

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENTFORM APPROVED
OMB NO. 1004-0137
Expires: January 31, 2018**SUNDRY NOTICES AND REPORTS ON WELLS**
*Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.***Carlsbad Field Office**
OCD Hobbs

SUBMIT IN TRIPLICATE - Other instructions on page 2		7. If Unit or CA/Agreement, Name and/or No.
1. Type of Well ☒ Oil Well ☐ Gas Well ☐ Other	8. Well Name and No. BLACK AND TAN 27 FEDERAL COM 305H	
2. Name of Operator APACHE CORPORATION	Contact: SORINA FLORES E-Mail: sorina.flores@apachecorp.com	9. API Well No. 30-025-43940-00-X1
3a. Address 303 VETERANS AIRPARK LANE SUITE 3000 MIDLAND, TX 79705	3b. Phone No. (include area code) Ph: 432-818-1167	10. Field and Pool or Exploratory Area LEA-BONE SPRING
4. Location of Well (Footage, Sec., T., R., M., or Survey Description) Sec 27 T20S R34E SWSE 215FSL 2112FEL 32.537437 N Lat, 103.546349 W Lon		11. County or Parish, State LEA COUNTY, NM

FEB 15 2018

RECEIVED

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 recompleate 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 recompleation 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 NMB-000736 NATIONWIDE

Due to a more profitable zone shone by pilot hole logs, Apache respectfully requests to lower landing zone from original plan. Apache also request to change prod lateral hole size to 8-3/4" & 8-1/2" which will reduce cmt volumes. New csg/cmt/dir plan attached:

OLD CSG:
Hole: 8-3/4" Top MD: 0' Top TVD: 0' Btm MD: 15855' Btm TVD: 11040'

OLD CMT:
(SINGLE STAGE):
Prod: Lead- TopMD: 3000' Btm MD: 10566.45' Qty: 938sx Vol: 2176.16

- All previous COAs still apply.

14. I hereby certify that the foregoing is true and correct.	
Electronic Submission #398610 verified by the BLM Well Information System For APACHE CORPORATION, sent to the Hobbs Committed to AFMSS for processing by PRISCILLA PEREZ on 01/25/2018 (18PP0450SE)	
Name (Printed/Typed) SORINA FLORES	Title SUBMITTING CONTACT
Signature (Electronic Submission)	Date 12/20/2017

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By <u>MUSTAFA HAQUE</u>	Title <u>PETROLEUM ENGINEER</u>	Date <u>02/09/2018</u>
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 Hobbs

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)

** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED **

K2

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>11447.13</u>	Btm setting depth (TVD):	<u>11163</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>11447.13</u>	Top Setting Depth (TVD):	<u>11163</u>	Btm setting depth (MD):	<u>15899.05</u>	Btm setting depth (TVD):	<u>11077</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: 1.32 Burst Design Safety Factor: 1.28

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

Body Tensile Design Safety Factor: 2.03

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

Joint Tensile Design Safety Factor: 2.12

Tapered String (Y/N)?: N

If yes, need spec attachment

BLACK & TAN 27 FEDERAL COM 305H - REVISED CMT IN YELLOW

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

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

Cmt Additives:

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

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): 1.34

Density (lbs/gal): 14.8

Volume (cu/ft): 268

Percent OH Excess: 25%

Stage Tool / ECP Depth: ± 3500'

2nd Stage

Lead:Top MD of
Segment: 0Btm MD of
Segment: 2815.44Cmt Type: CCmt Additives: 5% NaCl + 6% BentoniteQuantity (sks): 565Yield (cu/ft/sk): 1.868Density (lbs/gal): 12.9Volume (cu/ft): 1055.42Percent OH Excess: 25%**Tail:**Top MD of
Segment: 2815.44Btm MD of
Segment: 3500Cmt Type: CCmt Additives: 0.3% RetarderQuantity (sks): 200Yield (cu/ft/sk): 1.34Density (lbs/gal): 14.8Volume (cu/ft): 268Percent OH Excess: 25%**CEMENT: PRODUCTION****Single Stage****Lead:**Top MD of
Segment: 3000 OBtm MD of
Segment: 10689.46Cmt Type: HCmt Additives: 10% gel + 5% SaltQuantity (sks): 954Yield (cu/ft/sk): 2.32Density (lbs/gal): 11.9Volume (cu/ft): 2213.28Percent OH Excess: 20%**Tail:**Top MD of
Segment: 10689.46Btm MD of
Segment: 15899.05Cmt Type: TXI LiteCmt Additives: 0.3% Fluid Loss + 0.2% RetarderQuantity (sks): 1015Yield (cu/ft/sk): 1.44Density (lbs/gal): 12.8Volume (cu/ft): 1461.6Percent 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 Interim 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: 10689.46

Cmt Type: H

Cmt Additives: 10% gel + 5% Salt

Quantity (sks): 635

Yield (cu/ft/sk): 2.32

Density (lbs/gal): 11.9

Volume (cu/ft): 1473.2

Percent OH Excess: 20%

Tail:

Top MD of
Segment: 10689.46

Btm MD of
Segment: 15899.05

Cmt Type: TXI Lite

Cmt Additives: 0.3% Fluid Loss + 0.2% Retarder

Quantity (sks): 1015

Yield (cu/ft/sk): 1.44

Density (lbs/gal): 12.8

Volume (cu/ft): 1461.6

Percent OH Excess: 20%

Stage Tool / ECP Depth: ± 5830'

2nd Stage

Lead:

Top MD of
Segment: ~~3000~~ 0

Btm MD of
Segment: 4810.33

Cmt Type: H

Cmt Additives: 10% gel + 5% Salt

Quantity (sks): 204

Yield (cu/ft/sk): 2.32

Density (lbs/gal): 11.9

Volume (cu/ft): 473.28

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

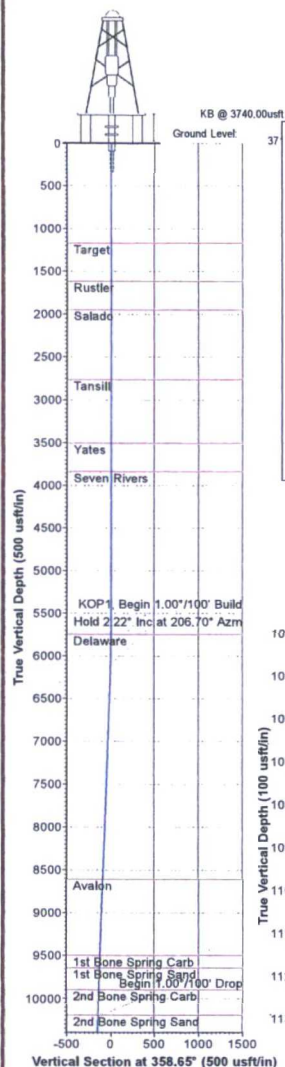
Density (lbs/gal): 14.8 Percent OH Excess: 20%

Project: Lea County, NM (NAD83 NME)
Site: Black & Tan 27 Federal Com
Well: 305H
Wellbore: OH
Design: Plan 4 12-12-17
Rig:

Map System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone Name: New Mexico Eastern Zone
Local Origin: Well 305H, Grid North
Latitude: 32° 32' 14.77181 N
Longitude: 103° 32' 46.86306 W

PHOENIX
TECHNOLOGY SERVICES

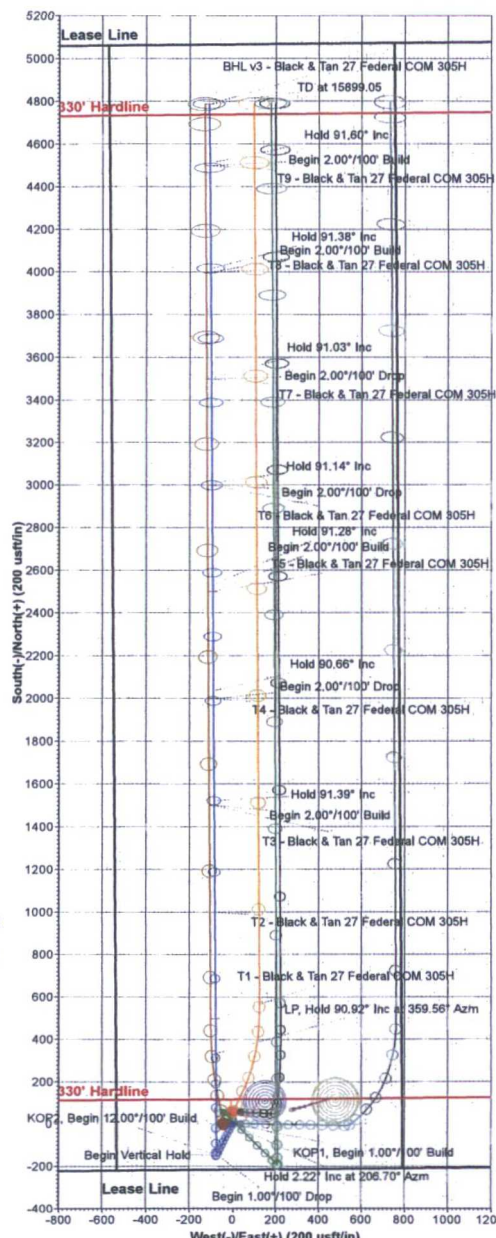
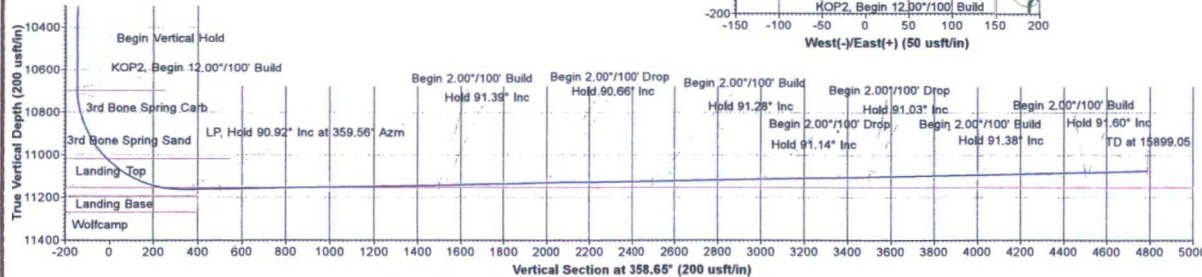
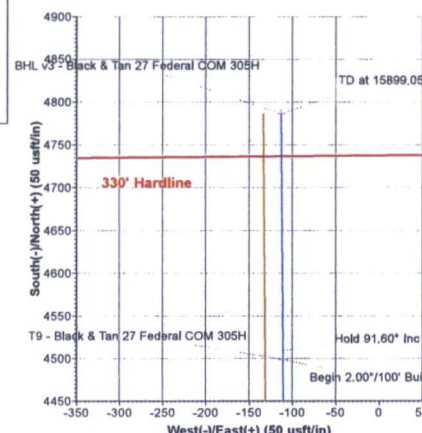
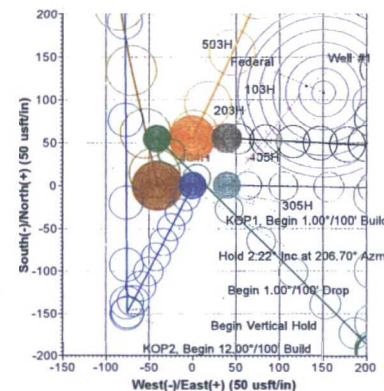
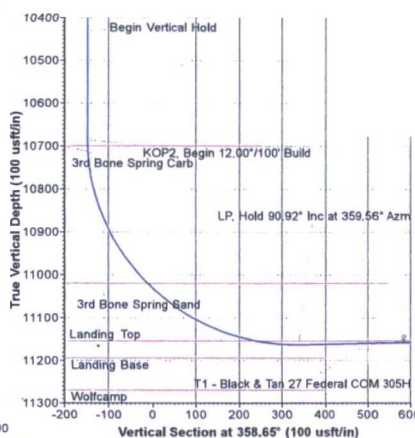
T G M
Azimuths to Grid North
True North: -0.42°
Magnetic North: 6.38°
Magnetic Field
Strength: 48328.9nT
Dip Angle: 60.52°
Date: 8/24/2017
Model: HDGM



WELL DETAILS									
	+N-S	+E-W	Northing	Ground Level Easting	Latitude	Longitude			
	0.00	0.00	560146.00	783862.20	32° 32' 14.77181 N	103° 32' 46.86306 W			

SECTION DETAILS									
Sec	MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	Vsect
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5880.00	0.00	0.00	5880.00	0.00	0.00	0.00	0.00	0.00
3	6101.74	2.22	206.70	6101.68	-3.83	-1.93	1.00	206.70	-3.79
4	10211.45	2.22	206.70	10208.32	-145.89	-73.37	0.00	0.00	-144.11
5	10433.19	0.00	0.00	10430.00	-149.72	-75.30	0.00	180.00	-147.90
6	10689.46	0.00	0.00	10686.27	-149.72	-75.30	0.00	0.00	-147.90
7	11447.13	90.92	359.56	11163.68	335.40	-79.02	12.00	359.56	337.17
8	12610.25	90.92	359.56	11145.00	1498.34	-87.95	0.00	0.00	1500.00
9	12633.53	91.39	359.56	11144.53	1521.61	-88.13	2.00	-0.03	1523.27
10	13110.46	91.39	359.56	11133.00	1998.39	-91.79	0.00	0.00	2000.00
11	13146.68	90.66	359.56	11132.35	2034.60	-92.07	2.00	180.00	2036.21
12	13610.56	90.66	359.56	11127.00	2498.44	-95.63	0.00	0.00	2500.00
13	13641.47	91.28	359.56	11126.48	2529.34	-95.87	2.00	0.00	2530.90
14	14110.75	91.28	359.56	11116.00	2998.49	-99.47	0.00	0.00	3000.00
15	14117.48	91.14	359.56	11115.86	3005.21	-99.52	2.00	-180.00	3006.73
16	14610.91	91.14	359.56	11106.00	3498.53	-103.31	0.00	0.00	3499.99
17	14616.62	91.03	359.56	11105.89	3504.25	-103.35	2.00	179.99	3505.71
18	15111.06	91.03	359.56	11097.00	3998.59	-107.15	0.00	0.00	4000.01
19	15128.58	91.38	359.56	11096.63	4016.11	-107.28	2.00	0.00	4017.52
20	15611.26	91.38	359.56	11085.00	4498.63	-110.99	0.00	0.00	4500.00
21	15622.07	91.60	359.56	11084.72	4509.43	-111.07	2.00	-0.05	4510.80
22	15899.05	91.60	359.56	11077.00	4786.30	-113.20	0.00	0.00	4787.84

FORMATION TOP DETAILS				
TVDPath	MDPath	Formation	DipAngle	DipDir
1175.00	1175.00	Target		
1620.00	1620.00	Rustler		
1950.00	1950.00	Salado		
2765.00	2765.00	Tansil		
3505.00	3505.00	Yates		
3840.00	3840.00	Seven Rivers		
5750.00	5750.00	Delaware		
8610.00	8610.00	Avalon		
9500.00	9502.60	1st Bone Spring Carb		
9640.00	9642.71	1st Bone Spring Sand		
9900.00	9902.90	2nd Bone Spring Carb		
10200.00	10203.13	2nd Bone Spring Sand		
10700.00	10703.19	3rd Bone Spring Sand		
11020.00	11058.99	3rd Bone Spring Sand		
11155.00	11347.98	Landing Top		





HOBBS OCD

FEB 15 2018

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Apache Corporation

**Lea County, NM (NAD83 NME)
Black & Tan 27 Federal Com
305H**

OH

Plan: Plan 4 12-12-17

Standard Planning Report

12 December, 2017





Phoenix Technology Services LP

Planning Report



Database: Compass 5000 GCR
Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Site: Black & Tan 27 Federal Com
Well: 305H
Wellbore: OH
Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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
From:	Map	Easting:	781,352.90 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 32' 14.81280 N
		Longitude:	103° 33' 16.17520 W
		Grid Convergence:	0.42 °

Well	305H		
Well Position	+N/-S	14.30 usft	Northing: 560,146.00 usft
	+E/-W	2,509.30 usft	Easting: 783,862.20 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft
		Latitude:	32° 32' 14.77181 N
		Longitude:	103° 32' 46.86306 W
		Ground Level:	3,714.00 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination
			(°)
	HDGM	8/24/2017	6.80
			Dip Angle
			(°)
			60.52
			Field Strength
			(nT)
			48,329

Design	Plan 4 12-12-17		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction
			(°)
			358.65

Database: Compass 5000 GCR
Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Site: Black & Tan 27 Federal Com
Well: 305H
Wellbore: OH
Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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	
5,880.00	0.00	0.00	5,880.00	0.00	0.00	0.00	0.00	0.00	0.00	
6,101.74	2.22	206.70	6,101.68	-3.83	-1.93	1.00	1.00	0.00	206.70	
10,211.45	2.22	206.70	10,208.32	-145.89	-73.37	0.00	0.00	0.00	0.00	
10,433.19	0.00	0.00	10,430.00	-149.72	-75.30	1.00	-1.00	0.00	180.00	
10,689.46	0.00	0.00	10,686.27	-149.72	-75.30	0.00	0.00	0.00	0.00	
11,447.13	90.92	359.56	11,163.68	335.40	-79.02	12.00	12.00	0.00	359.56	
12,610.25	90.92	359.56	11,145.00	1,498.34	-87.95	0.00	0.00	0.00	0.00	T3 - Black & Tan 27
12,633.53	91.39	359.56	11,144.53	1,521.61	-88.13	2.00	2.00	0.00	-0.03	
13,110.46	91.39	359.56	11,133.00	1,998.39	-91.79	0.00	0.00	0.00	0.00	T4 - Black & Tan 27
13,146.68	90.66	359.56	11,132.35	2,034.60	-92.07	2.00	-2.00	0.00	180.00	
13,610.57	90.66	359.56	11,127.00	2,498.44	-95.63	0.00	0.00	0.00	0.00	T5 - Black & Tan 27
13,641.47	91.28	359.56	11,126.48	2,529.34	-95.87	2.00	2.00	0.00	0.00	
14,110.75	91.28	359.56	11,116.00	2,998.49	-99.47	0.00	0.00	0.00	0.00	T6 - Black & Tan 27
14,117.48	91.14	359.56	11,115.86	3,005.21	-99.52	2.00	-2.00	0.00	-180.00	
14,610.91	91.14	359.56	11,106.00	3,498.53	-103.31	0.00	0.00	0.00	0.00	T7 - Black & Tan 27
14,616.62	91.03	359.56	11,105.89	3,504.25	-103.35	2.00	-2.00	0.00	179.99	
15,111.06	91.03	359.56	11,097.00	3,998.59	-107.15	0.00	0.00	0.00	0.00	T8 - Black & Tan 27
15,128.58	91.38	359.56	11,096.63	4,016.11	-107.28	2.00	2.00	0.00	0.00	
15,611.26	91.38	359.56	11,085.00	4,498.63	-110.99	0.00	0.00	0.00	0.00	T9 - Black & Tan 27
15,622.07	91.60	359.56	11,084.72	4,509.43	-111.07	2.00	2.00	0.00	-0.05	
15,899.05	91.60	359.56	11,077.00	4,786.30	-113.20	0.00	0.00	0.00	0.00	BHL v3 - Black & Tan 27

Database: Compass 5000 GCR
Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Site: Black & Tan 27 Federal Com
Well: 305H
Wellbore: OH
Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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
5,880.00	0.00	0.00	5,880.00	0.00	0.00	0.00	0.00	0.00	0.00
KOP1, Begin 1.00°/100' Build									
5,900.00	0.20	206.70	5,900.00	-0.03	-0.02	-0.03	1.00	1.00	0.00
6,000.00	1.20	206.70	5,999.99	-1.12	-0.56	-1.11	1.00	1.00	0.00
6,100.00	2.20	206.70	6,099.95	-3.77	-1.90	-3.73	1.00	1.00	0.00
6,101.74	2.22	206.70	6,101.68	-3.83	-1.93	-3.79	1.00	1.00	0.00
Hold 2.22° Inc at 206.70° Azm									
6,200.00	2.22	206.70	6,199.87	-7.23	-3.64	-7.14	0.00	0.00	0.00
6,300.00	2.22	206.70	6,299.80	-10.69	-5.37	-10.56	0.00	0.00	0.00
6,400.00	2.22	206.70	6,399.72	-14.14	-7.11	-13.97	0.00	0.00	0.00
6,500.00	2.22	206.70	6,499.65	-17.60	-8.85	-17.38	0.00	0.00	0.00
6,600.00	2.22	206.70	6,599.57	-21.06	-10.59	-20.80	0.00	0.00	0.00
6,700.00	2.22	206.70	6,699.50	-24.51	-12.33	-24.21	0.00	0.00	0.00
6,800.00	2.22	206.70	6,799.42	-27.97	-14.07	-27.63	0.00	0.00	0.00
6,900.00	2.22	206.70	6,899.35	-31.43	-15.80	-31.04	0.00	0.00	0.00
7,000.00	2.22	206.70	6,999.27	-34.88	-17.54	-34.46	0.00	0.00	0.00
7,100.00	2.22	206.70	7,099.20	-38.34	-19.28	-37.87	0.00	0.00	0.00
7,200.00	2.22	206.70	7,199.12	-41.79	-21.02	-41.29	0.00	0.00	0.00
7,300.00	2.22	206.70	7,299.05	-45.25	-22.76	-44.70	0.00	0.00	0.00
7,400.00	2.22	206.70	7,398.97	-48.71	-24.50	-48.12	0.00	0.00	0.00
7,500.00	2.22	206.70	7,498.90	-52.16	-26.24	-51.53	0.00	0.00	0.00
7,600.00	2.22	206.70	7,598.82	-55.62	-27.97	-54.94	0.00	0.00	0.00
7,700.00	2.22	206.70	7,698.75	-59.08	-29.71	-58.36	0.00	0.00	0.00
7,800.00	2.22	206.70	7,798.67	-62.53	-31.45	-61.77	0.00	0.00	0.00
7,900.00	2.22	206.70	7,898.60	-65.99	-33.19	-65.19	0.00	0.00	0.00
8,000.00	2.22	206.70	7,998.52	-69.45	-34.93	-68.60	0.00	0.00	0.00
8,100.00	2.22	206.70	8,098.45	-72.90	-36.67	-72.02	0.00	0.00	0.00
8,200.00	2.22	206.70	8,198.37	-76.36	-38.40	-75.43	0.00	0.00	0.00
8,300.00	2.22	206.70	8,298.30	-79.82	-40.14	-78.85	0.00	0.00	0.00
8,400.00	2.22	206.70	8,398.22	-83.27	-41.88	-82.26	0.00	0.00	0.00
8,500.00	2.22	206.70	8,498.15	-86.73	-43.62	-85.67	0.00	0.00	0.00
8,600.00	2.22	206.70	8,598.07	-90.19	-45.36	-89.09	0.00	0.00	0.00
8,700.00	2.22	206.70	8,698.00	-93.64	-47.10	-92.50	0.00	0.00	0.00
8,800.00	2.22	206.70	8,797.92	-97.10	-48.84	-95.92	0.00	0.00	0.00
8,900.00	2.22	206.70	8,897.85	-100.56	-50.57	-99.33	0.00	0.00	0.00
9,000.00	2.22	206.70	8,997.77	-104.01	-52.31	-102.75	0.00	0.00	0.00
9,100.00	2.22	206.70	9,097.70	-107.47	-54.05	-106.16	0.00	0.00	0.00
9,200.00	2.22	206.70	9,197.62	-110.93	-55.79	-109.58	0.00	0.00	0.00
9,300.00	2.22	206.70	9,297.55	-114.38	-57.53	-112.99	0.00	0.00	0.00
9,400.00	2.22	206.70	9,397.48	-117.84	-59.27	-116.40	0.00	0.00	0.00
9,500.00	2.22	206.70	9,497.40	-121.30	-61.00	-119.82	0.00	0.00	0.00
9,600.00	2.22	206.70	9,597.33	-124.75	-62.74	-123.23	0.00	0.00	0.00
9,700.00	2.22	206.70	9,697.25	-128.21	-64.48	-126.65	0.00	0.00	0.00
9,800.00	2.22	206.70	9,797.18	-131.67	-66.22	-130.06	0.00	0.00	0.00
9,900.00	2.22	206.70	9,897.10	-135.12	-67.96	-133.48	0.00	0.00	0.00
10,000.00	2.22	206.70	9,997.03	-138.58	-69.70	-136.89	0.00	0.00	0.00
10,100.00	2.22	206.70	10,096.95	-142.03	-71.43	-140.31	0.00	0.00	0.00
10,200.00	2.22	206.70	10,196.88	-145.49	-73.17	-143.72	0.00	0.00	0.00
10,211.45	2.22	206.70	10,208.32	-145.89	-73.37	-144.11	0.00	0.00	0.00
Begin 1.00°/100' Drop									
10,300.00	1.33	206.70	10,296.82	-148.34	-74.60	-146.53	1.00	-1.00	0.00
10,400.00	0.33	206.70	10,396.81	-149.63	-75.26	-147.81	1.00	-1.00	0.00

Database: Compass 5000 GCR
Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Site: Black & Tan 27 Federal Com
Well: 305H
Wellbore: OH
Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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)
10,433.19	0.00	0.00	10,430.00	-149.72	-75.30	-147.90	1.00	-1.00	0.00
Begin Vertical Hold									
10,689.46	0.00	0.00	10,686.27	-149.72	-75.30	-147.90	0.00	0.00	0.00
KOP2, Begin 12.00°/100' Build									
10,700.00	1.26	359.56	10,696.81	-149.60	-75.30	-147.78	12.00	12.00	0.00
10,800.00	13.26	359.56	10,795.83	-136.98	-75.40	-135.16	12.00	12.00	0.00
10,900.00	25.26	359.56	10,890.06	-104.05	-75.65	-102.23	12.00	12.00	0.00
11,000.00	37.26	359.56	10,975.38	-52.25	-76.05	-50.43	12.00	12.00	0.00
11,100.00	49.26	359.56	11,048.06	16.16	-76.57	17.97	12.00	12.00	0.00
11,200.00	61.26	359.56	11,104.94	98.19	-77.20	99.99	12.00	12.00	0.00
11,300.00	73.26	359.56	11,143.51	190.25	-77.91	192.04	12.00	12.00	0.00
11,400.00	85.26	359.56	11,162.11	288.32	-78.66	290.10	12.00	12.00	0.00
11,447.13	90.92	359.56	11,163.68	335.40	-79.02	337.17	12.00	12.00	0.00
LP, Hold 90.92° Inc at 359.56° Azm									
11,500.00	90.92	359.56	11,162.83	388.26	-79.43	390.03	0.00	0.00	0.00
11,600.00	90.92	359.56	11,161.22	488.25	-80.20	490.01	0.00	0.00	0.00
11,700.00	90.92	359.56	11,159.62	588.23	-80.96	589.98	0.00	0.00	0.00
11,800.00	90.92	359.56	11,158.01	688.21	-81.73	689.95	0.00	0.00	0.00
11,900.00	90.92	359.56	11,156.40	788.20	-82.50	789.93	0.00	0.00	0.00
12,000.00	90.92	359.56	11,154.80	888.18	-83.27	889.90	0.00	0.00	0.00
12,100.00	90.92	359.56	11,153.19	988.17	-84.03	989.88	0.00	0.00	0.00
12,200.00	90.92	359.56	11,151.59	1,088.15	-84.80	1,089.85	0.00	0.00	0.00
12,300.00	90.92	359.56	11,149.98	1,188.13	-85.57	1,189.83	0.00	0.00	0.00
12,400.00	90.92	359.56	11,148.38	1,288.12	-86.34	1,289.80	0.00	0.00	0.00
12,500.00	90.92	359.56	11,146.77	1,388.10	-87.10	1,389.77	0.00	0.00	0.00
12,600.00	90.92	359.56	11,145.16	1,488.09	-87.87	1,489.75	0.00	0.00	0.00
12,610.25	90.92	359.56	11,145.00	1,498.34	-87.95	1,500.00	0.00	0.00	0.00
Begin 2.00°/100' Build									
12,633.53	91.39	359.56	11,144.53	1,521.61	-88.13	1,523.27	2.00	2.00	0.00
Hold 91.39° Inc									
12,700.00	91.39	359.56	11,142.92	1,588.06	-88.64	1,589.71	0.00	0.00	0.00
12,800.00	91.39	359.56	11,140.51	1,688.03	-89.41	1,689.67	0.00	0.00	0.00
12,900.00	91.39	359.56	11,138.09	1,787.99	-90.17	1,789.63	0.00	0.00	0.00
13,000.00	91.39	359.56	11,135.67	1,887.96	-90.94	1,889.58	0.00	0.00	0.00
13,100.00	91.39	359.56	11,133.25	1,987.93	-91.71	1,989.54	0.00	0.00	0.00
13,110.46	91.39	359.56	11,133.00	1,998.39	-91.79	2,000.00	0.00	0.00	0.00
Begin 2.00°/100' Drop									
13,146.68	90.66	359.56	11,132.35	2,034.60	-92.07	2,036.21	2.00	-2.00	0.00
Hold 90.66° Inc									
13,200.00	90.66	359.56	11,131.74	2,087.91	-92.48	2,089.52	0.00	0.00	0.00
13,300.00	90.66	359.56	11,130.58	2,187.91	-93.25	2,189.50	0.00	0.00	0.00
13,400.00	90.66	359.56	11,129.43	2,287.90	-94.01	2,289.48	0.00	0.00	0.00
13,500.00	90.66	359.56	11,128.28	2,387.89	-94.78	2,389.46	0.00	0.00	0.00
13,600.00	90.66	359.56	11,127.12	2,487.88	-95.55	2,489.44	0.00	0.00	0.00
13,610.56	90.66	359.56	11,127.00	2,498.44	-95.63	2,500.00	0.00	0.00	0.00
Begin 2.00°/100' Build									
13,641.47	91.28	359.56	11,126.48	2,529.34	-95.87	2,530.90	2.00	2.00	0.00
Hold 91.28° Inc									
13,700.00	91.28	359.56	11,125.17	2,587.85	-96.32	2,589.41	0.00	0.00	0.00
13,800.00	91.28	359.56	11,122.94	2,687.83	-97.08	2,689.37	0.00	0.00	0.00
13,900.00	91.28	359.56	11,120.71	2,787.80	-97.85	2,789.33	0.00	0.00	0.00
14,000.00	91.28	359.56	11,118.47	2,887.77	-98.62	2,889.29	0.00	0.00	0.00
14,100.00	91.28	359.56	11,116.24	2,987.74	-99.39	2,989.26	0.00	0.00	0.00

Database: Compass 5000 GCR
Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Site: Black & Tan 27 Federal Com
Well: 305H
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Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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)
14,110.75	91.28	359.56	11,116.00	2,998.49	-99.47	3,000.00	0.00	0.00	0.00
Begin 2.00°/100' Drop									
14,117.48	91.14	359.56	11,115.86	3,005.22	-99.52	3,006.73	2.00	-2.00	0.00
Hold 91.14° Inc									
14,200.00	91.14	359.56	11,114.21	3,087.72	-100.16	3,089.22	0.00	0.00	0.00
14,300.00	91.14	359.56	11,112.21	3,187.70	-100.92	3,189.19	0.00	0.00	0.00
14,400.00	91.14	359.56	11,110.21	3,287.67	-101.69	3,289.16	0.00	0.00	0.00
14,500.00	91.14	359.56	11,108.22	3,387.65	-102.46	3,389.13	0.00	0.00	0.00
14,600.00	91.14	359.56	11,106.22	3,487.63	-103.23	3,489.09	0.00	0.00	0.00
14,610.91	91.14	359.56	11,106.00	3,498.53	-103.31	3,500.00	0.00	0.00	0.00
Begin 2.00°/100' Drop									
14,616.62	91.03	359.56	11,105.89	3,504.24	-103.35	3,505.71	2.00	-2.00	0.00
Hold 91.03° Inc									
14,700.00	91.03	359.56	11,104.39	3,587.61	-103.99	3,589.06	0.00	0.00	0.00
14,800.00	91.03	359.56	11,102.59	3,687.59	-104.76	3,689.03	0.00	0.00	0.00
14,900.00	91.03	359.56	11,100.80	3,787.57	-105.53	3,789.01	0.00	0.00	0.00
15,000.00	91.03	359.56	11,099.00	3,887.55	-106.30	3,888.98	0.00	0.00	0.00
15,100.00	91.03	359.56	11,097.20	3,987.53	-107.07	3,988.95	0.00	0.00	0.00
15,111.06	91.03	359.56	11,097.00	3,998.59	-107.15	4,000.00	0.00	0.00	0.00
Begin 2.00°/100' Build									
15,128.58	91.38	359.56	11,096.63	4,016.10	-107.28	4,017.52	2.00	2.00	0.00
Hold 91.38° Inc									
15,200.00	91.38	359.56	11,094.91	4,087.50	-107.83	4,088.91	0.00	0.00	0.00
15,300.00	91.38	359.56	11,092.50	4,187.47	-108.60	4,188.87	0.00	0.00	0.00
15,400.00	91.38	359.56	11,090.09	4,287.44	-109.37	4,288.82	0.00	0.00	0.00
15,500.00	91.38	359.56	11,087.68	4,387.41	-110.14	4,388.78	0.00	0.00	0.00
15,600.00	91.38	359.56	11,085.27	4,487.37	-110.90	4,488.74	0.00	0.00	0.00
15,611.26	91.38	359.56	11,085.00	4,498.63	-110.99	4,500.00	0.00	0.00	0.00
Begin 2.00°/100' Build									
15,622.07	91.60	359.56	11,084.72	4,509.44	-111.07	4,510.80	2.00	2.00	0.00
Hold 91.60° Inc									
15,700.00	91.60	359.56	11,082.55	4,587.33	-111.67	4,588.69	0.00	0.00	0.00
15,800.00	91.60	359.56	11,079.76	4,687.29	-112.44	4,688.64	0.00	0.00	0.00
15,899.05	91.60	359.56	11,077.00	4,786.30	-113.20	4,787.64	0.00	0.00	0.00
TD at 15899.05									



Phoenix Technology Services LP

Planning Report



Database: Compass 5000 GCR
Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Site: Black & Tan 27 Federal Com
Well: 305H
Wellbore: OH
Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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
BHL v3 - Black & Tan - plan hits target center - Point	0.00	0.00	11,077.00	4,786.30	-113.20	564,932.30	783,749.00	32° 33' 2.13873 N 03° 32' 47.77234 W	
T9 - Black & Tan 27 F - plan hits target center - Point	0.00	0.01	11,085.00	4,498.63	-110.99	564,644.63	783,751.21	32° 32' 59.29219 N 03° 32' 47.77136 W	
T8 - Black & Tan 27 F - plan hits target center - Point	0.00	0.01	11,097.00	3,998.59	-107.15	564,144.59	783,755.05	32° 32' 54.34420 N 03° 32' 47.76965 W	
T7 - Black & Tan 27 F - plan hits target center - Point	0.00	0.01	11,106.00	3,498.53	-103.31	563,644.53	783,758.89	32° 32' 49.39602 N 03° 32' 47.76795 W	
T6 - Black & Tan 27 F - plan hits target center - Point	0.00	0.01	11,116.00	2,998.49	-99.47	563,144.49	783,762.73	32° 32' 44.44803 N 03° 32' 47.76625 W	
T5 - Black & Tan 27 F - plan hits target center - Point	0.00	0.01	11,127.00	2,498.44	-95.63	562,644.44	783,766.57	32° 32' 39.49994 N 03° 32' 47.76454 W	
T4 - Black & Tan 27 F - plan hits target center - Point	0.00	0.01	11,133.00	1,998.39	-91.79	562,144.39	783,770.41	32° 32' 34.55185 N 03° 32' 47.76283 W	
T3 - Black & Tan 27 F - plan hits target center - Point	0.00	0.01	11,145.00	1,498.34	-87.95	561,644.34	783,774.25	32° 32' 29.60376 N 03° 32' 47.76113 W	
T2 - Black & Tan 27 F - plan misses target center by 0.03usft at 12110.13usft MD (11153.03 TVD, 998.29 N, -84.11 E) - Point	0.00	0.01	11,153.00	998.29	-84.11	561,144.29	783,778.09	32° 32' 24.65567 N 03° 32' 47.75942 W	
T1 - Black & Tan 27 F - plan misses target center by 0.06usft at 11610.00usft MD (11161.06 TVD, 498.24 N, -80.27 E) - Point	0.00	0.01	11,161.00	498.24	-80.27	560,644.24	783,781.93	32° 32' 19.70758 N 03° 32' 47.75770 W	

Database: Compass 5000 GCR
Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Site: Black & Tan 27 Federal Com
Well: 305H
Wellbore: OH
Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,175.00	1,177.00	Target			
1,620.00	1,622.00	Rustler			
1,950.00	1,952.00	Salado			
2,765.00	2,767.00	Tansill			
3,505.00	3,507.00	Yates			
3,840.00	3,842.00	Seven Rivers			
5,750.00	5,752.00	Delaware			
8,611.94	8,612.00	Avalon			
9,502.60	9,502.00	1st Bone Spring Carb			
9,642.71	9,642.00	1st Bone Spring Sand			
9,902.90	9,902.00	2nd Bone Spring Carb			
10,203.13	10,202.00	2nd Bone Spring Sand			
10,703.19	10,702.00	3rd Bone Spring Carb			
11,058.99	11,022.00	3rd Bone Spring Sand			
11,347.98	11,157.00	Landing Top			

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,880.00	5,880.00	0.00	0.00	KOP1, Begin 1.00°/100' Build
6,101.74	6,101.68	-3.83	-1.93	Hold 2.22° Inc at 206.70° Azm
10,211.45	10,208.32	-145.89	-73.37	Begin 1.00°/100' Drop
10,433.19	10,430.00	-149.72	-75.30	Begin Vertical Hold
10,689.46	10,686.27	-149.72	-75.30	KOP2, Begin 12.00°/100' Build
11,447.13	11,163.68	335.40	-79.02	LP, Hold 90.92° Inc at 359.56° Azm
12,610.25	11,145.00	1,498.34	-87.95	Begin 2.00°/100' Build
12,633.53	11,144.53	1,521.61	-88.13	Hold 91.39° Inc
13,110.46	11,133.00	1,998.39	-91.79	Begin 2.00°/100' Drop
13,146.68	11,132.35	2,034.60	-92.07	Hold 90.66° Inc
13,610.56	11,127.00	2,498.44	-95.63	Begin 2.00°/100' Build
13,641.47	11,126.48	2,529.34	-95.87	Hold 91.28° Inc
14,110.75	11,116.00	2,998.49	-99.47	Begin 2.00°/100' Drop
14,117.48	11,115.86	3,005.22	-99.52	Hold 91.14° Inc
14,610.91	11,106.00	3,498.53	-103.31	Begin 2.00°/100' Drop
14,616.62	11,105.89	3,504.24	-103.35	Hold 91.03° Inc
15,111.06	11,097.00	3,998.59	-107.15	Begin 2.00°/100' Build
15,128.58	11,096.63	4,016.10	-107.28	Hold 91.38° Inc
15,611.26	11,085.00	4,498.63	-110.99	Begin 2.00°/100' Build
15,622.07	11,084.72	4,509.44	-111.07	Hold 91.60° Inc
15,899.05	11,077.00	4,786.30	-113.20	TD at 15899.05



Apache Corporation

Lea County, NM (NAD83 NME)
Black & Tan 27 Federal Com
305H

OH
Plan 4 12-12-17

HOBBS OCD
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Anticollision Report

12 December, 2017



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Reference	Plan 4 12-12-17		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.00usft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 10,000.00 u	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program Date 12/12/2017

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	0.00	Plan 4 12-12-17 (OH)	NS-GYRO-MS	North sensing gyrocompassing m/s
10,647.92	15,899.05	Plan 4 12-12-17 (OH)	MWD+HDGM	OWSG Rev.2 MWD + HDGM

Summary

Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
API 30-025-08464						
Well #1 - OH - Assumed Surveys	3,725.17	3,329.16	65.60	48.46	3.827	CC, ES, SF
Black & Tan 27 Federal Com						
102 H - OH - Plan 1 08-29-17	9,198.62	9,186.67	937.41	895.97	22.624	CC
102 H - OH - Plan 1 08-29-17	9,200.00	9,187.32	937.41	895.97	22.622	ES
102 H - OH - Plan 1 08-29-17	15,899.05	14,194.03	1,767.74	1,661.41	16.624	SF
103H - OH - Plan 1 09-05-17	5,800.00	5,800.00	67.83	37.38	2.227	CC
103H - OH - Plan 1 09-05-17	5,900.00	5,900.00	67.87	36.91	2.192	ES, SF
202 H - OH - Plan 1 08-29-17	8,289.90	8,276.54	988.33	950.30	25.990	CC
202 H - OH - Plan 1 08-29-17	8,300.00	8,285.20	988.34	950.28	25.974	ES
202 H - OH - Plan 1 08-29-17	15,899.05	15,092.40	1,258.19	1,122.89	9.299	SF
203H - OH - Plan 1 09-05-17	5,800.00	5,800.00	55.05	24.59	1.807	CC
203H - OH - Plan 1 09-05-17	5,900.00	5,900.00	55.08	24.12	1.779	ES, SF
303H - OH / Job #61822 - Surveys (H&P 482)	11,085.90	11,048.73	954.48	915.77	24.652	CC, ES
303H - OH / Job #61822 - Surveys (H&P 482)	11,200.00	11,114.96	959.10	920.10	24.592	SF
303H - ST01 / Job #61822 - Surveys (H&P 482)	15,895.27	15,791.00	907.32	762.29	6.256	CC
303H - ST01 / Job #61822 - Surveys (H&P 482)	15,899.05	15,791.00	907.33	762.24	6.254	ES, SF
304H - OH - Plan 1 06-02-17	15,899.05	15,619.88	794.55	643.42	5.257	CC, ES, SF
403H - OH - Plan 1 08-29-17	10,857.35	10,855.60	895.17	852.68	21.066	CC
403H - OH - Plan 1 08-29-17	15,899.05	16,117.05	939.21	796.01	6.558	ES, SF
404H - OH - Plan 1 09-05-17	11,100.00	11,051.55	32.90	-15.50	0.680	Level 1, ES, SF
404H - OH - Plan 1 09-05-17	11,101.58	11,052.87	32.89	-15.48	0.680	Level 1, CC
405H - OH - Plan 1 09-05-17	5,800.00	5,800.00	39.68	9.23	1.303	Level 3, CC
405H - OH - Plan 1 09-05-17	5,900.00	5,899.86	39.73	8.79	1.284	Level 3, ES, SF
503H - OH - Plan 1 09-05-17	6,767.05	6,770.78	41.32	10.16	1.326	Level 3, CC, ES, SF
Gulf						
Federal - OH - Assumed Surveys	3,344.62	3,325.27	185.32	78.46	1.734	CC, ES, SF
Keohane A						
#1 - OH - Assumed Surveys	3,718.99	3,724.00	283.54	265.40	15.630	CC, ES, SF
1 - OH - Assumed Surveys	3,717.84	3,698.55	492.17	373.14	4.135	CC, ES
1 - OH - Assumed Surveys	3,800.00	3,724.00	495.43	375.42	4.128	SF

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design API 30-025-08464 - Well #1 - OH - Assumed Surveys													Offset Site Error: 0.00 usft
Survey Program: 0-MWD													Offset Well Error: 0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	400.00	0.00	0.00	48.40	116.03	130.71	436.52				
100.00	100.00	0.00	400.00	0.10	0.00	48.40	116.03	130.71	347.20	347.10	0.10	3,527.925	
200.00	200.00	0.00	400.00	0.36	0.00	48.40	116.03	130.71	265.61	265.25	0.36	729.977	
300.00	300.00	0.00	400.00	0.63	0.00	48.40	116.03	130.71	201.37	200.74	0.63	319.983	
400.00	400.00	0.00	400.00	0.89	0.00	48.40	116.03	130.71	174.78	173.89	0.89	195.342	
500.00	500.00	105.96	505.94	1.16	0.14	48.52	114.49	129.51	172.96	171.67	1.30	133.406	
600.00	600.00	205.90	605.81	1.43	0.39	48.74	111.75	127.36	169.53	167.74	1.79	94.662	
700.00	700.00	305.84	705.69	1.69	0.65	48.96	109.00	125.21	166.11	163.83	2.28	72.891	
800.00	800.00	405.78	805.57	1.96	0.90	49.19	106.25	123.07	162.68	159.91	2.77	58.748	
900.00	900.00	505.72	905.45	2.22	1.15	49.44	103.50	120.92	159.26	156.00	3.26	48.849	
1,000.00	1,000.00	605.65	1,005.33	2.49	1.40	49.69	100.75	118.77	155.84	152.09	3.75	41.540	
1,100.00	1,100.00	705.59	1,105.20	2.75	1.66	49.96	98.00	116.62	152.42	148.18	4.24	35.923	
1,200.00	1,200.00	805.53	1,205.08	3.02	1.91	50.24	95.26	114.48	149.01	144.28	4.73	31.473	
1,300.00	1,300.00	905.47	1,304.96	3.28	2.16	50.53	92.51	112.33	145.60	140.38	5.23	27.861	
1,400.00	1,400.00	1,005.41	1,404.84	3.55	2.42	50.83	89.76	110.18	142.20	136.48	5.72	24.871	
1,500.00	1,500.00	1,105.35	1,504.72	3.81	2.67	51.15	87.01	108.03	138.80	132.59	6.21	22.355	
1,600.00	1,600.00	1,205.29	1,604.60	4.08	2.92	51.49	84.26	105.89	135.40	128.70	6.70	20.209	
1,700.00	1,700.00	1,305.23	1,704.47	4.35	3.17	51.84	81.51	103.74	132.01	124.82	7.19	18.357	
1,800.00	1,800.00	1,405.17	1,804.35	4.61	3.43	52.21	78.77	101.59	128.62	120.94	7.68	16.743	
1,900.00	1,900.00	1,505.11	1,904.23	4.88	3.68	52.61	76.02	99.45	125.24	117.07	8.17	15.324	
2,000.00	2,000.00	1,605.05	2,004.11	5.14	3.93	53.02	73.27	97.30	121.87	113.20	8.66	14.066	
2,100.00	2,100.00	1,704.98	2,103.99	5.41	4.18	53.46	70.52	95.15	118.50	109.35	9.15	12.944	
2,200.00	2,200.00	1,804.92	2,203.86	5.67	4.44	53.92	67.77	93.00	115.14	105.50	9.65	11.937	
2,300.00	2,300.00	1,904.86	2,303.74	5.94	4.69	54.41	65.02	90.86	111.79	101.65	10.14	11.029	
2,400.00	2,400.00	2,004.80	2,403.62	6.20	4.94	54.93	62.27	88.71	108.45	97.82	10.63	10.205	
2,500.00	2,500.00	2,104.74	2,503.50	6.47	5.19	55.48	59.53	86.56	105.11	93.99	11.12	9.455	
2,600.00	2,600.00	2,204.68	2,603.38	6.73	5.45	56.07	56.78	84.41	101.79	90.18	11.61	8.770	
2,700.00	2,700.00	2,304.62	2,703.26	7.00	5.70	56.70	54.03	82.27	98.48	86.38	12.10	8.140	
2,800.00	2,800.00	2,404.56	2,803.13	7.27	5.95	57.38	51.28	80.12	95.18	82.59	12.59	7.561	
2,900.00	2,900.00	2,504.50	2,903.01	7.53	6.20	58.10	48.53	77.97	91.89	78.81	13.08	7.027	
3,000.00	3,000.00	2,604.44	3,002.89	7.80	6.46	58.88	45.78	75.82	88.62	75.05	13.57	6.532	
3,100.00	3,100.00	2,704.38	3,102.77	8.06	6.71	59.71	43.04	73.68	85.37	71.31	14.06	6.072	
3,200.00	3,200.00	2,804.31	3,202.65	8.33	6.96	60.61	40.29	71.53	82.14	67.59	14.55	5.645	
3,300.00	3,300.00	2,904.25	3,302.52	8.59	7.22	61.58	37.54	69.38	78.93	63.89	15.04	5.248	
3,400.00	3,400.00	3,004.19	3,402.40	8.86	7.47	62.64	34.79	67.24	75.74	60.21	15.53	4.876	
3,500.00	3,500.00	3,104.13	3,502.28	9.12	7.72	63.79	32.04	65.09	72.58	56.56	16.02	4.529	
3,600.00	3,600.00	3,204.07	3,602.16	9.39	7.97	65.04	29.29	62.94	69.46	52.94	16.52	4.205	
3,700.00	3,700.00	3,304.01	3,702.04	9.65	8.23	66.41	26.54	60.79	66.37	49.35	17.01	3.901	
3,725.17	3,725.17	3,329.16	3,727.17	9.72	8.29	66.78	25.85	60.25	65.60	48.46	17.14	3.827 CC, ES, SF	
3,800.00	3,800.00	3,341.00	3,739.01	9.92	8.32	66.95	25.53	60.00	65.00	47.92	17.36	5.142	
3,900.00	3,900.00	3,341.00	3,739.01	10.19	8.32	66.95	25.53	60.00	173.70	156.07	17.63	9.853	
4,000.00	4,000.00	3,341.00	3,739.01	10.45	8.32	66.95	25.53	60.00	269.02	251.12	17.89	15.033	
4,100.00	4,100.00	3,341.00	3,739.01	10.72	8.32	66.95	25.53	60.00	366.84	348.68	18.16	20.200	
4,200.00	4,200.00	3,341.00	3,739.01	10.98	8.32	66.95	25.53	60.00	465.58	447.16	18.43	25.268	
4,300.00	4,300.00	3,341.00	3,739.01	11.25	8.32	66.95	25.53	60.00	564.77	546.08	18.69	30.216	
4,400.00	4,400.00	3,341.00	3,739.01	11.51	8.32	66.95	25.53	60.00	664.20	645.25	18.96	35.038	
4,500.00	4,500.00	3,341.00	3,739.01	11.78	8.32	66.95	25.53	60.00	763.78	744.56	19.22	39.734	
4,600.00	4,600.00	3,341.00	3,739.01	12.04	8.32	66.95	25.53	60.00	863.46	843.97	19.49	44.308	
4,700.00	4,700.00	3,341.00	3,739.01	12.31	8.32	66.95	25.53	60.00	963.20	943.45	19.75	48.762	
4,800.00	4,800.00	3,341.00	3,739.01	12.57	8.32	66.95	25.53	60.00	1,063.00	1,042.98	20.02	53.101	
4,900.00	4,900.00	3,341.00	3,739.01	12.84	8.32	66.95	25.53	60.00	1,162.82	1,142.54	20.28	57.327	
5,000.00	5,000.00	3,341.00	3,739.01	13.11	8.32	66.95	25.53	60.00	1,262.68	1,242.13	20.55	61.446	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design API 30-025-08464 - Well #1 - OH - Assumed Surveys													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Warning						
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
5,100.00	5,100.00	3,341.00	3,739.01	13.37	8.32	66.95	25.53	60.00	1,362.56	1,341.74	20.81	65.461		
5,200.00	5,200.00	3,341.00	3,739.01	13.64	8.32	66.95	25.53	60.00	1,462.45	1,441.37	21.08	69.375		
5,300.00	5,300.00	3,341.00	3,739.01	13.90	8.32	66.95	25.53	60.00	1,562.36	1,541.01	21.35	73.193		
5,400.00	5,400.00	3,341.00	3,739.01	14.17	8.32	66.95	25.53	60.00	1,662.27	1,640.66	21.61	76.917		
5,500.00	5,500.00	3,341.00	3,739.01	14.43	8.32	66.95	25.53	60.00	1,762.20	1,740.32	21.88	80.552		
5,600.00	5,600.00	3,341.00	3,739.01	14.70	8.32	66.95	25.53	60.00	1,862.14	1,839.99	22.14	84.099		
5,700.00	5,700.00	3,341.00	3,739.01	14.96	8.32	66.95	25.53	60.00	1,962.08	1,939.67	22.41	87.563		
5,800.00	5,800.00	3,341.00	3,739.01	15.23	8.32	66.95	25.53	60.00	2,062.03	2,039.35	22.67	90.946		
5,900.00	5,900.00	3,341.00	3,739.01	15.47	8.32	-135.08	25.53	60.00	2,161.98	2,138.74	23.24	93.041		
6,000.00	5,999.99	3,341.00	3,739.01	15.45	8.32	-94.96	25.53	60.00	2,261.95	2,238.23	23.73	95.328		
6,100.00	6,099.95	3,341.00	3,739.01	15.44	8.32	-48.95	25.53	60.00	2,361.93	2,338.44	23.49	100.538		
6,200.00	6,199.87	3,341.00	3,739.01	15.43	8.32	-48.40	25.53	60.00	2,461.91	2,438.43	23.48	104.864		
6,300.00	6,299.80	3,341.00	3,739.01	15.42	8.32	-48.40	25.53	60.00	2,561.88	2,538.41	23.47	109.139		
6,400.00	6,399.72	3,341.00	3,739.01	15.43	8.32	-48.40	25.53	60.00	2,661.86	2,638.38	23.47	113.393		
6,500.00	6,499.65	3,341.00	3,739.01	15.43	8.32	-48.40	25.53	60.00	2,761.84	2,738.36	23.48	117.623		
6,600.00	6,599.57	3,341.00	3,739.01	15.44	8.32	-48.40	25.53	60.00	2,861.82	2,838.33	23.49	121.827		
6,700.00	6,699.50	3,341.00	3,739.01	15.46	8.32	-48.40	25.53	60.00	2,961.80	2,938.29	23.51	126.003		
6,800.00	6,799.42	3,341.00	3,739.01	15.48	8.32	-48.40	25.53	60.00	3,061.78	3,038.25	23.53	130.149		
6,900.00	6,899.35	3,341.00	3,739.01	15.50	8.32	-48.40	25.53	60.00	3,161.76	3,138.21	23.55	134.261		
7,000.00	6,999.27	3,341.00	3,739.01	15.53	8.32	-48.40	25.53	60.00	3,261.75	3,238.17	23.58	138.339		
7,100.00	7,099.20	3,341.00	3,739.01	15.56	8.32	-48.40	25.53	60.00	3,361.73	3,338.12	23.61	142.379		
7,200.00	7,199.12	3,341.00	3,739.01	15.60	8.32	-48.40	25.53	60.00	3,461.72	3,438.07	23.65	146.381		
7,300.00	7,299.05	3,341.00	3,739.01	15.64	8.32	-48.40	25.53	60.00	3,561.71	3,538.02	23.69	150.341		
7,400.00	7,398.97	3,341.00	3,739.01	15.69	8.32	-48.40	25.53	60.00	3,661.70	3,637.96	23.74	154.259		
7,500.00	7,498.90	3,341.00	3,739.01	15.74	8.32	-48.40	25.53	60.00	3,761.68	3,737.90	23.79	158.132		
7,600.00	7,598.82	3,341.00	3,739.01	15.80	8.32	-48.40	25.53	60.00	3,861.67	3,837.83	23.84	161.959		
7,700.00	7,698.75	3,341.00	3,739.01	15.86	8.32	-48.40	25.53	60.00	3,961.66	3,937.76	23.90	165.739		
7,800.00	7,798.67	3,341.00	3,739.01	15.92	8.32	-48.40	25.53	60.00	4,061.65	4,037.69	23.97	169.470		
7,900.00	7,898.60	3,341.00	3,739.01	15.99	8.32	-48.40	25.53	60.00	4,161.64	4,137.61	24.03	173.151		
8,000.00	7,998.52	3,341.00	3,739.01	16.06	8.32	-48.40	25.53	60.00	4,261.63	4,237.53	24.11	176.781		
8,100.00	8,098.45	3,341.00	3,739.01	16.14	8.32	-48.40	25.53	60.00	4,361.63	4,337.44	24.18	180.358		
8,200.00	8,198.37	3,341.00	3,739.01	16.22	8.32	-48.40	25.53	60.00	4,461.62	4,437.35	24.26	183.883		
8,300.00	8,298.30	3,341.00	3,739.01	16.30	8.32	-48.40	25.53	60.00	4,561.61	4,537.26	24.35	187.354		
8,400.00	8,398.22	3,341.00	3,739.01	16.39	8.32	-48.40	25.53	60.00	4,661.60	4,637.17	24.44	190.771		
8,500.00	8,498.15	3,341.00	3,739.01	16.49	8.32	-48.40	25.53	60.00	4,761.59	4,737.07	24.53	194.132		
8,600.00	8,598.07	3,341.00	3,739.01	16.58	8.32	-48.40	25.53	60.00	4,861.59	4,836.96	24.62	197.439		
8,700.00	8,698.00	3,341.00	3,739.01	16.68	8.32	-48.40	25.53	60.00	4,961.58	4,936.86	24.72	200.689		
8,800.00	8,797.92	3,341.00	3,739.01	16.78	8.32	-48.40	25.53	60.00	5,061.58	5,036.75	24.83	203.883		
8,900.00	8,897.85	3,341.00	3,739.01	16.89	8.32	-48.40	25.53	60.00	5,161.57	5,136.64	24.93	207.022		
9,000.00	8,997.77	3,341.00	3,739.01	17.00	8.32	-48.40	25.53	60.00	5,261.56	5,236.52	25.04	210.104		
9,100.00	9,097.70	3,341.00	3,739.01	17.12	8.32	-48.40	25.53	60.00	5,361.56	5,336.40	25.16	213.129		
9,200.00	9,197.62	3,341.00	3,739.01	17.23	8.32	-48.40	25.53	60.00	5,461.55	5,436.28	25.27	216.099		
9,300.00	9,297.55	3,341.00	3,739.01	17.36	8.32	-48.40	25.53	60.00	5,561.55	5,536.15	25.39	219.013		
9,400.00	9,397.48	3,341.00	3,739.01	17.48	8.32	-48.40	25.53	60.00	5,661.54	5,636.02	25.52	221.871		
9,500.00	9,497.40	3,341.00	3,739.01	17.61	8.32	-48.40	25.53	60.00	5,761.54	5,735.89	25.64	224.674		
9,600.00	9,597.33	3,341.00	3,739.01	17.74	8.32	-48.40	25.53	60.00	5,861.53	5,835.76	25.77	227.422		
9,700.00	9,697.25	3,341.00	3,739.01	17.87	8.32	-48.40	25.53	60.00	5,961.53	5,935.62	25.91	230.115		
9,800.00	9,797.18	3,341.00	3,739.01	18.01	8.32	-48.40	25.53	60.00	6,061.52	6,035.48	26.04	232.754		
9,900.00	9,897.10	3,341.00	3,739.01	18.15	8.32	-48.40	25.53	60.00	6,161.52	6,135.34	26.18	235.340		
10,000.00	9,997.03	3,341.00	3,739.01	18.29	8.32	-48.40	25.53	60.00	6,261.52	6,235.19	26.32	237.873		
10,100.00	10,096.95	3,341.00	3,739.01	18.43	8.32	-48.40	25.53	60.00	6,361.51	6,335.04	26.47	240.353		
10,200.00	10,196.88	3,341.00	3,739.01	18.58	8.32	-48.40	25.53	60.00	6,461.51	6,434.89	26.61	242.782		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design API 30-025-08464 - Well #1 - OH - Assumed Surveys													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance				Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
10,300.00	10,296.82	3,341.00	3,739.01	18.73	8.32	-146.36	25.53	60.00	6,561.50	6,535.19	26.32	249.323		
10,400.00	10,396.81	3,341.00	3,739.01	18.88	8.32	-166.73	25.53	60.00	6,661.48	6,635.20	26.29	253.416		
10,500.00	10,496.81	3,341.00	3,739.01	19.08	8.32	37.67	25.53	60.00	6,761.43	6,734.96	26.48	255.382		
10,600.00	10,596.81	3,341.00	3,739.01	19.29	8.32	37.67	25.53	60.00	6,861.38	6,834.70	26.68	257.148		
10,700.00	10,696.81	3,341.00	3,739.01	19.38	8.32	22.64	25.53	60.00	6,961.32	6,934.52	26.80	259.749		
10,800.00	10,795.83	3,341.00	3,739.01	19.39	8.32	4.40	25.53	60.00	7,059.99	7,033.49	26.50	266.386		
10,900.00	10,890.06	3,341.00	3,739.01	19.41	8.32	2.47	25.53	60.00	7,153.51	7,128.12	25.39	281.717		
11,000.00	10,975.38	3,341.00	3,739.01	19.47	8.32	1.76	25.53	60.00	7,238.07	7,214.30	23.76	304.579		
11,100.00	11,048.06	3,341.00	3,739.01	19.57	8.32	1.41	25.53	60.00	7,310.34	7,288.50	21.84	334.723		
11,200.00	11,104.94	3,341.00	3,739.01	19.75	8.32	1.22	25.53	60.00	7,367.57	7,347.67	19.90	370.204		
11,300.00	11,143.51	3,341.00	3,739.01	20.03	8.32	1.11	25.53	60.00	7,407.63	7,389.32	18.31	404.630		
11,400.00	11,162.11	3,341.00	3,739.01	20.42	8.32	1.06	25.53	60.00	7,429.05	7,411.48	17.56	423.005		
11,500.00	11,162.83	3,341.00	3,739.01	20.90	8.32	1.05	25.53	60.00	7,433.99	7,416.22	17.76	418.501		
11,600.00	11,161.22	3,341.00	3,739.01	21.47	8.32	1.05	25.53	60.00	7,437.95	7,419.99	17.95	414.263		
11,700.00	11,159.62	3,341.00	3,739.01	22.12	8.32	1.05	25.53	60.00	7,443.25	7,425.07	18.18	409.362		
11,800.00	11,158.01	3,341.00	3,739.01	22.85	8.32	1.05	25.53	60.00	7,449.89	7,431.45	18.45	403.886		
11,900.00	11,156.40	3,341.00	3,739.01	23.64	8.32	1.05	25.53	60.00	7,457.87	7,439.13	18.74	397.927		
12,000.00	11,154.80	3,341.00	3,739.01	24.49	8.32	1.05	25.53	60.00	7,467.17	7,448.10	19.07	391.573		
12,100.00	11,153.19	3,341.00	3,739.01	25.40	8.32	1.05	25.53	60.00	7,477.81	7,458.38	19.43	384.912		
12,200.00	11,151.59	3,341.00	3,739.01	26.35	8.32	1.05	25.53	60.00	7,489.76	7,469.95	19.81	378.024		
12,300.00	11,149.98	3,341.00	3,739.01	27.35	8.32	1.05	25.53	60.00	7,503.03	7,482.80	20.22	370.985		
12,400.00	11,148.38	3,341.00	3,739.01	28.38	8.32	1.05	25.53	60.00	7,517.60	7,496.94	20.66	363.860		
12,500.00	11,146.77	3,341.00	3,739.01	29.45	8.32	1.05	25.53	60.00	7,533.47	7,512.35	21.12	356.707		
12,600.00	11,145.16	3,341.00	3,739.01	30.55	8.32	1.05	25.53	60.00	7,550.64	7,529.04	21.60	349.578		
12,700.00	11,142.92	3,341.00	3,739.01	31.68	8.32	1.05	25.53	60.00	7,568.46	7,546.34	22.12	342.134		
12,800.00	11,140.51	3,341.00	3,739.01	32.83	8.32	1.05	25.53	60.00	7,587.39	7,564.75	22.64	335.164		
12,900.00	11,138.09	3,341.00	3,739.01	34.01	8.32	1.05	25.53	60.00	7,607.58	7,584.41	23.17	328.322		
13,000.00	11,135.67	3,341.00	3,739.01	35.20	8.32	1.05	25.53	60.00	7,629.03	7,605.31	23.72	321.630		
13,100.00	11,133.25	3,341.00	3,739.01	36.42	8.32	1.05	25.53	60.00	7,651.73	7,627.44	24.28	315.106		
13,200.00	11,131.74	3,341.00	3,739.01	37.65	8.32	1.06	25.53	60.00	7,676.53	7,651.71	24.82	309.251		
13,300.00	11,130.58	3,341.00	3,739.01	38.89	8.32	1.06	25.53	60.00	7,702.91	7,677.50	25.41	303.108		
13,400.00	11,129.43	3,341.00	3,739.01	40.15	8.32	1.06	25.53	60.00	7,730.49	7,704.47	26.01	297.161		
13,500.00	11,128.28	3,341.00	3,739.01	41.42	8.32	1.06	25.53	60.00	7,759.25	7,732.63	26.63	291.412		
13,600.00	11,127.12	3,341.00	3,739.01	42.70	8.32	1.06	25.53	60.00	7,789.20	7,761.95	27.25	285.864		
13,700.00	11,125.17	3,341.00	3,739.01	43.99	8.32	1.05	25.53	60.00	7,819.55	7,791.64	27.91	280.169		
13,800.00	11,122.94	3,341.00	3,739.01	45.29	8.32	1.05	25.53	60.00	7,850.79	7,822.25	28.55	275.004		
13,900.00	11,120.71	3,341.00	3,739.01	46.60	8.32	1.05	25.53	60.00	7,883.18	7,853.99	29.19	270.032		
14,000.00	11,118.47	3,341.00	3,739.01	47.92	8.32	1.05	25.53	60.00	7,916.70	7,886.85	29.85	265.248		
14,100.00	11,116.24	3,341.00	3,739.01	49.25	8.32	1.05	25.53	60.00	7,951.33	7,920.83	30.51	260.648		
14,200.00	11,114.21	3,341.00	3,739.01	50.58	8.32	1.05	25.53	60.00	7,987.26	7,956.09	31.16	256.291		
14,300.00	11,112.21	3,341.00	3,739.01	51.92	8.32	1.05	25.53	60.00	8,024.30	7,992.46	31.84	252.045		
14,400.00	11,110.21	3,341.00	3,739.01	53.26	8.32	1.05	25.53	60.00	8,062.41	8,029.90	32.51	247.966		
14,500.00	11,108.22	3,341.00	3,739.01	54.61	8.32	1.05	25.53	60.00	8,101.58	8,068.38	33.20	244.047		
14,600.00	11,106.22	3,341.00	3,739.01	55.96	8.32	1.05	25.53	60.00	8,141.78	8,107.90	33.88	240.284		
14,700.00	11,104.39	3,341.00	3,739.01	57.32	8.32	1.05	25.53	60.00	8,183.17	8,148.60	34.57	236.714		
14,800.00	11,102.59	3,341.00	3,739.01	58.68	8.32	1.05	25.53	60.00	8,225.59	8,190.32	35.27	233.245		
14,900.00	11,100.80	3,341.00	3,739.01	60.05	8.32	1.05	25.53	60.00	8,269.00	8,233.03	35.97	229.912		
15,000.00	11,099.00	3,341.00	3,739.01	61.42	8.32	1.05	25.53	60.00	8,313.38	8,276.71	36.67	226.710		
15,100.00	11,097.20	3,341.00	3,739.01	62.79	8.32	1.05	25.53	60.00	8,358.73	8,321.35	37.38	223.634		
15,200.00	11,094.91	3,341.00	3,739.01	64.16	8.32	1.05	25.53	60.00	8,404.59	8,366.48	38.11	220.560		
15,300.00	11,092.50	3,341.00	3,739.01	65.54	8.32	1.05	25.53	60.00	8,451.28	8,412.46	38.82	217.712		
15,400.00	11,090.09	3,341.00	3,739.01	66.93	8.32	1.05	25.53	60.00	8,498.88	8,459.35	39.53	214.974		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance				Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
15,500.00	11,087.68	3,341.00	3,739.01	68.31	8.32	1.05	25.53	60.00	8,547.39	8,507.14	40.25	212.342		
15,600.00	11,085.27	3,341.00	3,739.01	69.70	8.32	1.05	25.53	60.00	8,596.80	8,555.82	40.97	209.810		
15,700.00	11,082.55	3,341.00	3,739.01	71.09	8.32	1.05	25.53	60.00	8,646.80	8,605.09	41.71	207.312		
15,800.00	11,079.76	3,341.00	3,739.01	72.48	8.32	1.05	25.53	60.00	8,697.61	8,655.18	42.43	204.965		
15,899.05	11,077.00	3,341.00	3,739.01	73.86	8.32	1.05	25.53	60.00	8,748.78	8,705.62	43.16	202.727		



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 102 H - OH - Plan 1 08-29-17												Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 9177-MWD+HDGM												Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	1.00	0.00	0.00	0.00	-87.22	47.62	-979.56	980.71				
100.00	100.00	101.00	100.00	0.10	0.10	-87.22	47.62	-979.56	980.71	980.52	0.20	4,926.109	
200.00	200.00	201.00	200.00	0.36	0.37	-87.22	47.62	-979.56	980.71	979.98	0.73	1,343.486	
300.00	300.00	301.00	300.00	0.63	0.63	-87.22	47.62	-979.56	980.71	979.45	1.26	777.808	
400.00	400.00	401.00	400.00	0.89	0.90	-87.22	47.62	-979.56	980.71	978.92	1.79	547.346	
500.00	500.00	501.00	500.00	1.16	1.16	-87.22	47.62	-979.56	980.71	978.39	2.32	422.238	
600.00	600.00	601.00	600.00	1.43	1.43	-87.22	47.62	-979.56	980.71	977.86	2.85	343.682	
700.00	700.00	701.00	700.00	1.69	1.69	-87.22	47.62	-979.56	980.71	977.33	3.38	289.771	
800.00	800.00	801.00	800.00	1.96	1.96	-87.22	47.62	-979.56	980.71	976.80	3.92	250.480	
900.00	900.00	901.00	900.00	2.22	2.22	-87.22	47.62	-979.56	980.71	976.27	4.45	220.572	
1,000.00	1,000.00	1,001.00	1,000.00	2.49	2.49	-87.22	47.62	-979.56	980.71	975.74	4.98	197.045	
1,100.00	1,100.00	1,101.00	1,100.00	2.75	2.76	-87.22	47.62	-979.56	980.71	975.21	5.51	178.052	
1,200.00	1,200.00	1,201.00	1,200.00	3.02	3.02	-87.22	47.62	-979.56	980.71	974.68	6.04	162.399	
1,300.00	1,300.00	1,301.00	1,300.00	3.28	3.29	-87.22	47.62	-979.56	980.71	974.14	6.57	149.276	
1,400.00	1,400.00	1,401.00	1,400.00	3.55	3.55	-87.22	47.62	-979.56	980.71	973.61	7.10	138.115	
1,500.00	1,500.00	1,501.00	1,500.00	3.81	3.82	-87.22	47.62	-979.56	980.71	973.08	7.63	128.507	
1,600.00	1,600.00	1,601.00	1,600.00	4.08	4.08	-87.22	47.62	-979.56	980.71	972.55	8.16	120.149	
1,700.00	1,700.00	1,701.00	1,700.00	4.35	4.35	-87.22	47.62	-979.56	980.71	972.02	8.69	112.812	
1,800.00	1,800.00	1,801.00	1,800.00	4.61	4.61	-87.22	47.62	-979.56	980.71	971.49	9.22	106.319	
1,900.00	1,900.00	1,901.00	1,900.00	4.88	4.88	-87.22	47.62	-979.56	980.71	970.96	9.76	100.533	
2,000.00	2,000.00	2,001.00	2,000.00	5.14	5.14	-87.22	47.62	-979.56	980.71	970.43	10.29	95.344	
2,100.00	2,100.00	2,101.00	2,100.00	5.41	5.41	-87.22	47.62	-979.56	980.71	969.90	10.82	90.665	
2,200.00	2,200.00	2,201.00	2,200.00	5.67	5.68	-87.22	47.62	-979.56	980.71	969.37	11.35	86.423	
2,300.00	2,300.00	2,301.00	2,300.00	5.94	5.94	-87.22	47.62	-979.56	980.71	968.84	11.88	82.561	
2,400.00	2,400.00	2,401.00	2,400.00	6.20	6.21	-87.22	47.62	-979.56	980.71	968.30	12.41	79.029	
2,500.00	2,500.00	2,501.00	2,500.00	6.47	6.47	-87.22	47.62	-979.56	980.71	967.77	12.94	75.786	
2,600.00	2,600.00	2,601.00	2,600.00	6.73	6.74	-87.22	47.62	-979.56	980.71	967.24	13.47	72.800	
2,700.00	2,700.00	2,701.00	2,700.00	7.00	7.00	-87.22	47.62	-979.56	980.71	966.71	14.00	70.040	
2,800.00	2,800.00	2,801.00	2,800.00	7.27	7.27	-87.22	47.62	-979.56	980.71	966.18	14.53	67.481	
2,900.00	2,900.00	2,901.00	2,900.00	7.53	7.53	-87.22	47.62	-979.56	980.71	965.65	15.06	65.103	
3,000.00	3,000.00	3,001.00	3,000.00	7.80	7.80	-87.22	47.62	-979.56	980.71	965.12	15.59	62.887	
3,100.00	3,100.00	3,101.00	3,100.00	8.06	8.06	-87.22	47.62	-979.56	980.71	964.59	16.13	60.816	
3,200.00	3,200.00	3,201.00	3,200.00	8.33	8.33	-87.22	47.62	-979.56	980.71	964.06	16.66	58.878	
3,300.00	3,300.00	3,301.00	3,300.00	8.59	8.60	-87.22	47.62	-979.56	980.71	963.53	17.19	57.059	
3,400.00	3,400.00	3,401.00	3,400.00	8.86	8.86	-87.22	47.62	-979.56	980.71	963.00	17.72	55.350	
3,500.00	3,500.00	3,501.00	3,500.00	9.12	9.13	-87.22	47.62	-979.56	980.71	962.47	18.25	53.739	
3,600.00	3,600.00	3,601.00	3,600.00	9.39	9.39	-87.22	47.62	-979.56	980.71	961.93	18.78	52.220	
3,700.00	3,700.00	3,701.00	3,700.00	9.65	9.66	-87.22	47.62	-979.56	980.71	961.40	19.31	50.785	
3,800.00	3,800.00	3,801.00	3,800.00	9.92	9.92	-87.22	47.62	-979.56	980.71	960.87	19.84	49.426	
3,900.00	3,900.00	3,901.00	3,900.00	10.19	10.19	-87.22	47.62	-979.56	980.71	960.34	20.37	48.138	
4,000.00	4,000.00	4,001.00	4,000.00	10.45	10.45	-87.22	47.62	-979.56	980.71	959.81	20.90	46.915	
4,100.00	4,100.00	4,101.00	4,100.00	10.72	10.72	-87.22	47.62	-979.56	980.71	959.28	21.43	45.753	
4,200.00	4,200.00	4,201.00	4,200.00	10.98	10.98	-87.22	47.62	-979.56	980.71	958.75	21.97	44.648	
4,300.00	4,300.00	4,301.00	4,300.00	11.25	11.25	-87.22	47.62	-979.56	980.71	958.22	22.50	43.594	
4,400.00	4,400.00	4,401.00	4,400.00	11.51	11.52	-87.22	47.62	-979.56	980.71	957.69	23.03	42.589	
4,500.00	4,500.00	4,501.00	4,500.00	11.78	11.78	-87.22	47.62	-979.56	980.71	957.16	23.56	41.629	
4,600.00	4,600.00	4,601.00	4,600.00	12.04	12.05	-87.22	47.62	-979.56	980.71	956.63	24.09	40.712	
4,700.00	4,700.00	4,701.00	4,700.00	12.31	12.31	-87.22	47.62	-979.56	980.71	956.09	24.62	39.834	
4,800.00	4,800.00	4,801.00	4,800.00	12.57	12.58	-87.22	47.62	-979.56	980.71	955.56	25.15	38.993	
4,900.00	4,900.00	4,901.00	4,900.00	12.84	12.84	-87.22	47.62	-979.56	980.71	955.03	25.68	38.187	
5,000.00	5,000.00	5,001.00	5,000.00	13.11	13.11	-87.22	47.62	-979.56	980.71	954.50	26.21	37.414	
5,100.00	5,100.00	5,101.00	5,100.00	13.37	13.37	-87.22	47.62	-979.56	980.71	953.97	26.74	36.671	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 102 H - OH - Plan 1 08-29-17												Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 9177-MWD+HDGM												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
5,200.00	5,200.00	5,201.00	5,200.00	13.64	13.64	-87.22	47.62	-979.56	980.71	953.44	27.27	35.957	
5,300.00	5,300.00	5,301.00	5,300.00	13.90	13.90	-87.22	47.62	-979.56	980.71	952.91	27.81	35.271	
5,400.00	5,400.00	5,401.00	5,400.00	14.17	14.17	-87.22	47.62	-979.56	980.71	952.38	28.34	34.610	
5,500.00	5,500.00	5,501.00	5,500.00	14.43	14.43	-87.22	47.62	-979.56	980.71	951.85	28.87	33.973	
5,600.00	5,600.00	5,601.00	5,600.00	14.70	14.70	-87.22	47.62	-979.56	980.71	951.32	29.40	33.360	
5,700.00	5,700.00	5,701.00	5,700.00	14.96	14.97	-87.22	47.62	-979.56	980.71	950.79	29.93	32.768	
5,800.00	5,800.00	5,801.00	5,800.00	15.23	15.23	-87.22	47.62	-979.56	980.71	950.25	30.46	32.197	
5,900.00	5,900.00	5,901.00	5,900.00	15.47	15.50	66.09	47.62	-979.56	980.70	949.74	30.96	31.674	
6,000.00	5,999.99	6,000.99	5,999.99	15.45	15.76	66.16	47.62	-979.56	980.21	949.00	31.21	31.407	
6,100.00	6,099.95	6,100.95	6,099.95	15.44	16.03	66.33	47.62	-979.56	979.01	947.55	31.46	31.120	
6,200.00	6,199.87	6,200.87	6,199.87	15.43	16.29	66.53	47.62	-979.56	977.46	945.75	31.72	30.818	
6,300.00	6,299.80	6,300.80	6,299.80	15.42	16.56	66.74	47.62	-979.56	975.93	943.95	31.98	30.518	
6,400.00	6,399.72	6,400.72	6,399.72	15.43	16.82	66.95	47.62	-979.56	974.40	942.16	32.25	30.219	
6,500.00	6,499.65	6,500.65	6,499.65	15.43	17.09	67.16	47.62	-979.56	972.90	940.38	32.52	29.920	
6,600.00	6,599.57	6,600.57	6,599.57	15.44	17.35	67.37	47.62	-979.56	971.40	938.61	32.79	29.623	
6,700.00	6,699.50	6,700.50	6,699.50	15.46	17.62	67.58	47.62	-979.56	969.92	936.84	33.07	29.327	
6,800.00	6,799.42	6,800.42	6,799.42	15.48	17.88	67.79	47.62	-979.56	968.45	935.09	33.36	29.032	
6,900.00	6,899.35	6,900.35	6,899.35	15.50	18.15	68.00	47.62	-979.56	966.99	933.34	33.65	28.739	
7,000.00	6,999.27	7,000.27	6,999.27	15.53	18.41	68.22	47.62	-979.56	965.55	931.60	33.94	28.448	
7,100.00	7,099.20	7,100.20	7,099.20	15.56	18.68	68.43	47.62	-979.56	964.12	929.88	34.24	28.158	
7,200.00	7,199.12	7,200.12	7,199.12	15.60	18.95	68.64	47.62	-979.56	962.70	928.16	34.54	27.870	
7,300.00	7,299.05	7,300.05	7,299.05	15.64	19.21	68.86	47.62	-979.56	961.30	926.45	34.85	27.583	
7,400.00	7,398.97	7,399.97	7,398.97	15.69	19.48	69.07	47.62	-979.56	959.91	924.74	35.16	27.299	
7,500.00	7,498.90	7,499.90	7,498.90	15.74	19.74	69.29	47.62	-979.56	958.53	923.05	35.48	27.017	
7,600.00	7,598.82	7,599.82	7,598.82	15.80	20.01	69.51	47.62	-979.56	957.17	921.37	35.80	26.737	
7,700.00	7,698.75	7,699.75	7,698.75	15.86	20.27	69.72	47.62	-979.56	955.82	919.69	36.12	26.459	
7,800.00	7,798.67	7,799.67	7,798.67	15.92	20.54	69.94	47.62	-979.56	954.48	918.03	36.45	26.183	
7,900.00	7,898.60	7,899.60	7,898.60	15.99	20.80	70.16	47.62	-979.56	953.16	916.38	36.79	25.910	
8,000.00	7,998.52	7,999.52	7,998.52	16.06	21.07	70.38	47.62	-979.56	951.86	914.73	37.13	25.639	
8,100.00	8,098.45	8,099.45	8,098.45	16.14	21.33	70.60	47.62	-979.56	950.56	913.10	37.47	25.370	
8,200.00	8,198.37	8,199.37	8,198.37	16.22	21.60	70.82	47.62	-979.56	949.28	911.47	37.81	25.104	
8,300.00	8,298.30	8,299.30	8,298.30	16.30	21.86	71.04	47.62	-979.56	948.02	909.86	38.16	24.841	
8,400.00	8,398.22	8,399.22	8,398.22	16.39	22.13	71.26	47.62	-979.56	946.77	908.25	38.52	24.581	
8,500.00	8,498.15	8,499.15	8,498.15	16.49	22.39	71.48	47.62	-979.56	945.53	906.66	38.87	24.323	
8,600.00	8,598.07	8,599.07	8,598.07	16.58	22.66	71.70	47.62	-979.56	944.31	905.07	39.24	24.067	
8,700.00	8,698.00	8,699.00	8,698.00	16.68	22.92	71.93	47.62	-979.56	943.10	903.50	39.60	23.815	
8,800.00	8,797.92	8,798.92	8,797.92	16.78	23.19	72.15	47.62	-979.56	941.91	901.94	39.97	23.565	
8,900.00	8,897.85	8,898.85	8,897.85	16.89	23.45	72.38	47.62	-979.56	940.73	900.38	40.34	23.318	
9,000.00	8,997.77	8,998.77	8,997.77	17.00	23.72	72.60	47.62	-979.56	939.56	898.84	40.72	23.075	
9,100.00	9,097.70	9,098.70	9,097.70	17.12	23.98	72.83	47.62	-979.56	938.41	897.31	41.10	22.834	
9,198.62	9,196.25	9,186.67	9,185.67	17.23	24.21	73.03	47.71	-979.60	937.41	895.97	41.43	22.624 CC	
9,200.00	9,197.62	9,187.32	9,186.32	17.23	24.21	73.03	47.72	-979.60	937.41	895.97	41.44	22.622 ES	
9,300.00	9,297.55	9,234.61	9,233.47	17.36	24.23	73.31	50.79	-980.98	940.29	898.72	41.58	22.616	
9,400.00	9,397.48	9,275.00	9,273.31	17.48	24.23	73.73	56.77	-983.66	948.90	907.19	41.70	22.754	
9,500.00	9,497.40	9,325.00	9,321.64	17.61	24.24	74.47	68.38	-988.87	963.22	921.39	41.84	23.024	
9,600.00	9,597.33	9,365.72	9,359.85	17.74	24.25	75.24	81.21	-994.62	983.47	941.49	41.97	23.430	
9,700.00	9,697.25	9,400.00	9,390.98	17.87	24.26	76.00	94.28	-1,000.48	1,009.65	967.53	42.12	23.972	
9,800.00	9,797.18	9,439.28	9,425.28	18.01	24.28	76.97	111.72	-1,008.30	1,041.65	999.39	42.27	24.643	
9,900.00	9,897.10	9,475.00	9,455.03	18.15	24.29	77.94	129.76	-1,016.39	1,079.40	1,036.98	42.43	25.442	
10,000.00	9,997.03	9,500.00	9,474.92	18.29	24.30	78.66	143.57	-1,022.58	1,122.58	1,080.00	42.58	26.363	
10,100.00	10,096.95	9,525.00	9,494.00	18.43	24.31	79.41	158.31	-1,029.19	1,170.92	1,128.17	42.74	27.394	
10,200.00	10,196.88	9,552.00	9,513.62	18.58	24.34	80.25	175.23	-1,036.77	1,224.02	1,181.11	42.91	28.524	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 102 H - OH - Plan 1 08-29-17												Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 9177-MWD+HDGM												Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
10,300.00	10,296.82	9,584.69	9,536.05	18.73	24.38	81.91	197.16	-1,045.96	1,281.29	1,238.20	43.09	29.735	
10,400.00	10,396.81	9,614.79	9,555.41	18.88	24.42	83.66	218.78	-1,053.93	1,342.19	1,298.92	43.27	31.020	
10,500.00	10,496.81	9,641.46	9,571.48	19.08	24.46	-68.47	239.00	-1,060.56	1,406.44	1,362.95	43.49	32.340	
10,600.00	10,596.81	9,664.90	9,584.71	19.29	24.51	-67.65	257.55	-1,066.04	1,473.70	1,429.98	43.72	33.707	
10,700.00	10,696.81	9,685.59	9,595.68	19.38	24.55	-65.32	274.49	-1,070.60	1,543.69	1,499.85	43.83	35.216	
10,800.00	10,795.83	9,700.00	9,602.91	19.39	24.58	-55.13	286.58	-1,073.62	1,612.11	1,568.56	43.56	37.013	
10,900.00	10,890.06	9,725.00	9,614.63	19.41	24.63	-47.25	308.11	-1,078.53	1,674.02	1,631.46	42.56	39.333	
11,000.00	10,975.38	9,760.06	9,629.27	19.47	24.72	-41.59	339.35	-1,084.70	1,727.06	1,686.29	40.77	42.362	
11,100.00	11,048.06	9,789.24	9,639.80	19.57	24.80	-37.83	366.19	-1,089.19	1,769.50	1,731.04	38.46	46.010	
11,200.00	11,104.94	9,825.00	9,650.60	19.75	24.91	-35.46	399.95	-1,093.86	1,799.93	1,763.79	36.14	49.798	
11,300.00	11,143.51	9,850.00	9,656.74	20.03	24.99	-34.25	424.03	-1,096.57	1,817.37	1,782.94	34.43	52.792	
11,400.00	11,162.11	9,875.00	9,661.69	20.42	25.08	-34.02	448.43	-1,098.80	1,821.42	1,787.53	33.89	53.753	
11,500.00	11,162.83	9,913.84	9,667.02	20.90	25.22	-34.35	486.80	-1,101.34	1,814.23	1,779.83	34.40	52.738	
11,600.00	11,161.22	9,950.00	9,669.37	21.47	25.36	-34.43	522.85	-1,102.65	1,808.93	1,774.07	34.87	51.883	
11,700.00	11,159.62	9,995.28	9,669.35	22.12	25.55	-34.45	568.12	-1,103.12	1,807.23	1,771.83	35.40	51.052	
11,800.00	11,158.01	10,095.27	9,668.49	22.85	26.01	-34.46	668.11	-1,103.82	1,806.59	1,770.39	36.19	49.913	
11,900.00	11,156.40	10,195.27	9,667.62	23.64	26.55	-34.47	768.11	-1,104.53	1,805.94	1,768.85	37.09	48.691	
12,000.00	11,154.80	10,295.27	9,666.75	24.49	27.15	-34.48	868.10	-1,105.23	1,805.30	1,767.22	38.08	47.410	
12,100.00	11,153.19	10,395.26	9,665.89	25.40	27.82	-34.50	968.09	-1,105.93	1,804.65	1,765.50	39.15	46.091	
12,200.00	11,151.59	10,495.26	9,665.02	26.35	28.54	-34.51	1,068.08	-1,106.63	1,804.00	1,763.70	40.31	44.754	
12,300.00	11,149.98	10,595.26	9,664.15	27.35	29.32	-34.52	1,168.07	-1,107.34	1,803.36	1,761.82	41.54	43.414	
12,400.00	11,148.38	10,695.26	9,663.28	28.38	30.15	-34.53	1,268.06	-1,108.04	1,802.71	1,759.88	42.83	42.086	
12,500.00	11,146.77	10,795.25	9,662.42	29.45	31.02	-34.54	1,368.05	-1,108.74	1,802.07	1,757.88	44.19	40.778	
12,600.00	11,145.16	10,895.25	9,661.55	30.55	31.93	-34.55	1,468.04	-1,109.45	1,801.42	1,755.82	45.61	39.501	
12,700.00	11,142.92	10,995.24	9,660.68	31.68	32.89	-34.58	1,568.03	-1,110.15	1,800.26	1,753.16	47.09	38.227	
12,800.00	11,140.51	11,095.23	9,659.82	32.83	33.87	-34.61	1,668.01	-1,110.85	1,798.94	1,750.33	48.61	37.006	
12,900.00	11,138.09	11,195.22	9,658.95	34.01	34.89	-34.63	1,767.99	-1,111.56	1,797.63	1,747.46	50.17	35.829	
13,000.00	11,135.67	11,295.20	9,658.08	35.20	35.94	-34.66	1,867.97	-1,112.26	1,796.32	1,744.54	51.77	34.696	
13,100.00	11,133.25	11,395.19	9,657.22	36.42	37.01	-34.68	1,967.95	-1,112.96	1,795.00	1,741.59	53.41	33.609	
13,200.00	11,131.74	11,495.19	9,656.35	37.65	38.11	-34.69	2,067.94	-1,113.66	1,794.43	1,739.40	55.03	32.605	
13,300.00	11,130.58	11,595.19	9,655.48	38.89	39.23	-34.69	2,167.94	-1,114.37	1,794.16	1,737.44	56.72	31.632	
13,400.00	11,129.43	11,695.19	9,654.62	40.15	40.38	-34.70	2,267.93	-1,115.07	1,793.89	1,735.46	58.43	30.701	
13,500.00	11,128.28	11,795.19	9,653.75	41.42	41.54	-34.70	2,367.92	-1,115.77	1,793.61	1,733.45	60.17	29.811	
13,600.00	11,127.12	11,895.19	9,652.88	42.70	42.72	-34.71	2,467.92	-1,116.48	1,793.34	1,731.42	61.92	28.961	
13,700.00	11,125.17	11,995.18	9,652.02	43.99	43.91	-34.73	2,567.90	-1,117.18	1,792.41	1,728.67	63.74	28.122	
13,800.00	11,122.94	12,095.17	9,651.15	45.29	45.12	-34.75	2,667.89	-1,117.88	1,791.25	1,725.70	65.55	27.327	
13,900.00	11,120.71	12,195.16	9,650.28	46.60	46.34	-34.77	2,767.87	-1,118.58	1,790.09	1,722.72	67.38	26.568	
14,000.00	11,118.47	12,295.15	9,649.42	47.92	47.58	-34.80	2,867.86	-1,119.29	1,788.94	1,719.71	69.22	25.843	
14,100.00	11,116.24	12,395.14	9,648.55	49.25	48.82	-34.82	2,967.84	-1,119.99	1,787.78	1,716.69	71.08	25.150	
14,200.00	11,114.21	12,495.14	9,647.68	50.58	50.08	-34.84	3,067.83	-1,120.69	1,786.78	1,713.83	72.95	24.493	
14,300.00	11,112.21	12,595.13	9,646.81	51.92	51.35	-34.86	3,167.82	-1,121.40	1,785.82	1,710.98	74.84	23.863	
14,400.00	11,110.21	12,695.12	9,645.95	53.26	52.62	-34.88	3,267.80	-1,122.10	1,784.85	1,708.12	76.73	23.260	
14,500.00	11,108.22	12,795.12	9,645.08	54.61	53.91	-34.89	3,367.79	-1,122.80	1,783.89	1,705.25	78.64	22.683	
14,600.00	11,106.22	12,895.11	9,644.21	55.96	55.20	-34.91	3,467.78	-1,123.51	1,782.92	1,702.36	80.56	22.131	
14,700.00	11,104.39	12,995.11	9,643.35	57.32	56.50	-34.93	3,567.77	-1,124.21	1,782.10	1,699.62	82.49	21.605	
14,800.00	11,102.59	13,095.10	9,642.48	58.68	57.81	-34.94	3,667.76	-1,124.91	1,781.30	1,696.88	84.42	21.100	
14,900.00	11,100.80	13,195.10	9,641.61	60.05	59.12	-34.96	3,767.75	-1,125.61	1,780.50	1,694.13	86.37	20.615	
15,000.00	11,099.00	13,295.09	9,640.75	61.42	60.44	-34.98	3,867.74	-1,126.32	1,779.70	1,691.38	88.32	20.150	
15,100.00	11,097.20	13,395.09	9,639.88	62.79	61.77	-34.99	3,967.73	-1,127.02	1,778.90	1,688.62	90.28	19.704	
15,200.00	11,094.91	13,495.08	9,639.01	64.16	63.10	-35.02	4,067.71	-1,127.72	1,777.70	1,685.42	92.28	19.265	
15,300.00	11,092.50	13,595.07	9,638.15	65.54	64.43	-35.04	4,167.69	-1,128.43	1,776.40	1,682.13	94.26	18.845	
15,400.00	11,090.09	13,695.05	9,637.28	66.93	65.77	-35.07	4,267.67	-1,129.13	1,775.10	1,678.84	96.26	18.441	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 102 H - OH - Plan 1 08-29-17												Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 9177-MWD+HDGM												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
15,500.00	11,087.68	13,795.04	9,636.41	68.31	67.12	-35.10	4,367.65	-1,129.83	1,773.80	1,675.54	98.26	18.052	
15,600.00	11,085.27	13,895.03	9,635.55	69.70	68.47	-35.13	4,467.64	-1,130.54	1,772.50	1,672.23	100.27	17.678	
15,700.00	11,082.55	13,995.01	9,634.68	71.09	69.82	-35.16	4,567.61	-1,131.24	1,770.94	1,668.64	102.30	17.312	
15,800.00	11,079.76	14,094.99	9,633.81	72.48	71.17	-35.19	4,667.59	-1,131.94	1,769.33	1,665.01	104.32	16.960	
15,899.05	11,077.00	14,194.03	9,632.95	73.86	72.52	-35.23	4,766.61	-1,132.64	1,767.74	1,661.41	106.34	16.624 SF	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 103H - OH - Plan 1 09-05-17												Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 9202-MWD+HDGM												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (")	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	35.33	55.34	39.23	67.83				
100.00	100.00	100.00	100.00	0.10	0.10	35.33	55.34	39.23	67.83	67.64	0.20	345.325	
200.00	200.00	200.00	200.00	0.36	0.36	35.33	55.34	39.23	67.83	67.11	0.73	93.263	
300.00	300.00	300.00	300.00	0.63	0.63	35.33	55.34	39.23	67.83	66.57	1.26	53.912	
400.00	400.00	400.00	400.00	0.89	0.89	35.33	55.34	39.23	67.83	66.04	1.79	37.914	
500.00	500.00	500.00	500.00	1.16	1.16	35.33	55.34	39.23	67.83	65.51	2.32	29.238	
600.00	600.00	600.00	600.00	1.43	1.43	35.33	55.34	39.23	67.83	64.98	2.85	23.793	
700.00	700.00	700.00	700.00	1.69	1.69	35.33	55.34	39.23	67.83	64.45	3.38	20.058	
800.00	800.00	800.00	800.00	1.96	1.96	35.33	55.34	39.23	67.83	63.92	3.91	17.337	
900.00	900.00	900.00	900.00	2.22	2.22	35.33	55.34	39.23	67.83	63.39	4.44	15.265	
1,000.00	1,000.00	1,000.00	1,000.00	2.49	2.49	35.33	55.34	39.23	67.83	62.86	4.97	13.636	
1,100.00	1,100.00	1,100.00	1,100.00	2.75	2.75	35.33	55.34	39.23	67.83	62.33	5.51	12.321	
1,200.00	1,200.00	1,200.00	1,200.00	3.02	3.02	35.33	55.34	39.23	67.83	61.80	6.04	11.238	
1,300.00	1,300.00	1,300.00	1,300.00	3.28	3.28	35.33	55.34	39.23	67.83	61.27	6.57	10.329	
1,400.00	1,400.00	1,400.00	1,400.00	3.55	3.55	35.33	55.34	39.23	67.83	60.73	7.10	9.557	
1,500.00	1,500.00	1,500.00	1,500.00	3.81	3.81	35.33	55.34	39.23	67.83	60.20	7.63	8.891	
1,600.00	1,600.00	1,600.00	1,600.00	4.08	4.08	35.33	55.34	39.23	67.83	59.67	8.16	8.313	
1,700.00	1,700.00	1,700.00	1,700.00	4.35	4.35	35.33	55.34	39.23	67.83	59.14	8.69	7.805	
1,800.00	1,800.00	1,800.00	1,800.00	4.61	4.61	35.33	55.34	39.23	67.83	58.61	9.22	7.356	
1,900.00	1,900.00	1,900.00	1,900.00	4.88	4.88	35.33	55.34	39.23	67.83	58.08	9.75	6.955	
2,000.00	2,000.00	2,000.00	2,000.00	5.14	5.14	35.33	55.34	39.23	67.83	57.55	10.28	6.596	
2,100.00	2,100.00	2,100.00	2,100.00	5.41	5.41	35.33	55.34	39.23	67.83	57.02	10.81	6.272	
2,200.00	2,200.00	2,200.00	2,200.00	5.67	5.67	35.33	55.34	39.23	67.83	56.49	11.35	5.979	
2,300.00	2,300.00	2,300.00	2,300.00	5.94	5.94	35.33	55.34	39.23	67.83	55.96	11.88	5.712	
2,400.00	2,400.00	2,400.00	2,400.00	6.20	6.20	35.33	55.34	39.23	67.83	55.43	12.41	5.467	
2,500.00	2,500.00	2,500.00	2,500.00	6.47	6.47	35.33	55.34	39.23	67.83	54.89	12.94	5.243	
2,600.00	2,600.00	2,600.00	2,600.00	6.73	6.73	35.33	55.34	39.23	67.83	54.36	13.47	5.036	
2,700.00	2,700.00	2,700.00	2,700.00	7.00	7.00	35.33	55.34	39.23	67.83	53.83	14.00	4.845	
2,800.00	2,800.00	2,800.00	2,800.00	7.27	7.27	35.33	55.34	39.23	67.83	53.30	14.53	4.668	
2,900.00	2,900.00	2,900.00	2,900.00	7.53	7.53	35.33	55.34	39.23	67.83	52.77	15.06	4.504	
3,000.00	3,000.00	3,000.00	3,000.00	7.80	7.80	35.33	55.34	39.23	67.83	52.24	15.59	4.350	
3,100.00	3,100.00	3,100.00	3,100.00	8.06	8.06	35.33	55.34	39.23	67.83	51.71	16.12	4.207	
3,200.00	3,200.00	3,200.00	3,200.00	8.33	8.33	35.33	55.34	39.23	67.83	51.18	16.65	4.073	
3,300.00	3,300.00	3,300.00	3,300.00	8.59	8.59	35.33	55.34	39.23	67.83	50.65	17.18	3.947	
3,400.00	3,400.00	3,400.00	3,400.00	8.86	8.86	35.33	55.34	39.23	67.83	50.12	17.72	3.829	
3,500.00	3,500.00	3,500.00	3,500.00	9.12	9.12	35.33	55.34	39.23	67.83	49.59	18.25	3.717	
3,600.00	3,600.00	3,600.00	3,600.00	9.39	9.39	35.33	55.34	39.23	67.83	49.05	18.78	3.612	
3,700.00	3,700.00	3,700.00	3,700.00	9.65	9.65	35.33	55.34	39.23	67.83	48.52	19.31	3.513	
3,800.00	3,800.00	3,800.00	3,800.00	9.92	9.92	35.33	55.34	39.23	67.83	47.99	19.84	3.419	
3,900.00	3,900.00	3,900.00	3,900.00	10.19	10.19	35.33	55.34	39.23	67.83	47.46	20.37	3.330	
4,000.00	4,000.00	4,000.00	4,000.00	10.45	10.45	35.33	55.34	39.23	67.83	46.93	20.90	3.245	
4,100.00	4,100.00	4,100.00	4,100.00	10.72	10.72	35.33	55.34	39.23	67.83	46.40	21.43	3.165	
4,200.00	4,200.00	4,200.00	4,200.00	10.98	10.98	35.33	55.34	39.23	67.83	45.87	21.96	3.088	
4,300.00	4,300.00	4,300.00	4,300.00	11.25	11.25	35.33	55.34	39.23	67.83	45.34	22.49	3.016	
4,400.00	4,400.00	4,400.00	4,400.00	11.51	11.51	35.33	55.34	39.23	67.83	44.81	23.02	2.946	
4,500.00	4,500.00	4,500.00	4,500.00	11.78	11.78	35.33	55.34	39.23	67.83	44.28	23.56	2.880	
4,600.00	4,600.00	4,600.00	4,600.00	12.04	12.04	35.33	55.34	39.23	67.83	43.75	24.09	2.816	
4,700.00	4,700.00	4,700.00	4,700.00	12.31	12.31	35.33	55.34	39.23	67.83	43.21	24.62	2.755	
4,800.00	4,800.00	4,800.00	4,800.00	12.57	12.57	35.33	55.34	39.23	67.83	42.68	25.15	2.697	
4,900.00	4,900.00	4,900.00	4,900.00	12.84	12.84	35.33	55.34	39.23	67.83	42.15	25.68	2.642	
5,000.00	5,000.00	5,000.00	5,000.00	13.11	13.11	35.33	55.34	39.23	67.83	41.62	26.21	2.588	
5,100.00	5,100.00	5,100.00	5,100.00	13.37	13.37	35.33	55.34	39.23	67.83	41.09	26.74	2.537	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 103H - OH - Plan 1 09-05-17													Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 9202-MWD+HDGM													Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Warning						
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
5,200.00	5,200.00	5,200.00	5,200.00	13.64	13.64	35.33	55.34	39.23	67.83	40.56	27.27	2.487		
5,300.00	5,300.00	5,300.00	5,300.00	13.90	13.90	35.33	55.34	39.23	67.83	40.03	27.80	2.440		
5,400.00	5,400.00	5,400.00	5,400.00	14.17	14.17	35.33	55.34	39.23	67.83	39.50	28.33	2.394		
5,500.00	5,500.00	5,500.00	5,500.00	14.43	14.43	35.33	55.34	39.23	67.83	38.97	28.86	2.350		
5,600.00	5,600.00	5,600.00	5,600.00	14.70	14.70	35.33	55.34	39.23	67.83	38.44	29.40	2.308		
5,700.00	5,700.00	5,700.00	5,700.00	14.96	14.96	35.33	55.34	39.23	67.83	37.91	29.93	2.267		
5,800.00	5,800.00	5,800.00	5,800.00	15.23	15.23	35.33	55.34	39.23	67.83	37.38	30.46	2.227 CC		
5,858.33	5,858.33	5,858.33	5,858.33	15.37	15.38	-171.37	55.34	39.23	67.89	37.14	30.75	2.208		
5,900.00	5,900.00	5,900.00	5,900.00	15.47	15.49	-171.37	55.34	39.23	67.87	36.91	30.96	2.192 ES, SF		
6,000.00	5,999.99	5,999.99	5,999.99	15.45	15.76	-171.52	55.34	39.23	69.07	37.87	31.20	2.214		
6,100.00	6,099.95	6,099.95	6,099.95	15.44	16.02	-171.87	55.34	39.23	72.01	40.57	31.44	2.291		
6,200.00	6,199.87	6,199.87	6,199.87	15.43	16.29	-172.28	55.34	39.23	75.84	44.15	31.69	2.393		
6,300.00	6,299.80	6,299.80	6,299.80	15.42	16.56	-172.65	55.34	39.23	79.68	47.72	31.96	2.493		
6,400.00	6,399.72	6,399.72	6,399.72	15.43	16.82	-172.99	55.34	39.23	83.52	51.29	32.22	2.592		
6,500.00	6,499.65	6,499.65	6,499.65	15.43	17.09	-173.30	55.34	39.23	87.36	54.87	32.49	2.689		
6,600.00	6,599.57	6,599.57	6,599.57	15.44	17.27	-173.12	55.29	40.08	91.64	58.95	32.69	2.803		
6,700.00	6,699.50	6,697.78	6,697.74	15.46	17.38	-172.09	55.17	42.64	96.81	64.00	32.81	2.950		
6,800.00	6,799.42	6,796.62	6,796.48	15.48	17.49	-170.36	54.95	46.90	102.96	70.01	32.94	3.125		
6,900.00	6,899.35	6,895.63	6,895.32	15.50	17.61	-168.14	54.65	52.75	110.12	77.03	33.08	3.328		
7,000.00	6,999.27	6,995.26	6,994.76	15.53	17.73	-166.05	54.34	58.99	117.63	84.40	33.23	3.540		
7,100.00	7,099.20	7,094.89	7,094.19	15.56	17.85	-164.21	54.02	65.22	125.28	91.90	33.39	3.752		
7,200.00	7,199.12	7,194.52	7,193.63	15.60	17.98	-162.58	53.70	71.46	133.05	99.50	33.55	3.966		
7,300.00	7,299.05	7,294.15	7,293.06	15.64	18.11	-161.13	53.39	77.70	140.91	107.19	33.72	4.179		
7,400.00	7,398.97	7,393.78	7,392.50	15.69	18.24	-159.84	53.07	83.93	148.85	114.96	33.90	4.391		
7,500.00	7,498.90	7,493.41	7,491.93	15.74	18.38	-158.68	52.75	90.17	156.86	122.78	34.09	4.602		
7,600.00	7,598.82	7,593.04	7,591.37	15.80	18.52	-157.63	52.44	96.41	164.93	130.65	34.28	4.812		
7,700.00	7,698.75	7,692.67	7,690.80	15.86	18.66	-156.68	52.12	102.64	173.05	138.57	34.48	5.019		
7,800.00	7,798.67	7,792.31	7,790.24	15.92	18.80	-155.81	51.80	108.88	181.21	146.53	34.68	5.225		
7,900.00	7,898.60	7,891.94	7,889.67	15.99	18.95	-155.02	51.49	115.11	189.41	154.51	34.90	5.428		
8,000.00	7,998.52	7,991.57	7,989.11	16.06	19.10	-154.30	51.17	121.35	197.64	162.52	35.12	5.628		
8,100.00	8,098.45	8,091.20	8,088.54	16.14	19.25	-153.63	50.86	127.59	205.90	170.55	35.34	5.826		
8,200.00	8,198.37	8,190.83	8,187.98	16.22	19.40	-153.02	50.54	133.82	214.18	178.61	35.58	6.020		
8,300.00	8,298.30	8,290.46	8,287.41	16.30	19.56	-152.45	50.22	140.06	222.49	186.67	35.82	6.212		
8,400.00	8,398.22	8,390.09	8,386.85	16.39	19.72	-151.92	49.91	146.30	230.82	194.76	36.06	6.401		
8,500.00	8,498.15	8,489.72	8,486.28	16.49	19.88	-151.43	49.59	152.53	239.16	202.85	36.31	6.586		
8,600.00	8,598.07	8,589.35	8,585.72	16.58	20.05	-150.97	49.27	158.77	247.53	210.96	36.57	6.768		
8,700.00	8,698.00	8,688.98	8,685.15	16.68	20.21	-150.54	48.96	165.00	255.90	219.07	36.83	6.947		
8,800.00	8,797.92	8,788.61	8,784.59	16.78	20.38	-150.14	48.64	171.24	264.30	227.19	37.10	7.123		
8,900.00	8,897.85	8,888.24	8,884.02	16.89	20.55	-149.76	48.33	177.48	272.70	235.32	37.38	7.296		
9,000.00	8,997.77	8,987.88	8,983.46	17.00	20.73	-149.41	48.01	183.71	281.11	243.45	37.66	7.465		
9,100.00	9,097.70	9,087.51	9,082.89	17.12	20.90	-149.07	47.69	189.95	289.54	251.59	37.95	7.630		
9,200.00	9,197.62	9,187.14	9,182.33	17.23	21.08	-148.76	47.38	196.19	297.97	259.73	38.24	7.793		
9,300.00	9,297.55	9,285.05	9,259.91	17.36	21.13	-149.20	51.33	201.03	309.40	270.97	38.43	8.052		
9,400.00	9,397.48	9,335.76	9,328.97	17.48	21.14	-151.20	65.63	205.26	329.13	290.57	38.56	8.536		
9,500.00	9,497.40	9,400.00	9,389.27	17.61	21.16	-154.08	87.34	208.90	357.87	319.17	38.70	9.247		
9,600.00	9,597.33	9,457.55	9,440.39	17.74	21.18	-157.25	113.52	211.94	396.04	357.19	38.85	10.193		
9,700.00	9,697.25	9,507.21	9,481.71	17.87	21.20	-160.25	140.92	214.36	443.44	404.43	39.01	11.367		
9,800.00	9,797.18	9,550.00	9,514.87	18.01	21.23	-162.92	167.87	216.26	499.21	460.04	39.18	12.743		
9,900.00	9,897.10	9,586.31	9,541.03	18.15	21.25	-165.18	193.00	217.74	562.20	522.86	39.34	14.291		
10,000.00	9,997.03	9,617.50	9,561.93	18.29	21.27	-167.09	216.12	218.90	631.20	591.69	39.51	15.977		
10,100.00	10,096.95	9,650.00	9,582.05	18.43	21.31	-169.02	241.60	220.00	705.15	665.47	39.68	17.772		
10,200.00	10,196.88	9,667.36	9,592.07	18.58	21.34	-170.02	255.77	220.54	782.98	743.14	39.84	19.654		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 103H - OH - Plan 1 09-05-17													Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 9202-MWD+HDGM													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance		Warning						
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
10,300.00	10,296.82	9,687.60	9,603.10	18.73	21.37	-171.35	272.72	221.12	863.71	823.69	40.01	21.585		
10,400.00	10,396.81	9,700.00	9,609.50	18.88	21.40	-172.21	283.34	221.45	946.23	906.05	40.18	23.551		
10,500.00	10,496.81	9,725.00	9,621.56	19.08	21.45	33.17	305.23	222.07	1,030.28	989.88	40.40	25.505		
10,600.00	10,596.81	9,736.55	9,626.74	19.29	21.48	32.61	315.54	222.32	1,116.28	1,075.67	40.61	27.486		
10,700.00	10,696.81	9,750.00	9,632.46	19.38	21.51	31.18	327.72	222.60	1,203.92	1,163.22	40.70	29.579		
10,800.00	10,795.83	9,764.09	9,638.08	19.39	21.54	22.52	340.63	222.87	1,287.43	1,247.37	40.06	32.139		
10,900.00	10,890.06	9,775.00	9,642.17	19.41	21.57	17.79	350.75	223.07	1,361.36	1,322.90	38.46	35.400		
11,000.00	10,975.38	9,800.00	9,650.66	19.47	21.64	14.88	374.25	223.45	1,423.54	1,387.47	36.08	39.457		
11,100.00	11,048.06	9,825.00	9,657.91	19.57	21.72	13.12	398.17	223.75	1,472.63	1,439.38	33.25	44.287		
11,200.00	11,104.94	9,850.00	9,663.90	19.75	21.80	12.08	422.44	223.97	1,507.45	1,477.01	30.45	49.512		
11,300.00	11,143.51	9,875.00	9,668.62	20.03	21.89	11.56	446.99	224.10	1,527.23	1,498.97	28.26	54.048		
11,400.00	11,162.11	9,900.00	9,672.05	20.42	21.98	11.47	471.75	224.16	1,531.54	1,504.23	27.31	56.074		
11,500.00	11,162.83	9,925.00	9,674.18	20.90	22.08	11.57	496.66	224.13	1,523.14	1,495.59	27.55	55.285		
11,600.00	11,161.22	9,950.00	9,675.01	21.47	22.19	11.58	521.64	224.02	1,517.40	1,489.58	27.82	54.547		
11,700.00	11,159.62	10,005.76	9,674.58	22.12	22.44	11.59	577.40	223.64	1,515.99	1,487.79	28.20	53.755		
11,800.00	11,158.01	10,105.76	9,673.71	22.85	22.97	11.60	677.39	222.94	1,515.29	1,486.52	28.76	52.679		
11,900.00	11,156.40	10,205.76	9,672.84	23.64	23.57	11.60	777.38	222.24	1,514.58	1,485.17	29.41	51.498		
12,000.00	11,154.80	10,305.75	9,671.96	24.49	24.24	11.61	877.37	221.54	1,513.88	1,483.74	30.13	50.238		
12,100.00	11,153.19	10,405.75	9,671.09	25.40	24.98	11.62	977.36	220.85	1,513.17	1,482.24	30.93	48.924		
12,200.00	11,151.59	10,505.75	9,670.22	26.35	25.78	11.63	1,077.35	220.15	1,512.47	1,480.68	31.79	47.575		
12,300.00	11,149.98	10,605.74	9,669.35	27.35	26.63	11.64	1,177.34	219.45	1,511.77	1,479.05	32.71	46.212		
12,400.00	11,148.38	10,705.74	9,668.47	28.38	27.53	11.65	1,277.33	218.75	1,511.06	1,477.37	33.69	44.849		
12,500.00	11,146.77	10,805.74	9,667.60	29.45	28.48	11.65	1,377.32	218.05	1,510.36	1,475.64	34.72	43.498		
12,600.00	11,145.16	10,905.74	9,666.73	30.55	29.46	11.66	1,477.32	217.36	1,509.65	1,473.86	35.80	42.171		
12,700.00	11,142.92	11,005.73	9,665.86	31.68	30.49	11.68	1,577.30	216.66	1,508.33	1,471.39	36.94	40.834		
12,800.00	11,140.51	11,105.71	9,664.98	32.83	31.54	11.69	1,677.28	215.96	1,506.83	1,468.73	38.10	39.553		
12,900.00	11,138.09	11,205.70	9,664.11	34.01	32.63	11.70	1,777.26	215.26	1,505.33	1,466.04	39.29	38.314		
13,000.00	11,135.67	11,305.69	9,663.24	35.20	33.74	11.72	1,877.25	214.56	1,503.83	1,463.32	40.52	37.118		
13,100.00	11,133.25	11,405.68	9,662.37	36.42	34.88	11.73	1,977.23	213.87	1,502.33	1,460.56	41.77	35.967		
13,200.00	11,131.74	11,505.68	9,661.49	37.65	36.04	11.74	2,077.22	213.17	1,501.72	1,458.70	43.02	34.910		
13,300.00	11,130.58	11,605.68	9,660.62	38.89	37.22	11.74	2,177.21	212.47	1,501.46	1,457.13	44.32	33.876		
13,400.00	11,129.43	11,705.67	9,659.75	40.15	38.42	11.75	2,277.20	211.77	1,501.19	1,455.55	45.65	32.886		
13,500.00	11,128.28	11,805.67	9,658.88	41.42	39.63	11.75	2,377.20	211.07	1,500.93	1,453.94	47.00	31.938		
13,600.00	11,127.12	11,905.67	9,658.00	42.70	40.86	11.76	2,477.19	210.38	1,500.67	1,452.31	48.36	31.031		
13,700.00	11,125.17	12,005.67	9,657.13	43.99	42.11	11.77	2,577.18	209.68	1,499.63	1,449.86	49.77	30.129		
13,800.00	11,122.94	12,105.66	9,656.26	45.29	43.36	11.78	2,677.16	208.98	1,498.31	1,447.14	51.17	29.279		
13,900.00	11,120.71	12,205.65	9,655.38	46.60	44.63	11.80	2,777.15	208.28	1,497.00	1,444.41	52.59	28.466		
14,000.00	11,118.47	12,305.64	9,654.51	47.92	45.91	11.81	2,877.13	207.58	1,495.68	1,441.66	54.02	27.688		
14,100.00	11,116.24	12,405.63	9,653.64	49.25	47.20	11.82	2,977.12	206.89	1,494.36	1,438.90	55.46	26.945		
14,200.00	11,114.21	12,505.62	9,652.77	50.58	48.49	11.84	3,077.10	206.19	1,493.24	1,436.34	56.91	26.240		
14,300.00	11,112.21	12,605.62	9,651.89	51.92	49.80	11.85	3,177.09	205.49	1,492.16	1,433.79	58.37	25.564		
14,400.00	11,110.21	12,705.61	9,651.02	53.26	51.11	11.86	3,277.08	204.79	1,491.07	1,431.23	59.84	24.916		
14,500.00	11,108.22	12,805.60	9,650.15	54.61	52.43	11.87	3,377.07	204.09	1,489.98	1,428.66	61.33	24.296		
14,600.00	11,106.22	12,905.60	9,649.28	55.96	53.75	11.88	3,477.05	203.40	1,488.89	1,426.08	62.82	23.702		
14,700.00	11,104.39	13,005.59	9,648.40	57.32	55.08	11.89	3,577.04	202.70	1,487.98	1,423.67	64.31	23.137		
14,800.00	11,102.59	13,105.59	9,647.53	58.68	56.42	11.90	3,677.03	202.00	1,487.08	1,421.27	65.82	22.594		
14,900.00	11,100.80	13,205.58	9,646.66	60.05	57.76	11.91	3,777.02	201.30	1,486.19	1,418.86	67.33	22.073		
15,000.00	11,099.00	13,305.58	9,645.79	61.42	59.11	11.92	3,877.01	200.60	1,485.30	1,416.45	68.85	21.573		
15,100.00	11,097.20	13,405.58	9,644.91	62.79	60.46	11.93	3,977.00	199.91	1,484.41	1,414.03	70.38	21.092		
15,200.00	11,094.91	13,505.57	9,644.04	64.16	61.82	11.95	4,076.98	199.21	1,483.04	1,411.11	71.93	20.619		
15,300.00	11,092.50	13,605.55	9,643.17	65.54	63.18	11.96	4,176.96	198.51	1,481.55	1,408.08	73.47	20.166		
15,400.00	11,090.09	13,705.54	9,642.30	66.93	64.54	11.98	4,276.95	197.81	1,480.06	1,405.05	75.01	19.731		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 103H - OH - Plan 1 09-05-17												Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 9202-MWD+HDGM												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
15,500.00	11,087.68	13,805.53	9,641.42	68.31	65.91	11.99	4,376.93	197.11	1,478.57	1,402.01	76.56	19.312	
15,600.00	11,085.27	13,905.52	9,640.55	69.70	67.28	12.01	4,476.91	196.42	1,477.08	1,398.97	78.12	18.909	
15,700.00	11,082.55	14,005.50	9,639.68	71.09	68.65	12.02	4,576.89	195.72	1,475.29	1,395.60	79.69	18.514	
15,800.00	11,079.76	14,105.48	9,638.81	72.48	70.03	12.04	4,676.86	195.02	1,473.43	1,392.18	81.25	18.134	
15,899.05	11,077.00	14,204.52	9,637.94	73.86	71.39	12.06	4,775.89	194.33	1,471.59	1,388.78	82.81	17.771	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 202 H - OH - Plan 1 08-29-17												Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 10073-MWD+HDGM												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	1.00	0.00	0.00	0.00	-87.34	47.30	-1,019.56	1,020.65				
100.00	100.00	101.00	100.00	0.10	0.10	-87.34	47.30	-1,019.56	1,020.65	1,020.45	0.20	5,126.720	
200.00	200.00	201.00	200.00	0.36	0.37	-87.34	47.30	-1,019.56	1,020.65	1,019.92	0.73	1,398.198	
300.00	300.00	301.00	300.00	0.63	0.63	-87.34	47.30	-1,019.56	1,020.65	1,019.39	1.26	809.483	
400.00	400.00	401.00	400.00	0.89	0.90	-87.34	47.30	-1,019.56	1,020.65	1,018.86	1.79	569.636	
500.00	500.00	501.00	500.00	1.16	1.16	-87.34	47.30	-1,019.56	1,020.65	1,018.33	2.32	439.434	
600.00	600.00	601.00	600.00	1.43	1.43	-87.34	47.30	-1,019.56	1,020.65	1,017.80	2.85	357.679	
700.00	700.00	701.00	700.00	1.69	1.69	-87.34	47.30	-1,019.56	1,020.65	1,017.27	3.38	301.572	
800.00	800.00	801.00	800.00	1.96	1.96	-87.34	47.30	-1,019.56	1,020.65	1,016.74	3.92	260.681	
900.00	900.00	901.00	900.00	2.22	2.22	-87.34	47.30	-1,019.56	1,020.65	1,016.21	4.45	229.555	
1,000.00	1,000.00	1,001.00	1,000.00	2.49	2.49	-87.34	47.30	-1,019.56	1,020.65	1,015.68	4.98	205.069	
1,100.00	1,100.00	1,101.00	1,100.00	2.75	2.76	-87.34	47.30	-1,019.56	1,020.65	1,015.15	5.51	185.303	
1,200.00	1,200.00	1,201.00	1,200.00	3.02	3.02	-87.34	47.30	-1,019.56	1,020.65	1,014.61	6.04	169.013	
1,300.00	1,300.00	1,301.00	1,300.00	3.28	3.29	-87.34	47.30	-1,019.56	1,020.65	1,014.08	6.57	155.355	
1,400.00	1,400.00	1,401.00	1,400.00	3.55	3.55	-87.34	47.30	-1,019.56	1,020.65	1,013.55	7.10	143.740	
1,500.00	1,500.00	1,501.00	1,500.00	3.81	3.82	-87.34	47.30	-1,019.56	1,020.65	1,013.02	7.63	133.741	
1,600.00	1,600.00	1,601.00	1,600.00	4.08	4.08	-87.34	47.30	-1,019.56	1,020.65	1,012.49	8.16	125.042	
1,700.00	1,700.00	1,701.00	1,700.00	4.35	4.35	-87.34	47.30	-1,019.56	1,020.65	1,011.96	8.69	117.406	
1,800.00	1,800.00	1,801.00	1,800.00	4.61	4.61	-87.34	47.30	-1,019.56	1,020.65	1,011.43	9.22	110.649	
1,900.00	1,900.00	1,901.00	1,900.00	4.88	4.88	-87.34	47.30	-1,019.56	1,020.65	1,010.90	9.76	104.627	
2,000.00	2,000.00	2,001.00	2,000.00	5.14	5.14	-87.34	47.30	-1,019.56	1,020.65	1,010.37	10.29	99.227	
2,100.00	2,100.00	2,101.00	2,100.00	5.41	5.41	-87.34	47.30	-1,019.56	1,020.65	1,009.84	10.82	94.357	
2,200.00	2,200.00	2,201.00	2,200.00	5.67	5.68	-87.34	47.30	-1,019.56	1,020.65	1,009.31	11.35	89.943	
2,300.00	2,300.00	2,301.00	2,300.00	5.94	5.94	-87.34	47.30	-1,019.56	1,020.65	1,008.77	11.88	85.923	
2,400.00	2,400.00	2,401.00	2,400.00	6.20	6.21	-87.34	47.30	-1,019.56	1,020.65	1,008.24	12.41	82.247	
2,500.00	2,500.00	2,501.00	2,500.00	6.47	6.47	-87.34	47.30	-1,019.56	1,020.65	1,007.71	12.94	78.873	
2,600.00	2,600.00	2,601.00	2,600.00	6.73	6.74	-87.34	47.30	-1,019.56	1,020.65	1,007.18	13.47	75.764	
2,700.00	2,700.00	2,701.00	2,700.00	7.00	7.00	-87.34	47.30	-1,019.56	1,020.65	1,006.65	14.00	72.892	
2,800.00	2,800.00	2,801.00	2,800.00	7.27	7.27	-87.34	47.30	-1,019.56	1,020.65	1,006.12	14.53	70.229	
2,900.00	2,900.00	2,901.00	2,900.00	7.53	7.53	-87.34	47.30	-1,019.56	1,020.65	1,005.59	15.06	67.754	
3,000.00	3,000.00	3,001.00	3,000.00	7.80	7.80	-87.34	47.30	-1,019.56	1,020.65	1,005.06	15.59	65.448	
3,100.00	3,100.00	3,101.00	3,100.00	8.06	8.06	-87.34	47.30	-1,019.56	1,020.65	1,004.53	16.13	63.293	
3,200.00	3,200.00	3,201.00	3,200.00	8.33	8.33	-87.34	47.30	-1,019.56	1,020.65	1,004.00	16.66	61.276	
3,300.00	3,300.00	3,301.00	3,300.00	8.59	8.60	-87.34	47.30	-1,019.56	1,020.65	1,003.47	17.19	59.383	
3,400.00	3,400.00	3,401.00	3,400.00	8.86	8.86	-87.34	47.30	-1,019.56	1,020.65	1,002.93	17.72	57.604	
3,500.00	3,500.00	3,501.00	3,500.00	9.12	9.13	-87.34	47.30	-1,019.56	1,020.65	1,002.40	18.25	55.928	
3,600.00	3,600.00	3,601.00	3,600.00	9.39	9.39	-87.34	47.30	-1,019.56	1,020.65	1,001.87	18.78	54.347	
3,700.00	3,700.00	3,701.00	3,700.00	9.65	9.66	-87.34	47.30	-1,019.56	1,020.65	1,001.34	19.31	52.853	
3,800.00	3,800.00	3,801.00	3,800.00	9.92	9.92	-87.34	47.30	-1,019.56	1,020.65	1,000.81	19.84	51.439	
3,900.00	3,900.00	3,901.00	3,900.00	10.19	10.19	-87.34	47.30	-1,019.56	1,020.65	1,000.28	20.37	50.098	
4,000.00	4,000.00	4,001.00	4,000.00	10.45	10.45	-87.34	47.30	-1,019.56	1,020.65	999.75	20.90	48.826	
4,100.00	4,100.00	4,101.00	4,100.00	10.72	10.72	-87.34	47.30	-1,019.56	1,020.65	999.22	21.43	47.617	
4,200.00	4,200.00	4,201.00	4,200.00	10.98	10.98	-87.34	47.30	-1,019.56	1,020.65	998.69	21.97	46.466	
4,300.00	4,300.00	4,301.00	4,300.00	11.25	11.25	-87.34	47.30	-1,019.56	1,020.65	998.16	22.50	45.369	
4,400.00	4,400.00	4,401.00	4,400.00	11.51	11.52	-87.34	47.30	-1,019.56	1,020.65	997.63	23.03	44.323	
4,500.00	4,500.00	4,501.00	4,500.00	11.78	11.78	-87.34	47.30	-1,019.56	1,020.65	997.09	23.56	43.324	
4,600.00	4,600.00	4,601.00	4,600.00	12.04	12.05	-87.34	47.30	-1,019.56	1,020.65	996.56	24.09	42.370	
4,700.00	4,700.00	4,701.00	4,700.00	12.31	12.31	-87.34	47.30	-1,019.56	1,020.65	996.03	24.62	41.456	
4,800.00	4,800.00	4,801.00	4,800.00	12.57	12.58	-87.34	47.30	-1,019.56	1,020.65	995.50	25.15	40.581	
4,900.00	4,900.00	4,901.00	4,900.00	12.84	12.84	-87.34	47.30	-1,019.56	1,020.65	994.97	25.68	39.742	
5,000.00	5,000.00	5,001.00	5,000.00	13.11	13.11	-87.34	47.30	-1,019.56	1,020.65	994.44	26.21	38.937	
5,100.00	5,100.00	5,101.00	5,100.00	13.37	13.37	-87.34	47.30	-1,019.56	1,020.65	993.91	26.74	38.164	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 202 H - OH - Plan 1 08-29-17													Offset Site Error: 0.00 usft
Survey Program: 0-NS-GYRO-MS, 10073-MWD+HDGM													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
5,200.00	5,200.00	5,201.00	5,200.00	13.64	13.64	-87.34	47.30	-1,019.56	1,020.65	993.38	27.27	37.421	
5,300.00	5,300.00	5,301.00	5,300.00	13.90	13.90	-87.34	47.30	-1,019.56	1,020.65	992.85	27.81	36.707	
5,400.00	5,400.00	5,401.00	5,400.00	14.17	14.17	-87.34	47.30	-1,019.56	1,020.65	992.32	28.34	36.019	
5,500.00	5,500.00	5,501.00	5,500.00	14.43	14.43	-87.34	47.30	-1,019.56	1,020.65	991.79	28.87	35.357	
5,600.00	5,600.00	5,601.00	5,600.00	14.70	14.70	-87.34	47.30	-1,019.56	1,020.65	991.25	29.40	34.718	
5,700.00	5,700.00	5,701.00	5,700.00	14.96	14.97	-87.34	47.30	-1,019.56	1,020.65	990.72	29.93	34.102	
5,800.00	5,800.00	5,801.00	5,800.00	15.23	15.23	-87.34	47.30	-1,019.56	1,020.65	990.19	30.46	33.508	
5,900.00	5,900.00	5,901.00	5,900.00	15.47	15.50	65.96	47.30	-1,019.56	1,020.64	989.68	30.96	32.964	
6,000.00	5,999.99	6,000.99	5,999.99	15.45	15.76	66.03	47.30	-1,019.56	1,020.14	988.93	31.21	32.687	
6,100.00	6,099.95	6,100.95	6,099.95	15.44	16.03	66.19	47.30	-1,019.56	1,018.94	987.48	31.46	32.389	
6,200.00	6,199.87	6,200.87	6,199.87	15.43	16.29	66.39	47.30	-1,019.56	1,017.38	985.67	31.72	32.077	
6,300.00	6,299.80	6,300.80	6,299.80	15.42	16.56	66.59	47.30	-1,019.56	1,015.84	983.86	31.98	31.766	
6,400.00	6,399.72	6,400.72	6,399.72	15.43	16.82	66.79	47.30	-1,019.56	1,014.31	982.06	32.25	31.456	
6,500.00	6,499.65	6,500.65	6,499.65	15.43	17.09	66.99	47.30	-1,019.56	1,012.79	980.27	32.52	31.147	
6,600.00	6,599.57	6,600.57	6,599.57	15.44	17.35	67.19	47.30	-1,019.56	1,011.28	978.49	32.79	30.839	
6,700.00	6,699.50	6,700.50	6,699.50	15.46	17.62	67.39	47.30	-1,019.56	1,009.79	976.71	33.07	30.533	
6,800.00	6,799.42	6,800.42	6,799.42	15.48	17.88	67.60	47.30	-1,019.56	1,008.30	974.95	33.36	30.227	
6,900.00	6,899.35	6,900.35	6,899.35	15.50	18.15	67.80	47.30	-1,019.56	1,006.83	973.19	33.65	29.924	
7,000.00	6,999.27	7,000.27	6,999.27	15.53	18.41	68.00	47.30	-1,019.56	1,005.38	971.44	33.94	29.621	
7,100.00	7,099.20	7,100.20	7,099.20	15.56	18.68	68.21	47.30	-1,019.56	1,003.93	969.69	34.24	29.321	
7,200.00	7,199.12	7,200.12	7,199.12	15.60	18.95	68.41	47.30	-1,019.56	1,002.50	967.96	34.54	29.022	
7,300.00	7,299.05	7,300.05	7,299.05	15.64	19.21	68.62	47.30	-1,019.56	1,001.09	966.23	34.85	28.725	
7,400.00	7,398.97	7,399.97	7,398.97	15.69	19.48	68.83	47.30	-1,019.56	999.68	964.52	35.16	28.430	
7,500.00	7,498.90	7,499.90	7,498.90	15.74	19.74	69.03	47.30	-1,019.56	998.29	962.81	35.48	28.138	
7,600.00	7,598.82	7,599.82	7,598.82	15.80	20.01	69.24	47.30	-1,019.56	996.91	961.11	35.80	27.847	
7,700.00	7,698.75	7,699.75	7,698.75	15.86	20.27	69.45	47.30	-1,019.56	995.54	959.42	36.12	27.558	
7,800.00	7,798.67	7,799.67	7,798.67	15.92	20.54	69.66	47.30	-1,019.56	994.19	957.74	36.45	27.272	
7,900.00	7,898.60	7,899.60	7,898.60	15.99	20.80	69.87	47.30	-1,019.56	992.85	956.06	36.79	26.989	
8,000.00	7,998.52	7,999.52	7,998.52	16.06	21.07	70.08	47.30	-1,019.56	991.53	954.40	37.13	26.707	
8,100.00	8,098.45	8,099.45	8,098.45	16.14	21.33	70.29	47.30	-1,019.56	990.21	952.75	37.47	26.429	
8,200.00	8,198.37	8,199.37	8,198.37	16.22	21.60	70.50	47.30	-1,019.56	988.91	951.10	37.81	26.153	
8,289.90	8,288.21	8,276.54	8,275.54	16.30	21.74	70.65	47.22	-1,020.06	988.33	950.30	38.03	25.990 CC	
8,300.00	8,298.30	8,285.20	8,284.20	16.30	21.75	70.67	47.20	-1,020.18	988.34	950.28	38.05	25.974 ES	
8,400.00	8,398.22	8,370.96	8,369.93	16.39	21.84	70.82	46.90	-1,022.08	989.20	950.97	38.23	25.873	
8,500.00	8,498.15	8,456.70	8,455.61	16.49	21.93	70.95	46.40	-1,025.24	991.52	953.11	38.41	25.815	
8,600.00	8,598.07	8,542.38	8,541.18	16.58	22.01	71.05	45.70	-1,029.66	995.26	956.67	38.59	25.792	
8,700.00	8,698.00	8,627.97	8,626.57	16.68	22.10	71.14	44.80	-1,035.34	1,000.44	961.67	38.77	25.802	
8,800.00	8,797.92	8,716.27	8,714.57	16.78	22.19	71.20	43.67	-1,042.48	1,007.02	968.06	38.97	25.843	
8,900.00	8,897.85	8,816.01	8,813.94	16.89	22.29	71.27	42.33	-1,051.01	1,014.06	974.88	39.18	25.883	
9,000.00	8,997.77	8,915.76	8,913.31	17.00	22.40	71.33	40.98	-1,059.53	1,021.10	981.71	39.40	25.918	
9,100.00	9,097.70	9,015.50	9,012.68	17.12	22.51	71.39	39.63	-1,068.06	1,028.15	988.52	39.62	25.949	
9,200.00	9,197.62	9,115.25	9,112.06	17.23	22.63	71.45	38.28	-1,076.59	1,035.19	995.34	39.85	25.976	
9,300.00	9,297.55	9,214.99	9,211.43	17.36	22.74	71.52	36.93	-1,085.12	1,042.23	1,002.15	40.09	25.999	
9,400.00	9,397.48	9,314.74	9,310.80	17.48	22.86	71.58	35.58	-1,093.64	1,049.28	1,008.95	40.33	26.018	
9,500.00	9,497.40	9,414.49	9,410.17	17.61	22.99	71.63	34.23	-1,102.17	1,056.33	1,015.75	40.58	26.033	
9,600.00	9,597.33	9,514.23	9,509.54	17.74	23.11	71.69	32.88	-1,110.70	1,063.37	1,022.54	40.83	26.044	
9,700.00	9,697.25	9,613.98	9,608.91	17.87	23.24	71.75	31.53	-1,119.22	1,070.42	1,029.33	41.09	26.052	
9,800.00	9,797.18	9,713.72	9,708.28	18.01	23.37	71.81	30.18	-1,127.75	1,077.47	1,036.12	41.35	26.057	
9,900.00	9,897.10	9,813.47	9,807.65	18.15	23.50	71.86	28.84	-1,136.28	1,084.52	1,042.90	41.62	26.058	
10,000.00	9,997.03	9,913.21	9,907.03	18.29	23.63	71.92	27.49	-1,144.80	1,091.57	1,049.68	41.89	26.055	
10,100.00	10,096.95	10,012.96	10,006.40	18.43	23.77	71.97	26.14	-1,153.33	1,098.63	1,056.45	42.17	26.050	
10,200.00	10,196.88	10,100.00	10,093.10	18.58	23.85	72.09	26.24	-1,160.78	1,105.96	1,063.55	42.42	26.074	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 202 H - OH - Plan 1 08-29-17												Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 10073-MWD+HDGM												Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
10,300.00	10,296.82	10,170.30	10,162.45	18.73	23.86	72.71	35.57	-1,166.81	1,115.70	1,073.13	42.57	26.207	
10,400.00	10,396.81	10,236.62	10,225.95	18.88	23.87	73.75	53.65	-1,172.41	1,128.83	1,086.10	42.74	26.414	
10,500.00	10,496.81	10,300.00	10,283.75	19.08	23.89	-78.28	79.03	-1,177.57	1,145.74	1,102.79	42.95	26.677	
10,600.00	10,596.81	10,350.00	10,326.68	19.29	23.91	-77.07	104.33	-1,181.45	1,166.66	1,123.48	43.18	27.021	
10,700.00	10,696.81	10,400.00	10,366.73	19.38	23.93	-74.88	134.00	-1,185.12	1,192.10	1,148.80	43.30	27.533	
10,800.00	10,795.83	10,441.71	10,397.62	19.39	23.95	-70.62	161.86	-1,187.99	1,218.91	1,175.67	43.25	28.186	
10,900.00	10,890.06	10,486.82	10,428.16	19.41	24.00	-66.88	194.91	-1,190.87	1,243.56	1,200.57	42.99	28.926	
11,000.00	10,975.38	10,532.38	10,455.71	19.47	24.07	-63.88	231.07	-1,193.52	1,264.54	1,222.04	42.50	29.752	
11,100.00	11,048.06	10,575.00	10,478.27	19.57	24.14	-61.72	267.15	-1,195.74	1,280.70	1,238.82	41.88	30.581	
11,200.00	11,104.94	10,625.00	10,500.52	19.75	24.24	-60.36	311.84	-1,197.99	1,291.18	1,249.83	41.34	31.231	
11,300.00	11,143.51	10,675.00	10,518.00	20.03	24.37	-59.89	358.63	-1,199.86	1,295.53	1,254.37	41.15	31.481	
11,400.00	11,162.11	10,716.59	10,528.75	20.42	24.49	-60.25	398.77	-1,201.09	1,293.52	1,252.05	41.46	31.197	
11,500.00	11,162.83	10,762.88	10,536.58	20.90	24.64	-60.88	444.37	-1,202.12	1,286.76	1,244.61	42.16	30.524	
11,600.00	11,161.22	10,810.23	10,540.00	21.47	24.82	-61.05	491.57	-1,202.77	1,283.01	1,240.16	42.85	29.943	
11,700.00	11,159.62	10,893.65	10,539.51	22.12	25.17	-61.08	574.98	-1,203.38	1,282.39	1,238.64	43.75	29.314	
11,800.00	11,158.01	10,993.65	10,538.63	22.85	25.66	-61.11	674.97	-1,204.08	1,281.97	1,237.14	44.84	28.592	
11,900.00	11,156.40	11,093.65	10,537.76	23.64	26.22	-61.14	774.96	-1,204.77	1,281.56	1,235.51	46.05	27.829	
12,000.00	11,154.80	11,193.64	10,536.89	24.49	26.85	-61.16	874.96	-1,205.47	1,281.14	1,233.76	47.38	27.038	
12,100.00	11,153.19	11,293.64	10,536.02	25.40	27.54	-61.19	974.95	-1,206.17	1,280.73	1,231.91	48.82	26.232	
12,200.00	11,151.59	11,393.64	10,535.14	26.35	28.28	-61.22	1,074.94	-1,206.87	1,280.32	1,229.96	50.36	25.424	
12,300.00	11,149.98	11,493.63	10,534.27	27.35	29.08	-61.25	1,174.93	-1,207.57	1,279.90	1,227.92	51.99	24.621	
12,400.00	11,148.38	11,593.63	10,533.40	28.38	29.93	-61.27	1,274.92	-1,208.26	1,279.49	1,225.80	53.69	23.830	
12,500.00	11,146.77	11,693.63	10,532.53	29.45	30.82	-61.30	1,374.91	-1,208.96	1,279.08	1,223.60	55.47	23.057	
12,600.00	11,145.16	11,793.63	10,531.65	30.55	31.75	-61.33	1,474.90	-1,209.66	1,278.66	1,221.34	57.32	22.306	
12,700.00	11,142.92	11,893.62	10,530.78	31.68	32.72	-61.38	1,574.89	-1,210.36	1,277.95	1,218.70	59.25	21.570	
12,800.00	11,140.51	11,993.60	10,529.91	32.83	33.72	-61.44	1,674.87	-1,211.06	1,277.15	1,215.92	61.22	20.860	
12,900.00	11,138.09	12,093.59	10,529.04	34.01	34.76	-61.50	1,774.85	-1,211.75	1,276.35	1,213.09	63.25	20.178	
13,000.00	11,135.67	12,193.58	10,528.16	35.20	35.82	-61.56	1,874.83	-1,212.45	1,275.55	1,210.22	65.33	19.524	
13,100.00	11,133.25	12,293.57	10,527.29	36.42	36.91	-61.62	1,974.81	-1,213.15	1,274.75	1,207.30	67.45	18.899	
13,200.00	11,131.74	12,393.57	10,526.42	37.65	38.02	-61.64	2,074.80	-1,213.85	1,274.38	1,204.80	69.58	18.314	
13,300.00	11,130.58	12,493.56	10,525.54	38.89	39.16	-61.65	2,174.80	-1,214.55	1,274.19	1,202.43	71.76	17.757	
13,400.00	11,129.43	12,593.56	10,524.67	40.15	40.31	-61.66	2,274.79	-1,215.24	1,273.99	1,200.03	73.96	17.225	
13,500.00	11,128.28	12,693.56	10,523.80	41.42	41.49	-61.67	2,374.78	-1,215.94	1,273.80	1,197.60	76.20	16.717	
13,600.00	11,127.12	12,793.56	10,522.93	42.70	42.67	-61.68	2,474.78	-1,216.64	1,273.60	1,195.15	78.46	16.233	
13,700.00	11,125.17	12,893.56	10,522.05	43.99	43.88	-61.72	2,574.76	-1,217.34	1,273.03	1,192.27	80.76	15.763	
13,800.00	11,122.94	12,993.55	10,521.18	45.29	45.10	-61.78	2,674.75	-1,218.04	1,272.33	1,189.24	83.09	15.313	
13,900.00	11,120.71	13,093.54	10,520.31	46.60	46.33	-61.83	2,774.73	-1,218.73	1,271.62	1,186.18	85.44	14.883	
14,000.00	11,118.47	13,193.53	10,519.44	47.92	47.57	-61.88	2,874.72	-1,219.43	1,270.92	1,183.11	87.81	14.474	
14,100.00	11,116.24	13,293.52	10,518.56	49.25	48.83	-61.93	2,974.70	-1,220.13	1,270.22	1,180.02	90.20	14.082	
14,200.00	11,114.21	13,393.51	10,517.69	50.58	50.09	-61.98	3,074.69	-1,220.83	1,269.61	1,177.01	92.60	13.711	
14,300.00	11,112.21	13,493.51	10,516.82	51.92	51.37	-62.02	3,174.68	-1,221.53	1,269.02	1,174.01	95.02	13.356	
14,400.00	11,110.21	13,593.50	10,515.95	53.26	52.65	-62.06	3,274.66	-1,222.22	1,268.43	1,170.98	97.45	13.017	
14,500.00	11,108.22	13,693.49	10,515.07	54.61	53.94	-62.11	3,374.65	-1,222.92	1,267.84	1,167.95	99.89	12.692	
14,600.00	11,106.22	13,793.49	10,514.20	55.96	55.24	-62.15	3,474.64	-1,223.62	1,267.26	1,164.90	102.35	12.381	
14,700.00	11,104.39	13,893.48	10,513.33	57.32	56.55	-62.19	3,574.63	-1,224.32	1,266.75	1,161.93	104.82	12.085	
14,800.00	11,102.59	13,993.48	10,512.46	58.68	57.86	-62.22	3,674.62	-1,225.02	1,266.26	1,158.96	107.30	11.802	
14,900.00	11,100.80	14,093.47	10,511.58	60.05	59.18	-62.26	3,774.61	-1,225.72	1,265.76	1,155.98	109.78	11.530	
15,000.00	11,099.00	14,193.47	10,510.71	61.42	60.51	-62.29	3,874.60	-1,226.41	1,265.27	1,152.99	112.28	11.269	
15,100.00	11,097.20	14,293.47	10,509.84	62.79	61.84	-62.33	3,974.59	-1,227.11	1,264.78	1,149.99	114.79	11.018	
15,200.00	11,094.91	14,393.46	10,508.97	64.16	63.17	-62.39	4,074.57	-1,227.81	1,264.06	1,146.74	117.32	10.774	
15,300.00	11,092.50	14,493.44	10,508.09	65.54	64.51	-62.45	4,174.55	-1,228.51	1,263.29	1,143.42	119.87	10.539	
15,400.00	11,090.09	14,593.43	10,507.22	66.93	65.86	-62.51	4,274.53	-1,229.21	1,262.51	1,140.10	122.42	10.313	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 202 H - OH - Plan 1 08-29-17													Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 10073-MWD+HDGM													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (")	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
15,500.00	11,087.68	14,693.42	10,506.35	68.31	67.20	-62.57	4,374.51	-1,229.90	1,261.74	1,136.77	124.98	10.096		
15,600.00	11,085.27	14,793.41	10,505.48	69.70	68.56	-62.63	4,474.50	-1,230.60	1,260.97	1,133.43	127.54	9.887		
15,700.00	11,082.55	14,893.39	10,504.60	71.09	69.91	-62.70	4,574.47	-1,231.30	1,260.06	1,129.93	130.13	9.683		
15,800.00	11,079.76	14,993.37	10,503.73	72.48	71.27	-62.78	4,674.45	-1,232.00	1,259.12	1,126.40	132.73	9.487		
15,899.05	11,077.00	15,092.40	10,502.87	73.86	72.62	-62.85	4,773.47	-1,232.69	1,258.19	1,122.89	135.30	9.299 SF		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 203H - OH - Plan 1 09-05-17												Offset Site Error: 0.00 usft
Survey Program: 0-NS-GYRO-MS, 10044-MWD+HDGM												Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Distance						Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	
0.00	0.00	0.00	0.00	0.00	0.00	-0.80	55.04	-0.77	55.05			
100.00	100.00	100.00	100.00	0.10	0.10	-0.80	55.04	-0.77	55.05	54.85	0.20	280.236
200.00	200.00	200.00	200.00	0.36	0.36	-0.80	55.04	-0.77	55.05	54.32	0.73	75.684
300.00	300.00	300.00	300.00	0.63	0.63	-0.80	55.04	-0.77	55.05	53.79	1.26	43.750
400.00	400.00	400.00	400.00	0.89	0.89	-0.80	55.04	-0.77	55.05	53.26	1.79	30.768
500.00	500.00	500.00	500.00	1.16	1.16	-0.80	55.04	-0.77	55.05	52.73	2.32	23.727
600.00	600.00	600.00	600.00	1.43	1.43	-0.80	55.04	-0.77	55.05	52.20	2.85	19.309
700.00	700.00	700.00	700.00	1.69	1.69	-0.80	55.04	-0.77	55.05	51.67	3.38	16.277
800.00	800.00	800.00	800.00	1.96	1.96	-0.80	55.04	-0.77	55.05	51.13	3.91	14.069
900.00	900.00	900.00	900.00	2.22	2.22	-0.80	55.04	-0.77	55.05	50.60	4.44	12.388
1,000.00	1,000.00	1,000.00	1,000.00	2.49	2.49	-0.80	55.04	-0.77	55.05	50.07	4.97	11.066
1,100.00	1,100.00	1,100.00	1,100.00	2.75	2.75	-0.80	55.04	-0.77	55.05	49.54	5.51	9.999
1,200.00	1,200.00	1,200.00	1,200.00	3.02	3.02	-0.80	55.04	-0.77	55.05	49.01	6.04	9.119
1,300.00	1,300.00	1,300.00	1,300.00	3.28	3.28	-0.80	55.04	-0.77	55.05	48.48	6.57	8.382
1,400.00	1,400.00	1,400.00	1,400.00	3.55	3.55	-0.80	55.04	-0.77	55.05	47.95	7.10	7.755
1,500.00	1,500.00	1,500.00	1,500.00	3.81	3.81	-0.80	55.04	-0.77	55.05	47.42	7.63	7.216
1,600.00	1,600.00	1,600.00	1,600.00	4.08	4.08	-0.80	55.04	-0.77	55.05	46.89	8.16	6.746
1,700.00	1,700.00	1,700.00	1,700.00	4.35	4.35	-0.80	55.04	-0.77	55.05	46.36	8.69	6.334
1,800.00	1,800.00	1,800.00	1,800.00	4.61	4.61	-0.80	55.04	-0.77	55.05	45.83	9.22	5.969
1,900.00	1,900.00	1,900.00	1,900.00	4.88	4.88	-0.80	55.04	-0.77	55.05	45.29	9.75	5.644
2,000.00	2,000.00	2,000.00	2,000.00	5.14	5.14	-0.80	55.04	-0.77	55.05	44.76	10.28	5.353
2,100.00	2,100.00	2,100.00	2,100.00	5.41	5.41	-0.80	55.04	-0.77	55.05	44.23	10.81	5.090
2,200.00	2,200.00	2,200.00	2,200.00	5.67	5.67	-0.80	55.04	-0.77	55.05	43.70	11.35	4.852
2,300.00	2,300.00	2,300.00	2,300.00	5.94	5.94	-0.80	55.04	-0.77	55.05	43.17	11.88	4.635
2,400.00	2,400.00	2,400.00	2,400.00	6.20	6.20	-0.80	55.04	-0.77	55.05	42.64	12.41	4.437
2,500.00	2,500.00	2,500.00	2,500.00	6.47	6.47	-0.80	55.04	-0.77	55.05	42.11	12.94	4.255
2,600.00	2,600.00	2,600.00	2,600.00	6.73	6.73	-0.80	55.04	-0.77	55.05	41.58	13.47	4.087
2,700.00	2,700.00	2,700.00	2,700.00	7.00	7.00	-0.80	55.04	-0.77	55.05	41.05	14.00	3.932
2,800.00	2,800.00	2,800.00	2,800.00	7.27	7.27	-0.80	55.04	-0.77	55.05	40.52	14.53	3.788
2,900.00	2,900.00	2,900.00	2,900.00	7.53	7.53	-0.80	55.04	-0.77	55.05	39.99	15.06	3.655
3,000.00	3,000.00	3,000.00	3,000.00	7.80	7.80	-0.80	55.04	-0.77	55.05	39.45	15.59	3.530
3,100.00	3,100.00	3,100.00	3,100.00	8.06	8.06	-0.80	55.04	-0.77	55.05	38.92	16.12	3.414
3,200.00	3,200.00	3,200.00	3,200.00	8.33	8.33	-0.80	55.04	-0.77	55.05	38.39	16.65	3.305
3,300.00	3,300.00	3,300.00	3,300.00	8.59	8.59	-0.80	55.04	-0.77	55.05	37.86	17.18	3.203
3,400.00	3,400.00	3,400.00	3,400.00	8.86	8.86	-0.80	55.04	-0.77	55.05	37.33	17.72	3.107
3,500.00	3,500.00	3,500.00	3,500.00	9.12	9.12	-0.80	55.04	-0.77	55.05	36.80	18.25	3.017
3,600.00	3,600.00	3,600.00	3,600.00	9.39	9.39	-0.80	55.04	-0.77	55.05	36.27	18.78	2.932
3,700.00	3,700.00	3,700.00	3,700.00	9.65	9.65	-0.80	55.04	-0.77	55.05	35.74	19.31	2.851
3,800.00	3,800.00	3,800.00	3,800.00	9.92	9.92	-0.80	55.04	-0.77	55.05	35.21	19.84	2.775
3,900.00	3,900.00	3,900.00	3,900.00	10.19	10.19	-0.80	55.04	-0.77	55.05	34.68	20.37	2.702
4,000.00	4,000.00	4,000.00	4,000.00	10.45	10.45	-0.80	55.04	-0.77	55.05	34.15	20.90	2.634
4,100.00	4,100.00	4,100.00	4,100.00	10.72	10.72	-0.80	55.04	-0.77	55.05	33.61	21.43	2.568
4,200.00	4,200.00	4,200.00	4,200.00	10.98	10.98	-0.80	55.04	-0.77	55.05	33.08	21.96	2.506
4,300.00	4,300.00	4,300.00	4,300.00	11.25	11.25	-0.80	55.04	-0.77	55.05	32.55	22.49	2.447
4,400.00	4,400.00	4,400.00	4,400.00	11.51	11.51	-0.80	55.04	-0.77	55.05	32.02	23.02	2.391
4,500.00	4,500.00	4,500.00	4,500.00	11.78	11.78	-0.80	55.04	-0.77	55.05	31.49	23.56	2.337
4,600.00	4,600.00	4,600.00	4,600.00	12.04	12.04	-0.80	55.04	-0.77	55.05	30.96	24.09	2.285
4,700.00	4,700.00	4,700.00	4,700.00	12.31	12.31	-0.80	55.04	-0.77	55.05	30.43	24.62	2.236
4,800.00	4,800.00	4,800.00	4,800.00	12.57	12.57	-0.80	55.04	-0.77	55.05	29.90	25.15	2.189
4,900.00	4,900.00	4,900.00	4,900.00	12.84	12.84	-0.80	55.04	-0.77	55.05	29.37	25.68	2.144
5,000.00	5,000.00	5,000.00	5,000.00	13.11	13.11	-0.80	55.04	-0.77	55.05	28.84	26.21	2.100
5,100.00	5,100.00	5,100.00	5,100.00	13.37	13.37	-0.80	55.04	-0.77	55.05	28.31	26.74	2.059

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 203H - OH - Plan 1 09-05-17													Offset Site Error: 0.00 usft
Survey Program: 0-NS-GYRO-MS, 10044-MWD+HDGM													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
5,200.00	5,200.00	5,200.00	5,200.00	13.64	13.64	-0.80	55.04	-0.77	55.05	27.78	27.27	2.018	
5,300.00	5,300.00	5,300.00	5,300.00	13.90	13.90	-0.80	55.04	-0.77	55.05	27.24	27.80	1.980	
5,400.00	5,400.00	5,400.00	5,400.00	14.17	14.17	-0.80	55.04	-0.77	55.05	26.71	28.33	1.943	
5,500.00	5,500.00	5,500.00	5,500.00	14.43	14.43	-0.80	55.04	-0.77	55.05	26.18	28.86	1.907	
5,600.00	5,600.00	5,600.00	5,600.00	14.70	14.70	-0.80	55.04	-0.77	55.05	25.65	29.40	1.873	
5,700.00	5,700.00	5,700.00	5,700.00	14.96	14.96	-0.80	55.04	-0.77	55.05	25.12	29.93	1.839	
5,800.00	5,800.00	5,800.00	5,800.00	15.23	15.23	-0.80	55.04	-0.77	55.05	24.59	30.46	1.807	CC
5,858.33	5,858.33	5,858.33	5,858.33	15.37	15.38	152.53	55.04	-0.77	55.10	24.35	30.75	1.792	
5,900.00	5,900.00	5,900.00	5,900.00	15.47	15.49	152.52	55.04	-0.77	55.08	24.12	30.96	1.779	ES, SF
6,000.00	5,999.99	5,999.99	5,999.99	15.45	15.76	153.09	55.04	-0.77	56.16	24.96	31.20	1.800	
6,100.00	6,099.95	6,099.95	6,099.95	15.44	16.02	154.38	55.04	-0.77	58.83	27.38	31.44	1.871	
6,200.00	6,199.87	6,199.87	6,199.87	15.43	16.29	155.92	55.04	-0.77	62.34	30.64	31.70	1.967	
6,300.00	6,299.80	6,299.80	6,299.80	15.42	16.56	157.29	55.04	-0.77	65.89	33.93	31.96	2.062	
6,400.00	6,399.72	6,399.72	6,399.72	15.43	16.82	158.52	55.04	-0.77	69.47	37.25	32.23	2.156	
6,500.00	6,499.65	6,499.65	6,499.65	15.43	17.09	159.63	55.04	-0.77	73.09	40.59	32.50	2.249	
6,600.00	6,599.57	6,599.57	6,599.57	15.44	17.35	160.64	55.04	-0.77	76.73	43.96	32.77	2.341	
6,700.00	6,699.50	6,699.50	6,699.50	15.46	17.62	161.55	55.04	-0.77	80.39	47.34	33.05	2.432	
6,800.00	6,799.42	6,799.42	6,799.42	15.48	17.88	162.39	55.04	-0.77	84.07	50.73	33.33	2.522	
6,900.00	6,899.35	6,899.35	6,899.35	15.50	18.15	163.15	55.04	-0.77	87.76	54.14	33.62	2.610	
7,000.00	6,999.27	6,999.27	6,999.27	15.53	18.41	163.86	55.04	-0.77	91.47	57.56	33.92	2.697	
7,100.00	7,099.20	7,099.20	7,099.20	15.56	18.68	164.50	55.04	-0.77	95.20	60.98	34.21	2.782	
7,200.00	7,199.12	7,199.12	7,199.12	15.60	18.94	165.10	55.04	-0.77	98.93	64.41	34.52	2.866	
7,300.00	7,299.05	7,299.05	7,299.05	15.64	19.21	165.66	55.04	-0.77	102.68	67.85	34.82	2.948	
7,400.00	7,398.97	7,398.97	7,398.97	15.69	19.47	166.17	55.04	-0.77	106.43	71.29	35.13	3.029	
7,500.00	7,498.90	7,498.90	7,498.90	15.74	19.74	166.65	55.04	-0.77	110.19	74.74	35.45	3.108	
7,600.00	7,598.82	7,598.82	7,598.82	15.80	20.00	167.10	55.04	-0.77	113.96	78.19	35.77	3.186	
7,700.00	7,698.75	7,698.75	7,698.75	15.86	20.27	167.52	55.04	-0.77	117.73	81.64	36.09	3.262	
7,800.00	7,798.67	7,798.67	7,798.67	15.92	20.53	167.92	55.04	-0.77	121.51	85.09	36.42	3.336	
7,900.00	7,898.60	7,898.60	7,898.60	15.99	20.80	168.29	55.04	-0.77	125.30	88.54	36.75	3.409	
8,000.00	7,998.52	7,998.52	7,998.52	16.06	21.06	168.64	55.04	-0.77	129.09	92.00	37.09	3.480	
8,100.00	8,098.45	8,098.45	8,098.45	16.14	21.33	168.96	55.04	-0.77	132.89	95.45	37.43	3.550	
8,200.00	8,198.37	8,198.37	8,198.37	16.22	21.60	169.27	55.04	-0.77	136.69	98.91	37.78	3.618	
8,300.00	8,298.30	8,298.30	8,298.30	16.30	21.86	169.57	55.04	-0.77	140.49	102.36	38.13	3.685	
8,400.00	8,398.22	8,398.22	8,398.22	16.39	22.13	169.85	55.04	-0.77	144.30	105.82	38.48	3.750	
8,500.00	8,498.15	8,498.15	8,498.15	16.49	22.39	170.11	55.04	-0.77	148.11	109.27	38.83	3.814	
8,600.00	8,598.07	8,598.07	8,598.07	16.58	22.66	170.36	55.04	-0.77	151.92	112.72	39.19	3.876	
8,700.00	8,698.00	8,698.00	8,698.00	16.68	22.92	170.60	55.04	-0.77	155.73	116.18	39.56	3.937	
8,800.00	8,797.92	8,797.92	8,797.92	16.78	23.19	170.83	55.04	-0.77	159.55	119.63	39.93	3.996	
8,900.00	8,897.85	8,897.85	8,897.85	16.89	23.45	171.04	55.04	-0.77	163.37	123.08	40.30	4.054	
9,000.00	8,997.77	8,997.77	8,997.77	17.00	23.72	171.25	55.04	-0.77	167.20	126.53	40.67	4.111	
9,100.00	9,097.70	9,097.70	9,097.70	17.12	23.98	171.45	55.04	-0.77	171.02	129.97	41.05	4.166	
9,200.00	9,197.62	9,197.62	9,197.62	17.23	24.25	171.63	55.04	-0.77	174.85	133.42	41.43	4.220	
9,300.00	9,297.55	9,297.55	9,297.55	17.36	24.51	171.82	55.04	-0.77	178.68	136.86	41.82	4.273	
9,400.00	9,397.48	9,397.48	9,397.48	17.48	24.78	171.99	55.04	-0.77	182.51	140.31	42.20	4.324	
9,500.00	9,497.40	9,497.40	9,497.40	17.61	25.04	172.15	55.04	-0.77	186.34	143.75	42.60	4.375	
9,600.00	9,597.33	9,597.33	9,597.33	17.74	25.31	172.31	55.04	-0.77	190.17	147.19	42.99	4.424	
9,700.00	9,697.25	9,697.25	9,697.25	17.87	25.57	172.47	55.04	-0.77	194.01	150.62	43.39	4.472	
9,800.00	9,797.18	9,797.18	9,797.18	18.01	25.84	172.61	55.04	-0.77	197.85	154.06	43.79	4.518	
9,900.00	9,897.10	9,897.10	9,897.10	18.15	26.10	172.75	55.04	-0.77	201.68	157.49	44.19	4.564	
10,000.00	9,997.03	9,997.03	9,997.03	18.29	26.37	172.89	55.04	-0.77	205.52	160.93	44.60	4.609	
10,100.00	10,096.95	10,096.95	10,096.95	18.43	26.50	173.04	56.33	-0.17	211.40	166.52	44.88	4.710	
10,200.00	10,196.88	10,196.88	10,196.88	18.58	26.51	173.36	65.67	4.16	229.89	184.86	45.03	5.105	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 203H - OH - Plan 1 09-05-17													Offset Site Error: 0.00 usft
Survey Program: 0-NS-GYRO-MS, 10044-MWD+HDGM													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
10,300.00	10,296.82	10,211.02	10,207.64	18.73	26.52	173.78	81.27	11.41	260.91	215.70	45.21	5.771	
10,400.00	10,396.81	10,268.43	10,260.26	18.88	26.54	174.22	102.01	21.03	302.07	256.69	45.38	6.657	
10,500.00	10,496.81	10,325.00	10,309.06	19.08	26.56	21.32	127.90	33.05	352.23	306.64	45.59	7.726	
10,600.00	10,596.81	10,364.97	10,341.34	19.29	26.57	21.58	149.27	42.97	410.67	364.85	45.81	8.964	
10,700.00	10,696.81	10,400.00	10,367.92	19.38	26.59	21.80	169.95	52.57	476.06	430.15	45.91	10.370	
10,800.00	10,795.83	10,443.87	10,398.82	19.39	26.63	18.99	198.33	65.35	538.39	493.25	45.14	11.927	
10,900.00	10,890.06	10,486.15	10,426.16	19.41	26.68	17.31	228.43	76.85	590.76	547.49	43.27	13.654	
11,000.00	10,975.38	10,525.00	10,449.05	19.47	26.73	16.27	258.31	86.45	632.35	591.85	40.50	15.613	
11,100.00	11,048.06	10,575.00	10,475.08	19.57	26.81	15.90	299.55	97.35	662.47	625.22	37.25	17.783	
11,200.00	11,104.94	10,625.00	10,497.01	19.75	26.91	15.93	343.52	106.51	680.82	646.75	34.06	19.987	
11,300.00	11,143.51	10,665.81	10,511.69	20.03	27.01	16.23	381.09	112.61	686.96	655.34	31.63	21.721	
11,400.00	11,162.11	10,712.33	10,524.76	20.42	27.13	17.01	425.39	118.00	680.94	650.19	30.75	22.145	
11,500.00	11,162.83	10,759.28	10,533.86	20.90	27.26	17.82	471.28	121.71	665.54	634.30	31.24	21.306	
11,600.00	11,161.22	10,807.71	10,538.86	21.47	27.42	18.17	519.39	123.67	655.64	623.98	31.66	20.708	
11,700.00	11,159.62	10,872.61	10,539.41	22.12	27.65	18.26	584.27	123.69	653.11	621.00	32.11	20.339	
11,800.00	11,158.01	10,972.60	10,538.54	22.85	28.06	18.28	684.26	122.99	652.43	619.73	32.70	19.951	
11,900.00	11,156.40	11,072.60	10,537.67	23.64	28.54	18.31	784.25	122.29	651.76	618.39	33.37	19.531	
12,000.00	11,154.80	11,172.60	10,536.80	24.49	29.09	18.34	884.24	121.58	651.08	616.96	34.12	19.084	
12,100.00	11,153.19	11,272.60	10,535.93	25.40	29.69	18.36	984.23	120.88	650.40	615.47	34.93	18.619	
12,200.00	11,151.59	11,372.59	10,535.06	26.35	30.35	18.39	1,084.22	120.18	649.72	613.90	35.82	18.138	
12,300.00	11,149.98	11,472.59	10,534.19	27.35	31.07	18.41	1,184.22	119.48	649.05	612.28	36.77	17.651	
12,400.00	11,148.38	11,572.59	10,533.32	28.38	31.83	18.44	1,284.21	118.78	648.37	610.59	37.78	17.163	
12,500.00	11,146.77	11,672.58	10,532.45	29.45	32.64	18.47	1,384.20	118.08	647.69	608.85	38.84	16.676	
12,600.00	11,145.16	11,772.58	10,531.58	30.55	33.50	18.49	1,484.19	117.38	647.02	607.07	39.95	16.196	
12,700.00	11,142.92	11,872.57	10,530.71	31.68	34.39	18.54	1,584.17	116.68	645.74	604.60	41.14	15.696	
12,800.00	11,140.51	11,972.56	10,529.84	32.83	35.32	18.59	1,684.15	115.98	644.29	601.94	42.35	15.214	
12,900.00	11,138.09	12,072.55	10,528.97	34.01	36.28	18.64	1,784.14	115.28	642.84	599.25	43.60	14.746	
13,000.00	11,135.67	12,172.54	10,528.10	35.20	37.28	18.69	1,884.12	114.58	641.40	596.52	44.88	14.292	
13,100.00	11,133.25	12,272.52	10,527.23	36.42	38.30	18.74	1,984.10	113.88	639.95	593.76	46.20	13.853	
13,200.00	11,131.74	12,372.52	10,526.36	37.65	39.35	18.76	2,084.09	113.18	639.37	591.88	47.49	13.464	
13,300.00	11,130.58	12,472.52	10,525.49	38.89	40.42	18.77	2,184.08	112.48	639.12	590.27	48.85	13.084	
13,400.00	11,129.43	12,572.52	10,524.62	40.15	41.52	18.79	2,284.08	111.78	638.87	588.64	50.23	12.718	
13,500.00	11,128.28	12,672.52	10,523.75	41.42	42.64	18.80	2,384.07	111.08	638.62	586.98	51.64	12.366	
13,600.00	11,127.12	12,772.52	10,522.89	42.70	43.77	18.82	2,484.06	110.38	638.38	585.30	53.07	12.028	
13,700.00	11,125.17	12,872.51	10,522.02	43.99	44.93	18.85	2,584.05	109.68	637.37	582.80	54.57	11.679	
13,800.00	11,122.94	12,972.50	10,521.15	45.29	46.10	18.90	2,684.03	108.98	636.10	580.04	56.06	11.347	
13,900.00	11,120.71	13,072.49	10,520.28	46.60	47.28	18.95	2,784.02	108.28	634.84	577.27	57.56	11.028	
14,000.00	11,118.47	13,172.48	10,519.41	47.92	48.48	18.99	2,884.00	107.58	633.57	574.49	59.09	10.723	
14,100.00	11,116.24	13,272.47	10,518.54	49.25	49.70	19.04	2,983.99	106.88	632.30	571.68	60.62	10.430	
14,200.00	11,114.21	13,372.47	10,517.67	50.58	50.92	19.08	3,083.98	106.18	631.23	569.07	62.16	10.155	
14,300.00	11,112.21	13,472.46	10,516.80	51.92	52.16	19.12	3,183.96	105.48	630.18	566.46	63.72	9.890	
14,400.00	11,110.21	13,572.46	10,515.93	53.26	53.41	19.16	3,283.95	104.78	629.14	563.84	65.30	9.635	
14,500.00	11,108.22	13,672.45	10,515.06	54.61	54.66	19.20	3,383.94	104.08	628.10	561.21	66.88	9.391	
14,600.00	11,106.22	13,772.44	10,514.19	55.96	55.93	19.23	3,483.92	103.38	627.05	558.57	68.48	9.157	
14,700.00	11,104.39	13,872.44	10,513.32	57.32	57.20	19.27	3,583.91	102.67	626.17	556.10	70.08	8.936	
14,800.00	11,102.59	13,972.43	10,512.45	58.68	58.49	19.30	3,683.90	101.97	625.32	553.63	71.69	8.723	
14,900.00	11,100.80	14,072.43	10,511.58	60.05	59.78	19.34	3,783.89	101.27	624.46	551.15	73.31	8.518	
15,000.00	11,099.00	14,172.42	10,510.71	61.42	61.07	19.37	3,883.88	100.57	623.61	548.67	74.94	8.321	
15,100.00	11,097.20	14,272.42	10,509.84	62.79	62.37	19.41	3,983.87	99.87	622.76	546.17	76.58	8.132	
15,200.00	11,094.91	14,372.41	10,508.97	64.16	63.68	19.46	4,083.86	99.17	621.44	543.18	78.26	7.940	
15,300.00	11,092.50	14,472.40	10,508.10	65.54	65.00	19.51	4,183.84	98.47	620.01	540.08	79.94	7.756	
15,400.00	11,090.09	14,572.39	10,507.23	66.93	66.32	19.56	4,283.82	97.77	618.58	536.97	81.61	7.579	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 203H - OH - Plan 1 09-05-17												Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 10044-MWD+HDGM												Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (")	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
15,500.00	11,087.68	14,672.37	10,506.36	68.31	67.65	19.62	4,383.80	97.07	617.15	533.85	83.30	7.409	
15,600.00	11,085.27	14,772.36	10,505.49	69.70	68.98	19.67	4,483.78	96.37	615.73	530.73	84.99	7.244	
15,700.00	11,082.55	14,872.35	10,504.62	71.09	70.31	19.74	4,583.76	95.67	614.00	527.29	86.72	7.080	
15,800.00	11,079.76	14,972.33	10,503.75	72.48	71.65	19.80	4,683.73	94.97	612.22	523.79	88.44	6.923	
15,899.05	11,077.00	15,071.36	10,502.89	73.86	72.98	19.87	4,782.76	94.28	610.46	520.31	90.15	6.772	



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 303H - OH / Job #61822 - Surveys (H&P 482)												Offset Site Error:	0.00 usft
Survey Program: 100-SPT_GTD												Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (")	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	0.00	-1.00	0.00	0.00	-90.43	-7.70	-1,019.60	1,019.63				
100.00	100.00	98.35	97.35	0.10	0.06	-90.43	-7.64	-1,019.73	1,019.76	1,019.60	0.16	6,287.156	
200.00	200.00	200.25	199.25	0.36	0.24	-90.41	-7.27	-1,019.90	1,019.93	1,019.33	0.60	1,689.553	
300.00	300.00	301.13	300.13	0.63	0.42	-90.37	-6.60	-1,019.94	1,019.96	1,018.92	1.05	975.770	
400.00	400.00	402.95	401.94	0.89	0.60	-90.33	-5.89	-1,019.84	1,019.86	1,018.37	1.49	684.910	
500.00	500.00	505.57	504.56	1.16	0.78	-90.31	-5.59	-1,019.49	1,019.52	1,017.58	1.93	527.036	
568.41	568.41	569.41	568.41	1.34	0.89	-90.31	-5.45	-1,019.35	1,019.36	1,017.14	2.23	457.584	
600.00	600.00	600.00	598.99	1.43	0.94	-90.30	-5.28	-1,019.38	1,019.40	1,017.03	2.37	430.986	
700.00	700.00	700.00	698.99	1.69	1.12	-90.26	-4.59	-1,019.41	1,019.42	1,016.61	2.81	363.310	
800.00	800.00	796.99	795.98	1.96	1.29	-90.24	-4.20	-1,019.51	1,019.53	1,016.29	3.24	314.647	
900.00	900.00	894.25	893.24	2.22	1.46	-90.23	-4.09	-1,020.03	1,020.06	1,016.39	3.67	277.622	
1,000.00	1,000.00	994.59	993.57	2.49	1.64	-90.22	-3.93	-1,020.69	1,020.72	1,016.60	4.11	248.097	
1,100.00	1,100.00	1,105.77	1,104.76	2.75	1.83	-90.19	-3.30	-1,020.78	1,020.79	1,016.22	4.57	223.184	
1,200.00	1,200.00	1,204.71	1,203.69	3.02	2.01	-90.16	-2.78	-1,020.37	1,020.38	1,015.36	5.01	203.566	
1,300.00	1,300.00	1,302.10	1,301.07	3.28	2.18	-90.14	-2.52	-1,020.14	1,020.14	1,014.70	5.45	187.230	
1,354.85	1,354.85	1,355.87	1,354.85	3.43	2.27	-90.14	-2.43	-1,020.11	1,020.12	1,014.43	5.69	179.346	
1,400.00	1,400.00	1,400.00	1,398.98	3.55	2.35	-90.14	-2.51	-1,020.13	1,020.13	1,014.25	5.88	173.351	
1,500.00	1,500.00	1,498.38	1,497.36	3.81	2.52	-90.15	-2.68	-1,020.30	1,020.31	1,013.99	6.32	161.414	
1,600.00	1,600.00	1,599.20	1,598.18	4.08	2.69	-90.16	-2.85	-1,020.52	1,020.53	1,013.77	6.76	150.923	
1,700.00	1,700.00	1,707.96	1,706.94	4.35	2.88	-90.16	-2.92	-1,020.21	1,020.24	1,013.02	7.22	141.363	
1,800.00	1,800.00	1,806.88	1,805.86	4.61	3.05	-90.16	-2.85	-1,019.61	1,019.63	1,011.98	7.66	133.186	
1,900.00	1,900.00	1,910.84	1,909.81	4.88	3.23	-90.18	-3.14	-1,018.76	1,018.81	1,010.71	8.10	125.733	
2,000.00	2,000.00	2,005.92	2,004.89	5.14	3.40	-90.20	-3.57	-1,018.11	1,018.13	1,009.59	8.53	119.294	
2,100.00	2,100.00	2,113.82	2,112.78	5.41	3.58	-90.24	-4.27	-1,017.11	1,017.20	1,008.21	8.99	113.164	
2,200.00	2,200.00	2,213.12	2,212.07	5.67	3.76	-90.27	-4.88	-1,015.91	1,015.99	1,006.56	9.43	107.763	
2,300.00	2,300.00	2,314.60	2,313.54	5.94	3.93	-90.29	-5.22	-1,014.61	1,014.71	1,004.84	9.87	102.794	
2,400.00	2,400.00	2,413.95	2,412.89	6.20	4.11	-90.30	-5.35	-1,013.30	1,013.40	1,003.09	10.31	98.282	
2,500.00	2,500.00	2,512.10	2,511.03	6.47	4.28	-90.31	-5.56	-1,012.17	1,012.24	1,001.50	10.75	94.172	
2,600.00	2,600.00	2,614.16	2,613.08	6.73	4.46	-90.32	-5.71	-1,010.93	1,011.03	999.84	11.19	90.323	
2,700.00	2,700.00	2,713.60	2,712.51	7.00	4.63	-90.33	-5.82	-1,009.69	1,009.78	998.15	11.63	86.798	
2,800.00	2,800.00	2,815.21	2,814.11	7.27	4.81	-90.33	-5.79	-1,008.33	1,008.45	996.37	12.08	83.496	
2,900.00	2,900.00	2,913.49	2,912.38	7.53	4.99	-90.34	-5.90	-1,006.99	1,007.08	994.57	12.52	80.463	
3,000.00	3,000.00	3,005.44	3,004.33	7.80	5.15	-90.35	-6.14	-1,006.24	1,006.27	993.33	12.94	77.747	
3,100.00	3,100.00	3,104.25	3,103.14	8.06	5.32	-90.35	-6.18	-1,005.86	1,005.89	992.51	13.38	75.168	
3,139.78	3,139.78	3,141.40	3,140.28	8.17	5.39	-90.35	-6.18	-1,005.80	1,005.82	992.26	13.55	74.218	
3,200.00	3,200.00	3,200.00	3,198.89	8.33	5.49	-90.36	-6.33	-1,005.89	1,005.91	992.10	13.81	72.818	
3,300.00	3,300.00	3,302.91	3,301.79	8.59	5.67	-90.40	-7.00	-1,005.97	1,006.00	991.74	14.26	70.558	
3,400.00	3,400.00	3,401.21	3,400.09	8.86	5.84	-90.46	-8.04	-1,005.87	1,005.90	991.21	14.69	68.457	
3,404.19	3,404.19	3,405.31	3,404.19	8.87	5.84	-90.46	-8.09	-1,005.87	1,005.90	991.19	14.71	68.373	
3,500.00	3,500.00	3,500.00	3,498.87	9.12	6.01	-90.53	-9.36	-1,005.95	1,006.00	990.87	15.13	66.487	
3,600.00	3,600.00	3,591.92	3,590.78	9.39	6.17	-90.59	-10.45	-1,006.46	1,006.55	991.00	15.56	64.707	
3,700.00	3,700.00	3,687.84	3,686.69	9.65	6.33	-90.63	-11.14	-1,007.53	1,007.68	991.70	15.99	63.032	
3,800.00	3,800.00	3,792.47	3,791.32	9.92	6.52	-90.68	-11.95	-1,008.72	1,008.83	992.39	16.43	61.388	
3,900.00	3,900.00	3,893.72	3,892.55	10.19	6.69	-90.76	-13.36	-1,009.50	1,009.61	992.74	16.87	59.829	
4,000.00	4,000.00	3,989.97	3,988.79	10.45	6.86	-90.83	-14.67	-1,010.35	1,010.52	993.21	17.31	58.386	
4,100.00	4,100.00	4,084.69	4,083.50	10.72	7.02	-90.86	-15.15	-1,011.64	1,011.88	994.15	17.74	57.047	
4,200.00	4,200.00	4,184.09	4,182.88	10.98	7.20	-90.84	-14.78	-1,013.33	1,013.58	995.41	18.18	55.765	
4,300.00	4,300.00	4,285.34	4,284.12	11.25	7.37	-90.80	-14.25	-1,014.99	1,015.22	996.60	18.62	54.530	
4,400.00	4,400.00	4,386.59	4,385.35	11.51	7.55	-90.75	-13.27	-1,016.53	1,016.72	997.66	19.06	53.344	
4,500.00	4,500.00	4,492.30	4,491.04	11.78	7.73	-90.69	-12.22	-1,017.79	1,017.91	998.40	19.51	52.175	
4,600.00	4,600.00	4,595.28	4,594.02	12.04	7.91	-90.64	-11.31	-1,018.55	1,018.63	998.67	19.95	51.048	
4,700.00	4,700.00	4,706.07	4,704.81	12.31	8.10	-90.59	-10.43	-1,018.61	1,018.67	998.26	20.41	49.902	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 303H - OH / Job #61822 - Surveys (H&P 482)													Offset Site Error: 0.00 usft
Survey Program: 100-SPT_GTD													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
4,800.00	4,800.00	4,806.46	4,805.19	12.57	8.28	-90.52	-9.21	-1,018.13	1,018.18	997.33	20.85	48.824	
4,900.00	4,900.00	4,906.91	4,905.62	12.84	8.46	-90.43	-7.58	-1,017.61	1,017.66	996.36	21.30	47.788	
5,000.00	5,000.00	5,008.61	5,007.31	13.11	8.63	-90.34	-6.01	-1,016.97	1,017.01	995.27	21.74	46.784	
5,100.00	5,100.00	5,107.79	5,106.48	13.37	8.81	-90.25	-4.44	-1,016.30	1,016.33	994.15	22.18	45.827	
5,200.00	5,200.00	5,207.05	5,205.72	13.64	8.98	-90.16	-2.80	-1,015.72	1,015.73	993.12	22.62	44.911	
5,300.00	5,300.00	5,307.65	5,306.31	13.90	9.16	-90.07	-1.22	-1,015.13	1,015.15	992.09	23.06	44.025	
5,400.00	5,400.00	5,409.03	5,407.67	14.17	9.33	-89.99	0.17	-1,014.41	1,014.44	990.94	23.50	43.165	
5,500.00	5,500.00	5,506.50	5,505.13	14.43	9.51	-89.93	1.26	-1,013.79	1,013.81	989.87	23.94	42.352	
5,600.00	5,600.00	5,602.58	5,601.21	14.70	9.67	-89.88	2.21	-1,013.49	1,013.49	989.12	24.37	41.586	
5,619.38	5,619.38	5,621.03	5,619.66	14.75	9.71	-89.86	2.39	-1,013.47	1,013.48	989.02	24.45	41.443	
5,700.00	5,700.00	5,700.00	5,698.62	14.96	9.84	-89.81	3.31	-1,013.61	1,013.61	988.81	24.81	40.860	
5,800.00	5,800.00	5,805.67	5,804.28	15.23	10.03	-89.72	4.92	-1,013.56	1,013.58	988.32	25.26	40.130	
5,900.00	5,900.00	5,909.00	5,907.60	15.47	10.21	63.66	6.24	-1,012.90	1,012.94	987.26	25.67	39.456	
6,000.00	5,999.99	6,004.00	6,002.59	15.45	10.38	63.79	7.36	-1,012.46	1,011.93	986.11	25.82	39.191	
6,100.00	6,099.95	6,118.90	6,117.48	15.44	10.58	64.02	7.97	-1,011.21	1,009.53	983.53	26.01	38.819	
6,200.00	6,199.87	6,222.95	6,221.51	15.43	10.76	64.21	7.72	-1,009.18	1,005.89	979.71	26.18	38.421	
6,300.00	6,299.80	6,320.44	6,318.97	15.42	10.93	64.35	6.63	-1,007.01	1,001.96	975.62	26.35	38.029	
6,400.00	6,399.72	6,400.00	6,398.51	15.43	11.07	64.43	5.32	-1,006.26	999.34	972.85	26.49	37.728	
6,500.00	6,499.65	6,490.31	6,488.80	15.43	11.23	64.51	3.54	-1,006.77	998.20	971.55	26.65	37.455	
6,600.00	6,599.57	6,592.22	6,590.68	15.44	11.40	64.57	1.05	-1,007.90	997.60	970.76	26.84	37.170	
6,689.17	6,688.67	6,673.70	6,672.13	15.46	11.54	64.61	-1.04	-1,008.95	997.22	970.22	26.99	36.942	
6,700.00	6,699.50	6,683.48	6,681.90	15.46	11.56	64.62	-1.27	-1,009.12	997.22	970.21	27.01	36.917	
6,800.00	6,799.42	6,787.99	6,786.36	15.48	11.74	64.68	-3.72	-1,010.92	997.23	970.02	27.21	36.644	
6,900.00	6,899.35	6,900.00	6,898.34	15.50	11.94	64.75	-6.44	-1,011.67	996.18	968.74	27.43	36.312	
7,000.00	6,999.27	6,991.11	6,989.42	15.53	12.10	64.81	-8.64	-1,012.10	994.95	967.33	27.62	36.021	
7,100.00	7,099.20	7,095.56	7,093.84	15.56	12.28	64.88	-11.05	-1,013.04	994.15	966.31	27.84	35.713	
7,200.00	7,199.12	7,197.68	7,195.93	15.60	12.46	64.95	-13.32	-1,013.54	992.93	964.88	28.05	35.395	
7,300.00	7,299.05	7,284.98	7,283.21	15.64	12.61	65.03	-15.05	-1,014.41	992.24	963.99	28.25	35.126	
7,302.86	7,301.91	7,287.47	7,285.70	15.64	12.61	65.03	-15.09	-1,014.45	992.24	963.98	28.25	35.119	
7,400.00	7,398.97	7,377.52	7,375.73	15.69	12.77	65.16	-16.01	-1,016.31	992.63	964.17	28.46	34.883	
7,500.00	7,498.90	7,488.53	7,486.71	15.74	12.96	65.42	-15.35	-1,018.48	993.00	964.30	28.70	34.599	
7,600.00	7,598.82	7,595.48	7,593.63	15.80	13.15	65.76	-13.11	-1,019.28	992.23	963.29	28.94	34.283	
7,700.00	7,698.75	7,694.81	7,692.94	15.86	13.32	66.09	-10.83	-1,019.71	991.19	962.02	29.18	33.974	
7,800.00	7,798.67	7,793.35	7,791.46	15.92	13.49	66.40	-8.94	-1,020.26	990.29	960.88	29.41	33.670	
7,900.00	7,898.60	7,890.49	7,888.58	15.99	13.66	66.71	-7.10	-1,021.00	989.61	959.97	29.65	33.377	
8,000.00	7,998.52	7,988.45	7,986.51	16.06	13.83	67.02	-5.12	-1,021.97	989.21	959.32	29.89	33.092	
8,100.00	8,098.45	8,088.60	8,086.64	16.14	14.01	67.32	-3.37	-1,023.08	988.93	958.78	30.14	32.807	
8,200.00	8,198.37	8,196.19	8,194.21	16.22	14.20	67.63	-1.79	-1,023.87	988.30	957.88	30.41	32.496	
8,300.00	8,298.30	8,299.53	8,297.54	16.30	14.38	67.93	-0.31	-1,024.01	987.07	956.39	30.68	32.176	
8,400.00	8,398.22	8,394.16	8,392.16	16.39	14.54	68.22	1.30	-1,024.20	985.97	955.04	30.93	31.876	
8,500.00	8,498.15	8,495.78	8,493.76	16.49	14.72	68.53	2.93	-1,024.62	985.10	953.89	31.20	31.572	
8,600.00	8,598.07	8,612.09	8,610.07	16.58	14.93	68.84	4.07	-1,023.93	983.18	951.68	31.50	31.211	
8,700.00	8,698.00	8,705.01	8,702.97	16.68	15.09	69.08	4.73	-1,023.08	980.94	949.18	31.76	30.883	
8,800.00	8,797.92	8,806.76	8,804.72	16.78	15.27	69.30	4.75	-1,022.48	978.98	946.93	32.04	30.551	
8,900.00	8,897.85	8,910.83	8,908.79	16.89	15.45	69.51	4.53	-1,021.53	976.68	944.35	32.33	30.207	
9,000.00	8,997.77	9,010.35	9,008.30	17.00	15.62	69.72	4.23	-1,020.44	974.22	941.60	32.62	29.868	
9,100.00	9,097.70	9,106.98	9,104.93	17.12	15.79	69.91	3.87	-1,019.63	972.00	939.10	32.90	29.544	
9,200.00	9,197.62	9,213.00	9,210.95	17.23	15.98	70.09	2.99	-1,018.58	969.60	936.40	33.20	29.202	
9,300.00	9,297.55	9,314.51	9,312.44	17.36	16.15	70.27	2.21	-1,017.10	966.74	933.24	33.50	28.857	
9,400.00	9,397.48	9,405.98	9,403.90	17.48	16.31	70.41	1.09	-1,016.25	964.37	930.58	33.79	28.544	
9,500.00	9,497.40	9,507.42	9,505.31	17.61	16.49	70.51	-1.07	-1,015.74	962.30	928.21	34.09	28.229	
9,600.00	9,597.33	9,600.00	9,597.87	17.74	16.65	70.60	-3.02	-1,015.46	960.46	926.08	34.38	27.935	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 303H - OH / Job #61822 - Surveys (H&P 482)												Offset Site Error:	0.00 usft
Survey Program: 100-SPT_GTD												Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
9,700.00	9,697.25	9,693.83	9,691.69	17.87	16.81	70.73	-4.22	-1,015.74	959.33	924.65	34.68	27.663	
9,800.00	9,797.18	9,796.07	9,793.93	18.01	16.99	70.94	-4.34	-1,016.27	958.55	923.56	34.99	27.393	
9,900.00	9,897.10	9,892.49	9,890.35	18.15	17.16	71.15	-4.30	-1,016.76	957.80	922.50	35.30	27.133	
10,000.00	9,997.03	9,994.45	9,992.30	18.29	17.34	71.33	-4.87	-1,017.48	957.18	921.56	35.62	26.872	
10,100.00	10,096.95	10,090.96	10,088.81	18.43	17.51	71.52	-5.25	-1,018.17	956.60	920.67	35.93	26.622	
10,157.56	10,154.47	10,144.96	10,142.80	18.52	17.60	71.62	-5.41	-1,018.75	956.49	920.38	36.11	26.486	
10,200.00	10,196.88	10,184.57	10,182.41	18.58	17.67	71.69	-5.58	-1,019.33	956.55	920.31	36.24	26.392	
10,300.00	10,296.82	10,281.71	10,279.53	18.73	17.84	71.81	-6.35	-1,021.10	957.25	920.68	36.56	26.180	
10,400.00	10,396.81	10,378.93	10,376.73	18.88	18.01	71.83	-7.35	-1,023.16	958.74	921.85	36.89	25.993	
10,500.00	10,496.81	10,487.27	10,485.04	19.08	18.20	-81.52	-8.12	-1,025.23	960.50	923.22	37.27	25.771	
10,600.00	10,596.81	10,591.83	10,589.59	19.29	18.38	-81.61	-9.41	-1,026.42	961.44	923.78	37.66	25.530	
10,700.00	10,696.81	10,691.16	10,688.90	19.38	18.55	-81.25	-10.68	-1,027.38	962.19	924.27	37.93	25.370	
10,800.00	10,795.83	10,780.92	10,778.65	19.39	18.71	-82.03	-11.32	-1,028.62	961.62	923.53	38.08	25.250	
10,900.00	10,890.06	10,874.45	10,872.16	19.41	18.87	-84.10	-10.86	-1,030.38	959.44	921.18	38.26	25.076	
11,000.00	10,975.38	10,980.79	10,978.49	19.47	19.06	-87.73	-9.59	-1,031.37	956.27	917.77	38.51	24.833	
11,085.90	11,038.71	11,048.73	11,046.42	19.55	19.18	-90.63	-8.75	-1,030.84	954.48	915.77	38.72	24.652 CC, ES	
11,100.00	11,048.06	11,058.01	11,055.70	19.57	19.19	-91.03	-8.66	-1,030.76	954.54	915.80	38.75	24.636	
11,200.00	11,104.94	11,114.96	11,112.64	19.75	19.29	-93.26	-8.19	-1,030.35	959.10	920.10	39.00	24.592 SF	
11,300.00	11,143.51	11,155.39	11,153.07	20.03	19.36	-93.84	-7.80	-1,030.05	972.56	933.23	39.33	24.726	
11,400.00	11,162.11	11,175.80	11,173.48	20.42	19.40	-92.11	-7.55	-1,029.89	996.24	956.45	39.79	25.037	
11,500.00	11,162.83	11,177.89	11,175.57	20.90	19.40	-90.39	-7.52	-1,029.87	1,029.64	989.34	40.29	25.553	
11,600.00	11,161.22	11,177.57	11,175.25	21.47	19.40	-90.37	-7.53	-1,029.88	1,071.39	1,030.52	40.87	26.216	
11,700.00	11,159.62	11,177.25	11,174.93	22.12	19.40	-90.35	-7.53	-1,029.88	1,120.54	1,079.02	41.52	26.988	
11,800.00	11,158.01	11,176.92	11,174.60	22.85	19.40	-90.33	-7.53	-1,029.88	1,176.15	1,133.91	42.24	27.842	
11,900.00	11,156.40	11,176.58	11,174.26	23.64	19.40	-90.31	-7.54	-1,029.88	1,237.36	1,194.32	43.04	28.752	
12,000.00	11,154.80	11,176.24	11,173.92	24.49	19.40	-90.29	-7.54	-1,029.89	1,303.37	1,259.49	43.89	29.699	
12,100.00	11,153.19	11,175.90	11,173.58	25.40	19.40	-90.27	-7.55	-1,029.89	1,373.50	1,328.71	44.79	30.665	
12,200.00	11,151.59	11,175.54	11,173.23	26.35	19.40	-90.25	-7.55	-1,029.89	1,447.14	1,401.40	45.74	31.636	
12,300.00	11,149.98	11,175.19	11,172.87	27.35	19.40	-90.23	-7.56	-1,029.89	1,523.80	1,477.06	46.74	32.602	
12,400.00	11,148.38	11,174.82	11,172.50	28.38	19.40	-90.21	-7.56	-1,029.90	1,603.02	1,555.25	47.77	33.554	
12,500.00	11,146.77	11,174.45	11,172.13	29.45	19.39	-90.18	-7.57	-1,029.90	1,684.46	1,635.61	48.84	34.486	
12,600.00	11,145.16	11,174.07	11,171.75	30.55	19.39	-90.16	-7.57	-1,029.90	1,767.80	1,717.86	49.94	35.395	
12,700.00	11,142.92	11,172.96	11,170.64	31.68	19.39	-89.36	-7.59	-1,029.91	1,852.79	1,801.73	51.07	36.281	
12,800.00	11,140.51	11,171.61	11,169.29	32.83	19.39	-89.28	-7.60	-1,029.92	1,939.22	1,887.00	52.22	37.136	
12,900.00	11,138.09	11,170.24	11,167.92	34.01	19.39	-89.19	-7.62	-1,029.93	2,026.89	1,973.49	53.39	37.962	
13,000.00	11,135.67	11,168.85	11,166.53	35.20	19.38	-89.11	-7.64	-1,029.94	2,115.65	2,061.06	54.59	38.759	
13,100.00	11,133.25	11,167.43	11,165.11	36.42	19.38	-89.03	-7.65	-1,029.96	2,205.37	2,149.58	55.80	39.526	
13,200.00	11,131.74	11,167.07	11,164.76	37.65	19.38	-90.54	-7.66	-1,029.96	2,295.95	2,238.93	57.02	40.263	
13,300.00	11,130.58	11,167.15	11,164.84	38.89	19.38	-90.54	-7.66	-1,029.96	2,387.28	2,329.01	58.27	40.969	
13,400.00	11,129.43	11,167.24	11,164.92	40.15	19.38	-90.55	-7.66	-1,029.96	2,479.28	2,419.75	59.53	41.649	
13,500.00	11,128.28	11,167.32	11,165.00	41.42	19.38	-90.55	-7.66	-1,029.96	2,571.87	2,511.07	60.80	42.301	
13,600.00	11,127.12	11,167.40	11,165.09	42.70	19.38	-90.56	-7.65	-1,029.96	2,665.00	2,602.92	62.08	42.928	
13,700.00	11,125.17	11,166.48	11,164.16	43.99	19.38	-88.87	-7.67	-1,029.96	2,758.61	2,695.25	63.37	43.535	
13,800.00	11,122.94	11,165.17	11,162.86	45.29	19.38	-88.79	-7.68	-1,029.97	2,852.65	2,787.99	64.66	44.115	
13,900.00	11,120.71	11,163.84	11,161.53	46.60	19.38	-88.71	-7.70	-1,029.98	2,947.09	2,881.12	65.97	44.673	
14,000.00	11,118.47	11,162.49	11,160.17	47.92	19.37	-88.63	-7.71	-1,029.99	3,041.88	2,974.59	67.28	45.210	
14,100.00	11,116.24	11,161.10	11,158.79	49.25	19.37	-88.55	-7.73	-1,030.00	3,136.99	3,068.39	68.60	45.726	
14,200.00	11,114.21	11,159.96	11,157.65	50.58	19.37	-88.90	-7.74	-1,030.01	3,232.40	3,162.46	69.94	46.218	
14,300.00	11,112.21	11,158.84	11,156.52	51.92	19.37	-88.84	-7.76	-1,030.02	3,328.08	3,256.81	71.27	46.695	
14,400.00	11,110.21	11,157.69	11,155.38	53.26	19.37	-88.77	-7.77	-1,030.03	3,424.00	3,351.39	72.61	47.154	
14,500.00	11,108.22	11,156.52	11,154.21	54.61	19.36	-88.70	-7.78	-1,030.04	3,520.15	3,446.20	73.96	47.597	
14,600.00	11,106.22	11,155.33	11,153.01	55.96	19.36	-88.62	-7.80	-1,030.05	3,616.51	3,541.21	75.31	48.023	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 303H - OH / Job #61822 - Surveys (H&P 482)													Offset Site Error:	0.00 usft
Survey Program: 100-SPT_GTD													Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning								
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
14,700.00	11,104.39	11,154.35	11,152.03	57.32	19.36	-88.99	-7.81	-1,030.06	3,713.07	3,636.40	76.67	48.430		
14,800.00	11,102.59	11,153.39	11,151.07	58.68	19.36	-88.93	-7.82	-1,030.06	3,809.80	3,731.77	78.03	48.826		
14,900.00	11,100.80	11,152.41	11,150.09	60.05	19.36	-88.87	-7.83	-1,030.07	3,906.69	3,827.30	79.39	49.208		
15,000.00	11,099.00	11,151.40	11,149.09	61.42	19.35	-88.81	-7.84	-1,030.08	4,003.74	3,922.98	80.76	49.577		
15,100.00	11,097.20	11,150.37	11,148.06	62.79	19.35	-88.75	-7.85	-1,030.09	4,100.93	4,018.80	82.13	49.933		
15,200.00	11,094.91	11,148.59	11,146.28	64.16	19.35	-87.17	-7.87	-1,030.10	4,198.25	4,114.80	83.45	50.311		
15,300.00	11,092.50	11,146.59	11,144.28	65.54	19.35	-87.05	-7.89	-1,030.12	4,295.69	4,210.88	84.81	50.649		
15,400.00	11,090.09	11,144.54	11,142.23	66.93	19.34	-86.93	-7.92	-1,030.13	4,393.24	4,307.06	86.18	50.975		
15,500.00	11,087.68	11,142.44	11,140.13	68.31	19.34	-86.80	-7.94	-1,030.15	4,490.90	4,403.35	87.56	51.291		
15,600.00	11,085.27	11,140.30	11,137.98	69.70	19.34	-86.67	-7.96	-1,030.16	4,588.66	4,499.73	88.93	51.598		
15,700.00	11,082.55	11,137.60	11,135.29	71.09	19.33	-85.50	-7.99	-1,030.18	4,686.51	4,596.29	90.23	51.941		
15,800.00	11,079.76	11,134.74	11,132.43	72.48	19.33	-85.32	-8.01	-1,030.20	4,784.45	4,692.85	91.60	52.234		
15,899.05	11,077.00	11,131.83	11,129.52	73.86	19.32	-85.15	-8.04	-1,030.23	4,881.54	4,788.59	92.95	52.517		



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 303H - ST01 / Job #61822 - Surveys (H&P 482)												Offset Site Error:	0.00 usft
Survey Program: 100-SPT_GTD, 10761-MWD+HDGM												Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	0.00	-1.00	0.00	0.00	-90.43	-7.70	-1,019.60	1,019.63				
100.00	100.00	98.35	97.35	0.10	0.06	-90.43	-7.64	-1,019.73	1,019.76	1,019.60	0.16	6,285.441	
200.00	200.00	200.25	199.25	0.36	0.24	-90.41	-7.27	-1,019.90	1,019.93	1,019.33	0.60	1,689.391	
300.00	300.00	301.13	300.13	0.63	0.42	-90.37	-6.60	-1,019.94	1,019.96	1,018.92	1.05	975.779	
400.00	400.00	402.95	401.94	0.89	0.60	-90.33	-5.89	-1,019.84	1,019.86	1,018.37	1.49	684.960	
500.00	500.00	505.57	504.56	1.16	0.78	-90.31	-5.59	-1,019.49	1,019.52	1,017.58	1.93	527.077	
568.41	568.41	569.41	568.41	1.34	0.89	-90.31	-5.45	-1,019.35	1,019.36	1,017.14	2.23	457.609	
600.00	600.00	600.00	598.99	1.43	0.94	-90.30	-5.28	-1,019.38	1,019.40	1,017.03	2.37	431.025	
700.00	700.00	700.00	698.99	1.69	1.12	-90.26	-4.59	-1,019.41	1,019.42	1,016.61	2.81	363.346	
800.00	800.00	796.99	795.98	1.96	1.29	-90.24	-4.20	-1,019.51	1,019.53	1,016.29	3.24	314.672	
900.00	900.00	894.25	893.24	2.22	1.46	-90.23	-4.09	-1,020.03	1,020.06	1,016.39	3.67	277.637	
1,000.00	1,000.00	994.59	993.57	2.49	1.64	-90.22	-3.93	-1,020.69	1,020.72	1,016.60	4.11	248.103	
1,100.00	1,100.00	1,105.77	1,104.76	2.75	1.83	-90.19	-3.30	-1,020.78	1,020.79	1,016.22	4.57	223.189	
1,200.00	1,200.00	1,204.71	1,203.69	3.02	2.01	-90.16	-2.78	-1,020.37	1,020.38	1,015.36	5.01	203.574	
1,300.00	1,300.00	1,302.10	1,301.07	3.28	2.18	-90.14	-2.52	-1,020.14	1,020.14	1,014.70	5.45	187.239	
1,354.85	1,354.85	1,355.87	1,354.85	3.43	2.27	-90.14	-2.43	-1,020.11	1,020.12	1,014.43	5.69	179.355	
1,400.00	1,400.00	1,400.00	1,398.98	3.55	2.35	-90.14	-2.51	-1,020.13	1,020.13	1,014.25	5.88	173.359	
1,500.00	1,500.00	1,498.38	1,497.36	3.81	2.52	-90.15	-2.68	-1,020.30	1,020.31	1,013.99	6.32	161.418	
1,600.00	1,600.00	1,599.20	1,598.18	4.08	2.69	-90.16	-2.85	-1,020.52	1,020.53	1,013.77	6.76	150.924	
1,700.00	1,700.00	1,707.96	1,706.94	4.35	2.88	-90.16	-2.92	-1,020.21	1,020.24	1,013.02	7.22	141.364	
1,800.00	1,800.00	1,806.88	1,805.86	4.61	3.05	-90.16	-2.85	-1,019.61	1,019.63	1,011.98	7.66	133.189	
1,900.00	1,900.00	1,910.84	1,909.81	4.88	3.23	-90.18	-3.14	-1,018.76	1,018.81	1,010.71	8.10	125.734	
2,000.00	2,000.00	2,005.92	2,004.89	5.14	3.40	-90.20	-3.57	-1,018.11	1,018.13	1,009.59	8.53	119.296	
2,100.00	2,100.00	2,113.82	2,112.78	5.41	3.58	-90.24	-4.27	-1,017.11	1,017.20	1,008.21	8.99	113.165	
2,200.00	2,200.00	2,213.12	2,212.07	5.67	3.76	-90.27	-4.88	-1,015.91	1,015.99	1,006.56	9.43	107.764	
2,300.00	2,300.00	2,314.60	2,313.54	5.94	3.93	-90.29	-5.22	-1,014.61	1,014.71	1,004.84	9.87	102.795	
2,400.00	2,400.00	2,413.95	2,412.89	6.20	4.11	-90.30	-5.35	-1,013.30	1,013.40	1,003.09	10.31	98.283	
2,500.00	2,500.00	2,512.10	2,511.03	6.47	4.28	-90.31	-5.56	-1,012.17	1,012.24	1,001.50	10.75	94.173	
2,600.00	2,600.00	2,614.16	2,613.08	6.73	4.46	-90.32	-5.71	-1,010.93	1,011.03	999.84	11.19	90.324	
2,700.00	2,700.00	2,713.60	2,712.51	7.00	4.63	-90.33	-5.82	-1,009.69	1,009.78	998.15	11.63	86.798	
2,800.00	2,800.00	2,815.21	2,814.11	7.27	4.81	-90.33	-5.79	-1,008.33	1,008.45	996.37	12.08	83.496	
2,900.00	2,900.00	2,913.49	2,912.38	7.53	4.99	-90.34	-5.90	-1,006.99	1,007.08	994.57	12.52	80.463	
3,000.00	3,000.00	3,005.44	3,004.33	7.80	5.15	-90.35	-6.14	-1,006.24	1,006.27	993.33	12.94	77.747	
3,100.00	3,100.00	3,104.25	3,103.14	8.06	5.32	-90.35	-6.18	-1,005.86	1,005.89	992.51	13.38	75.167	
3,139.78	3,139.78	3,141.40	3,140.28	8.17	5.39	-90.35	-6.18	-1,005.80	1,005.82	992.26	13.55	74.218	
3,200.00	3,200.00	3,200.00	3,198.89	8.33	5.49	-90.36	-6.33	-1,005.89	1,005.91	992.10	13.81	72.817	
3,300.00	3,300.00	3,302.91	3,301.79	8.59	5.67	-90.40	-7.00	-1,005.97	1,006.00	991.74	14.26	70.558	
3,400.00	3,400.00	3,401.21	3,400.09	8.86	5.84	-90.46	-8.04	-1,005.87	1,005.90	991.21	14.69	68.457	
3,404.19	3,404.19	3,405.31	3,404.19	8.87	5.84	-90.46	-8.09	-1,005.87	1,005.90	991.19	14.71	68.372	
3,500.00	3,500.00	3,500.00	3,498.87	9.12	6.01	-90.53	-9.36	-1,005.95	1,006.00	990.87	15.13	66.486	
3,600.00	3,600.00	3,591.92	3,590.78	9.39	6.17	-90.59	-10.45	-1,006.46	1,006.55	991.00	15.56	64.707	
3,700.00	3,700.00	3,687.84	3,686.69	9.65	6.33	-90.63	-11.14	-1,007.53	1,007.68	991.70	15.99	63.031	
3,800.00	3,800.00	3,792.47	3,791.32	9.92	6.52	-90.68	-11.95	-1,008.72	1,008.83	992.39	16.43	61.388	
3,900.00	3,900.00	3,893.72	3,892.55	10.19	6.69	-90.76	-13.36	-1,009.50	1,009.61	992.74	16.88	59.829	
4,000.00	4,000.00	3,989.97	3,988.79	10.45	6.86	-90.83	-14.67	-1,010.35	1,010.52	993.21	17.31	58.386	
4,100.00	4,100.00	4,084.69	4,083.50	10.72	7.02	-90.86	-15.15	-1,011.64	1,011.88	994.15	17.74	57.047	
4,200.00	4,200.00	4,184.09	4,182.88	10.98	7.20	-90.84	-14.78	-1,013.33	1,013.58	995.41	18.18	55.765	
4,300.00	4,300.00	4,285.34	4,284.12	11.25	7.37	-90.80	-14.25	-1,014.99	1,015.22	996.60	18.62	54.530	
4,400.00	4,400.00	4,386.59	4,385.35	11.51	7.55	-90.75	-13.27	-1,016.53	1,016.72	997.66	19.06	53.344	
4,500.00	4,500.00	4,492.30	4,491.04	11.78	7.73	-90.69	-12.22	-1,017.79	1,017.91	998.40	19.51	52.175	
4,600.00	4,600.00	4,595.28	4,594.02	12.04	7.91	-90.64	-11.31	-1,018.55	1,018.63	998.67	19.95	51.048	
4,700.00	4,700.00	4,706.07	4,704.81	12.31	8.10	-90.59	-10.43	-1,018.61	1,018.67	998.26	20.41	49.903	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 303H - ST01 / Job #61822 - Surveys (H&P 482)													Offset Site Error: 0.00 usft
Survey Program: 100-SPT_GTD, 10761-MWD+HDGM													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
4,800.00	4,800.00	4,806.46	4,805.19	12.57	8.28	-90.52	-9.21	-1,018.13	1,018.18	997.33	20.85	48.824	
4,900.00	4,900.00	4,906.91	4,905.62	12.84	8.46	-90.43	-7.58	-1,017.61	1,017.66	996.36	21.30	47.788	
5,000.00	5,000.00	5,008.61	5,007.31	13.11	8.63	-90.34	-6.01	-1,016.97	1,017.01	995.27	21.74	46.784	
5,100.00	5,100.00	5,107.79	5,106.48	13.37	8.81	-90.25	-4.44	-1,016.30	1,016.33	994.15	22.18	45.827	
5,200.00	5,200.00	5,207.05	5,205.72	13.64	8.98	-90.16	-2.80	-1,015.72	1,015.73	993.12	22.62	44.911	
5,300.00	5,300.00	5,307.65	5,306.31	13.90	9.16	-90.07	-1.22	-1,015.13	1,015.15	992.09	23.06	44.026	
5,400.00	5,400.00	5,409.03	5,407.67	14.17	9.33	-89.99	0.17	-1,014.41	1,014.44	990.94	23.50	43.166	
5,500.00	5,500.00	5,506.50	5,505.13	14.43	9.51	-89.93	1.26	-1,013.79	1,013.81	989.87	23.94	42.352	
5,600.00	5,600.00	5,602.58	5,601.21	14.70	9.67	-89.88	2.21	-1,013.49	1,013.49	989.12	24.37	41.586	
5,619.38	5,619.38	5,621.03	5,619.66	14.75	9.71	-89.86	2.39	-1,013.47	1,013.48	989.02	24.45	41.443	
5,700.00	5,700.00	5,700.00	5,698.62	14.96	9.84	-89.81	3.31	-1,013.61	1,013.61	988.81	24.81	40.860	
5,800.00	5,800.00	5,805.67	5,804.28	15.23	10.03	-89.72	4.92	-1,013.56	1,013.58	988.32	25.26	40.130	
5,900.00	5,900.00	5,909.00	5,907.60	15.47	10.21	63.66	6.24	-1,012.90	1,012.94	987.26	25.67	39.456	
6,000.00	5,999.99	6,004.00	6,002.59	15.45	10.38	63.79	7.36	-1,012.46	1,011.93	986.11	25.82	39.191	
6,100.00	6,099.95	6,118.90	6,117.48	15.44	10.58	64.02	7.97	-1,011.21	1,009.53	983.53	26.01	38.819	
6,200.00	6,199.87	6,222.95	6,221.51	15.43	10.76	64.21	7.72	-1,009.18	1,005.89	979.71	26.18	38.422	
6,300.00	6,299.80	6,320.44	6,318.97	15.42	10.93	64.35	6.63	-1,007.01	1,001.96	975.62	26.35	38.029	
6,400.00	6,399.72	6,400.00	6,398.51	15.43	11.07	64.43	5.32	-1,006.26	999.34	972.85	26.49	37.729	
6,500.00	6,499.65	6,490.31	6,488.80	15.43	11.23	64.51	3.54	-1,006.77	998.20	971.55	26.65	37.455	
6,600.00	6,599.57	6,592.22	6,590.68	15.44	11.40	64.57	1.05	-1,007.90	997.60	970.76	26.84	37.171	
6,689.17	6,688.67	6,673.70	6,672.13	15.46	11.54	64.61	-1.04	-1,008.95	997.22	970.22	26.99	36.943	
6,700.00	6,699.50	6,683.48	6,681.90	15.46	11.56	64.62	-1.27	-1,009.12	997.22	970.21	27.01	36.917	
6,800.00	6,799.42	6,787.99	6,786.36	15.48	11.74	64.68	-3.72	-1,010.92	997.23	970.02	27.21	36.644	
6,900.00	6,899.35	6,900.00	6,898.34	15.50	11.94	64.75	-6.44	-1,011.67	996.18	968.74	27.43	36.312	
7,000.00	6,999.27	6,991.11	6,989.42	15.53	12.10	64.81	-8.64	-1,012.10	994.95	967.33	27.62	36.021	
7,100.00	7,099.20	7,095.56	7,093.84	15.56	12.28	64.88	-11.05	-1,013.04	994.15	966.32	27.84	35.713	
7,200.00	7,199.12	7,197.68	7,195.93	15.60	12.46	64.95	-13.32	-1,013.54	992.93	964.88	28.05	35.395	
7,300.00	7,299.05	7,284.98	7,283.21	15.64	12.61	65.03	-15.05	-1,014.41	992.24	963.99	28.25	35.126	
7,302.86	7,301.91	7,287.47	7,285.70	15.64	12.61	65.03	-15.09	-1,014.45	992.24	963.98	28.25	35.119	
7,400.00	7,398.97	7,377.52	7,375.73	15.69	12.77	65.16	-16.01	-1,016.31	992.63	964.17	28.46	34.883	
7,500.00	7,498.90	7,488.53	7,486.71	15.74	12.96	65.42	-15.35	-1,018.48	993.00	964.30	28.70	34.599	
7,600.00	7,598.82	7,595.48	7,593.63	15.80	13.15	65.76	-13.11	-1,019.28	992.23	963.29	28.94	34.283	
7,700.00	7,698.75	7,694.81	7,692.94	15.86	13.32	66.09	-10.83	-1,019.71	991.19	962.02	29.18	33.974	
7,800.00	7,798.67	7,793.35	7,791.46	15.92	13.49	66.40	-8.94	-1,020.26	990.29	960.88	29.41	33.670	
7,900.00	7,898.60	7,890.49	7,888.58	15.99	13.66	66.71	-7.10	-1,021.00	989.61	959.97	29.65	33.377	
8,000.00	7,998.52	7,988.45	7,986.51	16.06	13.83	67.02	-5.12	-1,021.97	989.21	959.32	29.89	33.092	
8,100.00	8,098.45	8,088.60	8,086.64	16.14	14.01	67.32	-3.37	-1,023.08	988.93	958.78	30.14	32.807	
8,200.00	8,198.37	8,196.19	8,194.21	16.22	14.20	67.63	-1.79	-1,023.87	988.30	957.88	30.41	32.496	
8,300.00	8,298.30	8,299.53	8,297.54	16.30	14.38	67.93	-0.31	-1,024.01	987.07	956.39	30.68	32.176	
8,400.00	8,398.22	8,394.16	8,392.16	16.39	14.54	68.22	1.30	-1,024.20	985.97	955.04	30.93	31.876	
8,500.00	8,498.15	8,495.78	8,493.76	16.49	14.72	68.53	2.93	-1,024.62	985.10	953.89	31.20	31.572	
8,600.00	8,598.07	8,612.09	8,610.07	16.58	14.93	68.84	4.07	-1,023.93	983.18	951.68	31.50	31.211	
8,700.00	8,698.00	8,705.01	8,702.97	16.68	15.09	69.08	4.73	-1,023.08	980.94	949.18	31.76	30.884	
8,800.00	8,797.92	8,806.76	8,804.72	16.78	15.27	69.30	4.75	-1,022.48	978.98	946.93	32.04	30.551	
8,900.00	8,897.85	8,910.83	8,908.79	16.89	15.45	69.51	4.53	-1,021.53	976.68	944.35	32.33	30.207	
9,000.00	8,997.77	9,010.35	9,008.30	17.00	15.62	69.72	4.23	-1,020.44	974.22	941.60	32.62	29.868	
9,100.00	9,097.70	9,106.98	9,104.93	17.12	15.79	69.91	3.87	-1,019.63	972.00	939.10	32.90	29.544	
9,200.00	9,197.62	9,213.00	9,210.95	17.23	15.98	70.09	2.99	-1,018.58	969.60	936.40	33.20	29.202	
9,300.00	9,297.55	9,314.51	9,312.44	17.36	16.15	70.27	2.21	-1,017.10	966.74	933.24	33.50	28.857	
9,400.00	9,397.48	9,405.98	9,403.90	17.48	16.31	70.41	1.09	-1,016.25	964.37	930.58	33.78	28.544	
9,500.00	9,497.40	9,507.42	9,505.31	17.61	16.49	70.51	-1.07	-1,015.74	962.30	928.21	34.09	28.229	
9,600.00	9,597.33	9,600.00	9,597.87	17.74	16.65	70.60	-3.02	-1,015.46	960.46	926.08	34.38	27.936	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 303H - ST01 / Job #61822 - Surveys (H&P 482)												Offset Site Error:	0.00 usft
Survey Program: 100-SPT_GTD, 10761-MWD+HDGM												Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
9,700.00	9,697.25	9,693.83	9,691.69	17.87	16.81	70.73	-4.22	-1,015.74	959.33	924.65	34.68	27.663	
9,800.00	9,797.18	9,796.07	9,793.93	18.01	16.99	70.94	-4.34	-1,016.27	958.55	923.56	34.99	27.393	
9,900.00	9,897.10	9,892.49	9,890.35	18.15	17.16	71.15	-4.30	-1,016.76	957.80	922.50	35.30	27.133	
10,000.00	9,997.03	9,994.45	9,992.30	18.29	17.34	71.33	-4.87	-1,017.48	957.18	921.56	35.62	26.872	
10,100.00	10,096.95	10,090.96	10,088.81	18.43	17.51	71.52	-5.25	-1,018.17	956.60	920.67	35.93	26.622	
10,157.56	10,154.47	10,144.96	10,142.80	18.52	17.60	71.62	-5.41	-1,018.75	956.49	920.38	36.11	26.486	
10,200.00	10,196.88	10,184.57	10,182.41	18.58	17.67	71.69	-5.58	-1,019.33	956.55	920.31	36.24	26.392	
10,300.00	10,296.82	10,281.71	10,279.53	18.73	17.84	71.81	-6.35	-1,021.10	957.25	920.68	36.56	26.180	
10,400.00	10,396.81	10,378.93	10,376.73	18.88	18.01	71.83	-7.35	-1,023.16	958.74	921.85	36.89	25.993	
10,500.00	10,496.81	10,487.27	10,485.04	19.08	18.20	-81.52	-8.12	-1,025.23	960.50	923.22	37.27	25.771	
10,600.00	10,596.81	10,591.83	10,589.59	19.29	18.38	-81.61	-9.41	-1,026.42	961.44	923.78	37.66	25.530	
10,700.00	10,696.81	10,691.16	10,688.90	19.38	18.55	-81.25	-10.68	-1,027.38	962.19	924.27	37.93	25.370	
10,800.00	10,795.83	10,771.95	10,769.58	19.39	18.66	-81.69	-7.59	-1,028.33	962.03	924.03	38.01	25.312	
10,900.00	10,890.06	10,850.23	10,846.61	19.41	18.73	-82.56	5.82	-1,029.48	961.12	923.07	38.05	25.261	
11,000.00	10,975.38	11,025.18	10,999.98	19.47	18.81	-83.88	86.40	-1,021.64	956.02	917.86	38.16	25.052	
11,100.00	11,048.06	11,106.50	11,060.18	19.57	18.87	-85.33	140.22	-1,012.79	944.48	906.12	38.36	24.624	
11,200.00	11,104.94	11,175.98	11,105.17	19.75	18.94	-87.00	192.69	-1,006.12	933.71	895.05	38.66	24.150	
11,300.00	11,143.51	11,247.71	11,145.13	20.03	19.09	-88.87	252.01	-1,001.28	925.43	886.32	39.11	23.663	
11,400.00	11,162.11	11,325.68	11,180.10	20.42	19.31	-90.91	321.53	-997.30	919.42	879.71	39.71	23.153	
11,500.00	11,162.83	11,394.41	11,204.04	20.90	19.56	-92.58	385.90	-995.29	916.79	876.37	40.42	22.681	
11,508.36	11,162.69	11,399.03	11,205.42	20.94	19.57	-92.67	390.30	-995.25	916.77	876.29	40.49	22.644	
11,600.00	11,161.22	11,455.81	11,219.76	21.47	19.82	-93.62	445.21	-996.09	918.77	877.54	41.23	22.281	
11,700.00	11,159.62	11,561.59	11,231.17	22.12	20.36	-94.42	550.12	-1,000.71	923.31	880.90	42.41	21.772	
11,800.00	11,158.01	11,671.47	11,228.70	22.85	21.02	-94.36	659.89	-1,004.52	925.93	882.12	43.80	21.139	
11,900.00	11,156.40	11,767.61	11,224.69	23.64	21.69	-94.19	755.89	-1,007.93	928.51	883.25	45.26	20.515	
12,000.00	11,154.80	11,859.91	11,221.76	24.49	22.39	-94.09	848.06	-1,011.73	931.74	884.92	46.82	19.902	
12,100.00	11,153.19	11,971.82	11,220.14	25.40	23.32	-94.09	959.88	-1,016.07	934.86	886.22	48.64	19.218	
12,200.00	11,151.59	12,065.06	11,218.82	26.35	24.15	-94.09	1,053.04	-1,019.35	937.62	887.20	50.42	18.595	
12,300.00	11,149.98	12,172.07	11,218.10	27.35	25.16	-94.13	1,159.99	-1,022.98	940.30	887.87	52.42	17.936	
12,400.00	11,148.38	12,283.07	11,216.86	28.38	26.26	-94.16	1,270.94	-1,026.12	942.43	887.88	54.56	17.274	
12,500.00	11,146.77	12,402.27	11,215.25	29.45	27.49	-94.18	1,390.12	-1,026.66	942.05	885.19	56.86	16.569	
12,600.00	11,145.16	12,498.53	11,213.33	30.55	28.52	-94.16	1,486.36	-1,026.69	941.29	882.31	58.98	15.958	
12,700.00	11,142.92	12,595.22	11,212.34	31.68	29.59	-94.23	1,583.04	-1,027.17	941.11	879.94	61.17	15.385	
12,800.00	11,140.51	12,707.62	11,210.24	32.83	30.86	-94.27	1,695.42	-1,027.44	940.65	877.07	63.59	14.793	
12,900.00	11,138.09	12,814.94	11,208.46	34.01	32.10	-94.33	1,802.72	-1,026.22	938.80	872.81	66.00	14.225	
13,000.00	11,135.67	12,913.00	11,206.26	35.20	33.26	-94.35	1,900.74	-1,024.98	936.79	868.45	68.34	13.707	
13,100.00	11,133.25	13,012.75	11,203.65	36.42	34.46	-94.35	2,000.45	-1,023.88	934.91	864.16	70.75	13.214	
13,200.00	11,131.74	13,110.37	11,201.23	37.65	35.65	-94.28	2,098.03	-1,022.86	933.03	859.87	73.16	12.753	
13,300.00	11,130.58	13,204.96	11,201.16	38.89	36.81	-94.35	2,192.62	-1,022.14	931.58	856.01	75.57	12.328	
13,400.00	11,129.43	13,305.30	11,200.50	40.15	38.07	-94.39	2,292.95	-1,021.67	930.38	852.31	78.07	11.917	
13,500.00	11,128.28	13,402.91	11,197.27	41.42	39.30	-94.27	2,390.50	-1,021.36	929.14	848.57	80.58	11.531	
13,555.44	11,127.64	13,449.42	11,195.82	42.13	39.89	-94.21	2,436.99	-1,021.56	928.88	847.00	81.88	11.344	
13,600.00	11,127.12	13,481.00	11,195.19	42.70	40.29	-94.19	2,468.56	-1,021.92	929.07	846.22	82.85	11.213	
13,700.00	11,125.17	13,576.00	11,193.34	43.99	41.52	-94.18	2,563.51	-1,024.24	930.74	845.38	85.36	10.903	
13,800.00	11,122.94	13,672.34	11,191.49	45.29	42.77	-94.18	2,659.79	-1,027.41	933.27	845.35	87.91	10.616	
13,900.00	11,120.71	13,784.41	11,189.36	46.60	44.24	-94.20	2,771.80	-1,030.38	935.19	844.51	90.68	10.313	
14,000.00	11,118.47	13,902.05	11,188.63	47.92	45.78	-94.31	2,889.42	-1,030.85	934.87	841.33	93.53	9.995	
14,083.63	11,116.61	13,978.43	11,187.35	49.03	46.79	-94.34	2,965.80	-1,030.98	934.42	838.77	95.64	9.770	
14,100.00	11,116.24	13,991.84	11,187.06	49.25	46.97	-94.34	2,979.20	-1,031.10	934.44	838.41	96.04	9.730	
14,200.00	11,114.21	14,088.65	11,184.56	50.58	48.26	-94.31	3,075.96	-1,032.91	935.47	836.82	98.65	9.483	
14,300.00	11,112.21	14,205.32	11,179.69	51.92	49.81	-94.15	3,192.52	-1,033.37	934.90	833.34	101.56	9.206	
14,400.00	11,110.21	14,299.65	11,177.34	53.26	51.08	-94.13	3,286.82	-1,033.14	933.87	829.71	104.16	8.966	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 303H - ST01 / Job #61822 - Surveys (H&P 482)													Offset Site Error:	0.00 usft
Survey Program: 100-SPT_GTD, 10761-MWD+HDGM													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre	Between Centres	Between Ellipses	Minimum Separation	Separation Factor			
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(°)	+N/-S (usft)	+E/-W (usft)	(usft)	(usft)	(usft)			
14,500.00	11,108.22	14,403.87	11,174.39	54.61	52.48	-94.08	3,391.00	-1,033.52	933.42	826.51	106.91	8.731		
14,600.00	11,106.22	14,510.63	11,171.57	55.96	53.92	-94.04	3,497.72	-1,032.88	932.00	822.29	109.70	8.496		
14,700.00	11,104.39	14,608.03	11,168.47	57.32	55.24	-93.97	3,595.06	-1,032.13	930.37	817.99	112.38	8.279		
14,800.00	11,102.59	14,704.11	11,165.78	58.68	56.55	-93.91	3,691.10	-1,031.74	929.14	814.09	115.05	8.076		
14,900.00	11,100.80	14,822.59	11,162.58	60.05	58.16	-93.85	3,809.52	-1,030.29	927.08	809.05	118.03	7.855		
15,000.00	11,099.00	14,927.99	11,159.08	61.42	59.59	-93.77	3,914.83	-1,027.76	923.82	802.98	120.84	7.645		
15,100.00	11,097.20	15,030.28	11,156.42	62.79	60.99	-93.73	4,017.04	-1,024.56	919.88	796.28	123.60	7.442		
15,200.00	11,094.91	15,128.12	11,155.52	64.16	62.33	-93.85	4,114.83	-1,021.60	916.18	789.88	126.30	7.254		
15,300.00	11,092.50	15,215.29	11,153.62	65.54	63.52	-93.87	4,201.95	-1,019.39	912.95	784.08	128.87	7.084		
15,380.90	11,090.55	15,279.00	11,152.39	66.66	64.40	-93.89	4,265.64	-1,019.29	912.17	781.31	130.86	6.971		
15,400.00	11,090.09	15,290.44	11,152.19	66.93	64.56	-93.90	4,277.07	-1,019.43	912.23	780.95	131.28	6.949		
15,500.00	11,087.68	15,385.63	11,149.19	68.31	65.88	-93.85	4,372.20	-1,021.14	913.21	779.22	133.99	6.816		
15,600.00	11,085.27	15,507.89	11,146.45	69.70	67.57	-93.86	4,494.42	-1,021.67	912.84	775.78	137.06	6.660		
15,700.00	11,082.55	15,611.35	11,147.63	71.09	69.01	-94.13	4,597.87	-1,020.37	911.08	771.23	139.85	6.515		
15,800.00	11,079.76	15,715.43	11,146.82	72.48	70.45	-94.27	4,701.92	-1,019.09	909.25	766.58	142.66	6.373		
15,895.27	11,077.11	15,791.00	11,144.00	73.81	71.50	-94.23	4,777.43	-1,018.01	907.32	762.29	145.04	6.256 CC		
15,899.05	11,077.00	15,791.00	11,144.00	73.86	71.50	-94.23	4,777.43	-1,018.01	907.33	762.24	145.09	6.254 ES, SF		



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 304H - OH - Plan 1 06-02-17												Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HDGM												Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	1.00	0.00	0.00	0.00	-90.43	-7.40	-979.60	979.63				
100.00	100.00	101.00	100.00	0.10	0.14	-90.43	-7.40	-979.60	979.63	979.39	0.23	4,178.683	
200.00	200.00	201.00	200.00	0.36	0.49	-90.43	-7.40	-979.60	979.63	978.77	0.86	1,141.289	
300.00	300.00	301.00	300.00	0.63	0.85	-90.43	-7.40	-979.60	979.63	978.15	1.48	660.897	
400.00	400.00	401.00	400.00	0.89	1.21	-90.43	-7.40	-979.60	979.63	977.52	2.11	465.119	
500.00	500.00	501.00	500.00	1.16	1.57	-90.43	-7.40	-979.60	979.63	976.90	2.73	358.824	
600.00	600.00	601.00	600.00	1.43	1.93	-90.43	-7.40	-979.60	979.63	976.27	3.35	292.075	
700.00	700.00	701.00	700.00	1.69	2.29	-90.43	-7.40	-979.60	979.63	975.65	3.98	246.265	
800.00	800.00	801.00	800.00	1.96	2.65	-90.43	-7.40	-979.60	979.63	975.03	4.60	212.877	
900.00	900.00	901.00	900.00	2.22	3.00	-90.43	-7.40	-979.60	979.63	974.40	5.23	187.461	
1,000.00	1,000.00	1,001.00	1,000.00	2.49	3.36	-90.43	-7.40	-979.60	979.63	973.78	5.85	167.466	
1,100.00	1,100.00	1,101.00	1,100.00	2.75	3.72	-90.43	-7.40	-979.60	979.63	973.15	6.47	151.326	
1,200.00	1,200.00	1,201.00	1,200.00	3.02	4.08	-90.43	-7.40	-979.60	979.63	972.53	7.10	138.024	
1,300.00	1,300.00	1,301.00	1,300.00	3.28	4.44	-90.43	-7.40	-979.60	979.63	971.91	7.72	126.871	
1,400.00	1,400.00	1,401.00	1,400.00	3.55	4.80	-90.43	-7.40	-979.60	979.63	971.28	8.35	117.386	
1,500.00	1,500.00	1,501.00	1,500.00	3.81	5.15	-90.43	-7.40	-979.60	979.63	970.66	8.97	109.220	
1,600.00	1,600.00	1,601.00	1,600.00	4.08	5.51	-90.43	-7.40	-979.60	979.63	970.03	9.59	102.117	
1,700.00	1,700.00	1,701.00	1,700.00	4.35	5.87	-90.43	-7.40	-979.60	979.63	969.41	10.22	95.881	
1,800.00	1,800.00	1,801.00	1,800.00	4.61	6.23	-90.43	-7.40	-979.60	979.63	968.79	10.84	90.363	
1,900.00	1,900.00	1,901.00	1,900.00	4.88	6.59	-90.43	-7.40	-979.60	979.63	968.16	11.46	85.445	
2,000.00	2,000.00	2,001.00	2,000.00	5.14	6.95	-90.43	-7.40	-979.60	979.63	967.54	12.09	81.036	
2,100.00	2,100.00	2,101.00	2,100.00	5.41	7.31	-90.43	-7.40	-979.60	979.63	966.92	12.71	77.058	
2,200.00	2,200.00	2,201.00	2,200.00	5.67	7.66	-90.43	-7.40	-979.60	979.63	966.29	13.34	73.453	
2,300.00	2,300.00	2,301.00	2,300.00	5.94	8.02	-90.43	-7.40	-979.60	979.63	965.67	13.96	70.171	
2,400.00	2,400.00	2,401.00	2,400.00	6.20	8.38	-90.43	-7.40	-979.60	979.63	965.04	14.58	67.169	
2,500.00	2,500.00	2,501.00	2,500.00	6.47	8.74	-90.43	-7.40	-979.60	979.63	964.42	15.21	64.413	
2,600.00	2,600.00	2,601.00	2,600.00	6.73	9.10	-90.43	-7.40	-979.60	979.63	963.80	15.83	61.875	
2,700.00	2,700.00	2,701.00	2,700.00	7.00	9.46	-90.43	-7.40	-979.60	979.63	963.17	16.46	59.529	
2,800.00	2,800.00	2,801.00	2,800.00	7.27	9.81	-90.43	-7.40	-979.60	979.63	962.55	17.08	57.355	
2,900.00	2,900.00	2,901.00	2,900.00	7.53	10.17	-90.43	-7.40	-979.60	979.63	961.92	17.70	55.333	
3,000.00	3,000.00	3,001.00	3,000.00	7.80	10.53	-90.43	-7.40	-979.60	979.63	961.30	18.33	53.450	
3,100.00	3,100.00	3,101.00	3,100.00	8.06	10.89	-90.43	-7.40	-979.60	979.63	960.68	18.95	51.690	
3,200.00	3,200.00	3,201.00	3,200.00	8.33	11.25	-90.43	-7.40	-979.60	979.63	960.05	19.58	50.043	
3,300.00	3,300.00	3,301.00	3,300.00	8.59	11.61	-90.43	-7.40	-979.60	979.63	959.43	20.20	48.497	
3,400.00	3,400.00	3,401.00	3,400.00	8.86	11.97	-90.43	-7.40	-979.60	979.63	958.80	20.82	47.044	
3,500.00	3,500.00	3,501.00	3,500.00	9.12	12.32	-90.43	-7.40	-979.60	979.63	958.18	21.45	45.675	
3,600.00	3,600.00	3,601.00	3,600.00	9.39	12.68	-90.43	-7.40	-979.60	979.63	957.56	22.07	44.384	
3,700.00	3,700.00	3,701.00	3,700.00	9.65	13.04	-90.43	-7.40	-979.60	979.63	956.93	22.70	43.164	
3,800.00	3,800.00	3,801.00	3,800.00	9.92	13.40	-90.43	-7.40	-979.60	979.63	956.31	23.32	42.009	
3,900.00	3,900.00	3,901.00	3,900.00	10.19	13.76	-90.43	-7.40	-979.60	979.63	955.68	23.94	40.914	
4,000.00	4,000.00	4,001.00	4,000.00	10.45	14.12	-90.43	-7.40	-979.60	979.63	955.06	24.57	39.875	
4,100.00	4,100.00	4,101.00	4,100.00	10.72	14.48	-90.43	-7.40	-979.60	979.63	954.44	25.19	38.888	
4,200.00	4,200.00	4,201.00	4,200.00	10.98	14.83	-90.43	-7.40	-979.60	979.63	953.81	25.82	37.948	
4,300.00	4,300.00	4,301.00	4,300.00	11.25	15.19	-90.43	-7.40	-979.60	979.63	953.19	26.44	37.052	
4,400.00	4,400.00	4,401.00	4,400.00	11.51	15.55	-90.43	-7.40	-979.60	979.63	952.57	27.06	36.198	
4,500.00	4,500.00	4,501.00	4,500.00	11.78	15.91	-90.43	-7.40	-979.60	979.63	951.94	27.69	35.382	
4,600.00	4,600.00	4,601.00	4,600.00	12.04	16.27	-90.43	-7.40	-979.60	979.63	951.32	28.31	34.603	
4,700.00	4,700.00	4,701.00	4,700.00	12.31	16.63	-90.43	-7.40	-979.60	979.63	950.69	28.93	33.857	
4,800.00	4,800.00	4,801.00	4,800.00	12.57	16.98	-90.43	-7.40	-979.60	979.63	950.07	29.56	33.142	
4,900.00	4,900.00	4,901.00	4,900.00	12.84	17.34	-90.43	-7.40	-979.60	979.63	949.45	30.18	32.457	
5,000.00	5,000.00	5,001.00	5,000.00	13.11	17.70	-90.43	-7.40	-979.60	979.63	948.82	30.81	31.799	
5,100.00	5,100.00	5,101.00	5,100.00	13.37	18.06	-90.43	-7.40	-979.60	979.63	948.20	31.43	31.168	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 304H - OH - Plan 1 06-02-17												Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HDGM												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
5,200.00	5,200.00	5,201.00	5,200.00	13.64	18.42	-90.43	-7.40	-979.60	979.63	947.57	32.05	30.562	
5,300.00	5,300.00	5,301.00	5,300.00	13.90	18.78	-90.43	-7.40	-979.60	979.63	946.95	32.68	29.978	
5,400.00	5,400.00	5,401.00	5,400.00	14.17	19.14	-90.43	-7.40	-979.60	979.63	946.33	33.30	29.416	
5,500.00	5,500.00	5,501.00	5,500.00	14.43	19.49	-90.43	-7.40	-979.60	979.63	945.70	33.93	28.875	
5,600.00	5,600.00	5,601.00	5,600.00	14.70	19.85	-90.43	-7.40	-979.60	979.63	945.08	34.55	28.354	
5,700.00	5,700.00	5,701.00	5,700.00	14.96	20.21	-90.43	-7.40	-979.60	979.63	944.45	35.17	27.851	
5,800.00	5,800.00	5,801.00	5,800.00	15.23	20.57	-90.43	-7.40	-979.60	979.63	943.83	35.80	27.366	
5,900.00	5,900.00	5,901.00	5,900.00	15.47	20.93	62.87	-7.40	-979.60	979.61	943.22	36.39	26.918	
6,000.00	5,999.99	6,000.99	5,999.99	15.45	21.29	62.94	-7.40	-979.60	979.06	942.32	36.73	26.653	
6,100.00	6,099.95	6,100.95	6,099.95	15.44	21.64	63.10	-7.40	-979.60	977.71	940.63	37.07	26.371	
6,200.00	6,199.87	6,200.87	6,199.87	15.43	22.00	63.31	-7.40	-979.60	975.96	938.54	37.42	26.078	
6,300.00	6,299.80	6,300.80	6,299.80	15.42	22.36	63.51	-7.40	-979.60	974.23	936.45	37.78	25.787	
6,400.00	6,399.72	6,400.72	6,399.72	15.43	22.72	63.71	-7.40	-979.60	972.51	934.37	38.14	25.499	
6,500.00	6,499.65	6,500.65	6,499.65	15.43	23.08	63.92	-7.40	-979.60	970.80	932.30	38.50	25.214	
6,600.00	6,599.57	6,600.57	6,599.57	15.44	23.44	64.12	-7.40	-979.60	969.11	930.23	38.87	24.931	
6,700.00	6,699.50	6,700.50	6,699.50	15.46	23.79	64.33	-7.40	-979.60	967.42	928.18	39.25	24.651	
6,800.00	6,799.42	6,800.42	6,799.42	15.48	24.15	64.54	-7.40	-979.60	965.75	926.13	39.62	24.373	
6,900.00	6,899.35	6,900.35	6,899.35	15.50	24.51	64.74	-7.40	-979.60	964.09	924.09	40.01	24.099	
7,000.00	6,999.27	7,000.27	6,999.27	15.53	24.87	64.95	-7.40	-979.60	962.45	922.06	40.39	23.827	
7,100.00	7,099.20	7,100.20	7,099.20	15.56	25.23	65.16	-7.40	-979.60	960.82	920.03	40.78	23.559	
7,200.00	7,199.12	7,200.12	7,199.12	15.60	25.58	65.37	-7.40	-979.60	959.20	918.02	41.18	23.293	
7,300.00	7,299.05	7,300.05	7,299.05	15.64	25.94	65.58	-7.40	-979.60	957.59	916.01	41.58	23.030	
7,400.00	7,398.97	7,399.97	7,398.97	15.69	26.30	65.79	-7.40	-979.60	956.00	914.01	41.99	22.769	
7,500.00	7,498.90	7,499.90	7,498.90	15.74	26.66	66.00	-7.40	-979.60	954.41	912.02	42.40	22.512	
7,600.00	7,598.82	7,599.82	7,598.82	15.80	27.02	66.22	-7.40	-979.60	952.85	910.04	42.81	22.258	
7,700.00	7,698.75	7,699.75	7,698.75	15.86	27.38	66.43	-7.40	-979.60	951.29	908.07	43.23	22.007	
7,800.00	7,798.67	7,799.67	7,798.67	15.92	27.73	66.64	-7.40	-979.60	949.75	906.10	43.65	21.759	
7,900.00	7,898.60	7,899.60	7,898.60	15.99	28.09	66.86	-7.40	-979.60	948.22	904.15	44.08	21.513	
8,000.00	7,998.52	7,999.52	7,998.52	16.06	28.45	67.07	-7.40	-979.60	946.71	902.20	44.51	21.271	
8,100.00	8,098.45	8,099.45	8,098.45	16.14	28.81	67.29	-7.40	-979.60	945.21	900.27	44.94	21.032	
8,200.00	8,198.37	8,199.37	8,198.37	16.22	29.17	67.51	-7.40	-979.60	943.72	898.34	45.38	20.796	
8,300.00	8,298.30	8,299.30	8,298.30	16.30	29.52	67.72	-7.40	-979.60	942.24	896.42	45.82	20.563	
8,400.00	8,398.22	8,399.22	8,398.22	16.39	29.88	67.94	-7.40	-979.60	940.78	894.51	46.27	20.333	
8,500.00	8,498.15	8,499.15	8,498.15	16.49	30.24	68.16	-7.40	-979.60	939.34	892.62	46.72	20.106	
8,600.00	8,598.07	8,599.07	8,598.07	16.58	30.60	68.38	-7.40	-979.60	937.90	890.73	47.17	19.881	
8,700.00	8,698.00	8,699.00	8,698.00	16.68	30.96	68.60	-7.40	-979.60	936.48	888.85	47.63	19.660	
8,800.00	8,797.92	8,798.92	8,797.92	16.78	31.32	68.82	-7.40	-979.60	935.08	886.98	48.09	19.442	
8,900.00	8,897.85	8,898.85	8,897.85	16.89	31.67	69.04	-7.40	-979.60	933.69	885.13	48.56	19.227	
9,000.00	8,997.77	8,998.77	8,997.77	17.00	32.03	69.26	-7.40	-979.60	932.31	883.28	49.03	19.015	
9,100.00	9,097.70	9,098.70	9,097.70	17.12	32.39	69.49	-7.40	-979.60	930.94	881.44	49.50	18.806	
9,200.00	9,197.62	9,198.62	9,197.62	17.23	32.75	69.71	-7.40	-979.60	929.59	879.62	49.98	18.600	
9,300.00	9,297.55	9,298.55	9,297.55	17.36	33.11	69.93	-7.40	-979.60	928.26	877.80	50.46	18.397	
9,400.00	9,397.48	9,398.48	9,397.48	17.48	33.47	70.16	-7.40	-979.60	926.94	876.00	50.94	18.197	
9,500.00	9,497.40	9,498.40	9,497.40	17.61	33.82	70.38	-7.40	-979.60	925.63	874.21	51.42	18.000	
9,600.00	9,597.33	9,598.33	9,597.33	17.74	34.18	70.61	-7.40	-979.60	924.34	872.42	51.91	17.806	
9,700.00	9,697.25	9,698.25	9,697.25	17.87	34.54	70.83	-7.40	-979.60	923.06	870.65	52.40	17.614	
9,800.00	9,797.18	9,798.18	9,797.18	18.01	34.90	71.06	-7.40	-979.60	921.79	868.90	52.90	17.426	
9,900.00	9,897.10	9,898.10	9,897.10	18.15	35.26	71.29	-7.40	-979.60	920.55	867.15	53.40	17.240	
10,000.00	9,997.03	9,998.03	9,997.03	18.29	35.61	71.52	-7.40	-979.60	919.31	865.41	53.90	17.057	
10,100.00	10,096.95	10,097.95	10,096.95	18.43	35.97	71.75	-7.40	-979.60	918.09	863.69	54.40	16.877	
10,200.00	10,196.88	10,197.88	10,196.88	18.58	36.33	71.98	-7.40	-979.60	916.89	861.98	54.91	16.699	
10,300.00	10,296.82	10,297.82	10,296.82	18.73	36.69	72.16	-7.40	-979.60	915.90	860.49	55.42	16.528	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 304H - OH - Plan 1 06-02-17												Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HDGM												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (")	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
10,400.00	10,396.81	10,397.81	10,396.81	18.88	37.05	72.24	-7.40	-979.60	915.46	859.53	55.93	16.369	
10,454.93	10,451.74	10,452.74	10,451.74	18.99	37.24	72.25	-7.40	-979.60	915.39	859.16	56.23	16.279	
10,500.00	10,496.81	10,497.81	10,496.81	19.08	37.41	-81.06	-7.40	-979.60	915.43	858.95	56.48	16.208	
10,600.00	10,596.81	10,761.38	10,751.44	19.29	38.31	-77.81	39.51	-951.03	909.19	851.60	57.59	15.788	
10,700.00	10,696.81	10,832.48	10,811.93	19.38	38.54	-75.23	72.15	-933.09	893.44	835.54	57.90	15.430	
10,800.00	10,795.83	10,885.87	10,853.92	19.39	38.70	-74.99	102.59	-920.50	880.32	822.33	58.00	15.179	
10,900.00	10,890.06	10,939.33	10,892.44	19.41	38.85	-74.96	137.76	-908.96	867.69	809.70	57.99	14.964	
11,000.00	10,975.38	10,993.00	10,927.09	19.47	39.00	-75.19	177.38	-898.60	855.36	797.43	57.94	14.764	
11,100.00	11,048.06	11,050.00	10,958.98	19.57	39.15	-75.68	223.62	-889.07	843.28	785.34	57.95	14.552	
11,200.00	11,104.94	11,100.00	10,982.45	19.75	39.28	-76.59	267.19	-882.08	831.50	773.39	58.11	14.308	
11,300.00	11,143.51	11,156.06	11,003.41	20.03	39.41	-77.76	318.77	-875.86	820.29	761.77	58.52	14.018	
11,400.00	11,162.11	11,211.17	11,018.23	20.42	39.54	-79.22	371.64	-871.49	810.07	750.92	59.15	13.695	
11,500.00	11,162.83	11,266.90	11,027.20	20.90	39.67	-80.30	426.55	-868.89	801.94	742.06	59.88	13.392	
11,600.00	11,161.22	11,325.00	11,029.96	21.47	39.79	-80.55	484.54	-868.16	798.83	738.23	60.60	13.182	
11,640.36	11,160.57	11,361.24	11,029.34	21.73	39.88	-80.54	520.78	-868.41	798.80	737.85	60.94	13.108	
11,700.00	11,159.62	11,420.88	11,028.30	22.12	40.03	-80.54	580.41	-868.83	798.77	737.30	61.47	12.994	
11,800.00	11,158.01	11,520.88	11,026.55	22.85	40.32	-80.53	680.39	-869.53	798.73	736.25	62.48	12.784	
11,900.00	11,156.40	11,620.88	11,024.81	23.64	40.66	-80.52	780.37	-870.23	798.69	735.09	63.59	12.559	
12,000.00	11,154.80	11,720.88	11,023.06	24.49	41.05	-80.50	880.35	-870.93	798.65	733.83	64.82	12.321	
12,100.00	11,153.19	11,820.88	11,021.31	25.40	41.49	-80.49	980.34	-871.64	798.60	732.46	66.14	12.074	
12,200.00	11,151.59	11,920.88	11,019.57	26.35	41.97	-80.48	1,080.32	-872.34	798.56	731.00	67.56	11.820	
12,300.00	11,149.98	12,020.88	11,017.82	27.35	42.49	-80.47	1,180.30	-873.04	798.52	729.46	69.06	11.562	
12,400.00	11,148.38	12,120.88	11,016.08	28.38	43.06	-80.46	1,280.28	-873.74	798.48	727.83	70.65	11.302	
12,500.00	11,146.77	12,220.88	11,014.33	29.45	43.67	-80.45	1,380.27	-874.44	798.44	726.13	72.31	11.042	
12,600.00	11,145.16	12,320.88	11,012.59	30.55	44.32	-80.44	1,480.25	-875.14	798.40	724.36	74.03	10.784	
12,700.00	11,142.92	12,420.88	11,010.84	31.68	45.00	-80.48	1,580.23	-875.85	798.25	722.42	75.83	10.527	
12,800.00	11,140.51	12,520.88	11,009.10	32.83	45.72	-80.52	1,680.21	-876.55	798.07	720.38	77.69	10.272	
12,900.00	11,138.09	12,620.88	11,007.35	34.01	46.48	-80.57	1,780.19	-877.25	797.90	718.29	79.61	10.023	
13,000.00	11,135.67	12,720.87	11,005.61	35.20	47.26	-80.62	1,880.17	-877.95	797.72	716.14	81.58	9.778	
13,100.00	11,133.25	12,820.87	11,003.86	36.42	48.08	-80.66	1,980.15	-878.65	797.55	713.95	83.60	9.540	
13,157.99	11,132.06	12,878.86	11,002.85	37.13	48.57	-80.67	2,038.13	-879.06	797.48	712.69	84.79	9.405	
13,200.00	11,131.74	12,920.87	11,002.12	37.65	48.93	-80.65	2,080.13	-879.35	797.52	711.87	85.65	9.311	
13,300.00	11,130.58	13,020.87	11,000.37	38.89	49.80	-80.60	2,180.11	-880.06	797.55	709.81	87.74	9.090	
13,400.00	11,129.43	13,120.87	10,998.63	40.15	50.70	-80.56	2,280.09	-880.76	797.58	707.71	89.87	8.875	
13,500.00	11,128.28	13,220.86	10,996.88	41.42	51.62	-80.52	2,380.07	-881.46	797.61	705.58	92.04	8.666	
13,600.00	11,127.12	13,320.86	10,995.14	42.70	52.57	-80.47	2,480.05	-882.16	797.65	703.41	94.23	8.465	
13,700.00	11,125.17	13,420.86	10,993.39	43.99	53.54	-80.49	2,580.03	-882.86	797.55	701.07	96.47	8.267	
13,800.00	11,122.94	13,520.86	10,991.65	45.29	54.53	-80.52	2,680.01	-883.56	797.40	698.65	98.75	8.075	
13,900.00	11,120.71	13,620.86	10,989.90	46.60	55.55	-80.56	2,779.99	-884.27	797.26	696.20	101.06	7.889	
14,000.00	11,118.47	13,720.86	10,988.16	47.92	56.58	-80.59	2,879.98	-884.97	797.11	693.72	103.39	7.710	
14,100.00	11,116.24	13,820.86	10,986.41	49.25	57.62	-80.62	2,979.96	-885.67	796.97	691.22	105.75	7.536	
14,200.00	11,114.21	13,920.86	10,984.67	50.58	58.69	-80.64	3,079.94	-886.37	796.86	688.73	108.13	7.370	
14,300.00	11,112.21	14,020.86	10,982.92	51.92	59.77	-80.66	3,179.92	-887.07	796.75	686.22	110.53	7.209	
14,400.00	11,110.21	14,120.86	10,981.17	53.26	60.87	-80.68	3,279.90	-887.78	796.64	683.70	112.95	7.053	
14,500.00	11,108.22	14,220.86	10,979.43	54.61	61.98	-80.69	3,379.88	-888.48	796.54	681.15	115.39	6.903	
14,600.00	11,106.22	14,320.86	10,977.68	55.96	63.10	-80.71	3,479.87	-889.18	796.43	678.59	117.85	6.758	
14,700.00	11,104.39	14,420.86	10,975.94	57.32	64.24	-80.72	3,579.85	-889.88	796.35	676.04	120.32	6.619	
14,800.00	11,102.59	14,520.86	10,974.19	58.68	65.39	-80.72	3,679.83	-890.58	796.28	673.47	122.81	6.484	
14,900.00	11,100.80	14,620.86	10,972.45	60.05	66.55	-80.72	3,779.81	-891.28	796.21	670.90	125.31	6.354	
15,000.00	11,099.00	14,720.86	10,970.70	61.42	67.72	-80.73	3,879.80	-891.99	796.13	668.30	127.83	6.228	
15,100.00	11,097.20	14,820.85	10,968.96	62.79	68.90	-80.73	3,979.78	-892.69	796.06	665.70	130.36	6.107	
15,200.00	11,094.91	14,920.85	10,967.21	64.16	70.09	-80.77	4,079.76	-893.39	795.91	662.99	132.91	5.988	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 304H - OH - Plan 1 06-02-17													Offset Site Error: 0.00 usft
Survey Program: 0-MWD+HDGM													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (")	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
15,300.00	11,092.50	15,020.85	10,965.47	65.54	71.29	-80.81	4,179.74	-894.09	795.73	660.25	135.48	5.873	
15,400.00	11,090.09	15,120.85	10,963.72	66.93	72.50	-80.86	4,279.72	-894.79	795.56	657.50	138.07	5.762	
15,500.00	11,087.68	15,220.85	10,961.98	68.31	73.72	-80.91	4,379.70	-895.49	795.39	654.73	140.66	5.655	
15,600.00	11,085.27	15,320.84	10,960.23	69.70	74.95	-80.95	4,479.68	-896.20	795.22	651.96	143.26	5.551	
15,700.00	11,082.55	15,420.84	10,958.49	71.09	76.18	-81.02	4,579.66	-896.90	795.00	649.12	145.88	5.450	
15,800.00	11,079.76	15,520.83	10,956.74	72.48	77.43	-81.10	4,679.63	-897.60	794.78	646.26	148.52	5.351	
15,899.05	11,077.00	15,619.88	10,955.01	73.86	78.66	-81.17	4,778.66	-898.29	794.55	643.42	151.13	5.257 CC, ES, SF	



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 403H - OH - Plan 1 08-29-17												Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 10938-MWD+HDGM												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	1.00	0.00	0.00	0.00	-90.43	-7.38	-979.17	979.20				
100.00	100.00	101.00	100.00	0.10	0.10	-90.43	-7.38	-979.17	979.20	979.00	0.20	4,918.501	
200.00	200.00	201.00	200.00	0.36	0.37	-90.43	-7.38	-979.17	979.20	978.47	0.73	1,341.411	
300.00	300.00	301.00	300.00	0.63	0.63	-90.43	-7.38	-979.17	979.20	977.94	1.26	776.606	
400.00	400.00	401.00	400.00	0.89	0.90	-90.43	-7.38	-979.17	979.20	977.41	1.79	546.501	
500.00	500.00	501.00	500.00	1.16	1.16	-90.43	-7.38	-979.17	979.20	976.88	2.32	421.586	
600.00	600.00	601.00	600.00	1.43	1.43	-90.43	-7.38	-979.17	979.20	976.35	2.85	343.152	
700.00	700.00	701.00	700.00	1.69	1.69	-90.43	-7.38	-979.17	979.20	975.82	3.38	289.324	
800.00	800.00	801.00	800.00	1.96	1.96	-90.43	-7.38	-979.17	979.20	975.28	3.92	250.094	
900.00	900.00	901.00	900.00	2.22	2.22	-90.43	-7.38	-979.17	979.20	974.75	4.45	220.232	
1,000.00	1,000.00	1,001.00	1,000.00	2.49	2.49	-90.43	-7.38	-979.17	979.20	974.22	4.98	196.740	
1,100.00	1,100.00	1,101.00	1,100.00	2.75	2.76	-90.43	-7.38	-979.17	979.20	973.69	5.51	177.777	
1,200.00	1,200.00	1,201.00	1,200.00	3.02	3.02	-90.43	-7.38	-979.17	979.20	973.16	6.04	162.149	
1,300.00	1,300.00	1,301.00	1,300.00	3.28	3.29	-90.43	-7.38	-979.17	979.20	972.63	6.57	149.046	
1,400.00	1,400.00	1,401.00	1,400.00	3.55	3.55	-90.43	-7.38	-979.17	979.20	972.10	7.10	137.902	
1,500.00	1,500.00	1,501.00	1,500.00	3.81	3.82	-90.43	-7.38	-979.17	979.20	971.57	7.63	128.309	
1,600.00	1,600.00	1,601.00	1,600.00	4.08	4.08	-90.43	-7.38	-979.17	979.20	971.04	8.16	119.964	
1,700.00	1,700.00	1,701.00	1,700.00	4.35	4.35	-90.43	-7.38	-979.17	979.20	970.51	8.69	112.638	
1,800.00	1,800.00	1,801.00	1,800.00	4.61	4.61	-90.43	-7.38	-979.17	979.20	969.98	9.22	106.155	
1,900.00	1,900.00	1,901.00	1,900.00	4.88	4.88	-90.43	-7.38	-979.17	979.20	969.44	9.76	100.378	
2,000.00	2,000.00	2,001.00	2,000.00	5.14	5.14	-90.43	-7.38	-979.17	979.20	968.91	10.29	95.197	
2,100.00	2,100.00	2,101.00	2,100.00	5.41	5.41	-90.43	-7.38	-979.17	979.20	968.38	10.82	90.525	
2,200.00	2,200.00	2,201.00	2,200.00	5.67	5.68	-90.43	-7.38	-979.17	979.20	967.85	11.35	86.290	
2,300.00	2,300.00	2,301.00	2,300.00	5.94	5.94	-90.43	-7.38	-979.17	979.20	967.32	11.88	82.433	
2,400.00	2,400.00	2,401.00	2,400.00	6.20	6.21	-90.43	-7.38	-979.17	979.20	966.79	12.41	78.907	
2,500.00	2,500.00	2,501.00	2,500.00	6.47	6.47	-90.43	-7.38	-979.17	979.20	966.26	12.94	75.669	
2,600.00	2,600.00	2,601.00	2,600.00	6.73	6.74	-90.43	-7.38	-979.17	979.20	965.73	13.47	72.687	
2,700.00	2,700.00	2,701.00	2,700.00	7.00	7.00	-90.43	-7.38	-979.17	979.20	965.20	14.00	69.931	
2,800.00	2,800.00	2,801.00	2,800.00	7.27	7.27	-90.43	-7.38	-979.17	979.20	964.67	14.53	67.377	
2,900.00	2,900.00	2,901.00	2,900.00	7.53	7.53	-90.43	-7.38	-979.17	979.20	964.14	15.06	65.002	
3,000.00	3,000.00	3,001.00	3,000.00	7.80	7.80	-90.43	-7.38	-979.17	979.20	963.60	15.59	62.789	
3,100.00	3,100.00	3,101.00	3,100.00	8.06	8.06	-90.43	-7.38	-979.17	979.20	963.07	16.13	60.722	
3,200.00	3,200.00	3,201.00	3,200.00	8.33	8.33	-90.43	-7.38	-979.17	979.20	962.54	16.66	58.787	
3,300.00	3,300.00	3,301.00	3,300.00	8.59	8.60	-90.43	-7.38	-979.17	979.20	962.01	17.19	56.971	
3,400.00	3,400.00	3,401.00	3,400.00	8.86	8.86	-90.43	-7.38	-979.17	979.20	961.48	17.72	55.264	
3,500.00	3,500.00	3,501.00	3,500.00	9.12	9.13	-90.43	-7.38	-979.17	979.20	960.95	18.25	53.656	
3,600.00	3,600.00	3,601.00	3,600.00	9.39	9.39	-90.43	-7.38	-979.17	979.20	960.42	18.78	52.140	
3,700.00	3,700.00	3,701.00	3,700.00	9.65	9.66	-90.43	-7.38	-979.17	979.20	959.89	19.31	50.706	
3,800.00	3,800.00	3,801.00	3,800.00	9.92	9.92	-90.43	-7.38	-979.17	979.20	959.36	19.84	49.350	
3,900.00	3,900.00	3,901.00	3,900.00	10.19	10.19	-90.43	-7.38	-979.17	979.20	958.83	20.37	48.064	
4,000.00	4,000.00	4,001.00	4,000.00	10.45	10.45	-90.43	-7.38	-979.17	979.20	958.30	20.90	46.843	
4,100.00	4,100.00	4,101.00	4,100.00	10.72	10.72	-90.43	-7.38	-979.17	979.20	957.77	21.43	45.683	
4,200.00	4,200.00	4,201.00	4,200.00	10.98	10.98	-90.43	-7.38	-979.17	979.20	957.23	21.97	44.579	
4,300.00	4,300.00	4,301.00	4,300.00	11.25	11.25	-90.43	-7.38	-979.17	979.20	956.70	22.50	43.527	
4,400.00	4,400.00	4,401.00	4,400.00	11.51	11.52	-90.43	-7.38	-979.17	979.20	956.17	23.03	42.523	
4,500.00	4,500.00	4,501.00	4,500.00	11.78	11.78	-90.43	-7.38	-979.17	979.20	955.64	23.56	41.565	
4,600.00	4,600.00	4,601.00	4,600.00	12.04	12.05	-90.43	-7.38	-979.17	979.20	955.11	24.09	40.649	
4,700.00	4,700.00	4,701.00	4,700.00	12.31	12.31	-90.43	-7.38	-979.17	979.20	954.58	24.62	39.772	
4,800.00	4,800.00	4,801.00	4,800.00	12.57	12.58	-90.43	-7.38	-979.17	979.20	954.05	25.15	38.933	
4,900.00	4,900.00	4,901.00	4,900.00	12.84	12.84	-90.43	-7.38	-979.17	979.20	953.52	25.68	38.128	
5,000.00	5,000.00	5,001.00	5,000.00	13.11	13.11	-90.43	-7.38	-979.17	979.20	952.99	26.21	37.356	
5,100.00	5,100.00	5,101.00	5,100.00	13.37	13.37	-90.43	-7.38	-979.17	979.20	952.46	26.74	36.614	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 403H - OH - Plan 1 08-29-17													Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 10938-MWD+HDGM													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance								Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
5,200.00	5,200.00	5,201.00	5,200.00	13.64	13.64	-90.43	-7.38	-979.17	979.20	951.93	27.27	35.902		
5,300.00	5,300.00	5,301.00	5,300.00	13.90	13.90	-90.43	-7.38	-979.17	979.20	951.39	27.81	35.216		
5,400.00	5,400.00	5,401.00	5,400.00	14.17	14.17	-90.43	-7.38	-979.17	979.20	950.86	28.34	34.556		
5,500.00	5,500.00	5,501.00	5,500.00	14.43	14.43	-90.43	-7.38	-979.17	979.20	950.33	28.87	33.921		
5,600.00	5,600.00	5,601.00	5,600.00	14.70	14.70	-90.43	-7.38	-979.17	979.20	949.80	29.40	33.308		
5,700.00	5,700.00	5,701.00	5,700.00	14.96	14.97	-90.43	-7.38	-979.17	979.20	949.27	29.93	32.717		
5,800.00	5,800.00	5,801.00	5,800.00	15.23	15.23	-90.43	-7.38	-979.17	979.20	948.74	30.46	32.147		
5,900.00	5,900.00	5,901.23	5,900.23	15.47	15.46	62.87	-7.42	-979.17	979.18	948.25	30.93	31.659		
6,000.00	5,999.99	6,002.32	6,001.31	15.45	15.43	62.86	-8.68	-979.08	978.55	947.67	30.88	31.691		
6,100.00	6,099.95	6,103.39	6,102.33	15.44	15.40	62.86	-11.72	-978.86	977.00	946.17	30.83	31.687		
6,200.00	6,199.87	6,204.42	6,203.25	15.43	15.38	62.78	-16.54	-978.52	974.94	944.14	30.80	31.653		
6,300.00	6,299.80	6,305.13	6,303.74	15.42	15.36	62.60	-23.05	-978.06	972.77	942.00	30.78	31.606		
6,400.00	6,399.72	6,405.04	6,403.41	15.43	15.34	62.39	-30.00	-977.57	970.59	939.83	30.77	31.548		
6,500.00	6,499.65	6,504.95	6,503.08	15.43	15.34	62.18	-36.96	-977.08	968.43	937.66	30.76	31.481		
6,600.00	6,599.57	6,604.87	6,602.75	15.44	15.33	61.97	-43.91	-976.58	966.27	935.50	30.77	31.405		
6,700.00	6,699.50	6,704.78	6,702.42	15.46	15.33	61.76	-50.87	-976.09	964.13	933.35	30.78	31.320		
6,800.00	6,799.42	6,804.70	6,802.09	15.48	15.34	61.55	-57.82	-975.60	962.00	931.19	30.81	31.226		
6,900.00	6,899.35	6,904.61	6,901.76	15.50	15.35	61.33	-64.78	-975.11	959.88	929.04	30.84	31.123		
7,000.00	6,999.27	7,004.52	7,001.43	15.53	15.36	61.12	-71.73	-974.61	957.78	926.90	30.88	31.012		
7,100.00	7,099.20	7,104.44	7,101.10	15.56	15.38	60.90	-78.69	-974.12	955.69	924.76	30.94	30.892		
7,200.00	7,199.12	7,204.35	7,200.77	15.60	15.40	60.69	-85.64	-973.63	953.62	922.62	31.00	30.763		
7,300.00	7,299.05	7,304.26	7,300.44	15.64	15.43	60.47	-92.60	-973.14	951.56	920.49	31.07	30.626		
7,400.00	7,398.97	7,404.18	7,400.11	15.69	15.47	60.25	-99.55	-972.64	949.51	918.36	31.15	30.482		
7,500.00	7,498.90	7,504.09	7,499.78	15.74	15.50	60.03	-106.51	-972.15	947.47	916.24	31.24	30.330		
7,600.00	7,598.82	7,604.00	7,599.45	15.80	15.55	59.81	-113.46	-971.66	945.45	914.12	31.34	30.171		
7,700.00	7,698.75	7,703.81	7,699.07	15.86	15.59	59.65	-119.54	-971.23	943.45	912.01	31.44	30.004		
7,800.00	7,798.67	7,803.69	7,798.85	15.92	15.64	59.58	-123.89	-970.92	941.47	909.91	31.56	29.833		
7,900.00	7,898.60	7,903.57	7,898.70	15.99	15.70	59.63	-126.50	-970.73	939.50	907.81	31.68	29.652		
8,000.00	7,998.52	8,003.40	7,998.52	16.06	15.86	59.78	-127.38	-970.67	937.54	905.63	31.91	29.381		
8,100.00	8,098.45	8,103.33	8,098.45	16.14	16.10	59.98	-127.38	-970.67	935.59	903.36	32.23	29.025		
8,200.00	8,198.37	8,203.25	8,198.37	16.22	16.35	60.19	-127.38	-970.67	933.66	901.10	32.56	28.671		
8,300.00	8,298.30	8,303.18	8,298.30	16.30	16.60	60.39	-127.38	-970.67	931.74	898.84	32.90	28.321		
8,400.00	8,398.22	8,403.10	8,398.22	16.39	16.85	60.60	-127.38	-970.67	929.84	896.60	33.24	27.975		
8,500.00	8,498.15	8,503.03	8,498.15	16.49	17.10	60.81	-127.38	-970.67	927.94	894.36	33.58	27.633		
8,600.00	8,598.07	8,602.95	8,598.07	16.58	17.36	61.02	-127.38	-970.67	926.06	892.13	33.93	27.295		
8,700.00	8,698.00	8,702.88	8,698.00	16.68	17.61	61.23	-127.38	-970.67	924.19	889.91	34.28	26.960		
8,800.00	8,797.92	8,802.80	8,797.92	16.78	17.86	61.44	-127.38	-970.67	922.33	887.70	34.64	26.630		
8,900.00	8,897.85	8,902.73	8,897.85	16.89	18.11	61.65	-127.38	-970.67	920.49	885.49	34.99	26.304		
9,000.00	8,997.77	9,002.65	8,997.77	17.00	18.37	61.86	-127.38	-970.67	918.66	883.30	35.36	25.981		
9,100.00	9,097.70	9,102.58	9,097.70	17.12	18.62	62.07	-127.38	-970.67	916.84	881.11	35.73	25.663		
9,200.00	9,197.62	9,202.50	9,197.62	17.23	18.87	62.29	-127.38	-970.67	915.03	878.93	36.10	25.350		
9,300.00	9,297.55	9,302.43	9,297.55	17.36	19.13	62.50	-127.38	-970.67	913.24	876.77	36.47	25.040		
9,400.00	9,397.48	9,402.35	9,397.48	17.48	19.38	62.72	-127.38	-970.67	911.46	874.61	36.85	24.735		
9,500.00	9,497.40	9,502.28	9,497.40	17.61	19.63	62.93	-127.38	-970.67	909.69	872.46	37.23	24.434		
9,600.00	9,597.33	9,602.20	9,597.33	17.74	19.89	63.15	-127.38	-970.67	907.93	870.32	37.62	24.137		
9,700.00	9,697.25	9,702.13	9,697.25	17.87	20.14	63.37	-127.38	-970.67	906.19	868.19	38.00	23.844		
9,800.00	9,797.18	9,802.05	9,797.18	18.01	20.40	63.59	-127.38	-970.67	904.46	866.07	38.40	23.556		
9,900.00	9,897.10	9,901.98	9,897.10	18.15	20.65	63.81	-127.38	-970.67	902.75	863.96	38.79	23.272		
10,000.00	9,997.03	10,001.90	9,997.03	18.29	20.91	64.03	-127.38	-970.67	901.05	861.86	39.19	22.993		
10,100.00	10,096.95	10,101.83	10,096.95	18.43	21.17	64.25	-127.38	-970.67	899.36	859.77	39.59	22.717		
10,200.00	10,196.88	10,201.75	10,196.88	18.58	21.42	64.47	-127.38	-970.67	897.68	857.69	39.99	22.446		
10,300.00	10,296.82	10,301.70	10,296.82	18.73	21.68	64.65	-127.38	-970.67	896.01	855.61	40.40	22.185		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 403H - OH - Plan 1 08-29-17												Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 10938-MWD+HDGM												Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
10,400.00	10,396.81	10,401.69	10,396.81	18.88	21.94	64.72	-127.38	-970.67	895.69	854.88	40.81	21.947	
10,454.93	10,451.74	10,456.62	10,451.74	18.99	22.08	64.74	-127.38	-970.67	895.59	854.53	41.06	21.812	
10,500.00	10,496.81	10,501.69	10,496.81	19.08	22.19	-88.57	-127.38	-970.67	895.65	854.39	41.26	21.705	
10,600.00	10,596.81	10,601.69	10,596.81	19.29	22.45	-88.57	-127.38	-970.67	895.65	853.92	41.73	21.464	
10,700.00	10,696.81	10,701.69	10,696.81	19.38	22.71	-88.14	-127.38	-970.67	895.65	853.57	42.08	21.285	
10,800.00	10,795.83	10,800.70	10,795.83	19.39	22.96	-88.97	-127.38	-970.67	895.33	852.98	42.34	21.145	
10,857.35	10,850.72	10,855.60	10,850.72	19.40	23.10	-90.00	-127.38	-970.67	895.17	852.68	42.49	21.066 CC	
10,900.00	10,890.06	10,894.93	10,890.06	19.41	23.21	-90.95	-127.38	-970.67	895.33	852.72	42.60	21.016	
11,000.00	10,975.38	10,987.14	10,982.18	19.47	23.27	-93.61	-124.89	-970.69	897.61	854.92	42.70	21.023	
11,100.00	11,048.06	11,093.48	11,085.90	19.57	23.28	-96.47	-102.42	-970.85	902.89	860.16	42.74	21.127	
11,200.00	11,104.94	11,218.30	11,197.67	19.75	23.32	-99.40	-47.68	-971.23	910.58	867.78	42.80	21.274	
11,300.00	11,143.51	11,368.95	11,308.06	20.03	23.45	-102.28	53.91	-971.93	919.20	876.23	42.97	21.390	
11,400.00	11,162.11	11,550.41	11,391.21	20.42	23.82	-104.65	213.97	-973.04	926.24	882.77	43.47	21.307	
11,500.00	11,162.83	11,722.57	11,410.74	20.90	24.44	-105.49	384.22	-974.22	928.51	884.06	44.45	20.887	
11,600.00	11,161.22	11,822.57	11,409.87	21.47	24.91	-105.53	484.21	-974.92	928.64	883.18	45.46	20.430	
11,700.00	11,159.62	11,922.57	11,408.99	22.12	25.45	-105.58	584.20	-975.61	928.76	882.16	46.60	19.929	
11,800.00	11,158.01	12,022.56	11,408.12	22.85	26.06	-105.62	684.19	-976.30	928.89	881.00	47.89	19.396	
11,900.00	11,156.40	12,122.56	11,407.25	23.64	26.74	-105.67	784.18	-977.00	929.01	879.71	49.30	18.843	
12,000.00	11,154.80	12,222.56	11,406.38	24.49	27.47	-105.71	884.17	-977.69	929.14	878.31	50.83	18.279	
12,100.00	11,153.19	12,322.56	11,405.50	25.40	28.26	-105.76	984.16	-978.39	929.27	876.80	52.47	17.712	
12,200.00	11,151.59	12,422.55	11,404.63	26.35	29.10	-105.80	1,084.15	-979.08	929.40	875.20	54.19	17.149	
12,300.00	11,149.98	12,522.55	11,403.76	27.35	29.99	-105.84	1,184.14	-979.77	929.53	873.52	56.01	16.595	
12,400.00	11,148.38	12,622.55	11,402.89	28.38	30.92	-105.89	1,284.14	-980.47	929.66	871.75	57.91	16.055	
12,500.00	11,146.77	12,722.55	11,402.01	29.45	31.88	-105.93	1,384.13	-981.16	929.79	869.92	59.87	15.530	
12,600.00	11,145.16	12,822.54	11,401.14	30.55	32.89	-105.98	1,484.12	-981.86	929.92	868.02	61.90	15.023	
12,700.00	11,142.92	12,922.53	11,400.27	31.68	33.92	-106.06	1,584.10	-982.55	930.22	866.24	63.98	14.539	
12,800.00	11,140.51	13,022.52	11,399.39	32.83	34.98	-106.15	1,684.08	-983.24	930.58	864.47	66.11	14.076	
12,900.00	11,138.09	13,122.51	11,398.52	34.01	36.07	-106.25	1,784.06	-983.94	930.94	862.66	68.28	13.633	
13,000.00	11,135.67	13,222.50	11,397.65	35.20	37.19	-106.34	1,884.05	-984.63	931.30	860.80	70.50	13.210	
13,100.00	11,133.25	13,322.48	11,396.78	36.42	38.32	-106.43	1,984.03	-985.32	931.67	858.91	72.76	12.805	
13,200.00	11,131.74	13,422.48	11,395.90	37.65	39.48	-106.47	2,084.02	-986.02	931.78	856.73	75.05	12.415	
13,300.00	11,130.58	13,522.48	11,395.03	38.89	40.65	-106.49	2,184.01	-986.71	931.79	854.40	77.39	12.040	
13,400.00	11,129.43	13,622.48	11,394.16	40.15	41.85	-106.51	2,284.01	-987.41	931.80	852.04	79.76	11.682	
13,500.00	11,128.28	13,722.48	11,393.29	41.42	43.05	-106.52	2,384.00	-988.10	931.81	849.65	82.16	11.341	
13,600.00	11,127.12	13,822.48	11,392.41	42.70	44.28	-106.54	2,483.99	-988.79	931.82	847.24	84.58	11.017	
13,700.00	11,125.17	13,922.47	11,391.54	43.99	45.51	-106.61	2,583.98	-989.49	932.05	845.04	87.01	10.712	
13,800.00	11,122.94	14,022.46	11,390.67	45.29	46.76	-106.69	2,683.96	-990.18	932.37	842.92	89.45	10.423	
13,900.00	11,120.71	14,122.45	11,389.80	46.60	48.01	-106.77	2,783.95	-990.88	932.69	840.78	91.92	10.147	
14,000.00	11,118.47	14,222.45	11,388.92	47.92	49.28	-106.85	2,883.93	-991.57	933.02	838.62	94.39	9.884	
14,100.00	11,116.24	14,322.44	11,388.05	49.25	50.56	-106.93	2,983.92	-992.26	933.34	836.45	96.89	9.633	
14,200.00	11,114.21	14,422.43	11,387.18	50.58	51.85	-107.00	3,083.90	-992.96	933.61	834.21	99.40	9.393	
14,300.00	11,112.21	14,522.42	11,386.31	51.92	53.14	-107.07	3,183.89	-993.65	933.87	831.95	101.92	9.163	
14,400.00	11,110.21	14,622.42	11,385.43	53.26	54.44	-107.14	3,283.88	-994.35	934.13	829.67	104.46	8.943	
14,500.00	11,108.22	14,722.41	11,384.56	54.61	55.75	-107.20	3,383.87	-995.04	934.39	827.39	107.00	8.733	
14,600.00	11,106.22	14,822.40	11,383.69	55.96	57.07	-107.27	3,483.85	-995.73	934.65	825.09	109.56	8.531	
14,700.00	11,104.39	14,922.40	11,382.82	57.32	58.39	-107.33	3,583.84	-996.43	934.86	822.74	112.12	8.338	
14,800.00	11,102.59	15,022.40	11,381.94	58.68	59.72	-107.38	3,683.83	-997.12	935.07	820.37	114.70	8.152	
14,900.00	11,100.80	15,122.39	11,381.07	60.05	61.05	-107.44	3,783.82	-997.82	935.28	817.99	117.29	7.974	
15,000.00	11,099.00	15,222.39	11,380.20	61.42	62.39	-107.49	3,883.81	-998.51	935.48	815.60	119.88	7.803	
15,100.00	11,097.20	15,322.38	11,379.32	62.79	63.73	-107.55	3,983.80	-999.20	935.69	813.21	122.48	7.639	
15,200.00	11,094.91	15,422.37	11,378.45	64.16	65.08	-107.63	4,083.78	-999.90	936.05	810.97	125.08	7.484	
15,300.00	11,092.50	15,522.36	11,377.58	65.54	66.43	-107.72	4,183.77	-1,000.59	936.45	808.78	127.67	7.335	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 403H - OH - Plan 1 08-29-17												Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 10938-MWD+HDGM												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
15,400.00	11,090.09	15,622.35	11,376.71	66.93	67.78	-107.81	4,283.75	-1,001.28	936.84	806.57	130.27	7.192	
15,500.00	11,087.68	15,722.34	11,375.83	68.31	69.14	-107.91	4,383.73	-1,001.98	937.25	804.37	132.87	7.054	
15,600.00	11,085.27	15,822.32	11,374.96	69.70	70.50	-108.00	4,483.71	-1,002.67	937.65	802.17	135.48	6.921	
15,700.00	11,082.55	15,922.31	11,374.09	71.09	71.87	-108.10	4,583.69	-1,003.37	938.15	800.07	138.08	6.794	
15,800.00	11,079.76	16,022.29	11,373.22	72.48	73.24	-108.22	4,683.66	-1,004.06	938.68	798.00	140.68	6.672	
15,899.05	11,077.00	16,117.05	11,372.39	73.86	74.54	-108.32	4,778.42	-1,004.72	939.21	796.01	143.21	6.558 ES, SF	



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 404H - OH - Plan 1 09-05-17												Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 10928-MWD+HDGM												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	-90.36	-0.25	-40.31	40.32				
100.00	100.00	100.00	100.00	0.10	0.10	-90.36	-0.25	-40.31	40.32	40.12	0.20	205.241	
200.00	200.00	200.00	200.00	0.36	0.36	-90.36	-0.25	-40.31	40.32	39.59	0.73	55.430	
300.00	300.00	300.00	300.00	0.63	0.63	-90.36	-0.25	-40.31	40.32	39.06	1.26	32.042	
400.00	400.00	400.00	400.00	0.89	0.89	-90.36	-0.25	-40.31	40.32	38.53	1.79	22.534	
500.00	500.00	500.00	500.00	1.16	1.16	-90.36	-0.25	-40.31	40.32	38.00	2.32	17.377	
600.00	600.00	600.00	600.00	1.43	1.43	-90.36	-0.25	-40.31	40.32	37.46	2.85	14.141	
700.00	700.00	700.00	700.00	1.69	1.69	-90.36	-0.25	-40.31	40.32	36.93	3.38	11.921	
800.00	800.00	800.00	800.00	1.96	1.96	-90.36	-0.25	-40.31	40.32	36.40	3.91	10.304	
900.00	900.00	900.00	900.00	2.22	2.22	-90.36	-0.25	-40.31	40.32	35.87	4.44	9.073	
1,000.00	1,000.00	1,000.00	1,000.00	2.49	2.49	-90.36	-0.25	-40.31	40.32	35.34	4.97	8.105	
1,100.00	1,100.00	1,100.00	1,100.00	2.75	2.75	-90.36	-0.25	-40.31	40.32	34.81	5.51	7.323	
1,200.00	1,200.00	1,200.00	1,200.00	3.02	3.02	-90.36	-0.25	-40.31	40.32	34.28	6.04	6.679	
1,300.00	1,300.00	1,300.00	1,300.00	3.28	3.28	-90.36	-0.25	-40.31	40.32	33.75	6.57	6.139	
1,400.00	1,400.00	1,400.00	1,400.00	3.55	3.55	-90.36	-0.25	-40.31	40.32	33.22	7.10	5.680	
1,500.00	1,500.00	1,500.00	1,500.00	3.81	3.81	-90.36	-0.25	-40.31	40.32	32.69	7.63	5.285	
1,600.00	1,600.00	1,600.00	1,600.00	4.08	4.08	-90.36	-0.25	-40.31	40.32	32.16	8.16	4.941	
1,700.00	1,700.00	1,700.00	1,700.00	4.35	4.35	-90.36	-0.25	-40.31	40.32	31.62	8.69	4.639	
1,800.00	1,800.00	1,800.00	1,800.00	4.61	4.61	-90.36	-0.25	-40.31	40.32	31.09	9.22	4.372	
1,900.00	1,900.00	1,900.00	1,900.00	4.88	4.88	-90.36	-0.25	-40.31	40.32	30.56	9.75	4.134	
2,000.00	2,000.00	2,000.00	2,000.00	5.14	5.14	-90.36	-0.25	-40.31	40.32	30.03	10.28	3.920	
2,100.00	2,100.00	2,100.00	2,100.00	5.41	5.41	-90.36	-0.25	-40.31	40.32	29.50	10.81	3.728	
2,200.00	2,200.00	2,200.00	2,200.00	5.67	5.67	-90.36	-0.25	-40.31	40.32	28.97	11.35	3.554	
2,300.00	2,300.00	2,300.00	2,300.00	5.94	5.94	-90.36	-0.25	-40.31	40.32	28.44	11.88	3.395	
2,400.00	2,400.00	2,400.00	2,400.00	6.20	6.20	-90.36	-0.25	-40.31	40.32	27.91	12.41	3.249	
2,500.00	2,500.00	2,500.00	2,500.00	6.47	6.47	-90.36	-0.25	-40.31	40.32	27.38	12.94	3.116	
2,600.00	2,600.00	2,600.00	2,600.00	6.73	6.73	-90.36	-0.25	-40.31	40.32	26.85	13.47	2.993	
2,700.00	2,700.00	2,700.00	2,700.00	7.00	7.00	-90.36	-0.25	-40.31	40.32	26.32	14.00	2.880	
2,800.00	2,800.00	2,800.00	2,800.00	7.27	7.27	-90.36	-0.25	-40.31	40.32	25.79	14.53	2.775	
2,900.00	2,900.00	2,900.00	2,900.00	7.53	7.53	-90.36	-0.25	-40.31	40.32	25.25	15.06	2.677	
3,000.00	3,000.00	3,000.00	3,000.00	7.80	7.80	-90.36	-0.25	-40.31	40.32	24.72	15.59	2.586	
3,100.00	3,100.00	3,100.00	3,100.00	8.06	8.06	-90.36	-0.25	-40.31	40.32	24.19	16.12	2.500	
3,200.00	3,200.00	3,200.00	3,200.00	8.33	8.33	-90.36	-0.25	-40.31	40.32	23.66	16.65	2.421	
3,300.00	3,300.00	3,300.00	3,300.00	8.59	8.59	-90.36	-0.25	-40.31	40.32	23.13	17.18	2.346	
3,400.00	3,400.00	3,400.00	3,400.00	8.86	8.86	-90.36	-0.25	-40.31	40.32	22.60	17.72	2.276	
3,500.00	3,500.00	3,500.00	3,500.00	9.12	9.12	-90.36	-0.25	-40.31	40.32	22.07	18.25	2.209	
3,600.00	3,600.00	3,600.00	3,600.00	9.39	9.39	-90.36	-0.25	-40.31	40.32	21.54	18.78	2.147	
3,700.00	3,700.00	3,700.00	3,700.00	9.65	9.65	-90.36	-0.25	-40.31	40.32	21.01	19.31	2.088	
3,800.00	3,800.00	3,800.00	3,800.00	9.92	9.92	-90.36	-0.25	-40.31	40.32	20.48	19.84	2.032	
3,900.00	3,900.00	3,900.00	3,900.00	10.19	10.19	-90.36	-0.25	-40.31	40.32	19.95	20.37	1.979	
4,000.00	4,000.00	4,000.00	4,000.00	10.45	10.45	-90.36	-0.25	-40.31	40.32	19.41	20.90	1.929	
4,100.00	4,100.00	4,100.00	4,100.00	10.72	10.72	-90.36	-0.25	-40.31	40.32	18.88	21.43	1.881	
4,200.00	4,200.00	4,200.00	4,200.00	10.98	10.98	-90.36	-0.25	-40.31	40.32	18.35	21.96	1.836	
4,300.00	4,300.00	4,300.00	4,300.00	11.25	11.25	-90.36	-0.25	-40.31	40.32	17.82	22.49	1.792	
4,400.00	4,400.00	4,400.00	4,400.00	11.51	11.51	-90.36	-0.25	-40.31	40.32	17.29	23.02	1.751	
4,500.00	4,500.00	4,500.00	4,500.00	11.78	11.78	-90.36	-0.25	-40.31	40.32	16.76	23.56	1.712	
4,600.00	4,600.00	4,600.00	4,600.00	12.04	12.04	-90.36	-0.25	-40.31	40.32	16.23	24.09	1.674	
4,700.00	4,700.00	4,700.00	4,700.00	12.31	12.31	-90.36	-0.25	-40.31	40.32	15.70	24.62	1.638	
4,800.00	4,800.00	4,800.00	4,800.00	12.57	12.57	-90.36	-0.25	-40.31	40.32	15.17	25.15	1.603	
4,900.00	4,900.00	4,900.00	4,900.00	12.84	12.84	-90.36	-0.25	-40.31	40.32	14.64	25.68	1.570	
5,000.00	5,000.00	5,000.00	5,000.00	13.11	13.11	-90.36	-0.25	-40.31	40.32	14.11	26.21	1.538	
5,100.00	5,100.00	5,100.00	5,100.00	13.37	13.37	-90.36	-0.25	-40.31	40.32	13.57	26.74	1.508	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 404H - OH - Plan 1 09-05-17													Offset Site Error: 0.00 usft
Survey Program: 0-NS-GYRO-MS, 10928-MWD+HDGM													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (")	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
5,200.00	5,200.00	5,200.00	5,200.00	13.64	13.64	-90.36	-0.25	-40.31	40.32	13.04	27.27	1.478	Level 3
5,300.00	5,300.00	5,300.00	5,300.00	13.90	13.90	-90.36	-0.25	-40.31	40.32	12.51	27.80	1.450	Level 3
5,400.00	5,400.00	5,400.00	5,400.00	14.17	14.17	-90.36	-0.25	-40.31	40.32	11.98	28.33	1.423	Level 3
5,500.00	5,500.00	5,500.00	5,500.00	14.43	14.43	-90.36	-0.25	-40.31	40.32	11.45	28.86	1.397	Level 3
5,600.00	5,600.00	5,600.00	5,600.00	14.70	14.70	-90.36	-0.25	-40.31	40.32	10.92	29.40	1.371	Level 3
5,700.00	5,700.00	5,700.00	5,700.00	14.96	14.96	-90.36	-0.25	-40.31	40.32	10.39	29.93	1.347	Level 3
5,800.00	5,800.00	5,800.00	5,800.00	15.23	15.23	-90.36	-0.25	-40.31	40.32	9.86	30.46	1.324	Level 3
5,900.00	5,900.00	5,900.00	5,900.00	15.47	15.49	62.99	-0.25	-40.31	40.30	9.34	30.96	1.302	Level 3
6,000.00	5,999.99	5,999.99	5,999.99	15.45	15.76	64.56	-0.25	-40.31	39.76	8.55	31.21	1.274	Level 3
6,100.00	6,099.95	6,099.95	6,099.95	15.44	16.02	68.55	-0.25	-40.31	38.58	7.12	31.46	1.226	Level 2
6,200.00	6,199.87	6,199.87	6,199.87	15.43	16.29	74.08	-0.25	-40.31	37.34	5.62	31.72	1.177	Level 2
6,300.00	6,299.80	6,299.80	6,299.80	15.42	16.56	79.93	-0.25	-40.31	36.46	4.49	31.98	1.140	Level 2
6,400.00	6,399.72	6,399.72	6,399.72	15.43	16.82	86.00	-0.25	-40.31	35.99	3.74	32.25	1.116	Level 2
6,464.87	6,464.54	6,464.54	6,464.54	15.43	16.99	90.00	-0.25	-40.31	35.90	3.48	32.42	1.107	Level 2
6,500.00	6,499.65	6,499.65	6,499.65	15.43	17.09	92.17	-0.25	-40.31	35.93	3.41	32.52	1.105	Level 2
6,600.00	6,599.57	6,599.57	6,599.57	15.44	17.35	98.28	-0.25	-40.31	36.28	3.49	32.79	1.106	Level 2
6,700.00	6,699.50	6,699.50	6,699.50	15.46	17.62	104.21	-0.25	-40.31	37.04	3.97	33.07	1.120	Level 2
6,800.00	6,799.42	6,799.42	6,799.42	15.48	17.88	109.84	-0.25	-40.31	38.17	4.82	33.36	1.144	Level 2
6,900.00	6,899.35	6,899.35	6,899.35	15.50	18.15	115.11	-0.25	-40.31	39.65	6.01	33.64	1.179	Level 2
7,000.00	6,999.27	6,999.27	6,999.27	15.53	18.41	119.95	-0.25	-40.31	41.45	7.51	33.93	1.221	Level 2
7,100.00	7,099.20	7,099.20	7,099.20	15.56	18.68	124.37	-0.25	-40.31	43.51	9.28	34.23	1.271	Level 3
7,200.00	7,199.12	7,199.12	7,199.12	15.60	18.94	128.37	-0.25	-40.31	45.80	11.27	34.53	1.326	Level 3
7,300.00	7,299.05	7,299.05	7,299.05	15.64	19.21	131.97	-0.25	-40.31	48.30	13.46	34.84	1.386	Level 3
7,400.00	7,398.97	7,398.97	7,398.97	15.69	19.47	135.20	-0.25	-40.31	50.97	15.82	35.15	1.450	Level 3
7,500.00	7,498.90	7,498.90	7,498.90	15.74	19.74	138.10	-0.25	-40.31	53.79	18.32	35.46	1.517	
7,600.00	7,598.82	7,598.82	7,598.82	15.80	20.00	140.71	-0.25	-40.31	56.73	20.95	35.78	1.585	
7,700.00	7,698.75	7,698.75	7,698.75	15.86	20.27	143.06	-0.25	-40.31	59.77	23.67	36.10	1.656	
7,800.00	7,798.67	7,798.67	7,798.67	15.92	20.53	145.18	-0.25	-40.31	62.91	26.48	36.43	1.727	
7,900.00	7,898.60	7,898.60	7,898.60	15.99	20.80	147.09	-0.25	-40.31	66.12	29.36	36.76	1.799	
8,000.00	7,998.52	7,998.52	7,998.52	16.06	21.06	148.83	-0.25	-40.31	69.40	32.30	37.10	1.871	
8,100.00	8,098.45	8,098.45	8,098.45	16.14	21.33	150.41	-0.25	-40.31	72.74	35.30	37.44	1.943	
8,200.00	8,198.37	8,198.37	8,198.37	16.22	21.60	151.84	-0.25	-40.31	76.13	38.35	37.78	2.015	
8,300.00	8,298.30	8,298.30	8,298.30	16.30	21.86	153.16	-0.25	-40.31	79.56	41.43	38.13	2.087	
8,400.00	8,398.22	8,398.22	8,398.22	16.39	22.13	154.36	-0.25	-40.31	83.04	44.55	38.48	2.158	
8,500.00	8,498.15	8,498.15	8,498.15	16.49	22.39	155.47	-0.25	-40.31	86.54	47.70	38.84	2.228	
8,600.00	8,598.07	8,598.07	8,598.07	16.58	22.66	156.49	-0.25	-40.31	90.07	50.87	39.20	2.298	
8,700.00	8,698.00	8,698.00	8,698.00	16.68	22.92	157.44	-0.25	-40.31	93.64	54.07	39.56	2.367	
8,800.00	8,797.92	8,797.92	8,797.92	16.78	23.19	158.31	-0.25	-40.31	97.22	57.29	39.93	2.435	
8,900.00	8,897.85	8,897.85	8,897.85	16.89	23.45	159.13	-0.25	-40.31	100.83	60.52	40.30	2.502	
9,000.00	8,997.77	8,997.77	8,997.77	17.00	23.72	159.88	-0.25	-40.31	104.45	63.77	40.68	2.568	
9,100.00	9,097.70	9,097.70	9,097.70	17.12	23.98	160.59	-0.25	-40.31	108.09	67.04	41.05	2.633	
9,200.00	9,197.62	9,197.62	9,197.62	17.23	24.25	161.25	-0.25	-40.31	111.75	70.31	41.44	2.697	
9,300.00	9,297.55	9,297.55	9,297.55	17.36	24.51	161.86	-0.25	-40.31	115.42	73.60	41.82	2.760	
9,400.00	9,397.48	9,397.48	9,397.48	17.48	24.78	162.44	-0.25	-40.31	119.10	76.90	42.21	2.822	
9,500.00	9,497.40	9,497.40	9,497.40	17.61	25.04	162.99	-0.25	-40.31	122.80	80.20	42.60	2.883	
9,600.00	9,597.33	9,597.33	9,597.33	17.74	25.31	163.50	-0.25	-40.31	126.50	83.51	42.99	2.942	
9,700.00	9,697.25	9,697.25	9,697.25	17.87	25.57	163.98	-0.25	-40.31	130.22	86.83	43.39	3.001	
9,800.00	9,797.18	9,797.18	9,797.18	18.01	25.84	164.44	-0.25	-40.31	133.94	90.15	43.79	3.059	
9,900.00	9,897.10	9,897.10	9,897.10	18.15	26.10	164.87	-0.25	-40.31	137.67	93.48	44.19	3.115	
10,000.00	9,997.03	9,997.03	9,997.03	18.29	26.37	165.28	-0.25	-40.31	141.41	96.81	44.60	3.171	
10,100.00	10,096.95	10,096.95	10,096.95	18.43	26.63	165.67	-0.25	-40.31	145.16	100.15	45.01	3.225	
10,200.00	10,196.88	10,196.88	10,196.88	18.58	26.90	166.04	-0.25	-40.31	148.91	103.49	45.42	3.279	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 404H - OH - Plan 1 09-05-17													Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 10928-MWD+HDGM													Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning								
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
10,300.00	10,296.82	10,296.82	10,296.82	18.73	27.17	166.33	-0.25	-40.31	152.00	106.15	45.85	3.315		
10,400.00	10,396.81	10,396.81	10,396.81	18.88	27.43	166.47	-0.25	-40.31	153.41	107.14	46.27	3.315		
10,500.00	10,496.81	10,496.81	10,496.81	19.08	27.70	13.17	-0.25	-40.31	153.51	106.77	46.73	3.285		
10,600.00	10,596.81	10,596.81	10,596.81	19.29	27.96	13.17	-0.25	-40.31	153.51	106.30	47.21	3.252		
10,700.00	10,696.81	10,696.81	10,696.81	19.38	28.23	13.63	-0.25	-40.31	153.39	105.84	47.55	3.226		
10,800.00	10,795.83	10,795.83	10,795.83	19.39	28.49	15.22	-0.25	-40.31	141.16	94.28	46.88	3.011		
10,900.00	10,890.06	10,890.06	10,890.06	19.41	28.74	21.10	-0.25	-40.31	109.65	64.66	44.99	2.437		
11,000.00	10,975.38	10,971.34	10,971.28	19.47	28.87	38.34	1.67	-40.74	64.58	20.02	44.55	1.449 Level 3		
11,100.00	11,048.06	11,051.55	11,050.18	19.57	28.88	94.10	15.27	-43.76	32.90	-15.50	48.40	0.680 Level 1, ES, SF		
11,101.58	11,049.10	11,052.87	11,051.45	19.57	28.88	95.42	15.60	-43.83	32.89	-15.48	48.37	0.680 Level 1, CC		
11,200.00	11,104.94	11,139.30	11,132.47	19.75	28.90	152.05	44.65	-50.27	65.95	27.54	38.41	1.717		
11,300.00	11,143.51	11,238.48	11,217.05	20.03	28.93	170.85	94.88	-61.40	121.56	88.96	32.60	3.729		
11,400.00	11,162.11	11,355.58	11,300.77	20.42	29.01	-179.83	174.60	-78.23	179.33	148.48	30.85	5.813		
11,500.00	11,162.83	11,505.92	11,376.06	20.90	29.25	-175.62	302.92	-95.01	230.21	198.81	31.40	7.332		
11,600.00	11,161.22	11,697.72	11,409.69	21.47	29.79	-174.61	490.24	-103.65	249.58	217.64	31.94	7.813		
11,700.00	11,159.62	11,797.72	11,408.83	22.12	30.16	-174.64	590.23	-104.35	250.31	217.97	32.34	7.739		
11,800.00	11,158.01	11,897.72	11,407.96	22.85	30.60	-174.67	690.22	-105.05	251.04	218.22	32.82	7.650		
11,900.00	11,156.40	11,997.71	11,407.09	23.64	31.11	-174.71	790.21	-105.75	251.77	218.41	33.36	7.548		
12,000.00	11,154.80	12,097.71	11,406.22	24.49	31.67	-174.74	890.20	-106.45	252.50	218.53	33.96	7.435		
12,100.00	11,153.19	12,197.71	11,405.35	25.40	32.28	-174.77	990.19	-107.15	253.22	218.59	34.63	7.312		
12,200.00	11,151.59	12,297.70	11,404.48	26.35	32.95	-174.80	1,090.19	-107.85	253.95	218.60	35.35	7.183		
12,300.00	11,149.98	12,397.70	11,403.61	27.35	33.66	-174.83	1,190.18	-108.55	254.68	218.55	36.13	7.048		
12,400.00	11,148.38	12,497.70	11,402.75	28.38	34.42	-174.86	1,290.17	-109.25	255.41	218.44	36.97	6.909		
12,500.00	11,146.77	12,597.70	11,401.88	29.45	35.23	-174.89	1,390.16	-109.95	256.14	218.29	37.84	6.768		
12,600.00	11,145.16	12,697.69	11,401.01	30.55	36.07	-174.92	1,490.15	-110.65	256.86	218.10	38.77	6.626		
12,700.00	11,142.92	12,797.68	11,400.14	31.68	36.95	-174.96	1,590.13	-111.35	258.22	218.46	39.76	6.494		
12,800.00	11,140.51	12,897.67	11,399.27	32.83	37.87	-175.00	1,690.12	-112.06	259.76	219.00	40.76	6.373		
12,900.00	11,138.09	12,997.66	11,398.40	34.01	38.82	-175.05	1,790.10	-112.76	261.30	219.50	41.80	6.252		
13,000.00	11,135.67	13,097.65	11,397.53	35.20	39.80	-175.09	1,890.08	-113.46	262.84	219.97	42.87	6.132		
13,100.00	11,133.25	13,197.64	11,396.67	36.42	40.80	-175.13	1,990.06	-114.16	264.38	220.41	43.96	6.013		
13,200.00	11,131.74	13,297.63	11,395.80	37.65	41.83	-175.16	2,090.05	-114.86	265.01	219.97	45.04	5.884		
13,300.00	11,130.58	13,397.63	11,394.93	38.89	42.89	-175.18	2,190.04	-115.56	265.29	219.09	46.20	5.742		
13,400.00	11,129.43	13,497.63	11,394.06	40.15	43.97	-175.20	2,290.04	-116.26	265.57	218.19	47.38	5.605		
13,500.00	11,128.28	13,597.63	11,393.19	41.42	45.06	-175.22	2,390.03	-116.96	265.85	217.27	48.59	5.472		
13,600.00	11,127.12	13,697.63	11,392.32	42.70	46.18	-175.24	2,490.02	-117.66	266.13	216.32	49.81	5.343		
13,700.00	11,125.17	13,797.62	11,391.45	43.99	47.32	-175.27	2,590.01	-118.36	267.20	216.11	51.10	5.229		
13,800.00	11,122.94	13,897.61	11,390.59	45.29	48.47	-175.31	2,690.00	-119.06	268.56	216.20	52.36	5.129		
13,900.00	11,120.71	13,997.61	11,389.72	46.60	49.64	-175.35	2,789.98	-119.76	269.91	216.28	53.63	5.033		
14,000.00	11,118.47	14,097.60	11,388.85	47.92	50.82	-175.38	2,889.97	-120.46	271.27	216.34	54.92	4.939		
14,100.00	11,116.24	14,197.59	11,387.98	49.25	52.01	-175.42	2,989.95	-121.16	272.62	216.39	56.23	4.849		
14,200.00	11,114.21	14,297.58	11,387.11	50.58	53.22	-175.46	3,089.94	-121.86	273.77	216.24	57.54	4.758		
14,300.00	11,112.21	14,397.57	11,386.24	51.92	54.44	-175.49	3,189.92	-122.57	274.89	216.03	58.87	4.670		
14,400.00	11,110.21	14,497.57	11,385.38	53.26	55.67	-175.52	3,289.91	-123.27	276.02	215.81	60.21	4.584		
14,500.00	11,108.22	14,597.56	11,384.51	54.61	56.91	-175.55	3,389.90	-123.97	277.14	215.57	61.56	4.502		
14,600.00	11,106.22	14,697.55	11,383.64	55.96	58.16	-175.58	3,489.89	-124.67	278.26	215.33	62.93	4.422		
14,700.00	11,104.39	14,797.55	11,382.77	57.32	59.41	-175.61	3,589.88	-125.37	279.21	214.91	64.29	4.343		
14,800.00	11,102.59	14,897.55	11,381.90	58.68	60.68	-175.64	3,689.86	-126.07	280.13	214.45	65.68	4.265		
14,900.00	11,100.80	14,997.54	11,381.03	60.05	61.95	-175.67	3,789.85	-126.77	281.05	213.98	67.07	4.191		
15,000.00	11,099.00	15,097.54	11,380.16	61.42	63.24	-175.70	3,889.84	-127.47	281.97	213.51	68.47	4.118		
15,100.00	11,097.20	15,197.53	11,379.30	62.79	64.52	-175.72	3,989.83	-128.17	282.89	213.02	69.87	4.049		
15,200.00	11,094.91	15,297.52	11,378.43	64.16	65.82	-175.76	4,089.82	-128.87	284.31	213.00	71.31	3.987		
15,300.00	11,092.50	15,397.51	11,377.56	65.54	67.12	-175.80	4,189.80	-129.57	285.84	213.11	72.73	3.930		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 404H - OH - Plan 1 09-05-17													Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 10928-MWD+HDGM													Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning								
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
15,400.00	11,090.09	15,497.50	11,376.69	66.93	68.43	-175.83	4,289.78	-130.27	287.37	213.22	74.15	3.875		
15,500.00	11,087.68	15,597.49	11,375.82	68.31	69.74	-175.87	4,389.76	-130.97	288.90	213.32	75.58	3.822		
15,600.00	11,085.27	15,697.47	11,374.95	69.70	71.06	-175.90	4,489.74	-131.67	290.44	213.42	77.01	3.771		
15,700.00	11,082.55	15,797.46	11,374.09	71.09	72.38	-175.94	4,589.72	-132.38	292.28	213.81	78.47	3.725		
15,800.00	11,079.76	15,897.44	11,373.22	72.48	73.71	-175.98	4,689.70	-133.08	294.19	214.28	79.91	3.681		
15,899.05	11,077.00	15,993.77	11,372.38	73.86	74.99	-176.02	4,786.02	-133.75	296.09	214.77	81.32	3.641		



Phoenix Technology Services LP

Anticollision Report



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Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 405H - OH - Plan 1 09-05-17												Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 10943-MWD+HDGM												Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	0.00	0.00	0.00	0.00	89.51	0.34	39.68	39.68				
100.00	100.00	100.00	100.00	0.10	0.10	89.51	0.34	39.68	39.68	39.49	0.20	202.027	
200.00	200.00	200.00	200.00	0.36	0.36	89.51	0.34	39.68	39.68	38.96	0.73	54.562	
300.00	300.00	300.00	300.00	0.63	0.63	89.51	0.34	39.68	39.68	38.43	1.26	31.540	
400.00	400.00	400.00	400.00	0.89	0.89	89.51	0.34	39.68	39.68	37.90	1.79	22.181	
500.00	500.00	500.00	500.00	1.16	1.16	89.51	0.34	39.68	39.68	37.36	2.32	17.105	
600.00	600.00	600.00	600.00	1.43	1.43	89.51	0.34	39.68	39.68	36.83	2.85	13.920	
700.00	700.00	700.00	700.00	1.69	1.69	89.51	0.34	39.68	39.68	36.30	3.38	11.735	
800.00	800.00	800.00	800.00	1.96	1.96	89.51	0.34	39.68	39.68	35.77	3.91	10.143	
900.00	900.00	900.00	900.00	2.22	2.22	89.51	0.34	39.68	39.68	35.24	4.44	8.931	
1,000.00	1,000.00	1,000.00	1,000.00	2.49	2.49	89.51	0.34	39.68	39.68	34.71	4.97	7.978	
1,100.00	1,100.00	1,100.00	1,100.00	2.75	2.75	89.51	0.34	39.68	39.68	34.18	5.51	7.208	
1,200.00	1,200.00	1,200.00	1,200.00	3.02	3.02	89.51	0.34	39.68	39.68	33.65	6.04	6.574	
1,300.00	1,300.00	1,300.00	1,300.00	3.28	3.28	89.51	0.34	39.68	39.68	33.12	6.57	6.043	
1,400.00	1,400.00	1,400.00	1,400.00	3.55	3.55	89.51	0.34	39.68	39.68	32.59	7.10	5.591	
1,500.00	1,500.00	1,500.00	1,500.00	3.81	3.81	89.51	0.34	39.68	39.68	32.06	7.63	5.202	
1,600.00	1,600.00	1,600.00	1,600.00	4.08	4.08	89.51	0.34	39.68	39.68	31.52	8.16	4.863	
1,700.00	1,700.00	1,700.00	1,700.00	4.35	4.35	89.51	0.34	39.68	39.68	30.99	8.69	4.566	
1,800.00	1,800.00	1,800.00	1,800.00	4.61	4.61	89.51	0.34	39.68	39.68	30.46	9.22	4.303	
1,900.00	1,900.00	1,900.00	1,900.00	4.88	4.88	89.51	0.34	39.68	39.68	29.93	9.75	4.069	
2,000.00	2,000.00	2,000.00	2,000.00	5.14	5.14	89.51	0.34	39.68	39.68	29.40	10.28	3.859	
2,100.00	2,100.00	2,100.00	2,100.00	5.41	5.41	89.51	0.34	39.68	39.68	28.87	10.81	3.670	
2,200.00	2,200.00	2,200.00	2,200.00	5.67	5.67	89.51	0.34	39.68	39.68	28.34	11.35	3.498	
2,300.00	2,300.00	2,300.00	2,300.00	5.94	5.94	89.51	0.34	39.68	39.68	27.81	11.88	3.342	
2,400.00	2,400.00	2,400.00	2,400.00	6.20	6.20	89.51	0.34	39.68	39.68	27.28	12.41	3.199	
2,500.00	2,500.00	2,500.00	2,500.00	6.47	6.47	89.51	0.34	39.68	39.68	26.75	12.94	3.067	
2,600.00	2,600.00	2,600.00	2,600.00	6.73	6.73	89.51	0.34	39.68	39.68	26.22	13.47	2.946	
2,700.00	2,700.00	2,700.00	2,700.00	7.00	7.00	89.51	0.34	39.68	39.68	25.68	14.00	2.835	
2,800.00	2,800.00	2,800.00	2,800.00	7.27	7.27	89.51	0.34	39.68	39.68	25.15	14.53	2.731	
2,900.00	2,900.00	2,900.00	2,900.00	7.53	7.53	89.51	0.34	39.68	39.68	24.62	15.06	2.635	
3,000.00	3,000.00	3,000.00	3,000.00	7.80	7.80	89.51	0.34	39.68	39.68	24.09	15.59	2.545	
3,100.00	3,100.00	3,100.00	3,100.00	8.06	8.06	89.51	0.34	39.68	39.68	23.56	16.12	2.461	
3,200.00	3,200.00	3,200.00	3,200.00	8.33	8.33	89.51	0.34	39.68	39.68	23.03	16.65	2.383	
3,300.00	3,300.00	3,300.00	3,300.00	8.59	8.59	89.51	0.34	39.68	39.68	22.50	17.18	2.309	
3,400.00	3,400.00	3,400.00	3,400.00	8.86	8.86	89.51	0.34	39.68	39.68	21.97	17.72	2.240	
3,500.00	3,500.00	3,500.00	3,500.00	9.12	9.12	89.51	0.34	39.68	39.68	21.44	18.25	2.175	
3,600.00	3,600.00	3,600.00	3,600.00	9.39	9.39	89.51	0.34	39.68	39.68	20.91	18.78	2.113	
3,700.00	3,700.00	3,700.00	3,700.00	9.65	9.65	89.51	0.34	39.68	39.68	20.38	19.31	2.055	
3,800.00	3,800.00	3,800.00	3,800.00	9.92	9.92	89.51	0.34	39.68	39.68	19.84	19.84	2.000	
3,900.00	3,900.00	3,900.00	3,900.00	10.19	10.19	89.51	0.34	39.68	39.68	19.31	20.37	1.948	
4,000.00	4,000.00	4,000.00	4,000.00	10.45	10.45	89.51	0.34	39.68	39.68	18.78	20.90	1.899	
4,100.00	4,100.00	4,100.00	4,100.00	10.72	10.72	89.51	0.34	39.68	39.68	18.25	21.43	1.852	
4,200.00	4,200.00	4,200.00	4,200.00	10.98	10.98	89.51	0.34	39.68	39.68	17.72	21.96	1.807	
4,300.00	4,300.00	4,300.00	4,300.00	11.25	11.25	89.51	0.34	39.68	39.68	17.19	22.49	1.764	
4,400.00	4,400.00	4,400.00	4,400.00	11.51	11.51	89.51	0.34	39.68	39.68	16.66	23.02	1.724	
4,500.00	4,500.00	4,500.00	4,500.00	11.78	11.78	89.51	0.34	39.68	39.68	16.13	23.56	1.685	
4,600.00	4,600.00	4,600.00	4,600.00	12.04	12.04	89.51	0.34	39.68	39.68	15.60	24.09	1.648	
4,700.00	4,700.00	4,700.00	4,700.00	12.31	12.31	89.51	0.34	39.68	39.68	15.07	24.62	1.612	
4,800.00	4,800.00	4,800.00	4,800.00	12.57	12.57	89.51	0.34	39.68	39.68	14.54	25.15	1.578	
4,900.00	4,900.00	4,900.00	4,900.00	12.84	12.84	89.51	0.34	39.68	39.68	14.01	25.68	1.545	
5,000.00	5,000.00	5,000.00	5,000.00	13.11	13.11	89.51	0.34	39.68	39.68	13.47	26.21	1.514	
5,100.00	5,100.00	5,100.00	5,100.00	13.37	13.37	89.51	0.34	39.68	39.68	12.94	26.74	1.484	Level 3

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 405H - OH - Plan 1 09-05-17													Offset Site Error: 0.00 usft
Survey Program: 0-NS-GYRO-MS, 10943-MWD+HDGM													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
5,200.00	5,200.00	5,200.00	5,200.00	13.64	13.64	89.51	0.34	39.68	39.68	12.41	27.27	1.455	Level 3
5,300.00	5,300.00	5,300.00	5,300.00	13.90	13.90	89.51	0.34	39.68	39.68	11.88	27.80	1.427	Level 3
5,400.00	5,400.00	5,400.00	5,400.00	14.17	14.17	89.51	0.34	39.68	39.68	11.35	28.33	1.401	Level 3
5,500.00	5,500.00	5,500.00	5,500.00	14.43	14.43	89.51	0.34	39.68	39.68	10.82	28.86	1.375	Level 3
5,600.00	5,600.00	5,600.00	5,600.00	14.70	14.70	89.51	0.34	39.68	39.68	10.29	29.40	1.350	Level 3
5,700.00	5,700.00	5,700.00	5,700.00	14.96	14.96	89.51	0.34	39.68	39.68	9.76	29.93	1.326	Level 3
5,800.00	5,800.00	5,800.00	5,800.00	15.23	15.23	89.51	0.34	39.68	39.68	9.23	30.46	1.303	Level 3, CC
5,852.78	5,852.78	5,852.78	5,852.78	15.35	15.37	-117.25	0.34	39.68	39.71	8.98	30.72	1.292	Level 3
5,900.00	5,900.00	5,899.86	5,899.86	15.47	15.48	-117.23	0.34	39.72	39.73	8.79	30.94	1.284	Level 3, ES, SF
6,000.00	5,999.99	5,999.14	5,999.13	15.45	15.59	-118.66	0.32	40.92	41.52	10.48	31.04	1.338	Level 3
6,100.00	6,099.95	6,098.26	6,098.21	15.44	15.71	-121.66	0.27	43.84	45.95	14.81	31.14	1.476	Level 3
6,200.00	6,199.87	6,197.15	6,196.99	15.43	15.83	-124.68	0.19	48.46	52.70	21.45	31.25	1.686	
6,300.00	6,299.80	6,295.80	6,295.44	15.42	15.95	-126.70	0.08	54.76	61.25	29.88	31.37	1.953	
6,400.00	6,399.72	6,394.15	6,393.46	15.43	16.08	-127.92	-0.06	62.73	71.53	40.03	31.49	2.271	
6,500.00	6,499.65	6,492.31	6,491.14	15.43	16.21	-128.57	-0.23	72.35	83.47	51.85	31.63	2.639	
6,600.00	6,599.57	6,591.51	6,589.80	15.44	16.34	-128.98	-0.41	82.72	96.06	64.29	31.77	3.024	
6,700.00	6,699.50	6,690.71	6,688.46	15.46	16.48	-129.29	-0.59	93.09	108.66	76.74	31.92	3.404	
6,800.00	6,799.42	6,789.92	6,787.12	15.48	16.62	-129.53	-0.77	103.46	121.25	89.18	32.08	3.780	
6,900.00	6,899.35	6,889.12	6,885.78	15.50	16.77	-129.73	-0.95	113.82	133.85	101.61	32.24	4.151	
7,000.00	6,999.27	6,988.32	6,984.44	15.53	16.92	-129.90	-1.14	124.19	146.45	114.03	32.42	4.518	
7,100.00	7,099.20	7,087.52	7,083.10	15.56	17.07	-130.04	-1.32	134.56	159.05	126.45	32.60	4.879	
7,200.00	7,199.12	7,186.72	7,181.76	15.60	17.22	-130.16	-1.50	144.93	171.65	138.87	32.78	5.236	
7,300.00	7,299.05	7,285.93	7,280.42	15.64	17.38	-130.26	-1.68	155.29	184.25	151.27	32.98	5.587	
7,400.00	7,398.97	7,385.13	7,379.08	15.69	17.54	-130.35	-1.86	165.66	196.85	163.67	33.18	5.933	
7,500.00	7,498.90	7,484.33	7,477.73	15.74	17.70	-130.43	-2.04	176.03	209.46	176.07	33.39	6.273	
7,600.00	7,598.82	7,583.53	7,576.39	15.80	17.87	-130.49	-2.22	186.40	222.06	188.45	33.61	6.608	
7,700.00	7,698.75	7,682.74	7,675.05	15.86	18.04	-130.56	-2.40	196.77	234.66	200.83	33.83	6.937	
7,800.00	7,798.67	7,781.94	7,773.71	15.92	18.21	-130.61	-2.58	207.13	247.27	213.21	34.06	7.260	
7,900.00	7,898.60	7,881.14	7,872.37	15.99	18.39	-130.66	-2.76	217.50	259.87	225.57	34.29	7.578	
8,000.00	7,998.52	7,980.34	7,971.03	16.06	18.56	-130.71	-2.95	227.87	272.47	237.94	34.54	7.890	
8,100.00	8,098.45	8,079.55	8,069.69	16.14	18.74	-130.75	-3.13	238.24	285.08	250.29	34.78	8.195	
8,200.00	8,198.37	8,178.75	8,168.35	16.22	18.92	-130.79	-3.31	248.61	297.68	262.64	35.04	8.496	
8,300.00	8,298.30	8,277.95	8,267.01	16.30	19.11	-130.82	-3.49	258.97	310.28	274.98	35.30	8.790	
8,400.00	8,398.22	8,377.15	8,365.66	16.39	19.29	-130.86	-3.67	269.34	322.89	287.32	35.57	9.078	
8,500.00	8,498.15	8,476.36	8,464.32	16.49	19.48	-130.89	-3.85	279.71	335.49	299.65	35.84	9.361	
8,600.00	8,598.07	8,575.56	8,562.98	16.58	19.67	-130.91	-4.03	290.08	348.10	311.98	36.12	9.638	
8,700.00	8,698.00	8,674.76	8,661.64	16.68	19.86	-130.94	-4.21	300.45	360.70	324.30	36.40	9.909	
8,800.00	8,797.92	8,773.96	8,760.30	16.78	20.06	-130.96	-4.39	310.81	373.31	336.62	36.69	10.174	
8,900.00	8,897.85	8,873.16	8,858.96	16.89	20.25	-130.99	-4.57	321.18	385.91	348.93	36.99	10.434	
9,000.00	8,997.77	8,972.37	8,957.62	17.00	20.45	-131.01	-4.75	331.55	398.51	361.23	37.28	10.688	
9,100.00	9,097.70	9,071.57	9,056.28	17.12	20.65	-131.03	-4.94	341.92	411.12	373.53	37.59	10.937	
9,200.00	9,197.62	9,170.77	9,154.94	17.23	20.85	-131.05	-5.12	352.28	423.72	385.82	37.90	11.180	
9,300.00	9,297.55	9,269.97	9,253.59	17.36	21.05	-131.06	-5.30	362.65	436.33	398.11	38.21	11.418	
9,400.00	9,397.48	9,369.18	9,352.25	17.48	21.26	-131.08	-5.48	373.02	448.93	410.40	38.53	11.650	
9,500.00	9,497.40	9,468.38	9,450.91	17.61	21.47	-131.09	-5.66	383.39	461.54	422.68	38.86	11.877	
9,600.00	9,597.33	9,567.58	9,549.57	17.74	21.67	-131.11	-5.84	393.76	474.14	434.96	39.19	12.099	
9,700.00	9,697.25	9,666.78	9,648.23	17.87	21.88	-131.12	-6.02	404.12	486.75	447.23	39.52	12.316	
9,800.00	9,797.18	9,765.99	9,746.89	18.01	22.09	-131.14	-6.20	414.49	499.35	459.49	39.86	12.528	
9,900.00	9,897.10	9,865.19	9,845.55	18.15	22.31	-131.15	-6.38	424.86	511.96	471.76	40.20	12.735	
10,000.00	9,997.03	9,964.39	9,944.21	18.29	22.52	-131.16	-6.56	435.23	524.56	484.02	40.55	12.937	
10,100.00	10,096.95	10,063.59	10,042.87	18.43	22.74	-131.17	-6.75	445.60	537.17	496.27	40.90	13.135	
10,200.00	10,196.88	10,162.80	10,141.52	18.58	22.95	-131.18	-6.93	455.96	549.77	508.52	41.25	13.328	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 405H - OH - Plan 1 09-05-17													Offset Site Error: 0.00 usft
Survey Program: 0-NS-GYRO-MS, 10943-MWD+HDGM													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
10,300.00	10,296.82	10,262.05	10,240.24	18.73	23.17	-131.22	-7.11	466.34	561.93	520.31	41.62	13.500	
10,400.00	10,396.81	10,361.43	10,339.07	18.88	23.39	-131.13	-7.29	476.72	572.96	530.96	42.00	13.643	
10,500.00	10,496.81	10,460.87	10,437.97	19.08	23.61	75.81	-7.47	487.12	583.10	540.70	42.41	13.750	
10,600.00	10,596.81	10,560.33	10,536.88	19.29	23.83	76.07	-7.65	497.51	593.20	550.37	42.83	13.851	
10,700.00	10,696.81	10,659.78	10,635.78	19.38	24.05	76.65	-7.83	507.90	603.28	560.15	43.14	13.985	
10,800.00	10,795.83	10,758.22	10,733.68	19.39	24.28	77.18	-8.01	518.19	610.61	567.26	43.35	14.085	
10,900.00	10,890.06	10,851.84	10,826.80	19.41	24.49	79.73	-8.18	527.98	614.46	570.92	43.54	14.112	
11,000.00	10,975.38	10,936.56	10,911.05	19.47	24.64	83.47	-8.34	536.83	617.81	574.06	43.75	14.121	
11,100.00	11,048.06	10,980.88	10,955.00	19.57	24.65	85.18	-7.17	542.35	626.32	582.44	43.88	14.274	
11,200.00	11,104.94	11,018.97	10,992.32	19.75	24.65	85.65	-3.52	548.95	644.28	600.22	44.06	14.622	
11,300.00	11,143.51	11,050.00	11,022.25	20.03	24.66	84.55	1.25	555.58	672.11	627.81	44.30	15.171	
11,400.00	11,162.11	11,079.09	11,049.80	20.42	24.66	82.13	7.17	562.78	709.30	664.74	44.56	15.917	
11,500.00	11,162.83	11,100.00	11,069.24	20.90	24.67	81.21	12.29	568.54	754.97	709.99	44.98	16.783	
11,600.00	11,161.22	11,123.13	11,090.34	21.47	24.67	83.14	18.77	575.46	809.52	763.84	45.67	17.724	
11,700.00	11,159.62	11,156.30	11,119.75	22.12	24.68	85.78	29.53	586.35	871.23	824.78	46.45	18.756	
11,800.00	11,158.01	11,972.56	11,407.73	22.85	26.64	106.54	696.31	759.01	877.08	828.86	48.22	18.191	
11,900.00	11,156.40	12,072.56	11,406.85	23.64	27.18	106.59	796.30	758.31	877.35	827.86	49.50	17.726	
12,000.00	11,154.80	12,172.55	11,405.98	24.49	27.79	106.63	896.29	757.60	877.62	826.73	50.90	17.243	
12,100.00	11,153.19	12,272.55	11,405.10	25.40	28.47	106.68	996.28	756.90	877.89	825.49	52.41	16.751	
12,200.00	11,151.59	12,372.55	11,404.23	26.35	29.20	106.72	1,096.27	756.20	878.17	824.15	54.02	16.256	
12,300.00	11,149.98	12,472.55	11,403.36	27.35	29.98	106.76	1,196.26	755.50	878.44	822.71	55.73	15.764	
12,400.00	11,148.38	12,572.54	11,402.48	28.38	30.81	106.81	1,296.25	754.79	878.71	821.20	57.51	15.278	
12,500.00	11,146.77	12,672.54	11,401.61	29.45	31.69	106.85	1,396.24	754.09	878.99	819.61	59.38	14.803	
12,600.00	11,145.16	12,772.54	11,400.73	30.55	32.60	106.90	1,496.23	753.39	879.26	817.95	61.32	14.340	
12,700.00	11,142.92	12,872.53	11,399.86	31.68	33.56	106.98	1,596.22	752.69	879.72	816.42	63.30	13.898	
12,800.00	11,140.51	12,972.52	11,398.98	32.83	34.55	107.07	1,696.20	751.98	880.24	814.89	65.34	13.471	
12,900.00	11,138.09	13,072.50	11,398.11	34.01	35.57	107.17	1,796.18	751.28	880.75	813.31	67.44	13.060	
13,000.00	11,135.67	13,172.49	11,397.24	35.20	36.61	107.26	1,896.16	750.58	881.27	811.69	69.58	12.666	
13,100.00	11,133.25	13,272.48	11,396.36	36.42	37.69	107.36	1,996.15	749.88	881.79	810.03	71.76	12.288	
13,200.00	11,131.74	13,372.48	11,395.49	37.65	38.79	107.40	2,096.14	749.17	882.05	808.05	74.00	11.920	
13,300.00	11,130.58	13,472.48	11,394.61	38.89	39.91	107.41	2,196.13	748.47	882.19	805.92	76.27	11.566	
13,400.00	11,129.43	13,572.48	11,393.74	40.15	41.05	107.43	2,296.12	747.77	882.34	803.75	78.58	11.228	
13,500.00	11,128.28	13,672.48	11,392.86	41.42	42.21	107.45	2,396.12	747.06	882.48	801.56	80.92	10.905	
13,600.00	11,127.12	13,772.48	11,391.99	42.70	43.39	107.46	2,496.11	746.36	882.63	799.34	83.29	10.597	
13,700.00	11,125.17	13,872.47	11,391.11	43.99	44.58	107.53	2,596.10	745.66	883.02	797.36	85.66	10.308	
13,800.00	11,122.94	13,972.46	11,390.24	45.29	45.79	107.61	2,696.08	744.96	883.49	795.44	88.05	10.034	
13,900.00	11,120.71	14,072.45	11,389.37	46.60	47.01	107.69	2,796.06	744.25	883.96	793.50	90.47	9.771	
14,000.00	11,118.47	14,172.44	11,388.49	47.92	48.25	107.77	2,896.05	743.55	884.44	791.54	92.90	9.521	
14,100.00	11,116.24	14,272.43	11,387.62	49.25	49.49	107.86	2,996.03	742.85	884.92	789.57	95.35	9.281	
14,200.00	11,114.21	14,372.42	11,386.74	50.58	50.75	107.93	3,096.02	742.15	885.33	787.52	97.81	9.051	
14,300.00	11,112.21	14,472.42	11,385.87	51.92	52.01	108.00	3,196.01	741.44	885.74	785.45	100.30	8.831	
14,400.00	11,110.21	14,572.41	11,384.99	53.26	53.29	108.06	3,296.00	740.74	886.15	783.36	102.79	8.621	
14,500.00	11,108.22	14,672.41	11,384.12	54.61	54.57	108.13	3,395.98	740.04	886.56	781.26	105.30	8.420	
14,600.00	11,106.22	14,772.40	11,383.25	55.96	55.86	108.20	3,495.97	739.34	886.97	779.16	107.82	8.227	
14,700.00	11,104.39	14,872.39	11,382.37	57.32	57.16	108.26	3,595.96	738.63	887.33	776.98	110.35	8.041	
14,800.00	11,102.59	14,972.39	11,381.50	58.68	58.46	108.31	3,695.95	737.93	887.69	774.79	112.90	7.863	
14,900.00	11,100.80	15,072.39	11,380.62	60.05	59.78	108.37	3,795.94	737.23	888.04	772.59	115.45	7.692	
15,000.00	11,099.00	15,172.38	11,379.75	61.42	61.09	108.42	3,895.93	736.53	888.39	770.38	118.01	7.528	
15,100.00	11,097.20	15,272.38	11,378.87	62.79	62.42	108.48	3,995.92	735.82	888.75	768.17	120.58	7.371	
15,200.00	11,094.91	15,372.37	11,378.00	64.16	63.75	108.56	4,095.90	735.12	889.26	766.12	123.14	7.222	
15,300.00	11,092.50	15,472.36	11,377.12	65.54	65.08	108.65	4,195.88	734.42	889.81	764.11	125.70	7.079	
15,400.00	11,090.09	15,572.34	11,376.25	66.93	66.42	108.75	4,295.86	733.71	890.36	762.10	128.27	6.941	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 405H - OH - Plan 1 09-05-17												Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 10943-MWD+HDGM												Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (")	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
15,500.00	11,087.68	15,672.33	11,375.38	68.31	67.76	108.84	4,395.85	733.01	890.92	760.08	130.84	6.809	
15,600.00	11,085.27	15,772.32	11,374.50	69.70	69.11	108.93	4,495.83	732.31	891.48	758.06	133.42	6.682	
15,700.00	11,082.55	15,872.30	11,373.63	71.09	70.46	109.04	4,595.80	731.61	892.14	756.15	135.99	6.560	
15,800.00	11,079.76	15,972.28	11,372.75	72.48	71.81	109.15	4,695.78	730.90	892.83	754.27	138.56	6.444	
15,899.05	11,077.00	16,070.58	11,371.89	73.86	73.16	109.27	4,794.07	730.21	893.51	752.42	141.09	6.333	



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 503H - OH - Plan 1 09-05-17												Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 11242-MWD+HDGM												Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	0.00	0.00	0.00	0.00	-36.67	54.75	-40.77	68.26				
100.00	100.00	100.00	100.00	0.10	0.10	-36.67	54.75	-40.77	68.26	68.06	0.20	347.490	
200.00	200.00	200.00	200.00	0.36	0.36	-36.67	54.75	-40.77	68.26	67.53	0.73	93.848	
300.00	300.00	300.00	300.00	0.63	0.63	-36.67	54.75	-40.77	68.26	67.00	1.26	54.250	
400.00	400.00	400.00	400.00	0.89	0.89	-36.67	54.75	-40.77	68.26	66.47	1.79	38.152	
500.00	500.00	500.00	500.00	1.16	1.16	-36.67	54.75	-40.77	68.26	65.94	2.32	29.421	
600.00	600.00	600.00	600.00	1.43	1.43	-36.67	54.75	-40.77	68.26	65.41	2.85	23.943	
700.00	700.00	700.00	700.00	1.69	1.69	-36.67	54.75	-40.77	68.26	64.88	3.38	20.184	
800.00	800.00	800.00	800.00	1.96	1.96	-36.67	54.75	-40.77	68.26	64.34	3.91	17.445	
900.00	900.00	900.00	900.00	2.22	2.22	-36.67	54.75	-40.77	68.26	63.81	4.44	15.361	
1,000.00	1,000.00	1,000.00	1,000.00	2.49	2.49	-36.67	54.75	-40.77	68.26	63.28	4.97	13.722	
1,100.00	1,100.00	1,100.00	1,100.00	2.75	2.75	-36.67	54.75	-40.77	68.26	62.75	5.51	12.398	
1,200.00	1,200.00	1,200.00	1,200.00	3.02	3.02	-36.67	54.75	-40.77	68.26	62.22	6.04	11.308	
1,300.00	1,300.00	1,300.00	1,300.00	3.28	3.28	-36.67	54.75	-40.77	68.26	61.69	6.57	10.394	
1,400.00	1,400.00	1,400.00	1,400.00	3.55	3.55	-36.67	54.75	-40.77	68.26	61.16	7.10	9.616	
1,500.00	1,500.00	1,500.00	1,500.00	3.81	3.81	-36.67	54.75	-40.77	68.26	60.63	7.63	8.947	
1,600.00	1,600.00	1,600.00	1,600.00	4.08	4.08	-36.67	54.75	-40.77	68.26	60.10	8.16	8.365	
1,700.00	1,700.00	1,700.00	1,700.00	4.35	4.35	-36.67	54.75	-40.77	68.26	59.57	8.69	7.854	
1,800.00	1,800.00	1,800.00	1,800.00	4.61	4.61	-36.67	54.75	-40.77	68.26	59.04	9.22	7.402	
1,900.00	1,900.00	1,900.00	1,900.00	4.88	4.88	-36.67	54.75	-40.77	68.26	58.51	9.75	6.999	
2,000.00	2,000.00	2,000.00	2,000.00	5.14	5.14	-36.67	54.75	-40.77	68.26	57.97	10.28	6.638	
2,100.00	2,100.00	2,100.00	2,100.00	5.41	5.41	-36.67	54.75	-40.77	68.26	57.44	10.81	6.312	
2,200.00	2,200.00	2,200.00	2,200.00	5.67	5.67	-36.67	54.75	-40.77	68.26	56.91	11.35	6.016	
2,300.00	2,300.00	2,300.00	2,300.00	5.94	5.94	-36.67	54.75	-40.77	68.26	56.38	11.88	5.747	
2,400.00	2,400.00	2,400.00	2,400.00	6.20	6.20	-36.67	54.75	-40.77	68.26	55.85	12.41	5.502	
2,500.00	2,500.00	2,500.00	2,500.00	6.47	6.47	-36.67	54.75	-40.77	68.26	55.32	12.94	5.276	
2,600.00	2,600.00	2,600.00	2,600.00	6.73	6.73	-36.67	54.75	-40.77	68.26	54.79	13.47	5.068	
2,700.00	2,700.00	2,700.00	2,700.00	7.00	7.00	-36.67	54.75	-40.77	68.26	54.26	14.00	4.876	
2,800.00	2,800.00	2,800.00	2,800.00	7.27	7.27	-36.67	54.75	-40.77	68.26	53.73	14.53	4.698	
2,900.00	2,900.00	2,900.00	2,900.00	7.53	7.53	-36.67	54.75	-40.77	68.26	53.20	15.06	4.532	
3,000.00	3,000.00	3,000.00	3,000.00	7.80	7.80	-36.67	54.75	-40.77	68.26	52.67	15.59	4.378	
3,100.00	3,100.00	3,100.00	3,100.00	8.06	8.06	-36.67	54.75	-40.77	68.26	52.13	16.12	4.234	
3,200.00	3,200.00	3,200.00	3,200.00	8.33	8.33	-36.67	54.75	-40.77	68.26	51.60	16.65	4.099	
3,300.00	3,300.00	3,300.00	3,300.00	8.59	8.59	-36.67	54.75	-40.77	68.26	51.07	17.18	3.972	
3,400.00	3,400.00	3,400.00	3,400.00	8.86	8.86	-36.67	54.75	-40.77	68.26	50.54	17.72	3.853	
3,500.00	3,500.00	3,500.00	3,500.00	9.12	9.12	-36.67	54.75	-40.77	68.26	50.01	18.25	3.741	
3,600.00	3,600.00	3,600.00	3,600.00	9.39	9.39	-36.67	54.75	-40.77	68.26	49.48	18.78	3.635	
3,700.00	3,700.00	3,700.00	3,700.00	9.65	9.65	-36.67	54.75	-40.77	68.26	48.95	19.31	3.535	
3,800.00	3,800.00	3,800.00	3,800.00	9.92	9.92	-36.67	54.75	-40.77	68.26	48.42	19.84	3.440	
3,900.00	3,900.00	3,900.00	3,900.00	10.19	10.19	-36.67	54.75	-40.77	68.26	47.89	20.37	3.351	
4,000.00	4,000.00	4,000.00	4,000.00	10.45	10.45	-36.67	54.75	-40.77	68.26	47.36	20.90	3.266	
4,100.00	4,100.00	4,100.00	4,100.00	10.72	10.72	-36.67	54.75	-40.77	68.26	46.83	21.43	3.185	
4,200.00	4,200.00	4,200.00	4,200.00	10.98	10.98	-36.67	54.75	-40.77	68.26	46.29	21.96	3.108	
4,300.00	4,300.00	4,300.00	4,300.00	11.25	11.25	-36.67	54.75	-40.77	68.26	45.76	22.49	3.034	
4,400.00	4,400.00	4,400.00	4,400.00	11.51	11.51	-36.67	54.75	-40.77	68.26	45.23	23.02	2.965	
4,500.00	4,500.00	4,500.00	4,500.00	11.78	11.78	-36.67	54.75	-40.77	68.26	44.70	23.56	2.898	
4,600.00	4,600.00	4,600.00	4,600.00	12.04	12.04	-36.67	54.75	-40.77	68.26	44.17	24.09	2.834	
4,700.00	4,700.00	4,700.00	4,700.00	12.31	12.31	-36.67	54.75	-40.77	68.26	43.64	24.62	2.773	
4,800.00	4,800.00	4,800.00	4,800.00	12.57	12.57	-36.67	54.75	-40.77	68.26	43.11	25.15	2.714	
4,900.00	4,900.00	4,900.00	4,900.00	12.84	12.84	-36.67	54.75	-40.77	68.26	42.58	25.68	2.658	
5,000.00	5,000.00	5,000.00	5,000.00	13.11	13.11	-36.67	54.75	-40.77	68.26	42.05	26.21	2.604	
5,100.00	5,100.00	5,100.00	5,100.00	13.37	13.37	-36.67	54.75	-40.77	68.26	41.52	26.74	2.553	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 503H - OH - Plan 1 09-05-17													Offset Site Error: 0.00 usft
Survey Program: 0-NS-GYRO-MS, 11242-MWD+HDGM													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
5,200.00	5,200.00	5,200.00	5,200.00	13.64	13.64	-36.67	54.75	-40.77	68.26	40.99	27.27	2.503	
5,300.00	5,300.00	5,300.00	5,300.00	13.90	13.90	-36.67	54.75	-40.77	68.26	40.45	27.80	2.455	
5,400.00	5,400.00	5,400.00	5,400.00	14.17	14.17	-36.67	54.75	-40.77	68.26	39.92	28.33	2.409	
5,500.00	5,500.00	5,500.00	5,500.00	14.43	14.43	-36.67	54.75	-40.77	68.26	39.39	28.86	2.365	
5,600.00	5,600.00	5,600.00	5,600.00	14.70	14.70	-36.67	54.75	-40.77	68.26	38.86	29.40	2.322	
5,700.00	5,700.00	5,700.00	5,700.00	14.96	14.96	-36.67	54.75	-40.77	68.26	38.33	29.93	2.281	
5,800.00	5,800.00	5,800.00	5,800.00	15.23	15.23	-36.67	54.75	-40.77	68.26	37.80	30.46	2.241	
5,900.00	5,900.00	5,900.24	5,900.24	15.47	15.47	116.66	54.72	-40.74	68.24	37.30	30.93	2.206	
6,000.00	5,999.99	6,001.41	6,001.40	15.45	15.48	117.75	53.84	-39.86	67.58	36.65	30.93	2.185	
6,100.00	6,099.95	6,102.51	6,102.45	15.44	15.50	120.50	51.69	-37.71	66.07	35.14	30.93	2.136	
6,200.00	6,199.87	6,203.49	6,203.32	15.43	15.52	124.46	48.29	-34.31	63.52	32.59	30.94	2.053	
6,300.00	6,299.80	6,304.31	6,303.92	15.42	15.54	129.31	43.64	-29.66	59.65	28.70	30.96	1.927	
6,400.00	6,399.72	6,404.91	6,404.18	15.43	15.57	135.60	37.76	-23.78	54.69	23.71	30.98	1.765	
6,500.00	6,499.65	6,505.05	6,503.82	15.43	15.60	144.13	30.70	-16.72	49.11	18.09	31.02	1.583	
6,600.00	6,599.57	6,604.56	6,602.78	15.44	15.64	154.93	23.34	-9.37	44.53	13.47	31.06	1.434 Level 3	
6,700.00	6,699.50	6,704.06	6,701.74	15.46	15.69	167.61	15.99	-2.01	41.85	10.74	31.12	1.345 Level 3	
6,767.05	6,766.50	6,770.78	6,768.09	15.47	15.72	176.72	11.06	2.92	41.32	10.16	31.16	1.326 Level 3, CC, ES, SF	
6,800.00	6,799.42	6,803.57	6,800.70	15.48	15.74	-178.77	8.64	5.34	41.45	10.26	31.19	1.329 Level 3	
6,900.00	6,899.35	6,903.07	6,899.66	15.50	15.79	-165.62	1.28	12.70	43.38	12.12	31.26	1.388 Level 3	
7,000.00	6,999.27	7,002.58	6,998.62	15.53	15.85	-154.13	-6.07	20.05	47.37	16.01	31.35	1.511	
7,100.00	7,099.20	7,102.08	7,097.58	15.56	15.91	-144.72	-13.43	27.41	52.94	21.49	31.45	1.683	
7,200.00	7,199.12	7,201.59	7,196.54	15.60	15.98	-137.25	-20.78	34.76	59.66	28.11	31.55	1.891	
7,300.00	7,299.05	7,301.09	7,295.50	15.64	16.05	-131.37	-28.14	42.11	67.19	35.52	31.67	2.122	
7,400.00	7,398.97	7,400.60	7,394.46	15.69	16.13	-126.70	-35.49	49.47	75.27	43.48	31.79	2.368	
7,500.00	7,498.90	7,500.10	7,493.42	15.74	16.21	-122.96	-42.85	56.82	83.76	51.84	31.92	2.624	
7,600.00	7,598.82	7,599.61	7,592.38	15.80	16.29	-119.91	-50.20	64.18	92.54	60.48	32.05	2.887	
7,700.00	7,698.75	7,699.11	7,691.34	15.86	16.38	-117.40	-57.56	71.53	101.53	69.33	32.20	3.153	
7,800.00	7,798.67	7,798.62	7,790.30	15.92	16.47	-115.30	-64.91	78.89	110.68	78.33	32.35	3.421	
7,900.00	7,898.60	7,898.12	7,889.26	15.99	16.57	-113.52	-72.27	86.24	119.96	87.45	32.51	3.690	
8,000.00	7,998.52	7,997.63	7,988.22	16.06	16.67	-111.99	-79.62	93.60	129.34	96.66	32.68	3.957	
8,100.00	8,098.45	8,097.13	8,087.17	16.14	16.78	-110.68	-86.98	100.95	138.79	105.94	32.86	4.224	
8,200.00	8,198.37	8,196.63	8,186.13	16.22	16.89	-109.53	-94.33	108.31	148.31	115.27	33.04	4.488	
8,300.00	8,298.30	8,296.14	8,285.09	16.30	17.00	-108.52	-101.68	115.66	157.88	124.65	33.23	4.751	
8,400.00	8,398.22	8,395.64	8,384.05	16.39	17.12	-107.63	-109.04	123.02	167.50	134.07	33.43	5.010	
8,500.00	8,498.15	8,495.15	8,483.01	16.49	17.24	-106.83	-116.39	130.37	177.15	143.51	33.64	5.266	
8,600.00	8,598.07	8,594.65	8,581.97	16.58	17.36	-106.12	-123.75	137.73	186.83	152.98	33.85	5.519	
8,700.00	8,698.00	8,694.16	8,680.93	16.68	17.49	-105.47	-131.10	145.08	196.54	162.46	34.07	5.768	
8,800.00	8,797.92	8,793.66	8,779.89	16.78	17.62	-104.89	-138.46	152.43	206.27	171.96	34.30	6.013	
8,900.00	8,897.85	8,893.17	8,878.85	16.89	17.75	-104.36	-145.81	159.79	216.01	181.48	34.54	6.255	
9,000.00	8,997.77	8,992.67	8,977.81	17.00	17.89	-103.87	-153.17	167.14	225.78	191.00	34.78	6.492	
9,100.00	9,097.70	9,092.18	9,076.77	17.12	18.03	-103.43	-160.52	174.50	235.56	200.53	35.02	6.726	
9,200.00	9,197.62	9,191.68	9,175.73	17.23	18.18	-103.02	-167.88	181.85	245.35	210.07	35.28	6.955	
9,300.00	9,297.55	9,292.42	9,275.93	17.36	18.33	-102.65	-175.26	189.24	255.08	219.54	35.54	7.178	
9,400.00	9,397.48	9,396.08	9,379.17	17.48	18.48	-102.45	-181.85	195.82	263.63	227.82	35.81	7.362	
9,500.00	9,497.40	9,500.00	9,482.81	17.61	18.64	-102.47	-187.13	201.10	270.64	234.55	36.09	7.499	
9,600.00	9,597.33	9,604.10	9,586.77	17.74	18.79	-102.70	-191.08	205.06	276.09	239.72	36.37	7.591	
9,700.00	9,697.25	9,708.33	9,690.93	17.87	18.95	-103.11	-193.70	207.68	280.00	243.34	36.66	7.637	
9,800.00	9,797.18	9,812.62	9,795.20	18.01	19.11	-103.72	-194.98	208.96	282.38	245.41	36.96	7.639	
9,900.00	9,897.10	9,914.52	9,897.10	18.15	19.32	-104.47	-195.12	209.10	283.48	246.16	37.31	7.597	
10,000.00	9,997.03	10,014.45	9,997.03	18.29	19.54	-105.22	-195.12	209.10	284.47	246.79	37.68	7.550	
10,100.00	10,096.95	10,114.37	10,096.95	18.43	19.76	-105.97	-195.12	209.10	285.51	247.46	38.05	7.504	
10,200.00	10,196.88	10,214.30	10,196.88	18.58	19.99	-106.72	-195.12	209.10	286.60	248.18	38.42	7.460	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 503H - OH - Plan 1 09-05-17													Offset Site Error: 0.00 usft
Survey Program: 0-NS-GYRO-MS, 11242-MWD+HDGM													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
10,300.00	10,296.82	10,314.25	10,296.82	18.73	20.21	-107.33	-195.12	209.10	287.53	248.73	38.80	7.411	
10,400.00	10,396.81	10,414.23	10,396.81	18.88	20.43	-107.61	-195.12	209.10	287.97	248.79	39.18	7.350	
10,500.00	10,496.81	10,514.23	10,496.81	19.08	20.66	99.07	-195.12	209.10	288.00	248.39	39.60	7.272	
10,600.00	10,596.81	10,614.23	10,596.81	19.29	20.89	99.07	-195.12	209.10	288.00	247.96	40.04	7.193	
10,662.74	10,659.55	10,676.98	10,659.55	19.35	21.03	99.59	-195.12	209.10	288.07	247.83	40.24	7.159	
10,700.00	10,696.81	10,714.23	10,696.81	19.38	21.11	99.53	-195.12	209.10	288.02	247.66	40.36	7.136	
10,800.00	10,795.83	10,813.25	10,795.83	19.39	21.34	101.68	-195.12	209.10	290.37	249.83	40.54	7.162	
10,900.00	10,890.06	10,907.48	10,890.06	19.41	21.55	106.54	-195.12	209.10	298.96	258.40	40.56	7.371	
11,000.00	10,975.38	10,992.80	10,975.38	19.47	21.75	112.12	-195.12	209.10	318.94	278.72	40.21	7.931	
11,100.00	11,048.06	11,065.48	11,048.06	19.57	21.92	116.12	-195.12	209.10	355.31	315.76	39.55	8.984	
11,200.00	11,104.94	11,122.36	11,104.94	19.75	22.05	116.57	-195.12	209.10	409.88	370.68	39.20	10.457	
11,300.00	11,143.51	11,160.94	11,143.51	20.03	22.14	111.45	-195.12	209.10	480.50	440.41	40.09	11.986	
11,400.00	11,162.11	11,179.53	11,162.11	20.42	22.18	98.03	-195.12	209.10	562.60	520.43	42.17	13.342	
11,500.00	11,162.83	12,104.69	11,701.15	20.90	23.79	152.15	394.95	204.97	608.87	573.44	35.43	17.187	
11,600.00	11,161.22	12,204.69	11,700.28	21.47	24.34	152.18	494.94	204.27	609.55	573.54	36.00	16.930	
11,700.00	11,159.62	12,304.69	11,699.40	22.12	24.96	152.20	594.93	203.57	610.23	573.55	36.68	16.638	
11,800.00	11,158.01	12,404.69	11,698.53	22.85	25.64	152.23	694.92	202.87	610.91	573.47	37.43	16.320	
11,900.00	11,156.40	12,504.68	11,697.66	23.64	26.39	152.25	794.91	202.17	611.59	573.31	38.27	15.979	
12,000.00	11,154.80	12,604.68	11,696.79	24.49	27.20	152.28	894.90	201.47	612.27	573.08	39.19	15.623	
12,100.00	11,153.19	12,704.68	11,695.91	25.40	28.05	152.31	994.90	200.77	612.95	572.77	40.18	15.256	
12,200.00	11,151.59	12,804.68	11,695.04	26.35	28.95	152.33	1,094.89	200.07	613.63	572.40	41.23	14.882	
12,300.00	11,149.98	12,904.67	11,694.17	27.35	29.90	152.36	1,194.88	199.37	614.31	571.97	42.35	14.507	
12,400.00	11,148.38	13,004.67	11,693.30	28.38	30.88	152.39	1,294.87	198.68	614.99	571.48	43.52	14.133	
12,500.00	11,146.77	13,104.67	11,692.42	29.45	31.90	152.41	1,394.86	197.98	615.67	570.94	44.74	13.762	
12,600.00	11,145.16	13,204.66	11,691.55	30.55	32.96	152.44	1,494.85	197.28	616.35	570.35	46.00	13.398	
12,700.00	11,142.92	13,304.65	11,690.68	31.68	34.04	152.49	1,594.83	196.58	617.60	570.27	47.33	13.050	
12,800.00	11,140.51	13,404.64	11,689.81	32.83	35.14	152.55	1,694.82	195.88	619.00	570.34	48.66	12.720	
12,900.00	11,138.09	13,504.63	11,688.93	34.01	36.27	152.61	1,794.80	195.18	620.40	570.37	50.03	12.400	
13,000.00	11,135.67	13,604.62	11,688.06	35.20	37.42	152.67	1,894.78	194.48	621.81	570.37	51.43	12.089	
13,100.00	11,133.25	13,704.61	11,687.19	36.42	38.60	152.73	1,994.76	193.78	623.21	570.35	52.87	11.789	
13,200.00	11,131.74	13,804.60	11,686.32	37.65	39.79	152.75	2,094.75	193.08	623.82	569.51	54.30	11.487	
13,300.00	11,130.58	13,904.60	11,685.44	38.89	40.99	152.76	2,194.75	192.38	624.10	568.28	55.81	11.182	
13,400.00	11,129.43	14,004.60	11,684.57	40.15	42.21	152.77	2,294.74	191.68	624.38	567.03	57.35	10.887	
13,500.00	11,128.28	14,104.60	11,683.70	41.42	43.45	152.77	2,394.73	190.98	624.66	565.75	58.91	10.604	
13,600.00	11,127.12	14,204.60	11,682.83	42.70	44.70	152.78	2,494.73	190.28	624.94	564.46	60.48	10.332	
13,700.00	11,125.17	14,304.60	11,681.95	43.99	45.95	152.82	2,594.71	189.58	625.93	563.84	62.09	10.081	
13,800.00	11,122.94	14,404.59	11,681.08	45.29	47.22	152.87	2,694.70	188.88	627.17	563.50	63.68	9.849	
13,900.00	11,120.71	14,504.58	11,680.21	46.60	48.50	152.92	2,794.68	188.19	628.42	563.14	65.27	9.627	
14,000.00	11,118.47	14,604.57	11,679.33	47.92	49.79	152.97	2,894.67	187.49	629.66	562.77	66.89	9.414	
14,100.00	11,116.24	14,704.56	11,678.46	49.25	51.09	153.02	2,994.65	186.79	630.90	562.39	68.51	9.209	
14,200.00	11,114.21	14,804.55	11,677.59	50.58	52.39	153.06	3,094.64	186.09	631.96	561.82	70.14	9.010	
14,300.00	11,112.21	14,904.54	11,676.72	51.92	53.71	153.10	3,194.62	185.39	633.00	561.20	71.80	8.817	
14,400.00	11,110.21	15,004.54	11,675.84	53.26	55.02	153.14	3,294.61	184.69	634.03	560.58	73.46	8.631	
14,500.00	11,108.22	15,104.53	11,674.97	54.61	56.35	153.18	3,394.60	183.99	635.07	559.94	75.13	8.453	
14,600.00	11,106.22	15,204.53	11,674.10	55.96	57.68	153.22	3,494.59	183.29	636.10	559.29	76.81	8.282	
14,700.00	11,104.39	15,304.52	11,673.23	57.32	59.02	153.26	3,594.58	182.59	636.99	558.49	78.50	8.115	
14,800.00	11,102.59	15,404.52	11,672.35	58.68	60.36	153.29	3,694.57	181.89	637.84	557.65	80.20	7.953	
14,900.00	11,100.80	15,504.51	11,671.48	60.05	61.70	153.32	3,794.55	181.19	638.70	556.80	81.91	7.798	
15,000.00	11,099.00	15,604.51	11,670.61	61.42	63.05	153.35	3,894.54	180.49	639.56	555.94	83.62	7.648	
15,100.00	11,097.20	15,704.50	11,669.74	62.79	64.41	153.38	3,994.53	179.79	640.42	555.08	85.34	7.504	
15,200.00	11,094.91	15,804.49	11,668.86	64.16	65.77	153.43	4,094.52	179.09	641.71	554.65	87.07	7.370	
15,300.00	11,092.50	15,904.48	11,667.99	65.54	67.13	153.49	4,194.50	178.39	643.12	554.35	88.77	7.245	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Black & Tan 27 Federal Com - 503H - OH - Plan 1 09-05-17													Offset Site Error:	0.00 usft
Survey Program: 0-NS-GYRO-MS, 11242-MWD+HDGM													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (")	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
15,400.00	11,090.09	16,004.47	11,667.12	66.93	68.49	153.54	4,294.48	177.69	644.53	554.04	90.48	7.123		
15,500.00	11,087.68	16,104.46	11,666.25	68.31	69.86	153.60	4,394.46	177.00	645.93	553.74	92.20	7.006		
15,600.00	11,085.27	16,204.45	11,665.37	69.70	71.23	153.66	4,494.44	176.30	647.34	553.43	93.91	6.893		
15,700.00	11,082.55	16,304.43	11,664.50	71.09	72.61	153.72	4,594.42	175.60	649.03	553.40	95.63	6.787		
15,800.00	11,079.76	16,404.41	11,663.63	72.48	73.98	153.79	4,694.40	174.90	650.78	553.44	97.34	6.686		
15,899.05	11,077.00	16,498.73	11,662.81	73.86	75.28	153.85	4,788.71	174.24	652.53	553.53	98.99	6.592		



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Gulf - Federal - OH - Assumed Surveys												Offset Site Error:	0.00 usft
Survey Program: 100-INC-ONLY-Offset Well												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)					
0.00	0.00	0.00	20.00	0.00	0.00	54.24	108.29	150.38	186.39				
100.00	100.00	80.00	100.00	0.10	1.21	54.24	108.29	150.38	185.32	184.01	1.30	142.040	
200.00	200.00	180.00	200.00	0.36	3.90	54.24	108.29	150.38	185.32	181.05	4.26	43.463	
300.00	300.00	280.02	300.00	0.63	6.90	54.24	108.29	150.38	185.32	177.79	7.52	24.631	
400.00	400.00	380.04	400.00	0.89	9.89	54.24	108.29	150.38	185.32	174.53	10.79	17.182	
500.00	500.00	480.06	500.00	1.16	12.89	54.24	108.29	150.38	185.32	171.27	14.05	13.192	
600.00	600.00	580.08	600.00	1.43	15.88	54.24	108.29	150.38	185.32	168.01	17.31	10.706	
700.00	700.00	680.10	700.00	1.69	18.88	54.24	108.29	150.38	185.32	164.75	20.57	9.008	
800.00	800.00	780.12	800.00	1.96	21.88	54.24	108.29	150.38	185.32	161.48	23.83	7.775	
900.00	900.00	880.14	900.00	2.22	24.88	54.24	108.29	150.38	185.32	158.22	27.10	6.839	
1,000.00	1,000.00	980.16	1,000.00	2.49	27.87	54.24	108.29	150.38	185.32	154.96	30.36	6.104	
1,100.00	1,100.00	1,080.18	1,100.00	2.75	30.87	54.24	108.29	150.38	185.32	151.70	33.62	5.512	
1,200.00	1,200.00	1,180.20	1,200.00	3.02	33.87	54.24	108.29	150.38	185.32	148.43	36.88	5.024	
1,300.00	1,300.00	1,280.22	1,300.00	3.28	36.86	54.24	108.29	150.38	185.32	145.17	40.15	4.616	
1,400.00	1,400.00	1,380.24	1,400.00	3.55	39.86	54.24	108.29	150.38	185.32	141.91	43.41	4.269	
1,500.00	1,500.00	1,480.26	1,500.00	3.81	42.86	54.24	108.29	150.38	185.32	138.65	46.67	3.971	
1,600.00	1,600.00	1,580.28	1,600.00	4.08	45.85	54.24	108.29	150.38	185.32	135.38	49.93	3.711	
1,700.00	1,700.00	1,680.30	1,700.00	4.35	48.85	54.24	108.29	150.38	185.32	132.12	53.20	3.484	
1,800.00	1,800.00	1,780.32	1,800.00	4.61	51.85	54.24	108.29	150.38	185.32	128.86	56.46	3.282	
1,900.00	1,900.00	1,880.35	1,900.00	4.88	54.85	54.24	108.29	150.38	185.32	125.60	59.72	3.103	
2,000.00	2,000.00	1,980.37	2,000.00	5.14	57.84	54.24	108.29	150.38	185.32	122.33	62.98	2.942	
2,100.00	2,100.00	2,080.39	2,100.00	5.41	60.84	54.24	108.29	150.38	185.32	119.07	66.25	2.797	
2,200.00	2,200.00	2,180.41	2,200.00	5.67	63.84	54.24	108.29	150.38	185.32	115.81	69.51	2.666	
2,300.00	2,300.00	2,280.43	2,300.00	5.94	66.83	54.24	108.29	150.38	185.32	112.55	72.77	2.547	
2,400.00	2,400.00	2,380.45	2,400.00	6.20	69.83	54.24	108.29	150.38	185.32	109.28	76.03	2.437	
2,500.00	2,500.00	2,480.47	2,500.00	6.47	72.83	54.24	108.29	150.38	185.32	106.02	79.30	2.337	
2,600.00	2,600.00	2,580.49	2,600.00	6.73	75.82	54.24	108.29	150.38	185.32	102.76	82.56	2.245	
2,700.00	2,700.00	2,680.51	2,700.00	7.00	78.82	54.24	108.29	150.38	185.32	99.50	85.82	2.159	
2,800.00	2,800.00	2,780.53	2,800.00	7.27	81.82	54.24	108.29	150.38	185.32	96.23	89.08	2.080	
2,900.00	2,900.00	2,880.55	2,900.00	7.53	84.82	54.24	108.29	150.38	185.32	92.97	92.35	2.007	
3,000.00	3,000.00	2,980.57	3,000.00	7.80	87.81	54.24	108.29	150.38	185.32	89.71	95.61	1.938	
3,100.00	3,100.00	3,080.59	3,100.00	8.06	90.81	54.24	108.29	150.38	185.32	86.45	98.87	1.874	
3,200.00	3,200.00	3,180.61	3,200.00	8.33	93.81	54.24	108.29	150.38	185.32	83.18	102.13	1.814	
3,300.00	3,300.00	3,280.63	3,300.00	8.59	96.80	54.24	108.29	150.38	185.32	79.92	105.40	1.758	
3,344.62	3,344.62	3,325.27	3,344.62	8.71	98.14	54.24	108.29	150.38	185.32	78.46	106.85	1.734 CC, ES, SF	
3,400.00	3,400.00	3,341.00	3,360.34	8.86	98.61	54.24	108.29	150.38	189.51	82.04	107.47	1.763	
3,500.00	3,500.00	3,341.00	3,360.34	9.12	98.61	54.24	108.29	150.38	232.05	124.31	107.74	2.154	
3,600.00	3,600.00	3,341.00	3,360.34	9.39	98.61	54.24	108.29	150.38	302.95	194.95	108.00	2.805	
3,700.00	3,700.00	3,341.00	3,360.34	9.65	98.61	54.24	108.29	150.38	386.92	278.66	108.27	3.574	
3,800.00	3,800.00	3,341.00	3,360.34	9.92	98.61	54.24	108.29	150.38	477.12	368.59	108.53	4.396	
3,900.00	3,900.00	3,341.00	3,360.34	10.19	98.61	54.24	108.29	150.38	570.59	461.79	108.80	5.244	
4,000.00	4,000.00	3,341.00	3,360.34	10.45	98.61	54.24	108.29	150.38	665.96	556.90	109.06	6.106	
4,100.00	4,100.00	3,341.00	3,360.34	10.72	98.61	54.24	108.29	150.38	762.52	653.19	109.33	6.975	
4,200.00	4,200.00	3,341.00	3,360.34	10.98	98.61	54.24	108.29	150.38	859.87	750.27	109.59	7.846	
4,300.00	4,300.00	3,341.00	3,360.34	11.25	98.61	54.24	108.29	150.38	957.76	847.90	109.86	8.718	
4,400.00	4,400.00	3,341.00	3,360.34	11.51	98.61	54.24	108.29	150.38	1,056.05	945.92	110.13	9.589	
4,500.00	4,500.00	3,341.00	3,360.34	11.78	98.61	54.24	108.29	150.38	1,154.63	1,044.24	110.39	10.459	
4,600.00	4,600.00	3,341.00	3,360.34	12.04	98.61	54.24	108.29	150.38	1,253.43	1,142.78	110.66	11.327	
4,700.00	4,700.00	3,341.00	3,360.34	12.31	98.61	54.24	108.29	150.38	1,352.42	1,241.49	110.92	12.192	
4,800.00	4,800.00	3,341.00	3,360.34	12.57	98.61	54.24	108.29	150.38	1,451.54	1,340.35	111.19	13.055	
4,900.00	4,900.00	3,341.00	3,360.34	12.84	98.61	54.24	108.29	150.38	1,550.77	1,439.32	111.45	13.914	
5,000.00	5,000.00	3,341.00	3,360.34	13.11	98.61	54.24	108.29	150.38	1,650.10	1,538.38	111.72	14.770	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Gulf - Federal - OH - Assumed Surveys													Offset Site Error:	0.00 usft
Survey Program: 100-INC-ONLY-Offset Well													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
5,100.00	5,100.00	3,341.00	3,360.34	13.37	98.61	54.24	108.29	150.38	1,749.50	1,637.52	111.98	15.623		
5,200.00	5,200.00	3,341.00	3,360.34	13.64	98.61	54.24	108.29	150.38	1,848.97	1,736.72	112.25	16.472		
5,300.00	5,300.00	3,341.00	3,360.34	13.90	98.61	54.24	108.29	150.38	1,948.49	1,835.98	112.51	17.318		
5,400.00	5,400.00	3,341.00	3,360.34	14.17	98.61	54.24	108.29	150.38	2,048.06	1,935.28	112.78	18.160		
5,500.00	5,500.00	3,341.00	3,360.34	14.43	98.61	54.24	108.29	150.38	2,147.67	2,034.62	113.05	18.998		
5,600.00	5,600.00	3,341.00	3,360.34	14.70	98.61	54.24	108.29	150.38	2,247.31	2,134.00	113.31	19.833		
5,700.00	5,700.00	3,341.00	3,360.34	14.96	98.61	54.24	108.29	150.38	2,346.99	2,233.41	113.58	20.664		
5,800.00	5,800.00	3,341.00	3,360.34	15.23	98.61	54.24	108.29	150.38	2,446.69	2,332.84	113.84	21.492		
5,900.00	5,900.00	3,341.00	3,360.34	15.47	98.61	-151.14	108.29	150.38	2,546.41	2,432.33	114.08	22.322		
6,000.00	5,999.99	3,341.00	3,360.34	15.45	98.61	-142.14	108.29	150.38	2,646.22	2,532.18	114.05	23.203		
6,100.00	6,099.95	3,341.00	3,360.34	15.44	98.61	-126.43	108.29	150.38	2,746.12	2,632.10	114.02	24.085		
6,200.00	6,199.87	3,341.00	3,360.34	15.43	98.61	-126.07	108.29	150.38	2,846.05	2,732.04	114.01	24.963		
6,300.00	6,299.80	3,341.00	3,360.34	15.42	98.61	-126.07	108.29	150.38	2,945.98	2,831.97	114.01	25.840		
6,400.00	6,399.72	3,341.00	3,360.34	15.43	98.61	-126.07	108.29	150.38	3,045.92	2,931.91	114.01	26.716		
6,500.00	6,499.65	3,341.00	3,360.34	15.43	98.61	-126.07	108.29	150.38	3,145.86	3,031.85	114.02	27.592		
6,600.00	6,599.57	3,341.00	3,360.34	15.44	98.61	-126.07	108.29	150.38	3,245.81	3,131.78	114.03	28.466		
6,700.00	6,699.50	3,341.00	3,360.34	15.46	98.61	-126.07	108.29	150.38	3,345.75	3,231.71	114.04	29.338		
6,800.00	6,799.42	3,341.00	3,360.34	15.48	98.61	-126.07	108.29	150.38	3,445.70	3,331.64	114.06	30.210		
6,900.00	6,899.35	3,341.00	3,360.34	15.50	98.61	-126.07	108.29	150.38	3,545.66	3,431.57	114.08	31.079		
7,000.00	6,999.27	3,341.00	3,360.34	15.53	98.61	-126.07	108.29	150.38	3,645.62	3,531.50	114.11	31.947		
7,100.00	7,099.20	3,341.00	3,360.34	15.56	98.61	-126.07	108.29	150.38	3,745.57	3,631.43	114.15	32.814		
7,200.00	7,199.12	3,341.00	3,360.34	15.60	98.61	-126.07	108.29	150.38	3,845.54	3,731.35	114.18	33.678		
7,300.00	7,299.05	3,341.00	3,360.34	15.64	98.61	-126.07	108.29	150.38	3,945.50	3,831.27	114.23	34.541		
7,400.00	7,398.97	3,341.00	3,360.34	15.69	98.61	-126.07	108.29	150.38	4,045.46	3,931.19	114.27	35.402		
7,500.00	7,498.90	3,341.00	3,360.34	15.74	98.61	-126.07	108.29	150.38	4,145.43	4,031.11	114.32	36.260		
7,600.00	7,598.82	3,341.00	3,360.34	15.80	98.61	-126.07	108.29	150.38	4,245.40	4,131.02	114.38	37.117		
7,700.00	7,698.75	3,341.00	3,360.34	15.86	98.61	-126.07	108.29	150.38	4,345.37	4,230.93	114.44	37.971		
7,800.00	7,798.67	3,341.00	3,360.34	15.92	98.61	-126.07	108.29	150.38	4,445.34	4,330.84	114.50	38.823		
7,900.00	7,898.60	3,341.00	3,360.34	15.99	98.61	-126.07	108.29	150.38	4,545.31	4,430.74	114.57	39.672		
8,000.00	7,998.52	3,341.00	3,360.34	16.06	98.61	-126.07	108.29	150.38	4,645.28	4,530.64	114.64	40.520		
8,100.00	8,098.45	3,341.00	3,360.34	16.14	98.61	-126.07	108.29	150.38	4,745.26	4,630.54	114.72	41.364		
8,200.00	8,198.37	3,341.00	3,360.34	16.22	98.61	-126.07	108.29	150.38	4,845.23	4,730.43	114.80	42.206		
8,300.00	8,298.30	3,341.00	3,360.34	16.30	98.61	-126.07	108.29	150.38	4,945.21	4,830.33	114.88	43.045		
8,400.00	8,398.22	3,341.00	3,360.34	16.39	98.61	-126.07	108.29	150.38	5,045.19	4,930.22	114.97	43.882		
8,500.00	8,498.15	3,341.00	3,360.34	16.49	98.61	-126.07	108.29	150.38	5,145.17	5,030.10	115.06	44.716		
8,600.00	8,598.07	3,341.00	3,360.34	16.58	98.61	-126.07	108.29	150.38	5,245.15	5,129.98	115.16	45.546		
8,700.00	8,698.00	3,341.00	3,360.34	16.68	98.61	-126.07	108.29	150.38	5,345.13	5,229.87	115.26	46.375		
8,800.00	8,797.92	3,341.00	3,360.34	16.78	98.61	-126.07	108.29	150.38	5,445.11	5,329.74	115.36	47.200		
8,900.00	8,897.85	3,341.00	3,360.34	16.89	98.61	-126.07	108.29	150.38	5,545.09	5,429.62	115.47	48.022		
9,000.00	8,997.77	3,341.00	3,360.34	17.00	98.61	-126.07	108.29	150.38	5,645.07	5,529.49	115.58	48.841		
9,100.00	9,097.70	3,341.00	3,360.34	17.12	98.61	-126.07	108.29	150.38	5,745.05	5,629.36	115.69	49.657		
9,200.00	9,197.62	3,341.00	3,360.34	17.23	98.61	-126.07	108.29	150.38	5,845.04	5,729.22	115.81	50.470		
9,300.00	9,297.55	3,341.00	3,360.34	17.36	98.61	-126.07	108.29	150.38	5,945.02	5,829.09	115.93	51.280		
9,400.00	9,397.48	3,341.00	3,360.34	17.48	98.61	-126.07	108.29	150.38	6,045.00	5,928.95	116.06	52.087		
9,500.00	9,497.40	3,341.00	3,360.34	17.61	98.61	-126.07	108.29	150.38	6,144.99	6,028.81	116.18	52.891		
9,600.00	9,597.33	3,341.00	3,360.34	17.74	98.61	-126.07	108.29	150.38	6,244.97	6,128.66	116.31	53.691		
9,700.00	9,697.25	3,341.00	3,360.34	17.87	98.61	-126.07	108.29	150.38	6,344.96	6,228.51	116.45	54.489		
9,800.00	9,797.18	3,341.00	3,360.34	18.01	98.61	-126.07	108.29	150.38	6,444.95	6,328.36	116.58	55.283		
9,900.00	9,897.10	3,341.00	3,360.34	18.15	98.61	-126.07	108.29	150.38	6,544.93	6,428.21	116.72	56.074		
10,000.00	9,997.03	3,341.00	3,360.34	18.29	98.61	-126.07	108.29	150.38	6,644.92	6,528.06	116.86	56.861		
10,100.00	10,096.95	3,341.00	3,360.34	18.43	98.61	-126.07	108.29	150.38	6,744.91	6,627.90	117.01	57.645		
10,200.00	10,196.88	3,341.00	3,360.34	18.58	98.61	-126.07	108.29	150.38	6,844.89	6,727.74	117.15	58.427		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Gulf - Federal - OH - Assumed Surveys													Offset Site Error:	0.00 usft
Survey Program: 100-INC-ONLY-Offset Well													Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning								
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
10,300.00	10,296.82	3,341.00	3,360.34	18.73	98.61	-153.12	108.29	150.38	6,944.87	6,827.58	117.29	59.211		
10,400.00	10,396.81	3,341.00	3,360.34	18.88	98.61	-163.59	108.29	150.38	7,044.81	6,927.36	117.46	59.979		
10,500.00	10,496.81	3,341.00	3,360.34	19.08	98.61	41.18	108.29	150.38	7,144.70	7,027.05	117.65	60.728		
10,600.00	10,596.81	3,341.00	3,360.34	19.29	98.61	41.18	108.29	150.38	7,244.58	7,126.73	117.86	61.468		
10,700.00	10,696.81	3,341.00	3,360.34	19.38	98.61	28.57	108.29	150.38	7,344.47	7,226.54	117.93	62.281		
10,800.00	10,795.83	3,341.00	3,360.34	19.39	98.61	6.68	108.29	150.38	7,442.96	7,327.87	115.08	64.676		
10,900.00	10,890.06	3,341.00	3,360.34	19.41	98.61	3.83	108.29	150.38	7,536.10	7,428.43	107.67	69.991		
11,000.00	10,975.38	3,341.00	3,360.34	19.47	98.61	2.75	108.29	150.38	7,620.09	7,523.96	96.13	79.267		
11,100.00	11,048.06	3,341.00	3,360.34	19.57	98.61	2.22	108.29	150.38	7,691.62	7,610.53	81.09	94.850		
11,200.00	11,104.94	3,341.00	3,360.34	19.75	98.61	1.92	108.29	150.38	7,747.95	7,684.57	63.37	122.257		
11,300.00	11,143.51	3,341.00	3,360.34	20.03	98.61	1.76	108.29	150.38	7,786.95	7,743.00	43.95	177.164		
11,400.00	11,162.11	3,341.00	3,360.34	20.42	98.61	1.68	108.29	150.38	7,807.20	7,782.97	24.24	322.122		
11,500.00	11,162.83	3,341.00	3,360.34	20.90	98.61	1.67	108.29	150.38	7,810.89	7,791.28	19.61	398.256		
11,600.00	11,161.22	3,341.00	3,360.34	21.47	98.61	1.67	108.29	150.38	7,813.53	7,793.73	19.80	394.536		
11,700.00	11,159.62	3,341.00	3,360.34	22.12	98.61	1.67	108.29	150.38	7,817.45	7,797.42	20.03	390.237		
11,800.00	11,158.01	3,341.00	3,360.34	22.85	98.61	1.67	108.29	150.38	7,822.65	7,802.35	20.30	385.430		
11,900.00	11,156.40	3,341.00	3,360.34	23.64	98.61	1.67	108.29	150.38	7,829.12	7,808.53	20.59	380.191		
12,000.00	11,154.80	3,341.00	3,360.34	24.49	98.61	1.67	108.29	150.38	7,836.86	7,815.94	20.92	374.595		
12,100.00	11,153.19	3,341.00	3,360.34	25.40	98.61	1.67	108.29	150.38	7,845.87	7,824.59	21.28	368.714		
12,200.00	11,151.59	3,341.00	3,360.34	26.35	98.61	1.67	108.29	150.38	7,856.14	7,834.48	21.67	362.618		
12,300.00	11,149.98	3,341.00	3,360.34	27.35	98.61	1.67	108.29	150.38	7,867.67	7,845.59	22.08	356.369		
12,400.00	11,148.38	3,341.00	3,360.34	28.38	98.61	1.67	108.29	150.38	7,880.45	7,857.94	22.51	350.026		
12,500.00	11,146.77	3,341.00	3,360.34	29.45	98.61	1.67	108.29	150.38	7,894.48	7,871.51	22.97	343.639		
12,600.00	11,145.16	3,341.00	3,360.34	30.55	98.61	1.67	108.29	150.38	7,909.75	7,886.29	23.45	337.251		
12,700.00	11,142.92	3,341.00	3,360.34	31.68	98.61	1.67	108.29	150.38	7,925.62	7,901.29	24.33	325.761		
12,800.00	11,140.51	3,341.00	3,360.34	32.83	98.61	1.67	108.29	150.38	7,942.55	7,917.70	24.85	319.663		
12,900.00	11,138.09	3,341.00	3,360.34	34.01	98.61	1.67	108.29	150.38	7,960.69	7,935.31	25.38	313.655		
13,000.00	11,135.67	3,341.00	3,360.34	35.20	98.61	1.67	108.29	150.38	7,980.05	7,954.12	25.93	307.757		
13,100.00	11,133.25	3,341.00	3,360.34	36.42	98.61	1.67	108.29	150.38	8,000.61	7,974.12	26.49	301.985		
13,200.00	11,131.74	3,341.00	3,360.34	37.65	98.61	1.67	108.29	150.38	8,023.25	7,996.71	26.54	302.305		
13,300.00	11,130.58	3,341.00	3,360.34	38.89	98.61	1.67	108.29	150.38	8,047.41	8,020.28	27.13	296.614		
13,400.00	11,129.43	3,341.00	3,360.34	40.15	98.61	1.67	108.29	150.38	8,072.74	8,045.01	27.73	291.089		
13,500.00	11,128.28	3,341.00	3,360.34	41.42	98.61	1.67	108.29	150.38	8,099.23	8,070.88	28.35	285.734		
13,600.00	11,127.12	3,341.00	3,360.34	42.70	98.61	1.67	108.29	150.38	8,126.86	8,097.89	28.97	280.551		
13,700.00	11,125.17	3,341.00	3,360.34	43.99	98.61	1.67	108.29	150.38	8,154.85	8,124.82	30.03	271.538		
13,800.00	11,122.94	3,341.00	3,360.34	45.29	98.61	1.67	108.29	150.38	8,183.71	8,153.04	30.67	266.827		
13,900.00	11,120.71	3,341.00	3,360.34	46.60	98.61	1.67	108.29	150.38	8,213.68	8,182.37	31.32	262.278		
14,000.00	11,118.47	3,341.00	3,360.34	47.92	98.61	1.67	108.29	150.38	8,244.76	8,212.79	31.97	257.890		
14,100.00	11,116.24	3,341.00	3,360.34	49.25	98.61	1.67	108.29	150.38	8,276.93	8,244.30	32.63	253.658		
14,200.00	11,114.21	3,341.00	3,360.34	50.58	98.61	1.67	108.29	150.38	8,310.37	8,277.18	33.18	250.434		
14,300.00	11,112.21	3,341.00	3,360.34	51.92	98.61	1.67	108.29	150.38	8,344.90	8,311.04	33.86	246.480		
14,400.00	11,110.21	3,341.00	3,360.34	53.26	98.61	1.67	108.29	150.38	8,380.48	8,345.95	34.53	242.671		
14,500.00	11,108.22	3,341.00	3,360.34	54.61	98.61	1.67	108.29	150.38	8,417.11	8,381.89	35.22	239.004		
14,600.00	11,106.22	3,341.00	3,360.34	55.96	98.61	1.67	108.29	150.38	8,454.75	8,418.85	35.91	235.474		
14,700.00	11,104.39	3,341.00	3,360.34	57.32	98.61	1.67	108.29	150.38	8,493.57	8,457.06	36.51	232.640		
14,800.00	11,102.59	3,341.00	3,360.34	58.68	98.61	1.67	108.29	150.38	8,533.40	8,496.19	37.21	229.354		
14,900.00	11,100.80	3,341.00	3,360.34	60.05	98.61	1.67	108.29	150.38	8,574.22	8,536.31	37.91	226.192		
15,000.00	11,099.00	3,341.00	3,360.34	61.42	98.61	1.67	108.29	150.38	8,616.00	8,577.39	38.61	223.149		
15,100.00	11,097.20	3,341.00	3,360.34	62.79	98.61	1.67	108.29	150.38	8,658.74	8,619.42	39.32	220.219		
15,200.00	11,094.91	3,341.00	3,360.34	64.16	98.61	1.67	108.29	150.38	8,701.97	8,661.65	40.32	215.819		
15,300.00	11,092.50	3,341.00	3,360.34	65.54	98.61	1.67	108.29	150.38	8,746.03	8,705.00	41.03	213.140		
15,400.00	11,090.09	3,341.00	3,360.34	66.93	98.61	1.67	108.29	150.38	8,791.00	8,749.25	41.75	210.560		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Gulf - Federal - OH - Assumed Surveys													Offset Site Error:	0.00 usft
Survey Program: 100-INC-ONLY-Offset Well													Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning								
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
15,500.00	11,087.68	3,341.00	3,360.34	68.31	98.61	1.67	108.29	150.38	8,836.88	8,794.41	42.47	208.075		
15,600.00	11,085.27	3,341.00	3,360.34	69.70	98.61	1.67	108.29	150.38	8,883.65	8,840.45	43.19	205.681		
15,700.00	11,082.55	3,341.00	3,360.34	71.09	98.61	1.66	108.29	150.38	8,931.01	8,886.89	44.12	202.407		
15,800.00	11,079.76	3,341.00	3,360.34	72.48	98.61	1.66	108.29	150.38	8,979.18	8,934.33	44.85	200.204		
15,899.05	11,077.00	3,341.00	3,360.34	73.86	98.61	1.66	108.29	150.38	9,027.74	8,982.17	45.57	198.100		



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Keohane A - #1 - OH - Assumed Surveys													Offset Site Error:	0.00 usft
Survey Program: 100-MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
0.00	0.00	0.00	0.00	0.00	0.00	75.58	118.49	460.70	475.70					
100.00	100.00	124.80	124.72	0.10	0.19	75.59	117.42	456.94	472.43	472.14	0.29	1,638.439		
200.00	200.00	224.66	224.44	0.36	0.43	75.61	115.97	451.92	467.20	466.41	0.79	594.199		
300.00	300.00	324.52	324.17	0.63	0.67	75.63	114.53	446.89	461.97	460.70	1.27	362.928		
400.00	400.00	424.38	423.89	0.89	0.92	75.64	113.09	441.87	456.74	454.97	1.76	258.892		
500.00	500.00	524.25	523.62	1.16	1.16	75.66	111.65	436.85	451.51	449.25	2.26	200.043		
600.00	600.00	624.11	623.35	1.43	1.41	75.68	110.21	431.82	446.28	443.52	2.75	162.246		
700.00	700.00	723.97	723.07	1.69	1.65	75.70	108.77	426.80	441.04	437.80	3.24	135.933		
800.00	800.00	823.84	822.80	1.96	1.90	75.72	107.33	421.77	435.81	432.07	3.74	116.567		
900.00	900.00	923.70	922.52	2.22	2.14	75.74	105.89	416.75	430.58	426.35	4.23	101.718		
1,000.00	1,000.00	1,023.56	1,022.25	2.49	2.39	75.77	104.45	411.73	425.35	420.62	4.73	89.973		
1,100.00	1,100.00	1,123.42	1,121.98	2.75	2.63	75.79	103.01	406.70	420.12	414.90	5.22	80.451		
1,200.00	1,200.00	1,223.29	1,221.70	3.02	2.87	75.81	101.57	401.68	414.89	409.17	5.72	72.576		
1,300.00	1,300.00	1,323.15	1,321.43	3.28	3.12	75.83	100.13	396.65	409.66	403.45	6.21	65.955		
1,400.00	1,400.00	1,423.01	1,421.15	3.55	3.36	75.86	98.69	391.63	404.43	397.72	6.71	60.310		
1,500.00	1,500.00	1,522.88	1,520.88	3.81	3.61	75.88	97.25	386.61	399.20	392.00	7.20	55.441		
1,600.00	1,600.00	1,622.74	1,620.61	4.08	3.85	75.91	95.81	381.58	393.96	386.27	7.70	51.197		
1,700.00	1,700.00	1,722.60	1,720.33	4.35	4.10	75.93	94.37	376.56	388.73	380.54	8.19	47.466		
1,800.00	1,800.00	1,822.47	1,820.06	4.61	4.34	75.96	92.93	371.53	383.50	374.82	8.68	44.161		
1,900.00	1,900.00	1,922.33	1,919.79	4.88	4.59	75.98	91.49	366.51	378.27	369.09	9.18	41.211		
2,000.00	2,000.00	2,022.19	2,019.51	5.14	4.83	76.01	90.04	361.49	373.04	363.37	9.67	38.563		
2,100.00	2,100.00	2,122.05	2,119.24	5.41	5.08	76.04	88.60	356.46	367.81	357.64	10.17	36.173		
2,200.00	2,200.00	2,221.92	2,218.96	5.67	5.32	76.07	87.16	351.44	362.58	351.92	10.66	34.004		
2,300.00	2,300.00	2,321.78	2,318.69	5.94	5.57	76.10	85.72	346.41	357.35	346.19	11.16	32.028		
2,400.00	2,400.00	2,421.64	2,418.42	6.20	5.81	76.13	84.28	341.39	352.12	340.47	11.65	30.220		
2,500.00	2,500.00	2,521.51	2,518.14	6.47	6.05	76.16	82.84	336.37	346.89	334.75	12.15	28.559		
2,600.00	2,600.00	2,621.37	2,617.87	6.73	6.30	76.20	81.40	331.34	341.66	329.02	12.64	27.028		
2,700.00	2,700.00	2,721.23	2,717.59	7.00	6.54	76.23	79.96	326.32	336.43	323.30	13.14	25.612		
2,800.00	2,800.00	2,821.10	2,817.32	7.27	6.79	76.27	78.52	321.29	331.20	317.57	13.63	24.299		
2,900.00	2,900.00	2,920.96	2,917.05	7.53	7.03	76.30	77.08	316.27	325.97	311.85	14.12	23.078		
3,000.00	3,000.00	3,020.82	3,016.77	7.80	7.28	76.34	75.64	311.25	320.74	306.12	14.62	21.940		
3,100.00	3,100.00	3,120.68	3,116.50	8.06	7.52	76.38	74.20	306.22	315.51	300.40	15.11	20.876		
3,200.00	3,200.00	3,220.55	3,216.22	8.33	7.77	76.42	72.76	301.20	310.29	294.68	15.61	19.880		
3,300.00	3,300.00	3,320.41	3,315.95	8.59	8.01	76.46	71.32	296.17	305.06	288.95	16.10	18.944		
3,400.00	3,400.00	3,420.27	3,415.68	8.86	8.26	76.50	69.88	291.15	299.83	283.23	16.60	18.065		
3,500.00	3,500.00	3,520.14	3,515.40	9.12	8.50	76.55	68.44	286.13	294.60	277.51	17.09	17.237		
3,600.00	3,600.00	3,620.00	3,615.13	9.39	8.75	76.59	67.00	281.10	289.37	271.79	17.59	16.455		
3,700.00	3,700.00	3,719.86	3,714.86	9.65	8.99	76.64	65.55	276.08	284.14	266.06	18.08	15.716		
3,718.99	3,718.99	3,724.00	3,718.99	9.70	9.00	76.64	65.49	275.87	283.54	265.40	18.14	15.630 CC, ES, SF		
3,800.00	3,800.00	3,724.00	3,718.99	9.92	9.00	76.64	65.49	275.87	294.88	276.53	18.36	16.065		
3,900.00	3,900.00	3,724.00	3,718.99	10.19	9.00	76.64	65.49	275.87	336.39	317.77	18.62	16.065		
4,000.00	4,000.00	3,724.00	3,718.99	10.45	9.00	76.64	65.49	275.87	399.20	380.32	18.89	21.137		
4,100.00	4,100.00	3,724.00	3,718.99	10.72	9.00	76.64	65.49	275.87	474.94	455.78	19.15	24.799		
4,200.00	4,200.00	3,724.00	3,718.99	10.98	9.00	76.64	65.49	275.87	558.36	538.94	19.42	28.756		
4,300.00	4,300.00	3,724.00	3,718.99	11.25	9.00	76.64	65.49	275.87	646.51	626.82	19.68	32.847		
4,400.00	4,400.00	3,724.00	3,718.99	11.51	9.00	76.64	65.49	275.87	737.68	717.73	19.95	36.980		
4,500.00	4,500.00	3,724.00	3,718.99	11.78	9.00	76.64	65.49	275.87	830.89	810.67	20.21	41.106		
4,600.00	4,600.00	3,724.00	3,718.99	12.04	9.00	76.64	65.49	275.87	925.51	905.04	20.48	45.194		
4,700.00	4,700.00	3,724.00	3,718.99	12.31	9.00	76.64	65.49	275.87	1,021.17	1,000.42	20.74	49.226		
4,800.00	4,800.00	3,724.00	3,718.99	12.57	9.00	76.64	65.49	275.87	1,117.58	1,096.57	21.01	53.193		
4,900.00	4,900.00	3,724.00	3,718.99	12.84	9.00	76.64	65.49	275.87	1,214.57	1,193.30	21.28	57.089		
5,000.00	5,000.00	3,724.00	3,718.99	13.11	9.00	76.64	65.49	275.87	1,312.02	1,290.48	21.54	60.909		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Keohane A - #1 - OH - Assumed Surveys													Offset Site Error:	0.00 usft
Survey Program: 100-MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
5,100.00	5,100.00	3,724.00	3,718.99	13.37	9.00	76.64	65.49	275.87	1,409.82	1,388.01	21.81	64.653		
5,200.00	5,200.00	3,724.00	3,718.99	13.64	9.00	76.64	65.49	275.87	1,507.91	1,485.84	22.07	68.319		
5,300.00	5,300.00	3,724.00	3,718.99	13.90	9.00	76.64	65.49	275.87	1,606.24	1,583.90	22.34	71.909		
5,400.00	5,400.00	3,724.00	3,718.99	14.17	9.00	76.64	65.49	275.87	1,704.76	1,682.15	22.60	75.424		
5,500.00	5,500.00	3,724.00	3,718.99	14.43	9.00	76.64	65.49	275.87	1,803.44	1,780.57	22.87	78.864		
5,600.00	5,600.00	3,724.00	3,718.99	14.70	9.00	76.64	65.49	275.87	1,902.26	1,879.13	23.13	82.231		
5,700.00	5,700.00	3,724.00	3,718.99	14.96	9.00	76.64	65.49	275.87	2,001.20	1,977.80	23.40	85.526		
5,800.00	5,800.00	3,724.00	3,718.99	15.23	9.00	76.64	65.49	275.87	2,100.24	2,076.58	23.66	88.752		
5,900.00	5,900.00	3,724.00	3,718.99	15.47	9.00	-128.86	65.49	275.87	2,199.37	2,175.53	23.84	92.271		
6,000.00	5,999.99	3,724.00	3,718.99	15.45	9.00	-122.06	65.49	275.87	2,298.66	2,274.81	23.85	96.375		
6,100.00	6,099.95	3,724.00	3,718.99	15.44	9.00	-113.67	65.49	275.87	2,398.11	2,374.21	23.90	100.348		
6,200.00	6,199.87	3,724.00	3,718.99	15.43	9.00	-113.51	65.49	275.87	2,497.64	2,473.75	23.89	104.543		
6,300.00	6,299.80	3,724.00	3,718.99	15.42	9.00	-113.51	65.49	275.87	2,597.21	2,573.32	23.89	108.726		
6,400.00	6,399.72	3,724.00	3,718.99	15.43	9.00	-113.51	65.49	275.87	2,696.80	2,672.92	23.89	112.889		
6,500.00	6,499.65	3,724.00	3,718.99	15.43	9.00	-113.51	65.49	275.87	2,796.43	2,772.54	23.89	117.031		
6,600.00	6,599.57	3,724.00	3,718.99	15.44	9.00	-113.51	65.49	275.87	2,896.09	2,872.18	23.91	121.149		
6,700.00	6,699.50	3,724.00	3,718.99	15.46	9.00	-113.51	65.49	275.87	2,995.76	2,971.84	23.92	125.239		
6,800.00	6,799.42	3,724.00	3,718.99	15.48	9.00	-113.51	65.49	275.87	3,095.46	3,071.52	23.94	129.301		
6,900.00	6,899.35	3,724.00	3,718.99	15.50	9.00	-113.51	65.49	275.87	3,195.18	3,171.21	23.96	133.331		
7,000.00	6,999.27	3,724.00	3,718.99	15.53	9.00	-113.51	65.49	275.87	3,294.91	3,270.92	23.99	137.328		
7,100.00	7,099.20	3,724.00	3,718.99	15.56	9.00	-113.51	65.49	275.87	3,394.66	3,370.63	24.03	141.289		
7,200.00	7,199.12	3,724.00	3,718.99	15.60	9.00	-113.51	65.49	275.87	3,494.42	3,470.36	24.06	145.213		
7,300.00	7,299.05	3,724.00	3,718.99	15.64	9.00	-113.51	65.49	275.87	3,594.20	3,570.09	24.11	149.097		
7,400.00	7,398.97	3,724.00	3,718.99	15.69	9.00	-113.51	65.49	275.87	3,693.99	3,669.84	24.15	152.940		
7,500.00	7,498.90	3,724.00	3,718.99	15.74	9.00	-113.51	65.49	275.87	3,793.79	3,769.58	24.20	156.740		
7,600.00	7,598.82	3,724.00	3,718.99	15.80	9.00	-113.51	65.49	275.87	3,893.60	3,869.34	24.26	160.496		
7,700.00	7,698.75	3,724.00	3,718.99	15.86	9.00	-113.51	65.49	275.87	3,993.42	3,969.10	24.32	164.206		
7,800.00	7,798.67	3,724.00	3,718.99	15.92	9.00	-113.51	65.49	275.87	4,093.25	4,068.86	24.38	167.868		
7,900.00	7,898.60	3,724.00	3,718.99	15.99	9.00	-113.51	65.49	275.87	4,193.08	4,168.63	24.45	171.483		
8,000.00	7,998.52	3,724.00	3,718.99	16.06	9.00	-113.51	65.49	275.87	4,292.93	4,268.40	24.52	175.048		
8,100.00	8,098.45	3,724.00	3,718.99	16.14	9.00	-113.51	65.49	275.87	4,392.78	4,368.18	24.60	178.563		
8,200.00	8,198.37	3,724.00	3,718.99	16.22	9.00	-113.51	65.49	275.87	4,492.64	4,467.96	24.68	182.026		
8,300.00	8,298.30	3,724.00	3,718.99	16.30	9.00	-113.51	65.49	275.87	4,592.50	4,567.74	24.77	185.437		
8,400.00	8,398.22	3,724.00	3,718.99	16.39	9.00	-113.51	65.49	275.87	4,692.37	4,667.52	24.85	188.795		
8,500.00	8,498.15	3,724.00	3,718.99	16.49	9.00	-113.51	65.49	275.87	4,792.25	4,767.30	24.95	192.101		
8,600.00	8,598.07	3,724.00	3,718.99	16.58	9.00	-113.51	65.49	275.87	4,892.13	4,867.08	25.04	195.352		
8,700.00	8,698.00	3,724.00	3,718.99	16.68	9.00	-113.51	65.49	275.87	4,992.01	4,966.87	25.14	198.550		
8,800.00	8,797.92	3,724.00	3,718.99	16.78	9.00	-113.51	65.49	275.87	5,091.90	5,066.66	25.25	201.693		
8,900.00	8,897.85	3,724.00	3,718.99	16.89	9.00	-113.51	65.49	275.87	5,191.80	5,166.44	25.35	204.781		
9,000.00	8,997.77	3,724.00	3,718.99	17.00	9.00	-113.51	65.49	275.87	5,291.69	5,266.23	25.46	207.815		
9,100.00	9,097.70	3,724.00	3,718.99	17.12	9.00	-113.51	65.49	275.87	5,391.60	5,366.02	25.58	210.795		
9,200.00	9,197.62	3,724.00	3,718.99	17.23	9.00	-113.51	65.49	275.87	5,491.50	5,465.81	25.69	213.720		
9,300.00	9,297.55	3,724.00	3,718.99	17.36	9.00	-113.51	65.49	275.87	5,591.41	5,565.59	25.82	216.591		
9,400.00	9,397.48	3,724.00	3,718.99	17.48	9.00	-113.51	65.49	275.87	5,691.32	5,665.38	25.94	219.407		
9,500.00	9,497.40	3,724.00	3,718.99	17.61	9.00	-113.51	65.49	275.87	5,791.24	5,765.17	26.07	222.170		
9,600.00	9,597.33	3,724.00	3,718.99	17.74	9.00	-113.51	65.49	275.87	5,891.15	5,864.96	26.20	224.880		
9,700.00	9,697.25	3,724.00	3,718.99	17.87	9.00	-113.51	65.49	275.87	5,991.08	5,964.75	26.33	227.536		
9,800.00	9,797.18	3,724.00	3,718.99	18.01	9.00	-113.51	65.49	275.87	6,091.00	6,064.53	26.47	230.140		
9,900.00	9,897.10	3,724.00	3,718.99	18.15	9.00	-113.51	65.49	275.87	6,190.92	6,164.32	26.61	232.692		
10,000.00	9,997.03	3,724.00	3,718.99	18.29	9.00	-113.51	65.49	275.87	6,290.85	6,264.10	26.75	235.192		
10,100.00	10,096.95	3,724.00	3,718.99	18.43	9.00	-113.51	65.49	275.87	6,390.78	6,363.89	26.89	237.642		
10,200.00	10,196.88	3,724.00	3,718.99	18.58	9.00	-113.51	65.49	275.87	6,490.72	6,463.68	27.04	240.041		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Keohane A - #1 - OH - Assumed Surveys													Offset Site Error: 0.00 usft
Survey Program: 100-MWD													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
10,300.00	10,296.82	3,724.00	3,718.99	18.73	9.00	-132.02	65.49	275.87	6,590.64	6,563.56	27.08	243.381	
10,400.00	10,396.81	3,724.00	3,718.99	18.88	9.00	-145.11	65.49	275.87	6,690.51	6,663.28	27.23	245.730	
10,500.00	10,496.81	3,724.00	3,718.99	19.08	9.00	58.50	65.49	275.87	6,790.33	6,762.90	27.43	247.556	
10,600.00	10,596.81	3,724.00	3,718.99	19.29	9.00	58.50	65.49	275.87	6,890.15	6,862.51	27.64	249.316	
10,700.00	10,696.81	3,724.00	3,718.99	19.38	9.00	43.92	65.49	275.87	6,989.97	6,962.15	27.82	251.279	
10,800.00	10,795.83	3,724.00	3,718.99	19.39	9.00	10.98	65.49	275.87	7,088.44	7,060.80	27.65	256.372	
10,900.00	10,890.06	3,724.00	3,718.99	19.41	9.00	6.27	65.49	275.87	7,181.68	7,155.20	26.48	271.193	
11,000.00	10,975.38	3,724.00	3,718.99	19.47	9.00	4.50	65.49	275.87	7,265.87	7,241.14	24.73	293.796	
11,100.00	11,048.06	3,724.00	3,718.99	19.57	9.00	3.62	65.49	275.87	7,337.71	7,315.08	22.63	324.235	
11,200.00	11,104.94	3,724.00	3,718.99	19.75	9.00	3.13	65.49	275.87	7,394.46	7,373.99	20.47	361.274	
11,300.00	11,143.51	3,724.00	3,718.99	20.03	9.00	2.86	65.49	275.87	7,434.00	7,415.39	18.61	399.557	
11,400.00	11,162.11	3,724.00	3,718.99	20.42	9.00	2.73	65.49	275.87	7,454.89	7,437.28	17.61	423.441	
11,500.00	11,162.83	3,724.00	3,718.99	20.90	9.00	2.71	65.49	275.87	7,459.30	7,441.54	17.76	419.979	
11,600.00	11,161.22	3,724.00	3,718.99	21.47	9.00	2.71	65.49	275.87	7,462.73	7,444.78	17.95	415.669	
11,700.00	11,159.62	3,724.00	3,718.99	22.12	9.00	2.71	65.49	275.87	7,467.50	7,449.32	18.18	410.693	
11,800.00	11,158.01	3,724.00	3,718.99	22.85	9.00	2.71	65.49	275.87	7,473.60	7,455.15	18.45	405.140	
11,900.00	11,156.40	3,724.00	3,718.99	23.64	9.00	2.71	65.49	275.87	7,481.04	7,462.29	18.74	399.102	
12,000.00	11,154.80	3,724.00	3,718.99	24.49	9.00	2.71	65.49	275.87	7,489.80	7,470.72	19.07	392.668	
12,100.00	11,153.19	3,724.00	3,718.99	25.40	9.00	2.71	65.49	275.87	7,499.88	7,480.45	19.43	385.928	
12,200.00	11,151.59	3,724.00	3,718.99	26.35	9.00	2.71	65.49	275.87	7,511.29	7,491.47	19.82	378.962	
12,300.00	11,149.98	3,724.00	3,718.99	27.35	9.00	2.71	65.49	275.87	7,524.00	7,503.77	20.23	371.846	
12,400.00	11,148.38	3,724.00	3,718.99	28.38	9.00	2.71	65.49	275.87	7,538.02	7,517.35	20.67	364.648	
12,500.00	11,146.77	3,724.00	3,718.99	29.45	9.00	2.71	65.49	275.87	7,553.34	7,532.21	21.13	357.424	
12,600.00	11,145.16	3,724.00	3,718.99	30.55	9.00	2.71	65.49	275.87	7,569.95	7,548.34	21.61	350.226	
12,700.00	11,142.92	3,724.00	3,718.99	31.68	9.00	2.71	65.49	275.87	7,587.22	7,565.08	22.14	342.720	
12,800.00	11,140.51	3,724.00	3,718.99	32.83	9.00	2.71	65.49	275.87	7,605.59	7,582.93	22.66	335.689	
12,900.00	11,138.09	3,724.00	3,718.99	34.01	9.00	2.71	65.49	275.87	7,625.22	7,602.03	23.19	328.788	
13,000.00	11,135.67	3,724.00	3,718.99	35.20	9.00	2.71	65.49	275.87	7,646.12	7,622.38	23.74	322.041	
13,100.00	11,133.25	3,724.00	3,718.99	36.42	9.00	2.71	65.49	275.87	7,668.26	7,643.95	24.31	315.465	
13,200.00	11,131.74	3,724.00	3,718.99	37.65	9.00	2.72	65.49	275.87	7,692.51	7,667.66	24.85	309.553	
13,300.00	11,130.58	3,724.00	3,718.99	38.89	9.00	2.72	65.49	275.87	7,718.33	7,692.89	25.44	303.363	
13,400.00	11,129.43	3,724.00	3,718.99	40.15	9.00	2.72	65.49	275.87	7,745.36	7,719.31	26.05	297.373	
13,500.00	11,128.28	3,724.00	3,718.99	41.42	9.00	2.72	65.49	275.87	7,773.57	7,746.91	26.66	291.583	
13,600.00	11,127.12	3,724.00	3,718.99	42.70	9.00	2.72	65.49	275.87	7,802.97	7,775.69	27.28	285.996	
13,700.00	11,125.17	3,724.00	3,718.99	43.99	9.00	2.71	65.49	275.87	7,832.77	7,804.83	27.95	280.274	
13,800.00	11,122.94	3,724.00	3,718.99	45.29	9.00	2.71	65.49	275.87	7,863.47	7,834.89	28.59	275.075	
13,900.00	11,120.71	3,724.00	3,718.99	46.60	9.00	2.71	65.49	275.87	7,895.32	7,866.08	29.23	270.070	
14,000.00	11,118.47	3,724.00	3,718.99	47.92	9.00	2.71	65.49	275.87	7,928.29	7,898.41	29.89	265.256	
14,100.00	11,116.24	3,724.00	3,718.99	49.25	9.00	2.71	65.49	275.87	7,962.39	7,931.84	30.55	260.628	
14,200.00	11,114.21	3,724.00	3,718.99	50.58	9.00	2.71	65.49	275.87	7,997.78	7,966.57	31.21	256.243	
14,300.00	11,112.21	3,724.00	3,718.99	51.92	9.00	2.71	65.49	275.87	8,034.29	8,002.41	31.89	251.972	
14,400.00	11,110.21	3,724.00	3,718.99	53.26	9.00	2.71	65.49	275.87	8,071.88	8,039.31	32.57	247.869	
14,500.00	11,108.22	3,724.00	3,718.99	54.61	9.00	2.71	65.49	275.87	8,110.52	8,077.27	33.25	243.928	
14,600.00	11,106.22	3,724.00	3,718.99	55.96	9.00	2.71	65.49	275.87	8,150.21	8,116.27	33.94	240.144	
14,700.00	11,104.39	3,724.00	3,718.99	57.32	9.00	2.71	65.49	275.87	8,191.08	8,156.45	34.63	236.553	
14,800.00	11,102.59	3,724.00	3,718.99	58.68	9.00	2.71	65.49	275.87	8,232.99	8,197.66	35.32	233.065	
14,900.00	11,100.80	3,724.00	3,718.99	60.05	9.00	2.71	65.49	275.87	8,275.89	8,239.87	36.03	229.715	
15,000.00	11,099.00	3,724.00	3,718.99	61.42	9.00	2.71	65.49	275.87	8,319.78	8,283.04	36.73	226.496	
15,100.00	11,097.20	3,724.00	3,718.99	62.79	9.00	2.71	65.49	275.87	8,364.63	8,327.19	37.44	223.404	
15,200.00	11,094.91	3,724.00	3,718.99	64.16	9.00	2.70	65.49	275.87	8,409.99	8,371.82	38.17	220.319	
15,300.00	11,092.50	3,724.00	3,718.99	65.54	9.00	2.70	65.49	275.87	8,456.19	8,417.31	38.89	217.456	
15,400.00	11,090.09	3,724.00	3,718.99	66.93	9.00	2.70	65.49	275.87	8,503.32	8,463.71	39.60	214.705	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Keohane A - #1 - OH - Assumed Surveys													Offset Well Error:	0.00 usft
Survey Program: 100-MWD														
Reference		Offset		Semi Major Axis			Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (")	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
15,500.00	11,087.68	3,724.00	3,718.99	68.31	9.00	2.70	65.49	275.87	8,551.35	8,511.02	40.33	212.060		
15,600.00	11,085.27	3,724.00	3,718.99	69.70	9.00	2.70	65.49	275.87	8,600.28	8,559.23	41.05	209.516		
15,700.00	11,082.55	3,724.00	3,718.99	71.09	9.00	2.70	65.49	275.87	8,649.81	8,608.03	41.78	207.008		
15,800.00	11,079.76	3,724.00	3,718.99	72.48	9.00	2.70	65.49	275.87	8,700.16	8,657.65	42.51	204.650		
15,899.05	11,077.00	3,724.00	3,718.99	73.86	9.00	2.70	65.49	275.87	8,750.87	8,707.63	43.24	202.402		

Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Keohane A - 1 - OH - Assumed Surveys													Offset Site Error:	0.00 usft
Survey Program: 100-INC-ONLY-Offset Well													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.00	0.00	0.00	20.00	0.00	0.00	77.00	110.73	479.55	492.57					
100.00	100.00	80.00	100.00	0.10	1.21	77.00	110.73	479.55	492.17	490.87	1.30	378.323		
200.00	200.00	180.00	200.00	0.36	3.90	77.00	110.73	479.55	492.17	487.91	4.26	115.491		
300.00	300.00	280.02	300.00	0.63	6.90	77.00	110.73	479.55	492.17	484.64	7.52	65.424		
400.00	400.00	380.04	400.00	0.89	9.89	77.00	110.73	479.55	492.17	481.38	10.78	45.635		
500.00	500.00	480.06	500.00	1.16	12.89	77.00	110.73	479.55	492.17	478.12	14.05	35.037		
600.00	600.00	580.08	600.00	1.43	15.88	77.00	110.73	479.55	492.17	474.86	17.31	28.433		
700.00	700.00	680.10	700.00	1.69	18.88	77.00	110.73	479.55	492.17	471.59	20.57	23.924		
800.00	800.00	780.12	800.00	1.96	21.88	77.00	110.73	479.55	492.17	468.33	23.83	20.650		
900.00	900.00	880.14	900.00	2.22	24.88	77.00	110.73	479.55	492.17	465.07	27.10	18.163		
1,000.00	1,000.00	980.16	1,000.00	2.49	27.87	77.00	110.73	479.55	492.17	461.81	30.36	16.211		
1,100.00	1,100.00	1,080.18	1,100.00	2.75	30.87	77.00	110.73	479.55	492.17	458.55	33.62	14.638		
1,200.00	1,200.00	1,180.20	1,200.00	3.02	33.87	77.00	110.73	479.55	492.17	455.28	36.88	13.344		
1,300.00	1,300.00	1,280.22	1,300.00	3.28	36.86	77.00	110.73	479.55	492.17	452.02	40.15	12.259		
1,400.00	1,400.00	1,380.24	1,400.00	3.55	39.86	77.00	110.73	479.55	492.17	448.76	43.41	11.338		
1,500.00	1,500.00	1,480.26	1,500.00	3.81	42.86	77.00	110.73	479.55	492.17	445.50	46.67	10.545		
1,600.00	1,600.00	1,580.28	1,600.00	4.08	45.85	77.00	110.73	479.55	492.17	442.23	49.93	9.856		
1,700.00	1,700.00	1,680.30	1,700.00	4.35	48.85	77.00	110.73	479.55	492.17	438.97	53.20	9.252		
1,800.00	1,800.00	1,780.32	1,800.00	4.61	51.85	77.00	110.73	479.55	492.17	435.71	56.46	8.717		
1,900.00	1,900.00	1,880.35	1,900.00	4.88	54.85	77.00	110.73	479.55	492.17	432.45	59.72	8.241		
2,000.00	2,000.00	1,980.37	2,000.00	5.14	57.84	77.00	110.73	479.55	492.17	429.18	62.98	7.814		
2,100.00	2,100.00	2,080.39	2,100.00	5.41	60.84	77.00	110.73	479.55	492.17	425.92	66.25	7.429		
2,200.00	2,200.00	2,180.41	2,200.00	5.67	63.84	77.00	110.73	479.55	492.17	422.66	69.51	7.081		
2,300.00	2,300.00	2,280.43	2,300.00	5.94	66.83	77.00	110.73	479.55	492.17	419.40	72.77	6.763		
2,400.00	2,400.00	2,380.45	2,400.00	6.20	69.83	77.00	110.73	479.55	492.17	416.13	76.03	6.473		
2,500.00	2,500.00	2,480.47	2,500.00	6.47	72.83	77.00	110.73	479.55	492.17	412.87	79.30	6.207		
2,600.00	2,600.00	2,580.49	2,600.00	6.73	75.82	77.00	110.73	479.55	492.17	409.61	82.56	5.961		
2,700.00	2,700.00	2,680.51	2,700.00	7.00	78.82	77.00	110.73	479.55	492.17	406.34	85.82	5.735		
2,800.00	2,800.00	2,780.53	2,800.00	7.27	81.82	77.00	110.73	479.55	492.17	403.08	89.08	5.525		
2,900.00	2,900.00	2,880.55	2,900.00	7.53	84.82	77.00	110.73	479.55	492.17	399.82	92.35	5.330		
3,000.00	3,000.00	2,980.57	3,000.00	7.80	87.81	77.00	110.73	479.55	492.17	396.56	95.61	5.148		
3,100.00	3,100.00	3,080.59	3,100.00	8.06	90.81	77.00	110.73	479.55	492.17	393.29	98.87	4.978		
3,200.00	3,200.00	3,180.61	3,200.00	8.33	93.81	77.00	110.73	479.55	492.17	390.03	102.13	4.819		
3,300.00	3,300.00	3,280.63	3,300.00	8.59	96.80	77.00	110.73	479.55	492.17	386.77	105.40	4.670		
3,400.00	3,400.00	3,380.65	3,400.00	8.86	99.80	77.00	110.73	479.55	492.17	383.51	108.66	4.529		
3,500.00	3,500.00	3,480.67	3,500.00	9.12	102.80	77.00	110.73	479.55	492.17	380.24	111.92	4.397		
3,600.00	3,600.00	3,580.69	3,600.00	9.39	105.80	77.00	110.73	479.55	492.17	376.98	115.18	4.273		
3,700.00	3,700.00	3,680.71	3,700.00	9.65	108.79	77.00	110.73	479.55	492.17	373.72	118.45	4.155		
3,717.84	3,717.84	3,698.55	3,717.84	9.70	109.33	77.00	110.73	479.55	492.17	373.14	119.03	4.135 CC, ES		
3,800.00	3,800.00	3,724.00	3,743.26	9.92	110.09	77.00	110.73	479.55	495.43	375.42	120.01	4.128 SF		
3,900.00	3,900.00	3,724.00	3,743.26	10.19	110.09	77.00	110.73	479.55	516.52	396.25	120.27	4.295		
4,000.00	4,000.00	3,724.00	3,743.26	10.45	110.09	77.00	110.73	479.55	555.10	434.56	120.54	4.605		
4,100.00	4,100.00	3,724.00	3,743.26	10.72	110.09	77.00	110.73	479.55	607.86	487.05	120.81	5.032		
4,200.00	4,200.00	3,724.00	3,743.26	10.98	110.09	77.00	110.73	479.55	671.44	550.37	121.07	5.546		
4,300.00	4,300.00	3,724.00	3,743.26	11.25	110.09	77.00	110.73	479.55	743.09	621.75	121.34	6.124		
4,400.00	4,400.00	3,724.00	3,743.26	11.51	110.09	77.00	110.73	479.55	820.69	699.09	121.60	6.749		
4,500.00	4,500.00	3,724.00	3,743.26	11.78	110.09	77.00	110.73	479.55	902.71	780.84	121.87	7.407		
4,600.00	4,600.00	3,724.00	3,743.26	12.04	110.09	77.00	110.73	479.55	988.04	865.91	122.13	8.090		
4,700.00	4,700.00	3,724.00	3,743.26	12.31	110.09	77.00	110.73	479.55	1,075.91	953.51	122.40	8.790		
4,800.00	4,800.00	3,724.00	3,743.26	12.57	110.09	77.00	110.73	479.55	1,165.73	1,043.06	122.66	9.503		
4,900.00	4,900.00	3,724.00	3,743.26	12.84	110.09	77.00	110.73	479.55	1,257.09	1,134.16	122.93	10.226		
5,000.00	5,000.00	3,724.00	3,743.26	13.11	110.09	77.00	110.73	479.55	1,349.67	1,226.48	123.19	10.956		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Keohane A - 1 - OH - Assumed Surveys													Offset Site Error:	0.00 usft
Survey Program: 100-INC-ONLY-Offset Well													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (")	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
5,100.00	5,100.00	3,724.00	3,743.26	13.37	110.09	77.00	110.73	479.55	1,443.25	1,319.79	123.46	11.690		
5,200.00	5,200.00	3,724.00	3,743.26	13.64	110.09	77.00	110.73	479.55	1,537.63	1,413.90	123.73	12.428		
5,300.00	5,300.00	3,724.00	3,743.26	13.90	110.09	77.00	110.73	479.55	1,632.68	1,508.69	123.99	13.168		
5,400.00	5,400.00	3,724.00	3,743.26	14.17	110.09	77.00	110.73	479.55	1,728.29	1,604.04	124.26	13.909		
5,500.00	5,500.00	3,724.00	3,743.26	14.43	110.09	77.00	110.73	479.55	1,824.38	1,699.85	124.52	14.651		
5,600.00	5,600.00	3,724.00	3,743.26	14.70	110.09	77.00	110.73	479.55	1,920.86	1,796.07	124.79	15.393		
5,700.00	5,700.00	3,724.00	3,743.26	14.96	110.09	77.00	110.73	479.55	2,017.68	1,892.63	125.05	16.135		
5,800.00	5,800.00	3,724.00	3,743.26	15.23	110.09	77.00	110.73	479.55	2,114.80	1,989.48	125.32	16.875		
5,900.00	5,900.00	3,724.00	3,743.26	15.47	110.09	-129.02	110.73	479.55	2,212.18	2,086.63	125.55	17.619		
6,000.00	5,999.99	3,724.00	3,743.26	15.45	110.09	-125.32	110.73	479.55	2,309.94	2,184.41	125.53	18.402		
6,100.00	6,099.95	3,724.00	3,743.26	15.44	110.09	-121.04	110.73	479.55	2,408.08	2,282.58	125.50	19.188		
6,200.00	6,199.87	3,724.00	3,743.26	15.43	110.09	-120.96	110.73	479.55	2,506.45	2,380.96	125.49	19.973		
6,300.00	6,299.80	3,724.00	3,743.26	15.42	110.09	-120.96	110.73	479.55	2,604.95	2,479.46	125.49	20.758		
6,400.00	6,399.72	3,724.00	3,743.26	15.43	110.09	-120.96	110.73	479.55	2,703.55	2,578.06	125.49	21.544		
6,500.00	6,499.65	3,724.00	3,743.26	15.43	110.09	-120.96	110.73	479.55	2,802.26	2,676.76	125.50	22.329		
6,600.00	6,599.57	3,724.00	3,743.26	15.44	110.09	-120.96	110.73	479.55	2,901.05	2,775.54	125.51	23.115		
6,700.00	6,699.50	3,724.00	3,743.26	15.46	110.09	-120.96	110.73	479.55	2,999.92	2,874.40	125.52	23.900		
6,800.00	6,799.42	3,724.00	3,743.26	15.48	110.09	-120.96	110.73	479.55	3,098.87	2,973.33	125.54	24.684		
6,900.00	6,899.35	3,724.00	3,743.26	15.50	110.09	-120.96	110.73	479.55	3,197.88	3,072.32	125.57	25.468		
7,000.00	6,999.27	3,724.00	3,743.26	15.53	110.09	-120.96	110.73	479.55	3,296.95	3,171.36	125.59	26.251		
7,100.00	7,099.20	3,724.00	3,743.26	15.56	110.09	-120.96	110.73	479.55	3,396.08	3,270.45	125.63	27.033		
7,200.00	7,199.12	3,724.00	3,743.26	15.60	110.09	-120.96	110.73	479.55	3,495.25	3,369.59	125.67	27.814		
7,300.00	7,299.05	3,724.00	3,743.26	15.64	110.09	-120.96	110.73	479.55	3,594.47	3,468.77	125.71	28.594		
7,400.00	7,398.97	3,724.00	3,743.26	15.69	110.09	-120.96	110.73	479.55	3,693.74	3,567.98	125.75	29.373		
7,500.00	7,498.90	3,724.00	3,743.26	15.74	110.09	-120.96	110.73	479.55	3,793.04	3,667.23	125.81	30.150		
7,600.00	7,598.82	3,724.00	3,743.26	15.80	110.09	-120.96	110.73	479.55	3,892.38	3,766.51	125.86	30.926		
7,700.00	7,698.75	3,724.00	3,743.26	15.86	110.09	-120.96	110.73	479.55	3,991.75	3,865.83	125.92	31.701		
7,800.00	7,798.67	3,724.00	3,743.26	15.92	110.09	-120.96	110.73	479.55	4,091.15	3,965.16	125.98	32.473		
7,900.00	7,898.60	3,724.00	3,743.26	15.99	110.09	-120.96	110.73	479.55	4,190.58	4,064.52	126.05	33.245		
8,000.00	7,998.52	3,724.00	3,743.26	16.06	110.09	-120.96	110.73	479.55	4,290.03	4,163.91	126.12	34.014		
8,100.00	8,098.45	3,724.00	3,743.26	16.14	110.09	-120.96	110.73	479.55	4,389.51	4,263.31	126.20	34.782		
8,200.00	8,198.37	3,724.00	3,743.26	16.22	110.09	-120.96	110.73	479.55	4,489.02	4,362.74	126.28	35.548		
8,300.00	8,298.30	3,724.00	3,743.26	16.30	110.09	-120.96	110.73	479.55	4,588.54	4,462.18	126.37	36.311		
8,400.00	8,398.22	3,724.00	3,743.26	16.39	110.09	-120.96	110.73	479.55	4,688.09	4,561.63	126.45	37.073		
8,500.00	8,498.15	3,724.00	3,743.26	16.49	110.09	-120.96	110.73	479.55	4,787.65	4,661.11	126.55	37.833		
8,600.00	8,598.07	3,724.00	3,743.26	16.58	110.09	-120.96	110.73	479.55	4,887.24	4,760.59	126.64	38.591		
8,700.00	8,698.00	3,724.00	3,743.26	16.68	110.09	-120.96	110.73	479.55	4,986.84	4,860.09	126.74	39.346		
8,800.00	8,797.92	3,724.00	3,743.26	16.78	110.09	-120.96	110.73	479.55	5,086.45	4,959.60	126.85	40.100		
8,900.00	8,897.85	3,724.00	3,743.26	16.89	110.09	-120.96	110.73	479.55	5,186.08	5,059.13	126.95	40.851		
9,000.00	8,997.77	3,724.00	3,743.26	17.00	110.09	-120.96	110.73	479.55	5,285.72	5,158.66	127.06	41.599		
9,100.00	9,097.70	3,724.00	3,743.26	17.12	110.09	-120.96	110.73	479.55	5,385.38	5,258.20	127.18	42.346		
9,200.00	9,197.62	3,724.00	3,743.26	17.23	110.09	-120.96	110.73	479.55	5,485.05	5,357.76	127.29	43.090		
9,300.00	9,297.55	3,724.00	3,743.26	17.36	110.09	-120.96	110.73	479.55	5,584.73	5,457.32	127.41	43.831		
9,400.00	9,397.48	3,724.00	3,743.26	17.48	110.09	-120.96	110.73	479.55	5,684.42	5,556.88	127.54	44.570		
9,500.00	9,497.40	3,724.00	3,743.26	17.61	110.09	-120.96	110.73	479.55	5,784.13	5,656.46	127.67	45.307		
9,600.00	9,597.33	3,724.00	3,743.26	17.74	110.09	-120.96	110.73	479.55	5,883.84	5,756.04	127.80	46.041		
9,700.00	9,697.25	3,724.00	3,743.26	17.87	110.09	-120.96	110.73	479.55	5,983.56	5,855.63	127.93	46.773		
9,800.00	9,797.18	3,724.00	3,743.26	18.01	110.09	-120.96	110.73	479.55	6,083.29	5,955.23	128.06	47.502		
9,900.00	9,897.10	3,724.00	3,743.26	18.15	110.09	-120.96	110.73	479.55	6,183.03	6,054.83	128.20	48.228		
10,000.00	9,997.03	3,724.00	3,743.26	18.29	110.09	-120.96	110.73	479.55	6,282.78	6,154.44	128.35	48.952		
10,100.00	10,096.95	3,724.00	3,743.26	18.43	110.09	-120.96	110.73	479.55	6,382.54	6,254.05	128.49	49.673		
10,200.00	10,196.88	3,724.00	3,743.26	18.58	110.09	-120.96	110.73	479.55	6,482.30	6,353.67	128.64	50.392		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Offset Design Keohane A - 1 - OH - Assumed Surveys													Offset Site Error:	0.00 usft
Survey Program: 100-INC-ONLY-Offset Well													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
10,300.00	10,296.82	3,724.00	3,743.26	18.73	110.09	-130.90	110.73	479.55	6,582.05	6,453.26	128.79	51.107		
10,400.00	10,396.81	3,724.00	3,743.26	18.88	110.09	-139.50	110.73	479.55	6,681.71	6,552.77	128.95	51.818		
10,500.00	10,496.81	3,724.00	3,743.26	19.08	110.09	64.85	110.73	479.55	6,781.31	6,652.16	129.14	52.511		
10,600.00	10,596.81	3,724.00	3,743.26	19.29	110.09	64.85	110.73	479.55	6,880.90	6,751.55	129.35	53.197		
10,700.00	10,696.81	3,724.00	3,743.26	19.38	110.09	53.67	110.73	479.55	6,980.51	6,851.08	129.42	53.936		
10,800.00	10,795.83	3,724.00	3,743.26	19.39	110.09	16.71	110.73	479.55	7,078.70	6,952.23	126.47	55.972		
10,900.00	10,890.06	3,724.00	3,743.26	19.41	110.09	9.75	110.73	479.55	7,171.54	7,053.21	118.33	60.605		
11,000.00	10,975.38	3,724.00	3,743.26	19.47	110.09	7.05	110.73	479.55	7,255.25	7,149.65	105.60	68.704		
11,100.00	11,048.06	3,724.00	3,743.26	19.57	110.09	5.68	110.73	479.55	7,326.55	7,237.55	88.99	82.325		
11,200.00	11,104.94	3,724.00	3,743.26	19.75	110.09	4.93	110.73	479.55	7,382.71	7,313.26	69.45	106.307		
11,300.00	11,143.51	3,724.00	3,743.26	20.03	110.09	4.51	110.73	479.55	7,421.64	7,373.48	48.16	154.108		
11,400.00	11,162.11	3,724.00	3,743.26	20.42	110.09	4.32	110.73	479.55	7,441.93	7,414.20	27.73	268.326		
11,500.00	11,162.83	3,724.00	3,743.26	20.90	110.09	4.29	110.73	479.55	7,445.76	7,421.57	24.19	307.777		
11,600.00	11,161.22	3,724.00	3,743.26	21.47	110.09	4.29	110.73	479.55	7,448.62	7,424.23	24.39	305.443		
11,700.00	11,159.62	3,724.00	3,743.26	22.12	110.09	4.29	110.73	479.55	7,452.82	7,428.20	24.62	302.746		
11,800.00	11,158.01	3,724.00	3,743.26	22.85	110.09	4.29	110.73	479.55	7,458.35	7,433.47	24.88	299.725		
11,900.00	11,156.40	3,724.00	3,743.26	23.64	110.09	4.29	110.73	479.55	7,465.22	7,440.04	25.18	296.426		
12,000.00	11,154.80	3,724.00	3,743.26	24.49	110.09	4.29	110.73	479.55	7,473.42	7,447.91	25.52	292.890		
12,100.00	11,153.19	3,724.00	3,743.26	25.40	110.09	4.29	110.73	479.55	7,482.95	7,457.07	25.88	289.161		
12,200.00	11,151.59	3,724.00	3,743.26	26.35	110.09	4.29	110.73	479.55	7,493.80	7,467.54	26.27	285.280		
12,300.00	11,149.98	3,724.00	3,743.26	27.35	110.09	4.29	110.73	479.55	7,505.97	7,479.29	26.68	281.283		
12,400.00	11,148.38	3,724.00	3,743.26	28.38	110.09	4.29	110.73	479.55	7,519.45	7,492.33	27.13	277.208		
12,500.00	11,146.77	3,724.00	3,743.26	29.45	110.09	4.29	110.73	479.55	7,534.23	7,506.65	27.59	273.084		
12,600.00	11,145.16	3,724.00	3,743.26	30.55	110.09	4.29	110.73	479.55	7,550.31	7,522.24	28.07	268.939		
12,700.00	11,142.92	3,724.00	3,743.26	31.68	110.09	4.28	110.73	479.55	7,567.06	7,538.25	28.80	262.701		
12,800.00	11,140.51	3,724.00	3,743.26	32.83	110.09	4.28	110.73	479.55	7,584.91	7,555.58	29.33	258.636		
12,900.00	11,138.09	3,724.00	3,743.26	34.01	110.09	4.28	110.73	479.55	7,604.03	7,574.16	29.87	254.612		
13,000.00	11,135.67	3,724.00	3,743.26	35.20	110.09	4.28	110.73	479.55	7,624.42	7,594.00	30.42	250.645		
13,100.00	11,133.25	3,724.00	3,743.26	36.42	110.09	4.28	110.73	479.55	7,646.06	7,615.07	30.99	246.745		
13,200.00	11,131.74	3,724.00	3,743.26	37.65	110.09	4.30	110.73	479.55	7,669.81	7,638.55	31.26	245.348		
13,300.00	11,130.58	3,724.00	3,743.26	38.89	110.09	4.30	110.73	479.55	7,695.15	7,663.29	31.86	241.557		
13,400.00	11,129.43	3,724.00	3,743.26	40.15	110.09	4.30	110.73	479.55	7,721.69	7,689.23	32.46	237.859		
13,500.00	11,128.28	3,724.00	3,743.26	41.42	110.09	4.30	110.73	479.55	7,749.43	7,716.35	33.08	234.259		
13,600.00	11,127.12	3,724.00	3,743.26	42.70	110.09	4.30	110.73	479.55	7,778.36	7,744.66	33.71	230.760		
13,700.00	11,125.17	3,724.00	3,743.26	43.99	110.09	4.28	110.73	479.55	7,807.71	7,773.12	34.59	225.730		
13,800.00	11,122.94	3,724.00	3,743.26	45.29	110.09	4.28	110.73	479.55	7,837.95	7,802.72	35.23	222.467		
13,900.00	11,120.71	3,724.00	3,743.26	46.60	110.09	4.28	110.73	479.55	7,869.35	7,833.47	35.88	219.306		
14,000.00	11,118.47	3,724.00	3,743.26	47.92	110.09	4.28	110.73	479.55	7,901.90	7,865.35	36.54	216.246		
14,100.00	11,116.24	3,724.00	3,743.26	49.25	110.09	4.28	110.73	479.55	7,935.56	7,898.36	37.21	213.286		
14,200.00	11,114.21	3,724.00	3,743.26	50.58	110.09	4.29	110.73	479.55	7,970.53	7,932.72	37.81	210.792		
14,300.00	11,112.21	3,724.00	3,743.26	51.92	110.09	4.29	110.73	479.55	8,006.63	7,968.14	38.49	208.020		
14,400.00	11,110.21	3,724.00	3,743.26	53.26	110.09	4.29	110.73	479.55	8,043.80	8,004.63	39.17	205.343		
14,500.00	11,108.22	3,724.00	3,743.26	54.61	110.09	4.29	110.73	479.55	8,082.05	8,042.19	39.86	202.759		
14,600.00	11,106.22	3,724.00	3,743.26	55.96	110.09	4.29	110.73	479.55	8,121.34	8,080.79	40.55	200.265		
14,700.00	11,104.39	3,724.00	3,743.26	57.32	110.09	4.29	110.73	479.55	8,161.83	8,120.63	41.20	198.096		
14,800.00	11,102.59	3,724.00	3,743.26	58.68	110.09	4.29	110.73	479.55	8,203.36	8,161.46	41.90	195.771		
14,900.00	11,100.80	3,724.00	3,743.26	60.05	110.09	4.29	110.73	479.55	8,245.89	8,203.28	42.61	193.528		
15,000.00	11,099.00	3,724.00	3,743.26	61.42	110.09	4.29	110.73	479.55	8,289.42	8,246.10	43.32	191.365		
15,100.00	11,097.20	3,724.00	3,743.26	62.79	110.09	4.29	110.73	479.55	8,333.91	8,289.88	44.03	189.279		
15,200.00	11,094.91	3,724.00	3,743.26	64.16	110.09	4.28	110.73	479.55	8,378.93	8,334.02	44.91	186.581		
15,300.00	11,092.50	3,724.00	3,743.26	65.54	110.09	4.28	110.73	479.55	8,424.79	8,379.16	45.63	184.649		
15,400.00	11,090.09	3,724.00	3,743.26	66.93	110.09	4.28	110.73	479.55	8,471.58	8,425.23	46.35	182.786		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

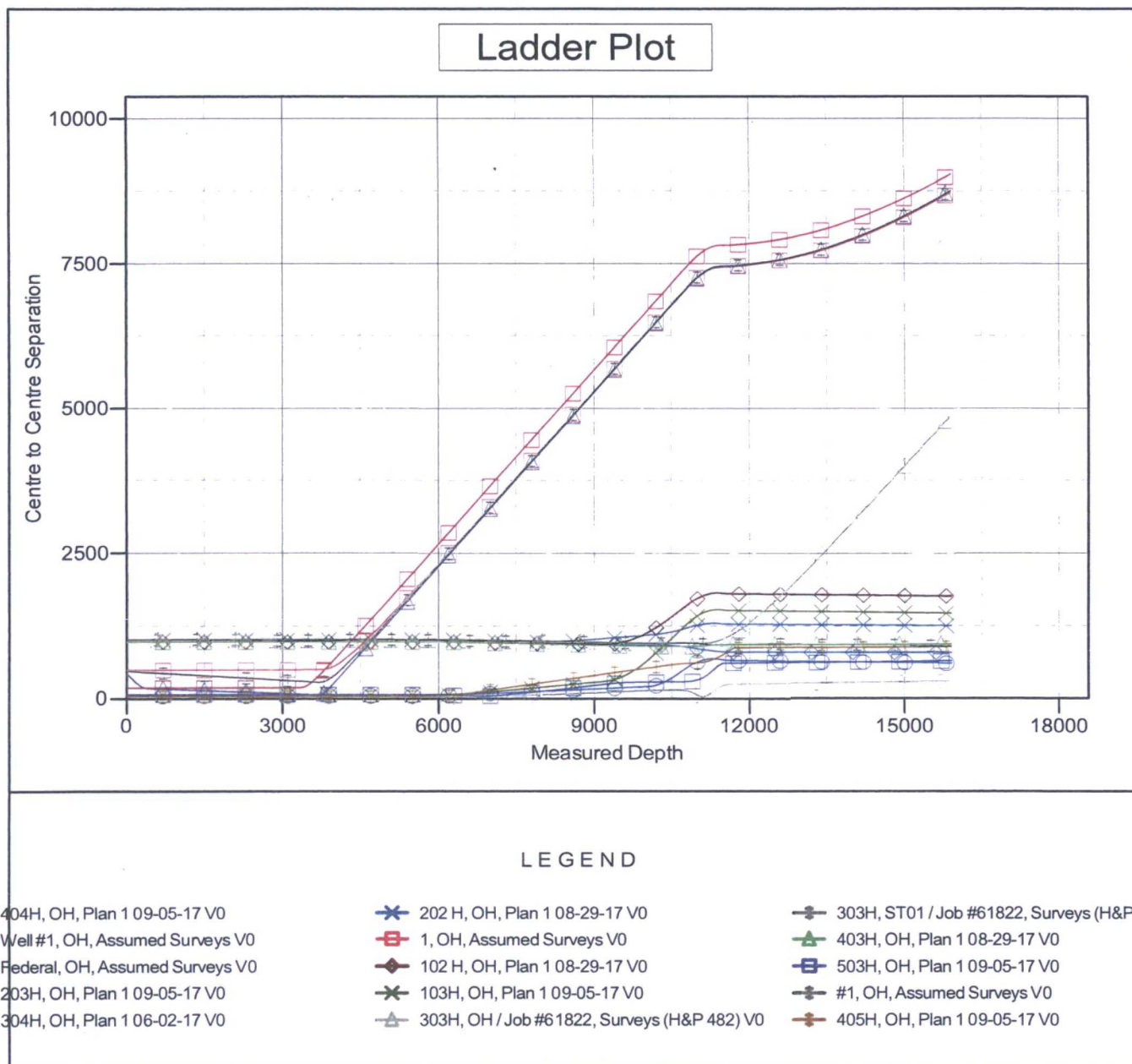
Offset Design Keohane A - 1 - OH - Assumed Surveys													Offset Site Error:	0.00 usft
Survey Program: 100-INC-ONLY-Offset Well													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
15,500.00	11,087.68	3,724.00	3,743.26	68.31	110.09	4.28	110.73	479.55	8,519.28	8,472.21	47.07	180.989		
15,600.00	11,085.27	3,724.00	3,743.26	69.70	110.09	4.28	110.73	479.55	8,567.89	8,520.09	47.80	179.255		
15,700.00	11,082.55	3,724.00	3,743.26	71.09	110.09	4.27	110.73	479.55	8,617.11	8,568.47	48.65	177.135		
15,800.00	11,079.76	3,724.00	3,743.26	72.48	110.09	4.27	110.73	479.55	8,667.15	8,617.78	49.38	175.527		
15,899.05	11,077.00	3,724.00	3,743.26	73.86	110.09	4.27	110.73	479.55	8,717.57	8,667.47	50.10	173.990		

Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Reference Depths are relative to KB @ 3740.00usft
Offset Depths are relative to Offset Datum
Central Meridian is 104° 19' 60.00000 W

Coordinates are relative to: 305H
Coordinate System is US State Plane 1983, New Mexico Eastern Zone
Grid Convergence at Surface is: 0.42°



Company: Apache Corporation
Project: Lea County, NM (NAD83 NME)
Reference Site: Black & Tan 27 Federal Com
Site Error: 0.00 usft
Reference Well: 305H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 4 12-12-17

Local Co-ordinate Reference: Well 305H
TVD Reference: KB @ 3740.00usft
MD Reference: KB @ 3740.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Reference Depths are relative to KB @ 3740.00usft

Offset Depths are relative to Offset Datum

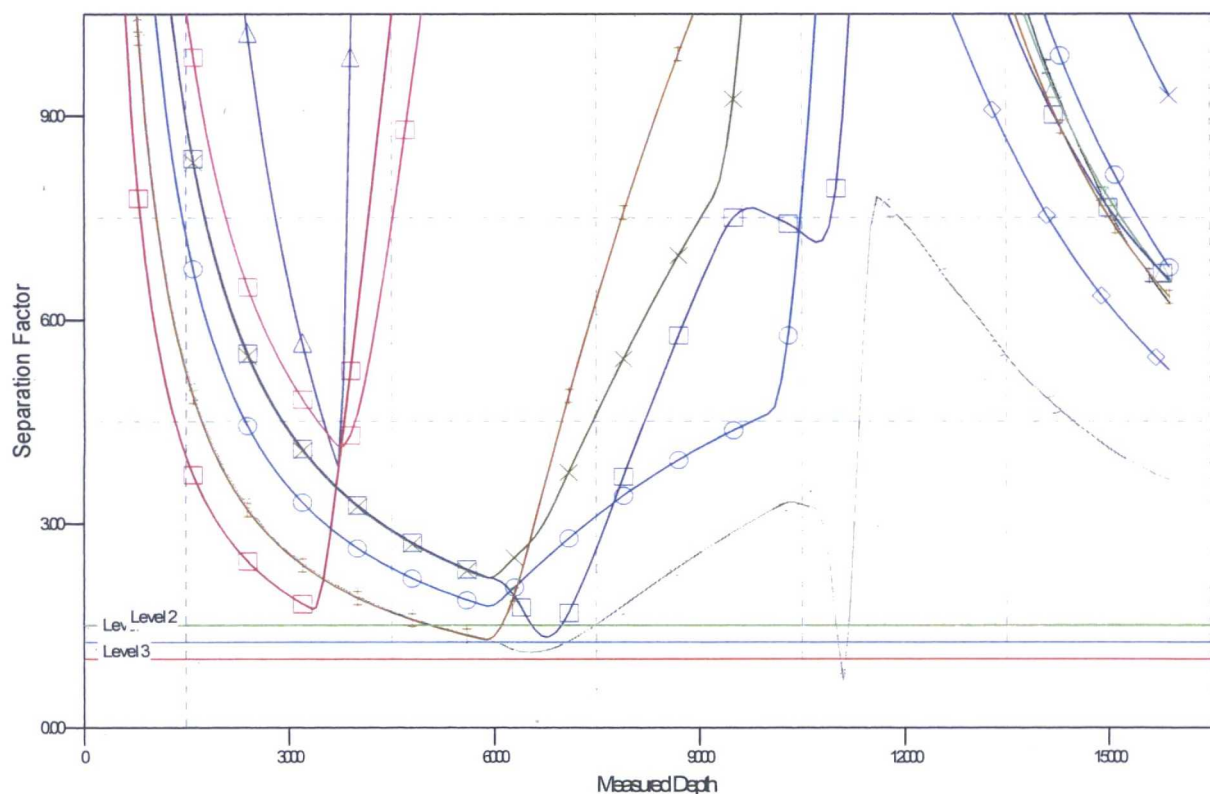
Central Meridian is 104° 19' 60.00000 W

Coordinates are relative to: 305H

Coordinate System is US State Plane 1983, New Mexico Eastern Zone

Grid Convergence at Surface is: 0.42°

Separation Factor Plot



LEGEND

404H, OH, Plan 1 09-05-17 V0
Well #1, OH, Assumed Surveys V0
Federal, OH, Assumed Surveys V0
203H, OH, Plan 1 09-05-17 V0
304H, OH, Plan 1 06-02-17 V0

202 H, OH, Plan 1 08-29-17 V0
1, OH, Assumed Surveys V0
102 H, OH, Plan 1 08-29-17 V0
103H, OH, Plan 1 09-05-17 V0
303H, OH / Job #61822, Surveys (H&P 482) V0

303H, ST01 / Job #61822, Surveys (H&P 482)
403H, OH, Plan 1 08-29-17 V0
503H, OH, Plan 1 09-05-17 V0
#1, OH, Assumed Surveys V0
405H, OH, Plan 1 09-05-17 V0