

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT**SUNDRY NOTICES AND REPORTS ON WELLS**
*Do not use this form for proposals to drill or to re-enter a Hobbs abandoned well. Use form 3160-3 (APD) for such proposals.*FORM APPROVED
OMB NO. 1004-0137
Expires: January 31, 20185. Lease Serial No.
NMNM60393

6. If Indian, Allottee or Tribe Name

7. If Unit or CA/Agreement, Name and/or No.

8. Well Name and No.
BLACK & TAN 27 FEDERAL COM 301H9. API Well No.
30-025-4401710. Field and Pool or Exploratory Area
LEA, BONESPRING, S

11. County or Parish, State

LEA COUNTY, NM

SUBMIT IN TRIPLICATE - Other instructions on page 2

1. Type of Well

☒ Oil Well ☐ Gas Well ☐ Other2. Name of Operator
APACHE CORPORATIONContact: SORINA FLORES
E-Mail: sorina.flores@apachecorp.com3a. Address
303 VETERANS AIRPARK LN #1000
MIDLAND, TX 797053b. Phone No. (include area code)
Ph: 432-818-1167

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)

Sec 27 T20S R34E Mer NMP SWSW 220FSL 670FWL
32.537448 N Lat, 103.554493 W Lon

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Hydraulic Fracturing	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	Change to Original A
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	PD

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recompleat horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.

BLM-CO-1463 NATIONWIDE; NMB-000736

Apache respectfully request to change Prod TVD/MD. After reviewing logs, zone of higher quality deeper than anticipated. Apache also request to change hole size in the prod lateral. Listed is

*Approved depth: 15739.36' MD / 11024' TVD
NEW PROD HOLE DEPTH: 15829.15' MD / 11149.12' TVD*Approved Csg: Hole: 8.75" Top: 0' Btm MD: 15739.36' Btm TVD: 11024'
Csg: 5.5" P-110 17# Buttress New API standard

*Safety Factors: Collapse: 1.35 Burst: 1.28 Tensile: 2.03 Joint: 2.13

well already drilled

14. I hereby certify that the foregoing is true and correct.

Electronic Submission #394332 verified by the BLM Well Information System
For APACHE CORPORATION, sent to the Hobbs
Committed to AFMSS for processing by PRISCILLA PEREZ on 11/28/2017 ()

Name (Printed/Typed) SORINA FLORES

Title SUBMITTING CONTACT

Signature (Electronic Submission)

Date 11/07/2017

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By

Title

Date

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Office

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Instructions on page 2)

** OPERATOR-SUBMITTED ** OPERATOR-SUBMITTED ** OPERATOR-SUBMITTED **

Additional data for EC transaction #394332 that would not fit on the form

32. Additional remarks, continued

NEW CSG: Hole: 8.75" Top: 0' Btm MD: 11518.67' Btm TVD: 11228'
Csg: 5.5" P-110 17# Buttress New API standard
Hole: 8.5" Top MD: 11518.67' TopTVD: 11228'
Btm MD: 15829.15' BtmTVD: 11149.12'
Csg: 5.5" P-110 17# Buttress New API standard
NEW SAFETY FACTORS: Collapse: 1.33 Burst: 1.28 Tensile: 2.02 Joint: 2.11

*Approved Prod Csg (ONLY CHANGING THE FOLLOWING, EVERYTHING ELSE WILL REMAIN AS ON APPROVED APD):

Single Stage Cmt Job:
Lead: TopMD: 3000' BtmMD: 10473.05' 926sx Volume: 2148.32
Tail: TopMD: 10473.05' BtmMD: 15739.36' 1115sx Volume: 1605.6
2nd Stage Cmt Job:
Lead: TopMD: 5830' BtmMD: 10473.05' 607sx Volume: 1408.24
Tail: TopMD: 10473.05' BtmMD: 15739.36' 1115sx Volume: 1605.6

NEW PROD CSG (ONLY CHANGING THE FOLLOWING, EVERYTHING ELSE WILL REMAIN AS ON APPROVED APD):

Single Stage Cmt Job:
Lead: TopMD: 3000' BtmMD: 10757.5' 965sx Volume: 2238.8
Tail: TopMD: 10757.5' BtmMD: 15829.15 1000sx Volume: 1440
2nd Stage Cmt Job, 1st stage:
Lead: TopMD: 5830' BtmMD: 10757.5' 645sx Volume: 1496.4
Tail: TopMD: 10757.5' BtmMD: 15829.15' 1000sx Volume: 1440

*****SEE ATTACHED REVISED CSG DESIGN, CMT DESIGN, DIRECTIONAL PLAN



HOBBS OCD

JAN 16 2018

RECEIVED

Apache Corporation

Lea County, NM (NAD83 NME)
Black & Tan 27 Federal Com
301H

OH

Plan: Plan 4 10-24-17

Standard Planning Report

24 October, 2017



Database:	Compass 5000 GCR	Local Co-ordinate Reference:	Well 301H
Company:	Apache Corporation	TVD Reference:	GL + KB @ 3754.00usft (H&P 482)
Project:	Lea County, NM (NAD83 NME)	MD Reference:	GL + KB @ 3754.00usft (H&P 482)
Site:	Black & Tan 27 Federal Com	North Reference:	Grid
Well:	301H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan 4 10-24-17		

Project	Lea County, NM (NAD83 NME)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site		Black & Tan 27 Federal Com			
Site Position:		Northing:	560,131.70 usft	Latitude:	32° 32' 14.81280 N
From:	Map	Easting:	781,352.90 usft	Longitude:	103° 33' 16.17520 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.42 °

Well	301H					
Well Position	+N/-S	0.00 usft	Northing:	560,131.70 usft	Latitude:	32° 32' 14.81280 N
	+E/-W	0.00 usft	Easting:	781,352.90 usft	Longitude:	103° 33' 16.17520 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	3,728.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	8/19/2017	6.75	60.52	48,311

Design	Plan 4 10-24-17			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	356.13



Phoenix Technology Services LP Planning Report



Database:	Compass 5000 GCR	Local Co-ordinate Reference:	Well 301H
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Project:	Lea County, NM (NAD83 NME)	MD Reference:	GL + KB @ 3754.00usft (H&P 482)
Site:	Black & Tan 27 Federal Com	North Reference:	Grid
Well:	301H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan 4 10-24-17		

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
6,325.00	0.00	0.00	6,325.00	0.00	0.00	0.00	0.00	0.00	0.00	
6,676.17	3.51	265.77	6,675.95	-0.79	-10.73	1.00	1.00	0.00	265.77	
10,757.49	3.51	265.77	10,749.60	-19.22	-260.04	0.00	0.00	0.00	0.00	
11,518.67	91.11	359.60	11,228.00	467.26	-293.31	12.00	11.51	12.33	93.75	T1 - B&T 27 Fed Co
12,033.71	91.11	359.60	11,218.02	982.19	-296.91	0.00	0.00	0.00	0.00	T2 - B&T 27 Fed Co
12,043.43	90.92	359.60	11,217.85	991.90	-296.97	2.00	-2.00	0.00	-180.00	
12,534.70	90.92	359.60	11,210.00	1,483.10	-300.40	0.00	0.00	0.00	0.00	T3 - B&T 27 Fed Co
12,540.41	91.03	359.60	11,209.90	1,488.81	-300.44	2.00	2.00	0.00	0.00	
13,035.70	91.03	359.60	11,201.00	1,984.00	-303.90	0.00	0.00	0.00	0.00	T4 - B&T 27 Fed Co
13,047.30	90.80	359.60	11,200.82	1,995.60	-303.98	2.00	-2.00	0.00	-180.00	
13,536.67	90.80	359.60	11,194.00	2,484.91	-307.40	0.00	0.00	0.00	0.00	T5 - B&T 27 Fed Co
13,554.27	91.15	359.60	11,193.70	2,502.51	-307.52	2.00	2.00	0.00	0.00	
14,037.68	91.15	359.60	11,184.00	2,985.82	-310.89	0.00	0.00	0.00	0.00	T6 - B&T 27 Fed Co
14,043.73	91.03	359.60	11,183.89	2,991.86	-310.94	2.00	-2.00	0.00	-180.00	
15,039.69	91.03	359.60	11,166.00	3,987.64	-317.89	0.00	0.00	0.00	0.00	T7 - B&T 27 Fed Co
15,049.57	91.23	359.60	11,165.81	3,997.51	-317.96	2.00	2.00	0.00	0.00	
15,829.15	91.23	359.60	11,149.12	4,776.90	-323.40	0.00	0.00	0.00	0.00	BHLv2 - 27 Fed Co



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Project:	Lea County, NM (NAD83 NME)	MD Reference:	GL + KB @ 3754.00usft (H&P 482)
Site:	Black & Tan 27 Federal Com	North Reference:	Grid
Well:	301H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan 4 10-24-17		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,624.00	0.00	0.00	1,624.00	0.00	0.00	0.00	0.00	0.00	0.00
Rustler									
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
Surface									
1,962.00	0.00	0.00	1,962.00	0.00	0.00	0.00	0.00	0.00	0.00
Salado									
2,764.00	0.00	0.00	2,764.00	0.00	0.00	0.00	0.00	0.00	0.00
Tansill									
3,574.00	0.00	0.00	3,574.00	0.00	0.00	0.00	0.00	0.00	0.00
Yates									
3,914.00	0.00	0.00	3,914.00	0.00	0.00	0.00	0.00	0.00	0.00
Seven Rivers									
5,774.00	0.00	0.00	5,774.00	0.00	0.00	0.00	0.00	0.00	0.00
Delaware									
5,780.00	0.00	0.00	5,780.00	0.00	0.00	0.00	0.00	0.00	0.00
Intermediate									
6,325.00	0.00	0.00	6,325.00	0.00	0.00	0.00	0.00	0.00	0.00
KOP, Begin 1.00°/100' Build									
6,400.00	0.75	265.77	6,400.00	-0.04	-0.49	0.00	1.00	1.00	0.00
6,500.00	1.75	265.77	6,499.97	-0.20	-2.67	-0.02	1.00	1.00	0.00
6,600.00	2.75	265.77	6,599.89	-0.49	-6.58	-0.04	1.00	1.00	0.00
6,676.17	3.51	265.77	6,675.95	-0.79	-10.73	-0.07	1.00	1.00	0.00
Hold 3.51° Inc at 265.77° Azm									
6,700.00	3.51	265.77	6,699.74	-0.90	-12.18	-0.08	0.00	0.00	0.00
6,800.00	3.51	265.77	6,799.55	-1.35	-18.29	-0.11	0.00	0.00	0.00
6,900.00	3.51	265.77	6,899.36	-1.80	-24.40	-0.15	0.00	0.00	0.00
7,000.00	3.51	265.77	6,999.17	-2.25	-30.51	-0.19	0.00	0.00	0.00
7,100.00	3.51	265.77	7,098.98	-2.71	-36.62	-0.23	0.00	0.00	0.00
7,200.00	3.51	265.77	7,198.80	-3.16	-42.73	-0.26	0.00	0.00	0.00
7,300.00	3.51	265.77	7,298.61	-3.61	-48.84	-0.30	0.00	0.00	0.00
7,400.00	3.51	265.77	7,398.42	-4.06	-54.95	-0.34	0.00	0.00	0.00
7,500.00	3.51	265.77	7,498.23	-4.51	-61.05	-0.38	0.00	0.00	0.00
7,600.00	3.51	265.77	7,598.05	-4.96	-67.16	-0.42	0.00	0.00	0.00
7,700.00	3.51	265.77	7,697.86	-5.41	-73.27	-0.45	0.00	0.00	0.00
7,800.00	3.51	265.77	7,797.67	-5.87	-79.38	-0.49	0.00	0.00	0.00
7,900.00	3.51	265.77	7,897.48	-6.32	-85.49	-0.53	0.00	0.00	0.00
8,000.00	3.51	265.77	7,997.29	-6.77	-91.60	-0.57	0.00	0.00	0.00
8,100.00	3.51	265.77	8,097.11	-7.22	-97.71	-0.60	0.00	0.00	0.00
8,200.00	3.51	265.77	8,196.92	-7.67	-103.81	-0.64	0.00	0.00	0.00
8,300.00	3.51	265.77	8,296.73	-8.12	-109.92	-0.68	0.00	0.00	0.00
8,400.00	3.51	265.77	8,396.54	-8.57	-116.03	-0.72	0.00	0.00	0.00
8,500.00	3.51	265.77	8,496.36	-9.03	-122.14	-0.75	0.00	0.00	0.00
8,600.00	3.51	265.77	8,596.17	-9.48	-128.25	-0.79	0.00	0.00	0.00
8,631.04	3.51	265.77	8,627.15	-9.62	-130.14	-0.80	0.00	0.00	0.00
Avalon									
8,700.00	3.51	265.77	8,695.98	-9.93	-134.36	-0.83	0.00	0.00	0.00
8,800.00	3.51	265.77	8,795.79	-10.38	-140.47	-0.87	0.00	0.00	0.00
8,900.00	3.51	265.77	8,895.60	-10.83	-146.57	-0.91	0.00	0.00	0.00
9,000.00	3.51	265.77	8,995.42	-11.28	-152.68	-0.94	0.00	0.00	0.00
9,100.00	3.51	265.77	9,095.23	-11.73	-158.79	-0.98	0.00	0.00	0.00
9,200.00	3.51	265.77	9,195.04	-12.19	-164.90	-1.02	0.00	0.00	0.00
9,300.00	3.51	265.77	9,294.85	-12.64	-171.01	-1.06	0.00	0.00	0.00

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Wellbore:	OH		
Design:	Plan 4 10-24-17		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,400.00	3.51	265.77	9,394.67	-13.09	-177.12	-1.09	0.00	0.00	0.00
9,500.00	3.51	265.77	9,494.48	-13.54	-183.23	-1.13	0.00	0.00	0.00
9,509.76	3.51	265.77	9,504.21	-13.58	-183.82	-1.14	0.00	0.00	0.00
1st Bone Spring Carb									
9,600.00	3.51	265.77	9,594.29	-13.99	-189.33	-1.17	0.00	0.00	0.00
9,700.00	3.51	265.77	9,694.10	-14.44	-195.44	-1.21	0.00	0.00	0.00
9,700.13	3.51	265.77	9,694.23	-14.44	-195.45	-1.21	0.00	0.00	0.00
1st Bone Spring Sand									
9,800.00	3.51	265.77	9,793.91	-14.89	-201.55	-1.25	0.00	0.00	0.00
9,900.00	3.51	265.77	9,893.73	-15.34	-207.66	-1.28	0.00	0.00	0.00
9,965.64	3.51	265.77	9,959.25	-15.64	-211.67	-1.31	0.00	0.00	0.00
2nd Bone Spring Carb									
10,000.00	3.51	265.77	9,993.54	-15.80	-213.77	-1.32	0.00	0.00	0.00
10,100.00	3.51	265.77	10,093.35	-16.25	-219.88	-1.36	0.00	0.00	0.00
10,200.00	3.51	265.77	10,193.16	-16.70	-225.99	-1.40	0.00	0.00	0.00
10,221.14	3.51	265.77	10,214.27	-16.79	-227.28	-1.40	0.00	0.00	0.00
2nd Bone Spring Sand									
10,300.00	3.51	265.77	10,292.98	-17.15	-232.10	-1.43	0.00	0.00	0.00
10,400.00	3.51	265.77	10,392.79	-17.60	-238.20	-1.47	0.00	0.00	0.00
10,500.00	3.51	265.77	10,492.60	-18.05	-244.31	-1.51	0.00	0.00	0.00
10,600.00	3.51	265.77	10,592.41	-18.50	-250.42	-1.55	0.00	0.00	0.00
10,700.00	3.51	265.77	10,692.22	-18.96	-256.53	-1.59	0.00	0.00	0.00
10,732.14	3.51	265.77	10,724.30	-19.10	-258.49	-1.60	0.00	0.00	0.00
3rd Bone Spring Carb									
10,757.49	3.51	265.77	10,749.60	-19.22	-260.04	-1.61	0.00	0.00	0.00
KOP2, Begin 12.00°/100' Build & Turn									
10,800.00	6.00	323.89	10,791.99	-17.52	-262.65	0.27	12.00	5.85	136.69
10,900.00	17.22	348.14	10,889.83	1.26	-268.80	19.41	12.00	11.22	24.25
11,000.00	29.07	353.21	10,981.63	40.01	-274.73	58.47	12.00	11.84	5.07
11,024.87	32.03	353.91	11,003.05	52.57	-276.15	71.10	12.00	11.91	2.85
3rd Bone Spring Sand									
11,100.00	41.00	355.49	11,063.37	97.04	-280.21	115.74	12.00	11.94	2.10
11,200.00	52.95	356.88	11,131.48	169.85	-284.97	188.71	12.00	11.96	1.39
11,300.00	64.92	357.89	11,182.99	255.26	-288.82	274.19	12.00	11.97	1.01
11,400.00	76.90	358.72	11,215.63	349.55	-291.59	368.45	12.00	11.97	0.83
11,500.00	88.87	359.46	11,228.00	448.59	-293.16	467.36	12.00	11.98	0.75
11,518.67	91.11	359.60	11,228.00	467.26	-293.31	486.00	12.00	11.98	0.73
LP, Hold 91.11° Inc at 359.60° Azm									
11,600.00	91.11	359.60	11,226.42	548.57	-293.88	567.16	0.00	0.00	0.00
11,700.00	91.11	359.60	11,224.49	648.55	-294.58	666.96	0.00	0.00	0.00
11,800.00	91.11	359.60	11,222.55	748.53	-295.27	766.76	0.00	0.00	0.00
11,900.00	91.11	359.60	11,220.61	848.50	-295.97	866.56	0.00	0.00	0.00
12,000.00	91.11	359.60	11,218.68	948.48	-296.67	966.36	0.00	0.00	0.00
12,033.71	91.11	359.60	11,218.02	982.19	-296.91	1,000.00	0.00	0.00	0.00
Begin 2.00°/100' Drop									
12,043.43	90.92	359.60	11,217.85	991.90	-296.97	1,009.69	2.00	-2.00	0.00
Hold 90.92° Inc									
12,100.00	90.92	359.60	11,216.95	1,048.47	-297.37	1,066.16	0.00	0.00	0.00
12,200.00	90.92	359.60	11,215.35	1,148.45	-298.07	1,165.96	0.00	0.00	0.00
12,300.00	90.92	359.60	11,213.75	1,248.43	-298.76	1,265.76	0.00	0.00	0.00
12,400.00	90.92	359.60	11,212.15	1,348.42	-299.46	1,365.57	0.00	0.00	0.00
12,500.00	90.92	359.60	11,210.55	1,448.40	-300.16	1,465.37	0.00	0.00	0.00
12,534.70	90.92	359.60	11,210.00	1,483.10	-300.40	1,500.00	0.00	0.00	0.00

Database:	Compass 5000 GCR	Local Co-ordinate Reference:	Well 301H
Company:	Apache Corporation	TVD Reference:	GL + KB @ 3754.00usft (H&P 482)
Project:	Lea County, NM (NAD83 NME)	MD Reference:	GL + KB @ 3754.00usft (H&P 482)
Site:	Black & Tan 27 Federal Com	North Reference:	Grid
Well:	301H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan 4 10-24-17		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
Begin 2.00°/100' Build									
12,540.41	91.03	359.60	11,209.90	1,488.81	-300.44	1,505.70	2.00	2.00	0.00
Hold 91.03° Inc									
12,600.00	91.03	359.60	11,208.83	1,548.39	-300.86	1,565.17	0.00	0.00	0.00
12,700.00	91.03	359.60	11,207.03	1,648.37	-301.56	1,664.97	0.00	0.00	0.00
12,800.00	91.03	359.60	11,205.24	1,748.35	-302.25	1,764.77	0.00	0.00	0.00
12,900.00	91.03	359.60	11,203.44	1,848.33	-302.95	1,864.57	0.00	0.00	0.00
13,000.00	91.03	359.60	11,201.64	1,948.31	-303.65	1,964.37	0.00	0.00	0.00
13,035.70	91.03	359.60	11,201.00	1,984.00	-303.90	2,000.00	0.00	0.00	0.00
Begin 2.00°/100' Drop									
13,047.30	90.80	359.60	11,200.82	1,995.60	-303.98	2,011.58	2.00	-2.00	0.00
Hold 90.80° Inc									
13,100.00	90.80	359.60	11,200.08	2,048.30	-304.35	2,064.18	0.00	0.00	0.00
13,200.00	90.80	359.60	11,198.69	2,148.29	-305.05	2,163.98	0.00	0.00	0.00
13,300.00	90.80	359.60	11,197.30	2,248.27	-305.74	2,263.79	0.00	0.00	0.00
13,400.00	90.80	359.60	11,195.90	2,348.26	-306.44	2,363.60	0.00	0.00	0.00
13,500.00	90.80	359.60	11,194.51	2,448.25	-307.14	2,463.40	0.00	0.00	0.00
13,536.67	90.80	359.60	11,194.00	2,484.91	-307.40	2,500.00	0.00	0.00	0.00
Begin 2.00°/100' Build									
13,554.27	91.15	359.60	11,193.70	2,502.51	-307.52	2,517.56	2.00	2.00	0.00
Hold 91.15° Inc									
13,600.00	91.15	359.60	11,192.78	2,548.23	-307.84	2,563.21	0.00	0.00	0.00
13,700.00	91.15	359.60	11,190.78	2,648.21	-308.54	2,663.00	0.00	0.00	0.00
13,800.00	91.15	359.60	11,188.77	2,748.19	-309.23	2,762.80	0.00	0.00	0.00
13,900.00	91.15	359.60	11,186.76	2,848.16	-309.93	2,862.59	0.00	0.00	0.00
14,000.00	91.15	359.60	11,184.76	2,948.14	-310.63	2,962.39	0.00	0.00	0.00
14,037.68	91.15	359.60	11,184.00	2,985.82	-310.89	3,000.00	0.00	0.00	0.00
Begin 2.00°/100' Drop									
14,043.73	91.03	359.60	11,183.89	2,991.86	-310.94	3,006.03	2.00	-2.00	0.00
Hold 91.03° Inc									
14,100.00	91.03	359.60	11,182.87	3,048.12	-311.33	3,062.19	0.00	0.00	0.00
14,200.00	91.03	359.60	11,181.08	3,148.10	-312.03	3,161.99	0.00	0.00	0.00
14,300.00	91.03	359.60	11,179.28	3,248.08	-312.72	3,261.79	0.00	0.00	0.00
14,400.00	91.03	359.60	11,177.49	3,348.07	-313.42	3,361.59	0.00	0.00	0.00
14,500.00	91.03	359.60	11,175.69	3,448.05	-314.12	3,461.39	0.00	0.00	0.00
14,600.00	91.03	359.60	11,173.90	3,548.03	-314.82	3,561.19	0.00	0.00	0.00
14,700.00	91.03	359.60	11,172.10	3,648.01	-315.52	3,660.99	0.00	0.00	0.00
14,800.00	91.03	359.60	11,170.30	3,747.99	-316.22	3,760.79	0.00	0.00	0.00
14,900.00	91.03	359.60	11,168.51	3,847.97	-316.91	3,860.59	0.00	0.00	0.00
15,000.00	91.03	359.60	11,166.71	3,947.95	-317.61	3,960.39	0.00	0.00	0.00
15,039.69	91.03	359.60	11,166.00	3,987.64	-317.89	4,000.00	0.00	0.00	0.00
Begin 2.00°/100' Build									
15,049.57	91.23	359.60	11,165.81	3,997.51	-317.96	4,009.86	2.00	2.00	0.00
Hold 91.23° Inc									
15,100.00	91.23	359.60	11,164.73	4,047.93	-318.31	4,060.19	0.00	0.00	0.00
15,200.00	91.23	359.60	11,162.59	4,147.91	-319.01	4,159.98	0.00	0.00	0.00
15,300.00	91.23	359.60	11,160.45	4,247.88	-319.70	4,259.77	0.00	0.00	0.00
15,400.00	91.23	359.60	11,158.31	4,347.86	-320.40	4,359.57	0.00	0.00	0.00
15,500.00	91.23	359.60	11,156.17	4,447.83	-321.10	4,459.36	0.00	0.00	0.00
15,600.00	91.23	359.60	11,154.02	4,547.81	-321.80	4,559.15	0.00	0.00	0.00
15,700.00	91.23	359.60	11,151.88	4,647.78	-322.50	4,658.95	0.00	0.00	0.00
15,800.00	91.23	359.60	11,149.74	4,747.75	-323.19	4,758.74	0.00	0.00	0.00

Database:	Compass 5000 GCR	Local Co-ordinate Reference:	Well 301H
Company:	Apache Corporation	TVD Reference:	GL + KB @ 3754.00usft (H&P 482)
Project:	Lea County, NM (NAD83 NME)	MD Reference:	GL + KB @ 3754.00usft (H&P 482)
Site:	Black & Tan 27 Federal Com	North Reference:	Grid
Well:	301H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan 4 10-24-17		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
15,829.15	91.23	359.60	11,149.12	4,776.90	-323.40	4,787.83	0.00	0.00	0.00
TD at 15829.15									

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
BHLv2 - 27 Fed Com - plan hits target center - Point	0.00	0.00	11,149.12	4,776.90	-323.40	564,908.60	781,029.50	32° 33' 2.10192 N 03° 33' 19.54523 W	
T8 - B&T 27 Fed Com - plan hits target center - Point	0.00	0.00	11,151.00	4,688.91	-322.78	564,820.61	781,030.11	32° 33' 1.23120 N 03° 33' 19.54556 W	
T7 - B&T 27 Fed Com - plan hits target center - Point	0.00	0.00	11,166.00	3,987.64	-317.89	564,119.34	781,035.01	32° 32' 54.29207 N 03° 33' 19.54822 W	
T6 - B&T 27 Fed Com - plan hits target center - Point	0.00	0.00	11,184.00	2,985.82	-310.89	563,117.52	781,042.00	32° 32' 44.37889 N 03° 33' 19.55200 W	
T5 - B&T 27 Fed Com - plan hits target center - Point	0.00	0.00	11,194.00	2,484.91	-307.40	562,616.62	781,045.50	32° 32' 39.42239 N 03° 33' 19.55389 W	
T4 - B&T 27 Fed Com - plan hits target center - Point	0.00	0.00	11,201.00	1,984.00	-303.90	562,115.71	781,049.00	32° 32' 34.46580 N 03° 33' 19.55578 W	
T3 - B&T 27 Fed Com - plan hits target center - Point	0.00	0.00	11,210.00	1,483.10	-300.40	561,614.80	781,052.49	32° 32' 29.50926 N 03° 33' 19.55766 W	
T2 - B&T 27 Fed Com - plan misses target center by 0.02usft at 12033.71usft MD (11218.02 TVD, 982.19 N, -296.91 E) - Point	0.00	0.00	11,218.00	982.19	-296.91	561,113.89	781,055.99	32° 32' 24.55266 N 03° 33' 19.55955 W	
T1 - B&T 27 Fed Com - plan hits target center - Point	0.00	0.00	11,228.00	467.26	-293.31	560,598.96	781,059.59	32° 32' 19.45736 N 03° 33' 19.56148 W	

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,700.00	1,700.00	Surface	13-3/8	17-1/2
5,780.00	5,780.00	Intermediate	9-5/8	12-1/4

Database:	Compass 5000 GCR	Local Co-ordinate Reference:	Well 301H
Company:	Apache Corporation	TVD Reference:	GL + KB @ 3754.00usft (H&P 482)
Project:	Lea County, NM (NAD83 NME)	MD Reference:	GL + KB @ 3754.00usft (H&P 482)
Site:	Black & Tan 27 Federal Com	North Reference:	Grid
Well:	301H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan 4 10-24-17		

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,624.00	1,624.00	Rustler		-1.00	359.60
1,962.00	1,962.00	Salado		-1.00	359.60
2,764.00	2,764.00	Tansill		-1.00	359.60
3,574.00	3,574.00	Yates		-1.00	359.60
3,914.00	3,914.00	Seven Rivers		-1.00	359.60
5,774.00	5,774.00	Delaware		-1.00	359.60
8,631.04	8,627.15	Avalon		-1.00	359.60
9,509.76	9,504.21	1st Bone Spring Carb		-1.00	359.60
9,700.13	9,694.23	1st Bone Spring Sand		-1.00	359.60
9,965.64	9,959.25	2nd Bone Spring Carb		-1.00	359.60
10,221.14	10,214.27	2nd Bone Spring Sand		-1.00	359.60
10,732.14	10,724.30	3rd Bone Spring Carb		-1.00	359.60
11,024.87	11,003.05	3rd Bone Spring Sand		-1.00	359.60

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
6,325.00	6,325.00	0.00	0.00	KOP, Begin 1.00°/100' Build
6,676.17	6,675.95	-0.79	-10.73	Hold 3.51° Inc at 265.77° Azm
10,757.49	10,749.60	-19.22	-260.04	KOP2, Begin 12.00°/100' Build & Turn
11,518.67	11,228.00	467.26	-293.31	LP, Hold 91.11° Inc at 359.60° Azm
12,033.71	11,218.02	982.19	-296.91	Begin 2.00°/100' Drop
12,043.43	11,217.85	991.90	-296.97	Hold 90.92° Inc
12,534.70	11,210.00	1,483.10	-300.40	Begin 2.00°/100' Build
12,540.41	11,209.90	1,488.81	-300.44	Hold 91.03° Inc
13,035.70	11,201.00	1,984.00	-303.90	Begin 2.00°/100' Drop
13,047.30	11,200.82	1,995.60	-303.98	Hold 90.80° Inc
13,536.67	11,194.00	2,484.91	-307.40	Begin 2.00°/100' Build
13,554.27	11,193.70	2,502.51	-307.52	Hold 91.15° Inc
14,037.68	11,184.00	2,985.82	-310.89	Begin 2.00°/100' Drop
14,043.73	11,183.89	2,991.86	-310.94	Hold 91.03° Inc
15,039.69	11,166.00	3,987.64	-317.89	Begin 2.00°/100' Build
15,049.57	11,165.81	3,997.51	-317.96	Hold 91.23° Inc
15,829.15	11,149.12	4,776.90	-323.40	TD at 15829.15

REVISED CSG DESIGN - BLACK & TAN 27 FED COM 301H
(highlighted items have changed)

String: **SURFACE**

Hole 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): New Standard (API/Non-API): API

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

Safety Factors

Collapse Design Safety Factor: 2.15 Burst Design Safety Factor: 1.82

Body Tensile Design Safety Factor type?: Dry/Buoyant Buoyant
Body Tensile Design Safety Factor: 3.79

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

String: **INTERMEDIATE**

Hole 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: 8.75

Top Setting Depth (MD):	<u>0</u>	Top Setting Depth (TVD):	<u>0</u>	Btm setting depth (MD):	<u>11518.67</u>	Btm setting depth (TVD):	<u>11228</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>
Hole Size:	<u>8.5</u>						
Top Setting Depth (MD):	<u>11518.67</u>	Top Setting Depth (TVD):	<u>11228</u>	Btm setting depth (MD):	<u>15829.15</u>	Btm setting depth (TVD):	<u>11149.12</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: 1.33 Burst Design Safety Factor: 1.28

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

Body Tensile Design Safety Factor: 2.02

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

Joint Tensile Design Safety Factor: 2.11

Tapered String (Y/N)?: N

If yes, need spec attachment

REVISED CMT DESIGN - BLACK & TAN 27 FED COM 301H
(highlighted items have changed)

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 Volume (cu/ft): 1124.5

Density (lbs/gal): 13.5 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 Volume (cu/ft): 399

Density (lbs/gal): 14.8 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 Volume (cu/ft): 1966.06

Density (lbs/gal): 12.9 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 Volume (cu/ft): 268

Density (lbs/gal): 14.8 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 Interim 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 Volume (cu/ft): 650.33

Density (lbs/gal): 12.9 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): 1.34 Volume (cu/ft): 268

Density (lbs/gal): 14.8 Percent OH Excess: 25%

Stage Tool / ECP Depth: ± 3500'

2nd Stage

Lead:

Top MD of
Segment: 0

Btm MD of
Segment: 2815.44

Cmt Type: C

Cmt Additives: 5% NaCl + 6% Bentonite

Quantity (sks): 565

Yield (cu/ft/sk): 1.868 Volume (cu/ft): 1055.42

Density (lbs/gal): 12.9 Percent OH Excess: 25%

Tail:

Top MD of
Segment: 2815.44

Btm MD of
Segment: 3500

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: 25%

CEMENT: PRODUCTION

Single Stage

Lead:

Top MD of
Segment: 3000

Btm MD of
Segment: 10757.5

Cmt Type: H

Cmt Additives: 10% gel + 5% Salt

Quantity (sks): 965

Yield (cu/ft/sk): 2.32 Volume (cu/ft): 2238.8

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

Tail:

Top MD of
Segment: 10757.5

Btm MD of
Segment: 15829.15

Cmt Type: TXI Lite

Cmt Additives: 0.3% Fluid Loss + 0.2% Retarder

Quantity (sks): 1000

Yield (cu/ft/sk): 1.44

Density (lbs/gal): 12.8

Volume (cu/ft): 1440

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: 10757.5

Cmt Type: H

Cmt Additives: 10% gel + 5% Salt

Quantity (sks): 645

Yield (cu/ft/sk): 2.32

Density (lbs/gal): 11.9

Volume (cu/ft): 1496.4

Percent OH Excess: 20%

Tail:

Top MD of
Segment: 10757.5

Btm MD of
Segment: 15829.15

Cmt Type: TXI Lite

Cmt Additives: 0.3% Fluid Loss + 0.2% Retarder

Quantity (sks): 1000

Yield (cu/ft/sk): 1.44

Density (lbs/gal): 12.8

Volume (cu/ft): 1440

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%