67	354.08	11322.60	141.91	89.45	392.19	7.47	560235.75	784294.49	
11505.00	59.87	355.12	11346.96	181.04	129.46	388.41	5.05	560275.76	784290.71	
11552.00	61.92	356.33	11369.82	221.19	170.40	385.35	4.91	560316.70	784287.65	
11600.00	64.02	358.47	11391.64	263.24	213.11	383.42	5.91	560359.41	784285.72	
11647.00	71.74	2.36	11409.33	306.38	256.61	383.78	18.12	560402.91	784286.08	
11672.00	76.43	3.30	11416.18	330.32	280.61	384.96	19.11	560426.91	784287.26	
11716.00	84.57	2.23	11423.44	373.51	323.92	387.05	18.65	560470.22	784289.35	
11763.00	86.98	358.10	11426.90	419.95	370.78	387.18	10.15	560517.08	784289.48	
11811.00	87.22	357.03	11429.33	467.13	418.67	385.15	2.28	560564.97	784287.45	
11858.00	88.10	0.49	11431.25	513.50	465.62	384.13	7.59	560611.92	784286.43	
11905.00	88.63	0.15	11432.59	560.08	512.60	384.39	1.34	560658.90	784286.69	
11999.00	88.77	0.89	11434.72	653.29	606.57	385.25	0.80	560752.87	784287.55	
12093.00	89.47	0.60	11436.17	746.57	700.55	386.47	0.81	560846.85	784288.77	
12188.00	88.17	1.12	11438.12	840.85	795.52	387.89	1.47	560941.82	784290.19	
12282.00	89.61	1.27	11439.95	934.20	889.47	389.85	1.54	561035.77	784292.15	
12376.00	89.81	2.69	11440.42	1027.71	983.41	393.10	1.53	561129.71	784295.40	
12470.00	90.24	3.14	11440.38	1121.37	1077.29	397.88	0.66	561223.59	784300.18	
12565.00	87.02	359.60	11442.65	1215.71	1172.21	400.15	5.04	561318.51	784302.45	
12659.00	89.19	358.26	11445.76	1308.53	1266.14	398.40	2.71	561412.44	784300.70	
12753.00	88.93	359.20	11447.30	1401.34	1360.10	396.32	1.04	561506.40	784298.62	
12847.00	87.40	359.92	11450.31	1494.31	1454.04	395.59	1.80	561600.34	784297.89	
12941.00	88.49	359.83	11453.68	1587.35	1547.98	395.39	1.16	561694.28	784297.69	
13036.00	88.49	0.02	11456.19	1681.42	1642.95	395.26	0.20	561789.25	784297.56	
13130.00	88.91	359.02	11458.32	1774.41	1736.92	394.48	1.15	561883.22	784296.78	
13224.00	89.22	359.53	11459.85	1867.36	1830.90	393.29	0.63	561977.20	784295.59	
13318.00	87.93	1.17	11462.19	1960.53	1924.86	393.86	2.22	562071.16	784296.16	
13412.00	89.75	1.02	11464.09	2053.86	2018.82	395.66	1.94	562165.12	784297.96	
13506.00	92.30	358.96	11462.41	2146.96	2112.80	395.64	3.49	562259.10	784297.94	
13600.00	88.70	359.03	11461.59	2239.83	2206.76	393.99	3.83	562353.06	784296.29	
13695.00	89.85	357.64	11462.79	2333.52	2301.71	391.23	1.90	562448.01	784293.53	
13789.00	91.67	357.08	11461.55	2425.95	2395.60	386.90	2.03	562541.90	784289.20	
13883.00	89.82	358.23	11460.33	2518.47	2489.51	383.06	2.32	562635.81	784285.36	
13978.00	90.38	357.85	11460.16	2612.09	2584.45	379.81	0.71	562730.75	784282.11	
14072.00	91.88	359.01	11458.31	2704.81	2678.39	377.23	2.02	562824.69	784279.53	
14166.00	91.66	0.58	11455.40	2797.84	2772.34	376.90	1.69	562918.64	784279.20	
14260.00	91.42	359.81	11452.88	2890.98	2866.31	377.22	0.86	563012.61	784279.52	
14354.00	89.99	2.53	11451.72	2984.33	2960.27	379.14	3.27	563106.57	784281.44	
14449.00	91.21	1.59	11450.72	3078.84	3055.20	382.55	1.62	563201.50	784284.85	
14543.00	93.88	0.27	11446.55	3172.07	3149.08	384.08	3.17	563295.38	784286.38	
14637.00	91.67	0.60	11442.00	3265.17	3242.97	384.79	2.38	563389.27	784287.09	
14731.00	94.26	1.24	11437.14	3358.36	3336.82	386.30	2.84	563483.12	784288.60	
14825.00	91.72	2.96	11432.23	3451.76	3430.62	389.74	3.26	563576.92	784292.04	
14920.00	92.98	0.89	11428.34	3546.17	3525.48	392.93	2.55	563671.78	784295.23	
15014.00	90.04	354.76	11425.86	3638.66	3619.32	389.36	7.23	563765.62	784291.66	

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
15108.00	92.37	356.67	11423.88	3730.54	3713.03	382.34	3.20	563859.33	784284.64	
15202.00	92.09	358.13	11420.23	3822.92	3806.86	378.08	1.58	563953.16	784280.38	
15297.00	91.88	358.36	11416.93	3916.54	3901.75	375.17	0.33	564048.05	784277.47	
15391.00	91.78	0.03	11413.93	4009.43	3995.69	373.85	1.78	564141.99	784276.15	
15486.00	93.21	359.40	11409.80	4103.39	4090.60	373.38	1.64	564236.90	784275.68	
15580.00	93.21	0.37	11404.53	4196.35	4184.45	373.19	1.03	564330.75	784275.49	
15675.00	93.74	0.63	11398.77	4290.40	4279.27	374.02	0.62	564425.57	784276.32	
15769.00	91.57	1.27	11394.42	4383.62	4373.15	375.57	2.41	564519.45	784277.87	
15863.00	94.12	0.42	11389.76	4476.81	4467.02	376.96	2.86	564613.32	784279.26	
15957.00	90.90	359.64	11385.64	4569.84	4560.91	377.01	3.52	564707.21	784279.31	
16052.00	90.13	358.26	11384.79	4663.70	4655.89	375.27	1.66	564802.19	784277.57	
16146.00	89.81	356.95	11384.83	4756.21	4749.81	371.34	1.43	564896.11	784273.64	
16240.00	95.38	359.86	11380.58	4848.80	4843.63	368.72	6.68	564989.93	784271.02	
16335.00	94.09	0.45	11372.74	4942.63	4938.30	368.98	1.49	565084.60	784271.28	Last WFT MWD Svy
16400.00	94.09	0.45	11368.10	5006.93	5003.13	369.49	0.00	565149.43	784271.79	TD@16,400' MD / PTB