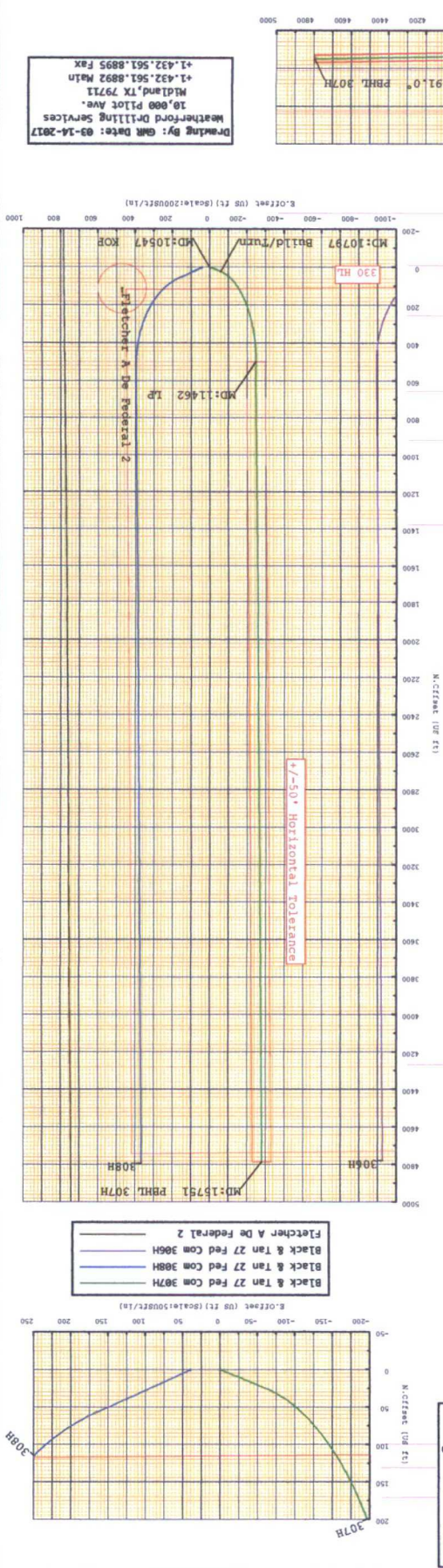
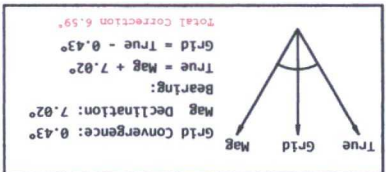


[illegible]

**5D Plan Report**

Apache Corporation**Field Name:** *Apache Lea Co, NM (Nad 83 NME)***Site Name:** *Black & Tan 27 Fed Com E***Well Name:** *Black & Tan 27 Fed Com 307H***Plan:** *P1:V1*

14 March 2017



Black & Tan 27 Fed Com 307H

Field Name: Apache Lea Co, NM (Nad 83 NME)	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 E	Units: US ft	North Reference: Grid	Convergence Angle: 0.43	
	Position:	Northing: 560155.80 US ft	Latitude: 32.537436469	
		Easting: 785192.00 US ft	Longitude: -103.542035828	
	Elevation above MSL:3715.00 US ft			
Comment:				
Slot: Black & Tan 27 Fed Com 307H	Position (Relative to Site Centre)			
	+N/-S: 0.00 US ft	Northing: 560155.80 US ft	Latitude: 32.537436469	
	+E/-W: 0.00 US ft	Easting: 785192.00 US ft	Longitude: -103.542035828	
	Slot TVD Reference: Ground Elevation			
	Elevation above MSL: 3715.00 US ft			
Comment:				
Well: Black & Tan 27 Fed Com 307H	Type:Main well		UWI:	Plan:P1:V1
	File Number:	Comment:		
	Closure Distance:4794.81US ft		Closure Azimuth:356.65°	
	Vertical Section: Position of Origin (Relative to Slot centre)			
	+N/-S: 0.00 US ft		+E/-W: 0.00 US ft	Az: 0.00°
	Magnetic Parameters:			
	Model: bggm2016	Field Strength:	Declination: 7.02°	Dip: 60.38°
	48263.9nT		Date: 13/Mar/2017	

Drill floor: Plan: P1:V1			
Rig Height (Drill Floor): 25.00us ft	Elevation above MSL: 3740.00us ft	Inclination: 0.00°	Azimuth: 0.00°

Target set: Black & Tan 27 Fed Com 307H Comment:									
Target Name:	Shape:	TVD (US ft)	N.Offset (US ft)	E.Offset (US ft)	Northing (USft)	Easting (USft)	Latitude (° ' ")	Longitude (° ' ")	Comment
PBHL 307H	Cuboid	11050.00	4786.60	-280.40	564942.40	784911.60	32°33'2.15"	-103°32'34.19"	

Wellpath created using minimum curvature.

Tie Point:					
MD: 0.00USFt	Inclination: 0.00°	Azimuth: 0.00°	TVD: 0.00USFt	North Offset: 0.00USFt	East Offset: 0.00USFt

Salient 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)	Latitude (° ' ")	Longitude (° ' ")	B.Rate (°/100US ft)	T.Rate (°/100US ft)	DLS (°/100US ft)	Comment
0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.537436 469	-103.54203 5828	0.00	0.00	0.00	
1635.00	0.00	0.00	1635.00	0.00	0.00	0.00	32.537436 469	-103.54203 5828	0.00	0.00	0.00	Rustler :

5D Plan Report

Salient 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)	Latitude (° ' ")	Longitude (° ' ")	B.Rate (°/100US ft)	T.Rate (°/100US ft)	DLS (°/100US ft)	Comment
1970.00	0.00	0.00	1970.00	0.00	0.00	0.00	32.537436 469	- 103.54203 5828	0.00	0.00	0.00	Salado :
3375.00	0.00	0.00	3375.00	0.00	0.00	0.00	32.537436 469	- 103.54203 5828	0.00	0.00	0.00	Tansill :
3535.00	0.00	0.00	3535.00	0.00	0.00	0.00	32.537436 469	- 103.54203 5828	0.00	0.00	0.00	Yates :
3660.00	0.00	0.00	3660.00	0.00	0.00	0.00	32.537436 469	- 103.54203 5828	0.00	0.00	0.00	Seven Rivers :
5680.00	0.00	0.00	5680.00	0.00	0.00	0.00	32.537436 469	- 103.54203 5828	0.00	0.00	0.00	Delaware :
8575.00	0.00	0.00	8575.00	0.00	0.00	0.00	32.537436 469	- 103.54203 5828	0.00	0.00	0.00	Bone Spring :
9030.00	0.00	0.00	9030.00	0.00	0.00	0.00	32.537436 469	- 103.54203 5828	0.00	0.00	0.00	Avalon :
9295.00	0.00	0.00	9295.00	0.00	0.00	0.00	32.537436 469	- 103.54203 5828	0.00	0.00	0.00	1st Bone Spring Carb :
9695.00	0.00	0.00	9695.00	0.00	0.00	0.00	32.537436 469	- 103.54203 5828	0.00	0.00	0.00	1st Bone Spring Sand :
9960.00	0.00	0.00	9960.00	0.00	0.00	0.00	32.537436 469	- 103.54203 5828	0.00	0.00	0.00	2nd Bone Spring Carb :
10235.00	0.00	0.00	10235.00	0.00	0.00	0.00	32.537436 469	- 103.54203 5828	0.00	0.00	0.00	2nd Bone Spring Sand :
10547.14	0.00	0.00	10547.14	0.00	0.00	0.00	32.537436 469	- 103.54203 5828	0.00	0.00	0.00	KOP
10779.01	27.82	292.09	10770.00	20.76	20.76	-51.15	32.537494 582	- 103.54220 1287	12.00	0.00	12.00	3rd Bone Spring Carb :
10797.14	30.00	292.09	10785.87	24.06	24.06	-59.27	32.537503 811	- 103.54222 7562	12.00	0.00	12.00	Build/Turn
11060.02	49.64	332.20	10990.00	140.33	140.33	-169.69	32.537825 639	- 103.54258 3036	7.47	15.25	12.00	3rd Bone Spring Sand :
11462.43	91.00	359.56	11124.85	498.59	498.59	-247.41	32.538811 886	- 103.54282 6591	10.28	6.80	12.00	LP
15751.22	91.00	359.56	11050.00	4786.60	4786.60	-280.40	32.550598 184	- 103.54283 0361	0.00	0.00	0.00	PBHL 307H

Interpolated 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)	Northing (US ft)	Easting (US ft)	B.Rate (°/100US ft)	T.Rate (°/100US ft)	DLS (°/100US ft)	Comment
0.00	0.00	0.00	0.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
100.00	0.00	0.00	100.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
200.00	0.00	0.00	200.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
300.00	0.00	0.00	300.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
400.00	0.00	0.00	400.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
500.00	0.00	0.00	500.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
600.00	0.00	0.00	600.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
700.00	0.00	0.00	700.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
800.00	0.00	0.00	800.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
900.00	0.00	0.00	900.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
1000.00	0.00	0.00	1000.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
1100.00	0.00	0.00	1100.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
1200.00	0.00	0.00	1200.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
1300.00	0.00	0.00	1300.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
1400.00	0.00	0.00	1400.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	

5D Plan Report

Interpolated 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)	Northing (US ft)	Easting (US ft)	B.Rate (%/100US ft)	T.Rate (%/100US ft)	DLS (%/100US ft)	
1500.00	0.00	0.00	1500.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	Rustler :
1600.00	0.00	0.00	1600.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
1635.00	0.00	0.00	1635.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
1700.00	0.00	0.00	1700.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
1800.00	0.00	0.00	1800.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
1900.00	0.00	0.00	1900.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	Salado :
1970.00	0.00	0.00	1970.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
2000.00	0.00	0.00	2000.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
2100.00	0.00	0.00	2100.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
2200.00	0.00	0.00	2200.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
2300.00	0.00	0.00	2300.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	Tansill :
2400.00	0.00	0.00	2400.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
2500.00	0.00	0.00	2500.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
2600.00	0.00	0.00	2600.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
2700.00	0.00	0.00	2700.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
2800.00	0.00	0.00	2800.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	Yates :
2900.00	0.00	0.00	2900.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
3000.00	0.00	0.00	3000.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
3100.00	0.00	0.00	3100.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
3200.00	0.00	0.00	3200.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
3300.00	0.00	0.00	3300.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	Seven Rivers :
3375.00	0.00	0.00	3375.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
3400.00	0.00	0.00	3400.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
3500.00	0.00	0.00	3500.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
3535.00	0.00	0.00	3535.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
3600.00	0.00	0.00	3600.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	Delaware :
3660.00	0.00	0.00	3660.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
3700.00	0.00	0.00	3700.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
3800.00	0.00	0.00	3800.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
3900.00	0.00	0.00	3900.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
4000.00	0.00	0.00	4000.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
4100.00	0.00	0.00	4100.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
4200.00	0.00	0.00	4200.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
4300.00	0.00	0.00	4300.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
4400.00	0.00	0.00	4400.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
4500.00	0.00	0.00	4500.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
4600.00	0.00	0.00	4600.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
4700.00	0.00	0.00	4700.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
4800.00	0.00	0.00	4800.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
4900.00	0.00	0.00	4900.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
5000.00	0.00	0.00	5000.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
5100.00	0.00	0.00	5100.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
5200.00	0.00	0.00	5200.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
5300.00	0.00	0.00	5300.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
5400.00	0.00	0.00	5400.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
5500.00	0.00	0.00	5500.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
5600.00	0.00	0.00	5600.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
5680.00	0.00	0.00	5680.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
5700.00	0.00	0.00	5700.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
5800.00	0.00	0.00	5800.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
5900.00	0.00	0.00	5900.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
6000.00	0.00	0.00	6000.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
6100.00	0.00	0.00	6100.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
6200.00	0.00	0.00	6200.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
6300.00	0.00	0.00	6300.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
6400.00	0.00	0.00	6400.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
6500.00	0.00	0.00	6500.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	

5D Plan Report

Interpolated 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)	Northing (US ft)	Easting (US ft)	B.Rate (%/100US ft)	T.Rate (%/100US ft)	DLS (%/100US ft)	Comment
6600.00	0.00	0.00	6600.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
6700.00	0.00	0.00	6700.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
6800.00	0.00	0.00	6800.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
6900.00	0.00	0.00	6900.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
7000.00	0.00	0.00	7000.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
7100.00	0.00	0.00	7100.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
7200.00	0.00	0.00	7200.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
7300.00	0.00	0.00	7300.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
7400.00	0.00	0.00	7400.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
7500.00	0.00	0.00	7500.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
7600.00	0.00	0.00	7600.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
7700.00	0.00	0.00	7700.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
7800.00	0.00	0.00	7800.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
7900.00	0.00	0.00	7900.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
8000.00	0.00	0.00	8000.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
8100.00	0.00	0.00	8100.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
8200.00	0.00	0.00	8200.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
8300.00	0.00	0.00	8300.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
8400.00	0.00	0.00	8400.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
8500.00	0.00	0.00	8500.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
8575.00	0.00	0.00	8575.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	Bone Spring :
8600.00	0.00	0.00	8600.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
8700.00	0.00	0.00	8700.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
8800.00	0.00	0.00	8800.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
8900.00	0.00	0.00	8900.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
9000.00	0.00	0.00	9000.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
9030.00	0.00	0.00	9030.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	Avalon :
9100.00	0.00	0.00	9100.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
9200.00	0.00	0.00	9200.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
9295.00	0.00	0.00	9295.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	1st Bone Spring Carb :
9300.00	0.00	0.00	9300.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
9400.00	0.00	0.00	9400.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
9500.00	0.00	0.00	9500.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
9600.00	0.00	0.00	9600.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
9695.00	0.00	0.00	9695.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	1st Bone Spring Sand :
9700.00	0.00	0.00	9700.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
9800.00	0.00	0.00	9800.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
9900.00	0.00	0.00	9900.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
9960.00	0.00	0.00	9960.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	2nd Bone Spring Carb :
10000.00	0.00	0.00	10000.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
10100.00	0.00	0.00	10100.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
10200.00	0.00	0.00	10200.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
10235.00	0.00	0.00	10235.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	2nd Bone Spring Sand :
10300.00	0.00	0.00	10300.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
10400.00	0.00	0.00	10400.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
10500.00	0.00	0.00	10500.00	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	
10547.14	0.00	0.00	10547.14	0.00	0.00	0.00	560155.80	785192.00	0.00	0.00	0.00	KOP
10600.00	6.34	292.09	10599.89	1.10	1.10	-2.71	560156.90	785189.29	12.00	0.00	12.00	
10700.00	18.34	292.09	10697.40	9.13	9.13	-22.48	560164.93	785169.52	12.00	0.00	12.00	
10779.01	27.82	292.09	10770.00	20.76	20.76	-51.15	560176.56	785140.85	12.00	-0.00	12.00	3rd Bone Spring Carb :
10797.14	30.00	292.09	10785.87	24.06	24.06	-59.27	560179.86	785132.73	12.00	0.00	12.00	Build/Turn

SD Plan Report

Interpolated 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)	Northing (US ft)	Easting (US ft)	B.Rate (%/100US ft)	T.Rate (%/100US ft)	DLS (%/100US ft)	Comment
10800.00	30.12	292.74	10788.35	24.61	24.61	-60.60	560180.41	785131.40	4.21	22.44	12.00	
10900.00	36.00	312.05	10872.35	54.10	54.10	-105.73	560209.90	785086.27	5.88	19.31	12.00	
11000.00	44.13	325.83	10948.97	102.76	102.76	-147.26	560258.56	785044.74	8.13	13.79	12.00	
11060.02	49.64	332.20	10990.00	140.33	140.33	-169.69	560296.13	785022.31	9.18	10.60	12.00	3rd Bone Spring Sand :
11100.00	53.48	335.87	11014.85	168.49	168.49	-183.37	560324.29	785008.63	9.61	9.19	12.00	
11200.00	63.49	343.66	11067.11	248.39	248.39	-212.49	560404.19	784979.51	10.01	7.79	12.00	
11300.00	73.85	350.18	11103.47	338.98	338.98	-233.34	560494.78	784958.66	10.36	6.52	12.00	
11400.00	84.39	356.04	11122.34	436.30	436.30	-245.02	560592.10	784946.98	10.54	5.86	12.00	
11462.43	91.00	359.56	11124.85	498.59	498.59	-247.41	560654.39	784944.59	10.59	5.64	12.00	LP
11500.00	91.00	359.56	11124.19	536.15	536.15	-247.70	560691.95	784944.30	0.00	0.00	0.00	
11600.00	91.00	359.56	11122.45	636.13	636.13	-248.47	560791.93	784943.53	0.00	0.00	0.00	
11700.00	91.00	359.56	11120.70	736.11	736.11	-249.24	560891.91	784942.76	0.00	0.00	0.00	
11800.00	91.00	359.56	11118.96	836.10	836.10	-250.01	560991.90	784941.99	0.00	0.00	0.00	
11900.00	91.00	359.56	11117.21	936.08	936.08	-250.78	561091.88	784941.22	0.00	0.00	0.00	
12000.00	91.00	359.56	11115.47	1036.06	1036.06	-251.54	561191.86	784940.46	0.00	0.00	0.00	
12100.00	91.00	359.56	11113.72	1136.04	1136.04	-252.31	561291.84	784939.69	0.00	0.00	0.00	
12200.00	91.00	359.56	11111.98	1236.02	1236.02	-253.08	561391.82	784938.92	0.00	0.00	0.00	
12300.00	91.00	359.56	11110.23	1336.01	1336.01	-253.85	561491.81	784938.15	0.00	0.00	0.00	
12400.00	91.00	359.56	11108.49	1435.99	1435.99	-254.62	561591.79	784937.38	0.00	0.00	0.00	
12500.00	91.00	359.56	11106.74	1535.97	1535.97	-255.39	561691.77	784936.61	0.00	0.00	0.00	
12600.00	91.00	359.56	11105.00	1635.95	1635.95	-256.16	561791.75	784935.84	0.00	0.00	0.00	
12700.00	91.00	359.56	11103.25	1735.93	1735.93	-256.93	561891.73	784935.07	0.00	0.00	0.00	
12800.00	91.00	359.56	11101.51	1835.91	1835.91	-257.70	561991.71	784934.30	0.00	0.00	0.00	
12900.00	91.00	359.56	11099.76	1935.90	1935.90	-258.47	562091.70	784933.53	0.00	0.00	0.00	
13000.00	91.00	359.56	11098.02	2035.88	2035.88	-259.24	562191.68	784932.76	0.00	0.00	0.00	
13100.00	91.00	359.56	11096.27	2135.86	2135.86	-260.01	562291.66	784931.99	0.00	0.00	0.00	
13200.00	91.00	359.56	11094.52	2235.84	2235.84	-260.78	562391.64	784931.22	0.00	0.00	0.00	
13300.00	91.00	359.56	11092.78	2335.82	2335.82	-261.54	562491.62	784930.46	0.00	0.00	0.00	
13400.00	91.00	359.56	11091.03	2435.81	2435.81	-262.31	562591.61	784929.69	0.00	0.00	0.00	
13500.00	91.00	359.56	11089.29	2535.79	2535.79	-263.08	562691.59	784928.92	0.00	0.00	0.00	
13600.00	91.00	359.56	11087.54	2635.77	2635.77	-263.85	562791.57	784928.15	0.00	0.00	0.00	
13700.00	91.00	359.56	11085.80	2735.75	2735.75	-264.62	562891.55	784927.38	0.00	0.00	0.00	
13800.00	91.00	359.56	11084.05	2835.73	2835.73	-265.39	562991.53	784926.61	0.00	0.00	0.00	
13900.00	91.00	359.56	11082.31	2935.71	2935.71	-266.16	563091.51	784925.84	0.00	0.00	0.00	
14000.00	91.00	359.56	11080.56	3035.70	3035.70	-266.93	563191.50	784925.07	0.00	0.00	0.00	
14100.00	91.00	359.56	11078.82	3135.68	3135.68	-267.70	563291.48	784924.30	0.00	0.00	0.00	
14200.00	91.00	359.56	11077.07	3235.66	3235.66	-268.47	563391.46	784923.53	0.00	0.00	0.00	
14300.00	91.00	359.56	11075.33	3335.64	3335.64	-269.24	563491.44	784922.76	0.00	0.00	0.00	
14400.00	91.00	359.56	11073.58	3435.62	3435.62	-270.01	563591.42	784921.99	0.00	0.00	0.00	
14500.00	91.00	359.56	11071.84	3535.60	3535.60	-270.78	563691.40	784921.22	0.00	0.00	0.00	
14600.00	91.00	359.56	11070.09	3635.59	3635.59	-271.54	563791.39	784920.46	0.00	0.00	0.00	
14700.00	91.00	359.56	11068.35	3735.57	3735.57	-272.31	563891.37	784919.69	0.00	0.00	0.00	
14800.00	91.00	359.56	11066.60	3835.55	3835.55	-273.08	563991.35	784918.92	0.00	0.00	0.00	
14900.00	91.00	359.56	11064.86	3935.53	3935.53	-273.85	564091.33	784918.15	0.00	0.00	0.00	
15000.00	91.00	359.56	11063.11	4035.51	4035.51	-274.62	564191.31	784917.38	0.00	0.00	0.00	
15100.00	91.00	359.56	11061.37	4135.50	4135.50	-275.39	564291.30	784916.61	0.00	0.00	0.00	
15200.00	91.00	359.56	11059.62	4235.48	4235.48	-276.16	564391.28	784915.84	0.00	0.00	0.00	
15300.00	91.00	359.56	11057.87	4335.46	4335.46	-276.93	564491.26	784915.07	0.00	0.00	0.00	
15400.00	91.00	359.56	11056.13	4435.44	4435.44	-277.70	564591.24	784914.30	0.00	0.00	0.00	
15500.00	91.00	359.56	11054.38	4535.42	4535.42	-278.47	564691.22	784913.53	0.00	0.00	0.00	
15600.00	91.00	359.56	11052.64	4635.40	4635.40	-279.24	564791.20	784912.76	0.00	0.00	0.00	
15700.00	91.00	359.56	11050.89	4735.39	4735.39	-280.01	564891.19	784911.99	0.00	0.00	0.00	
15751.22	91.00	359.56	11050.00	4786.60	4786.60	-280.40	564942.40	784911.60	0.00	0.00	0.00	PBHL 307H

5D Plan Report

Formation Points: (Relative to Slot centre)(TVD relative to Drill Floor)									
Name	MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	TVD (MSL) (US ft)	N.Offset (US ft)	E.Offset (US ft)	F.Dip (°)	F.Dir (°)
Rustler	1635.00	0.00	0.00	1635.00	-2105.00	0.00	0.00	0	0
Salado	1970.00	0.00	0.00	1970.00	-1770.00	0.00	0.00	0	0
Tansill	3375.00	0.00	0.00	3375.00	-365.00	0.00	0.00	0	0
Yates	3535.00	0.00	0.00	3535.00	-205.00	0.00	0.00	0	0
Seven Rivers	3660.00	0.00	0.00	3660.00	-80.00	0.00	0.00	0	0
Delaware	5680.00	0.00	0.00	5680.00	1940.00	0.00	0.00	0	0
Bone Spring	8575.00	0.00	0.00	8575.00	4835.00	0.00	0.00	0	0
Avalon	9030.00	0.00	0.00	9030.00	5290.00	0.00	0.00	0	0
1st Bone Spring Carb	9295.00	0.00	0.00	9295.00	5555.00	0.00	0.00	0	0
1st Bone Spring Sand	9695.00	0.00	0.00	9695.00	5955.00	0.00	0.00	0	0
2nd Bone Spring Carb	9960.00	0.00	0.00	9960.00	6220.00	0.00	0.00	0	0
2nd Bone Spring Sand	10235.00	0.00	0.00	10235.00	6495.00	0.00	0.00	0	0
3rd Bone Spring Carb	10779.01	27.82	292.09	10770.00	7030.00	20.76	-51.15	0	0
3rd Bone Spring Sand	11060.02	49.64	332.20	10990.00	7250.00	140.33	-169.69	0	0

BLACK & TAN 27 FEDERAL COM 307H

String: SURFACEHole Size: 17.5

Top Setting Depth (MD):	<u>0</u>	Top Setting Depth (TVD):	<u>0</u>	Btm setting depth (MD):	<u>1700</u>	Btm setting depth (TVD):	<u>1700</u>
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Size:	<u>13-3/8"</u>	Grade:	<u>J-55</u>	Weight (lbs/ft):	<u>54.5</u>	Joint (Butt,FJ, LTC,STC, SLH, N/A, Other):	<u>Buttress</u>
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Condition (New/Used):	<u>New</u>	Standard (API/Non-API):	<u>API</u>
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Tapered String (Y/N)?: N
If yes, need spec attachment

Safety Factors

Collapse Design Safety Factor:	<u>2.15</u>	Burst Design Safety Factor:	<u>1.82</u>
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Body Tensile Design Safety Factor type?:	<u>Dry/Buoyant</u>	<u>Buoyant</u>
Body Tensile Design Safety Factor:	<u>3.79</u>	

Joint Tensile Design Safety Factor type?:	<u>Dry/Buoyant</u>	<u>Buoyant</u>
Joint Tensile Design Safety Factor:	<u>4.04</u>	

String: INTERMEDIATEHole Size: 12.25

Top Setting Depth (MD):	<u>0</u>	Top Setting Depth (TVD):	<u>0</u>	Btm setting depth (MD):	<u>900</u>	Btm setting depth (TVD):	<u>900</u>
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Size:	<u>9-5/8"</u>	Grade:	<u>J-55</u>	Weight (lbs/ft):	<u>40</u>	Joint (Butt,FJ, LTC,STC, SLH, N/A, Other):	<u>Buttress</u>
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Condition (New/Used): New Standard (API/Non-API): API

Tapered String (Y/N)?: N
If yes, need spec attachment

Safety Factors

Collapse Design Safety Factor: 5.37 Burst Design Safety Factor: 1.7

Body Tensile Design Safety Factor type?: Dry/Buoyant Buoyant
Body Tensile Design Safety Factor: 1.96

Joint Tensile Design Safety Factor type?: Dry/Buoyant Buoyant
Joint Tensile Design Safety Factor: 2.24

Top Setting Depth (MD):	<u>900</u>	Top Setting Depth (TVD):	<u>900</u>	Btm setting depth (MD):	<u>5780</u>	Btm setting depth (TVD):	<u>5780</u>
Size:	<u>9-5/8"</u>	Grade:	<u>J-55</u>	Weight (lbs/ft):	<u>40</u>	Joint (Butt,FJ, LTC,STC, SLH, N/A, Other):	<u>LTC</u>

Condition (New/Used): New Standard (API/Non-API): API

Tapered String (Y/N)?: N
If yes, need spec attachment

Safety Factors

Collapse Design Safety Factor: 1.54 Burst Design Safety Factor: 1.87

Body Tensile Design Safety Factor type?: Dry/Buoyant Buoyant
Body Tensile Design Safety Factor: 2.15

Joint Tensile Design Safety Factor type?: Dry/Buoyant Buoyant
Joint Tensile Design Safety Factor: 1.8

String: PRODUCTION

Hole Size:	<u>8.75</u>						
Top Setting Depth (MD):	<u>0</u>	Top Setting Depth (TVD):	<u>0</u>	Btm setting depth (MD):	<u>15751.22</u>	Btm setting depth (TVD):	<u>11050</u>
Size:	<u>5-1/2"</u>	Grade:	<u>P-110</u>	Weight (lbs/ft):	<u>17</u>	Joint (Butt,FJ, LTC,STC, SLH, N/A, Other):	<u>Buttress</u>
Condition (New/Used):	<u>New</u>		Standard (API/Non-API):	<u>API</u>			
Safety Factors							
Collapse Design Safety Factor:	<u>1.34</u>		Burst Design Safety Factor:	<u>1.28</u>			
Body Tensile Design Safety Factor type?:	Dry/Buoyant		<u>Buoyant</u>				
Body Tensile Design Safety Factor:	<u>2.03</u>						
Joint Tensile Design Safety Factor type?:	Dry/Buoyant		<u>Buoyant</u>				
Joint Tensile Design Safety Factor:	<u>2.12</u>						
Tapered String (Y/N)?:	<u>N</u>						
If yes, need spec attachment							

BLACK & TAN 27 FEDERAL COM 307H

CEMENT: SURFACE

Stage Tool Depth: N/A

Lead:

Top MD of
Segment: 0

Btm MD of
Segment: 1285.47

Cmt Type: C

Cmt Additives: 4% Bentonite + 1% CaCl2

Quantity (sks): 650

Yield (cu/ft/sk): 1.73

Density (lbs/gal): 13.5

Volume (cu/ft): 1124.5

Percent OH Excess: 25%

Tail:

Top MD of
Segment: 1285.47

Btm MD of
Segment: 1700

Cmt Type: C

Cmt Additives: 1% CaCl2

Quantity (sks): 300

Yield (cu/ft/sk): 1.33

Density (lbs/gal): 14.8

Volume (cu/ft): 399

Percent OH Excess: 25%

CEMENT: INTERMEDIATE

Single Stage

Lead:

Top MD of
Segment: 0

Btm MD of
Segment: 5144.38

Cmt Type: C

Cmt Additives: 5% NaCl + 6% Bentonite + 2
lb/sk Kolseal + 0.125 lb/sk
Celloflake + 0.4% Retarder

Quantity (sks): 1043

Yield (cu/ft/sk): 1.885

Density (lbs/gal): 12.9

Volume (cu/ft): 1966.06

Percent OH Excess: 25%

Tail:

Top MD of
Segment: 5144.38

Btm MD of
Segment: 5780

Cmt Type: C

Cmt Additives: 0.2% Retarder

Quantity (sks): 200

Yield (cu/ft/sk): 1.34

Density (lbs/gal): 14.8

Volume (cu/ft): 268

Percent OH Excess: 25%

2 Stage Cement Job

* DV tool depth(s) will be adjusted based on hole conditions and cement volumes will be adjusted proportionally. DV tool will be set a minimum of 50 feet below previous casing and a minimum of 200 feet above current shoe. Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

*If lost circulation is encountered, Apache may 2-stage Interm csg. A DVT may be used in the 9-5/8" csg & ECP may be placed below DVT.

1st Stage

Lead:

Top MD of
Segment: 3500

Btm MD of
Segment: 5144.38

Cmt Type: C

Cmt Additives: 5% NaCl + 6% Bentonite + 2
lb/sk Kolseal + 0.125 lb/sk
Celloflake + 0.4% Retarder

Quantity (sks): 345

Yield (cu/ft/sk): 1.885

Density (lbs/gal): 12.9

Volume (cu/ft): 650.33

Percent OH Excess: 25%

Tail:

Top MD of
Segment: 5144.38

Btm MD of
Segment: 5780

Cmt Type: C

Cmt Additives: 0.3% Retarder

Quantity (sks): 200

Yield (cu/ft/sk):	<u>1.34</u>	Volume (cu/ft):	<u>268</u>
Density (lbs/gal):	<u>14.8</u>	Percent OH Excess:	<u>25%</u>

Stage Tool / ECP Depth: ± 3500'

2nd Stage

Lead:

Top MD of Segment:	<u>0</u>	Btm MD of Segment:	<u>2815.44</u>
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Cmt Type:	<u>C</u>	Cmt Additives:	<u>5% NaCl + 6% Bentonite</u>
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Quantity (sk):	<u>565</u>		
Yield (cu/ft/sk):	<u>1.868</u>	Volume (cu/ft):	<u>1055.42</u>
Density (lbs/gal):	<u>12.9</u>	Percent OH Excess:	<u>25%</u>

Tail:

Top MD of Segment:	<u>2815.44</u>	Btm MD of Segment:	<u>3500</u>
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Cmt Type:	<u>C</u>	Cmt Additives:	<u>0.3% Retarder</u>
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Quantity (sk):	<u>200</u>		
Yield (cu/ft/sk):	<u>1.34</u>	Volume (cu/ft):	<u>268</u>
Density (lbs/gal):	<u>14.8</u>	Percent OH Excess:	<u>25%</u>

CEMENT: PRODUCTION

Single Stage

Lead:

Top MD of Segment:	<u>3000</u>	Btm MD of Segment:	<u>10547.14</u>
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Cmt Type:	<u>H</u>	Cmt Additives:	<u>10% gel + 5% Salt</u>
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Quantity (sk):	<u>936</u>		
Yield (cu/ft/sk):	<u>2.32</u>	Volume (cu/ft):	<u>2171.52</u>
Density (lbs/gal):	<u>11.9</u>	Percent OH Excess:	<u>20%</u>

Tail:

Top MD of
Segment: 10547.14

Btm MD of
Segment: 15751.22

Cmt Type: TXI Lite

Cmt Additives: 0.3% Fluid Loss + 0.2% Retarder

Quantity (sks): 1102

Yield (cu/ft/sk): 1.44 Volume (cu/ft): 1586.88

Density (lbs/gal): 12.8 Percent OH Excess: 20%

2 Stage Cement Job

* DV tool depth(s) will be adjusted based on hole conditions and cement volumes will be adjusted proportionally. DV tool will be set a minimum of 50 feet below previous casing and a minimum of 200 feet above current shoe. Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

*If lost circulation is encountered, Apache may 2-stage Interm csg. A DVT may be used in the 7" csg & ECP may be placed below DVT.

1st Stage

Lead:

Top MD of
Segment: 5830

Btm MD of
Segment: 10547.14

Cmt Type: H

Cmt Additives: 10% gel + 5% Salt

Quantity (sks): 617

Yield (cu/ft/sk): 2.32 Volume (cu/ft): 1431.44

Density (lbs/gal): 11.9 Percent OH Excess: 20%

Tail:

Top MD of
Segment: 10547.14

Btm MD of
Segment: 15751.22

Cmt Type: TXI Lite

Cmt Additives: 0.3% Fluid Loss + 0.2% Retarder

Quantity (sks): 1102

Yield (cu/ft/sk): 1.44 Volume (cu/ft): 1586.88

Density (lbs/gal): 12.8 Percent OH Excess: 20%

Stage Tool / ECP Depth: ± 5830'

2nd Stage

Lead:

Top MD of
Segment: 3000

Btm MD of
Segment: 4810.33

Cmt Type: H

Cmt Additives: 10% gel + 5% Salt

Quantity (sks): 204

Yield (cu/ft/sk): 2.32 Volume (cu/ft): 473.28

Density (lbs/gal): 11.9 Percent OH Excess: 20%

Tail:

Top MD of
Segment: 4810.33

Btm MD of
Segment: 5830

Cmt Type: C

Cmt Additives: 0.3% Retarder

Quantity (sks): 200

Yield (cu/ft/sk): 1.34 Volume (cu/ft): 268

Density (lbs/gal): 14.8 Percent OH Excess: 20%