

CORPORATION

Apache Corporation

Location: Eddy County, NM
Field: Eddy County, NM NAD83
Facility: Thunderbird Pad

Slot: Thunderbird No. 19H
Well: Thunderbird No. 19H
Wellbore: Thunderbird No. 19H



30-015-44599

Well Profile Data

Design Comment	MD (ft)	Inc. (°)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	DLS (°/100ft)	VS (ft)
Tie On	25.00	0.000	269.819	25.00	0.00	0.00	0.00	0.00
End of Tangent	4197.06	0.000	269.819	4197.06	0.00	0.00	0.00	0.00
End of Build	5092.79	89.573	269.819	4770.00	-1.80	-568.68	10.00	568.68
End of Tangent	9115.48	89.573	269.819	4800.00	-14.50	-4591.24	0.00	4591.26

Bottom Hole Location

MD (ft)	Inc. (°)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
9115.48	89.573	269.819	4800.00	-14.50	-4591.24	664284.90	683017.90	32°52'37.184"N	103°55'58.282"W

Plot reference wellpath is Thunderbird No. 19H Prelim 1

Grid System: NAD83 / TM New Mexico SP, Eastern Zone (3001), US feet

True vertical depths are referenced to Rig on Thunderbird No. 19H (KB)

North Reference: Grid north

Measured depths are referenced to Rig on Thunderbird No. 19H (KB)

Scale: True distance

Rig on Thunderbird No. 19H (KB) to Mean Sea Level: 3850 feet

Depths are in feet

Mean Sea Level to Ground level (At Slot: Thunderbird No. 19H): -3825 feet

Created by: builduyn on 2017-12-12

Coordinates are in feet referenced to Slot

Database: WellArchitectDB

Location Information

Facility Name	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
Thunderbird Pad	668895.500	681145.800	32°52'18.483"N	103°55'04.305"W
Slot	Local N (ft)	Local E (ft)	Latitude	Longitude
Thunderbird No. 19H	1886.74	-19.70	32°52'37.151"N	103°55'04.449"W

Rig on Thunderbird No. 19H (KB) to Ground level (At Slot: Thunderbird No. 19H)

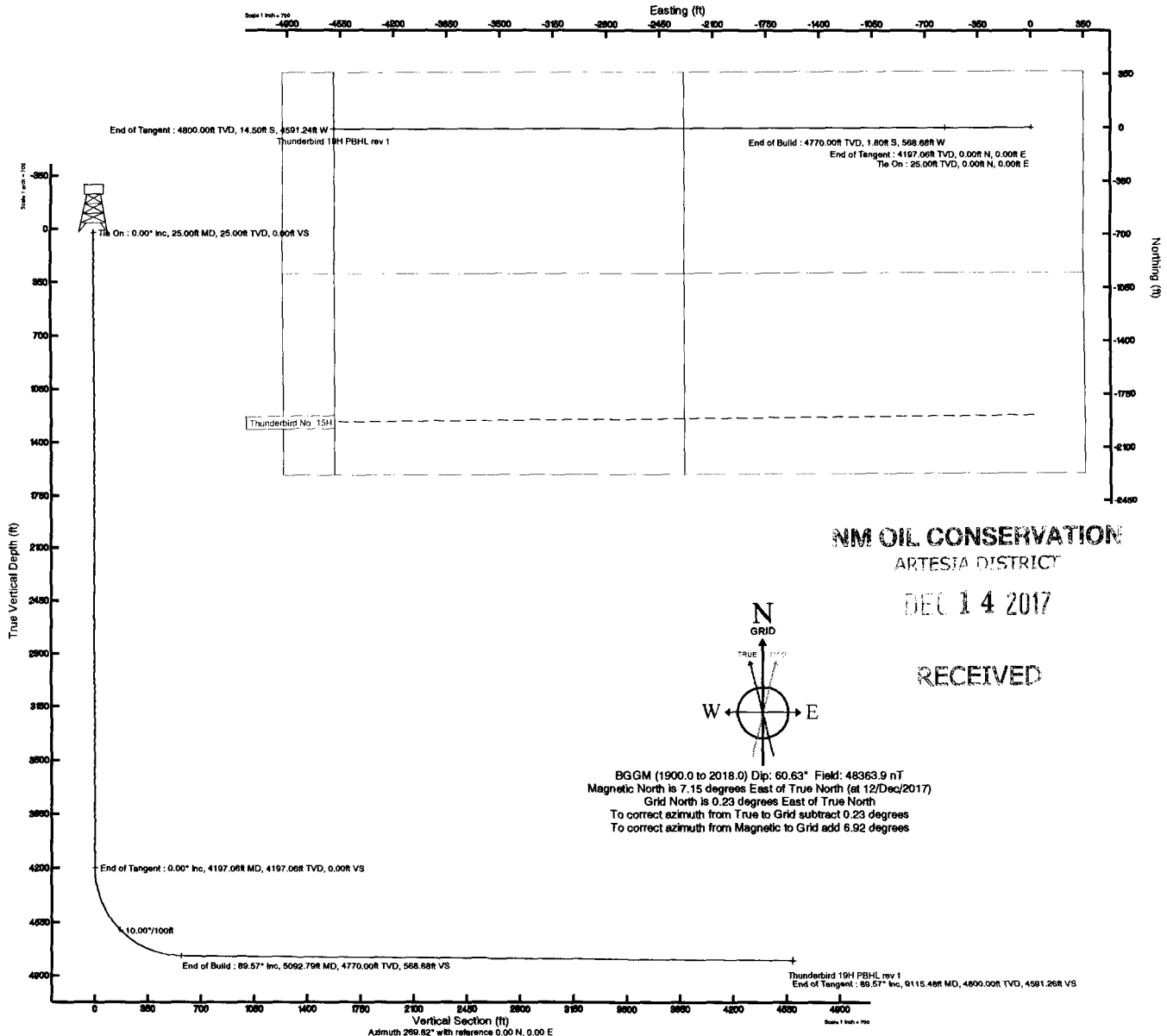
25ft

Mean Sea Level to Ground level (At Slot: Thunderbird No. 19H)

-3825ft

Rig on Thunderbird No. 19H (KB) to Mean Sea Level

3850ft



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CORPORATION

REFERENCE WELLPATH IDENTIFICATION

Operator	Apache Corporation	Slot	Thunderbird No. 19H
Area	Eddy County, NM	Well	Thunderbird No. 19H
Field	Eddy County, NM NAD83	Wellbore	Thunderbird No. 19H
Facility	Thunderbird Pad		

REPORT SETUP INFORMATION

Projection System	NAD83 / TM New Mexico SP, Eastern Zone (3001), US feet	Software System	WellArchitect® 5.1
North Reference	Grid	User	Buiduyh
Scale	0.999928	Report Generated	12/Dec/2017 at 15:31
Convergence at slot	0.23° East	Database/Source file	WellArchitectDB/Thunderbird_No_19H_Prelim_1.xml

WELLPATH LOCATION

	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	1886.74	-19.70	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W
Facility Reference Pt			668895.50	681145.80	32°52'18.483"N	103°55'04.305"W
Field Reference Pt			165000.00	0.00	30°59'39.893"N	105°32'03.866"W

WELLPATH DATUM

Calculation method	Minimum curvature	Rig on Thunderbird No. 19H (KB) to Facility Vertical Datum	3850.00ft
Horizontal Reference Pt	Slot	Rig on Thunderbird No. 19H (KB) to Mean Sea Level	3850.00ft
Vertical Reference Pt	Rig on Thunderbird No. 19H (KB)	Rig on Thunderbird No. 19H (KB) to Ground Level at Slot (Thunderbird No. 19H)	25.00ft
MD Reference Pt	Rig on Thunderbird No. 19H (KB)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	269.82°



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Field	Eddy County, NM NAD83	Wellbore	Thunderbird No. 19H
Facility	Thunderbird Pad		

WELLPATH DATA (106 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]	Comments
0.00†	0.000	269.819	0.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
25.00	0.000	269.819	25.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	Tie On
125.00†	0.000	269.819	125.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
225.00†	0.000	269.819	225.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
325.00†	0.000	269.819	325.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
425.00†	0.000	269.819	425.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
451.00†	0.000	269.819	451.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	Salado
525.00†	0.000	269.819	525.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
725.00†	0.000	269.819	725.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
825.00†	0.000	269.819	825.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
925.00†	0.000	269.819	925.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
1025.00†	0.000	269.819	1025.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
1225.00†	0.000	269.819	1225.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
1325.00†	0.000	269.819	1325.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
1357.00†	0.000	269.819	1357.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	Tansill
1425.00†	0.000	269.819	1425.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
1525.00†	0.000	269.819	1525.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
1625.00†	0.000	269.819	1625.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
1725.00†	0.000	269.819	1725.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
1781.00†	0.000	269.819	1781.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	Seven Rivers
1925.00†	0.000	269.819	1925.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
2025.00†	0.000	269.819	2025.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
2125.00†	0.000	269.819	2125.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
2225.00†	0.000	269.819	2225.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	



Planned Wellpath Report

Thunderbird No. 19H Prelim 1

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CORPORATION

REFERENCE WELLPATH IDENTIFICATION

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Area	Eddy County, NM	Well	Thunderbird No. 19H
Field	Eddy County, NM NAD83	Wellbore	Thunderbird No. 19H
Facility	Thunderbird Pad		

WELLPATH DATA (106 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]	Comments
2382.00†	0.000	269.819	2382.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	Queen
2425.00†	0.000	269.819	2425.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
2525.00†	0.000	269.819	2525.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
2625.00†	0.000	269.819	2625.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
2800.00†	0.000	269.819	2800.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	Grayburg
2825.00†	0.000	269.819	2825.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
2925.00†	0.000	269.819	2925.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
3025.00†	0.000	269.819	3025.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
3125.00†	0.000	269.819	3125.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
3225.00†	0.000	269.819	3225.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
3325.00†	0.000	269.819	3325.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
3425.00†	0.000	269.819	3425.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
3625.00†	0.000	269.819	3625.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
3725.00†	0.000	269.819	3725.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
3825.00†	0.000	269.819	3825.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
3925.00†	0.000	269.819	3925.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
4125.00†	0.000	269.819	4125.00	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	
4197.06	0.000	269.819	4197.06	0.00	0.00	0.00	668875.80	683032.40	32°52'37.151"N	103°55'04.449"W	0.00	0.00	0.00	End of Tangent
4225.00†	2.794	269.819	4224.99	0.68	0.00	-0.68	668875.12	683032.40	32°52'37.151"N	103°55'04.456"W	10.00	10.00	-322.74	
4325.00†	12.794	269.819	4323.94	14.23	-0.04	-14.23	668861.58	683032.36	32°52'37.152"N	103°55'04.615"W	10.00	10.00	0.00	
4525.00†	32.794	269.819	4507.39	91.32	-0.29	-91.32	668784.49	683032.11	32°52'37.152"N	103°55'05.519"W	10.00	10.00	0.00	
4560.98†	36.392	269.819	4537.00	111.74	-0.35	-111.74	668764.07	683032.05	32°52'37.152"N	103°55'05.759"W	10.00	10.00	0.00	Glorieta
4625.00†	42.794	269.819	4586.31	152.52	-0.48	-152.52	668723.29	683031.92	32°52'37.153"N	103°55'06.237"W	10.00	10.00	0.00	
4651.03†	45.397	269.819	4605.00	170.63	-0.54	-170.63	668705.18	683031.86	32°52'37.153"N	103°55'06.449"W	10.00	10.00	0.00	Paddock



Planned Wellpath Report

Thunderbird No. 19H Prelim 1

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Field	Eddy County, NM NAD83	Wellbore	Thunderbird No. 19H
Facility	Thunderbird Pad		

WELLPATH DATA (106 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]	Comments
4825.00†	62.794	269.819	4706.63	311.01	-0.98	-311.01	668564.82	683031.42	32°52'37.154"N	103°55'08.095"W	10.00	10.00	0.00	
4925.00†	72.794	269.819	4744.38	403.47	-1.27	-403.47	668472.36	683031.13	32°52'37.155"N	103°55'09.179"W	10.00	10.00	0.00	
5025.00†	82.794	269.819	4765.49	501.09	-1.58	-501.09	668374.75	683030.82	32°52'37.155"N	103°55'10.324"W	10.00	10.00	0.00	
5092.79	89.573	269.819	4770.00	568.68	-1.80	-568.68	668307.16	683030.60	32°52'37.156"N	103°55'11.116"W	10.00	10.00	0.00	End of Build
5125.00†	89.573	269.819	4770.24	600.90	-1.90	-600.90	668274.95	683030.50	32°52'37.156"N	103°55'11.494"W	0.00	0.00	0.00	
5225.00†	89.573	269.819	4770.99	700.90	-2.21	-700.89	668174.96	683030.19	32°52'37.157"N	103°55'12.667"W	0.00	0.00	0.00	
5325.00†	89.573	269.819	4771.73	800.89	-2.53	-800.89	668074.97	683029.87	32°52'37.158"N	103°55'13.839"W	0.00	0.00	0.00	
5425.00†	89.573	269.819	4772.48	900.89	-2.85	-900.89	667974.98	683029.55	32°52'37.158"N	103°55'15.012"W	0.00	0.00	0.00	
5625.00†	89.573	269.819	4773.97	1100.89	-3.48	-1100.88	667775.00	683028.92	32°52'37.160"N	103°55'17.357"W	0.00	0.00	0.00	
5725.00†	89.573	269.819	4774.71	1200.88	-3.79	-1200.88	667675.01	683028.61	32°52'37.160"N	103°55'18.529"W	0.00	0.00	0.00	
5825.00†	89.573	269.819	4775.46	1300.88	-4.11	-1300.87	667575.02	683028.29	32°52'37.161"N	103°55'19.702"W	0.00	0.00	0.00	
5925.00†	89.573	269.819	4776.21	1400.88	-4.42	-1400.87	667475.03	683027.98	32°52'37.162"N	103°55'20.874"W	0.00	0.00	0.00	
6125.00†	89.573	269.819	4777.70	1600.87	-5.06	-1600.86	667275.06	683027.34	32°52'37.163"N	103°55'23.219"W	0.00	0.00	0.00	
6225.00†	89.573	269.819	4778.44	1700.87	-5.37	-1700.86	667175.07	683027.03	32°52'37.164"N	103°55'24.392"W	0.00	0.00	0.00	
6325.00†	89.573	269.819	4779.19	1800.87	-5.69	-1800.86	667075.08	683026.71	32°52'37.165"N	103°55'25.564"W	0.00	0.00	0.00	
6425.00†	89.573	269.819	4779.94	1900.86	-6.00	-1900.85	666975.09	683026.40	32°52'37.166"N	103°55'26.737"W	0.00	0.00	0.00	
6625.00†	89.573	269.819	4781.43	2100.86	-6.64	-2100.85	666775.11	683025.77	32°52'37.167"N	103°55'29.082"W	0.00	0.00	0.00	
6725.00†	89.573	269.819	4782.17	2200.85	-6.95	-2200.84	666675.12	683025.45	32°52'37.168"N	103°55'30.254"W	0.00	0.00	0.00	
6825.00†	89.573	269.819	4782.92	2300.85	-7.27	-2300.84	666575.13	683025.13	32°52'37.168"N	103°55'31.427"W	0.00	0.00	0.00	
6925.00†	89.573	269.819	4783.66	2400.85	-7.58	-2400.84	666475.14	683024.82	32°52'37.169"N	103°55'32.599"W	0.00	0.00	0.00	
7125.00†	89.573	269.819	4785.16	2600.84	-8.21	-2600.83	666275.16	683024.19	32°52'37.170"N	103°55'34.944"W	0.00	0.00	0.00	
7225.00†	89.573	269.819	4785.90	2700.84	-8.53	-2700.83	666175.17	683023.87	32°52'37.171"N	103°55'36.117"W	0.00	0.00	0.00	
7325.00†	89.573	269.819	4786.65	2800.84	-8.85	-2800.82	666075.18	683023.55	32°52'37.172"N	103°55'37.289"W	0.00	0.00	0.00	
7425.00†	89.573	269.819	4787.39	2900.83	-9.16	-2900.82	665975.19	683023.24	32°52'37.172"N	103°55'38.462"W	0.00	0.00	0.00	



Planned Wellpath Report

Thunderbird No. 19H Prelim 1

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REFERENCE WELLPATH IDENTIFICATION

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Field	Eddy County, NM NAD83	Wellbore	Thunderbird No. 19H
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MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]	Comments
7625.00†	89.573269.819	4788.88	3100.83	-9.79	-3100.81	665775.22	683022.61	32°52'37.174"N	103°55'40.807"W	0.00	0.00	0.00	0.00	
7725.00†	89.573269.819	4789.63	3200.83	-10.11	-3200.81	665675.23	683022.29	32°52'37.175"N	103°55'41.979"W	0.00	0.00	0.00	0.00	
7825.00†	89.573269.819	4790.38	3300.82	-10.43	-3300.81	665575.24	683021.98	32°52'37.175"N	103°55'43.151"W	0.00	0.00	0.00	0.00	
7925.00†	89.573269.819	4791.12	3400.82	-10.74	-3400.80	665475.25	683021.66	32°52'37.176"N	103°55'44.324"W	0.00	0.00	0.00	0.00	
8125.00†	89.573269.819	4792.61	3600.82	-11.37	-3600.80	665275.27	683021.03	32°52'37.177"N	103°55'46.669"W	0.00	0.00	0.00	0.00	
8225.00†	89.573269.819	4793.36	3700.81	-11.69	-3700.79	665175.28	683020.71	32°52'37.178"N	103°55'47.841"W	0.00	0.00	0.00	0.00	
8325.00†	89.573269.819	4794.10	3800.81	-12.00	-3800.79	665075.29	683020.40	32°52'37.178"N	103°55'49.014"W	0.00	0.00	0.00	0.00	
8425.00†	89.573269.819	4794.85	3900.81	-12.32	-3900.79	664975.30	683020.08	32°52'37.179"N	103°55'50.186"W	0.00	0.00	0.00	0.00	
8625.00†	89.573269.819	4796.34	4100.80	-12.95	-4100.78	664775.32	683019.45	32°52'37.180"N	103°55'52.531"W	0.00	0.00	0.00	0.00	
8725.00†	89.573269.819	4797.09	4200.80	-13.27	-4200.78	664675.33	683019.13	32°52'37.181"N	103°55'53.704"W	0.00	0.00	0.00	0.00	
8825.00†	89.573269.819	4797.83	4300.80	-13.58	-4300.77	664575.34	683018.82	32°52'37.182"N	103°55'54.876"W	0.00	0.00	0.00	0.00	
8925.00†	89.573269.819	4798.58	4400.79	-13.90	-4400.77	664475.36	683018.50	32°52'37.182"N	103°55'56.049"W	0.00	0.00	0.00	0.00	
9115.48	89.573269.819	4800.00†	4591.26	-14.50	-4591.24	664284.90	683017.90	32°52'37.184"N	103°55'58.282"W	0.00	0.00	0.00	0.00	End of Tangent; Paddock LZ Base

TARGETS

Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
1) Thunderbird 19H PBHL rev 1	9115.48	4800.00	-14.50	-4591.24	664284.90	683017.90	32°52'37.184"N	103°55'58.282"W	point

Planned Wellpath Report

Thunderbird No. 19H Prelim 1

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CORPORATION



**BAKER
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REFERENCE WELLPATH IDENTIFICATION

Operator	Apache Corporation	Slot	Thunderbird No. 19H
Area	Eddy County, NM	Well	Thunderbird No. 19H
Field	Eddy County, NM NAD83	Wellbore	Thunderbird No. 19H
Facility	Thunderbird Pad		

SURVEY PROGRAM - Ref Wellbore: Thunderbird No. 19H Ref Wellpath: Thunderbird No. 19H Prelim 1

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
25.00	9115.48	BHI NaviTrak (Standard)		Thunderbird No. 19H

Planned Wellpath Report

Thunderbird No. 19H Prelim 1

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REFERENCE WELLPATH IDENTIFICATION

Operator	Apache Corporation	Slot	Thunderbird No. 19H
Area	Eddy County, NM	Well	Thunderbird No. 19H
Field	Eddy County, NM NAD83	Wellbore	Thunderbird No. 19H
Facility	Thunderbird Pad		

WELLPATH COMMENTS

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Comment
293.00	0.000	269.819	293.00	Rustler
451.00	0.000	269.819	451.00	Salado
1357.00	0.000	269.819	1357.00	Tansill
1513.00	0.000	269.819	1513.00	Yates
1781.00	0.000	269.819	1781.00	Seven Rivers
2382.00	0.000	269.819	2382.00	Queen
2800.00	0.000	269.819	2800.00	Grayburg
3104.00	0.000	269.819	3104.00	San Andres
4560.98	36.392	269.819	4537.00	Glorieta
4651.03	45.397	269.819	4605.00	Paddock
5092.80	89.573	269.819	4770.00	Paddock LZ_Top
9115.48	89.573	269.819	4800.00	Paddock LZ_Base