



NM OIL CONSERVATION
ARTESIA DISTRICT

JUL 28 2017

RECEIVED

Apache Corporation

Eddy County, NM (NAD27 NME)

NFE Federal COM

#47H

OH / Job #1610026

30-015-43507
Cedar Lake Federal CA #547H

Design: Surveys (Capstar 119)

Standard Survey Report

20 January, 2016

mud w/ gyro tie on





Phoenix Technology Services LP Survey Report

NM OIL CONSERVATION
ARTESIA DISTRICT

JUL 28 2017

PHOENIX
TECHNOLOGY SERVICES

RECEIVED

Company: Apache Corporation
Project: Eddy County, NM (NAD27 NME)
Site: NFE Federal COM
Well: #47H
Wellbore: OH / Job #1610026
Design: Surveys (Capstar 119)

Local Co-ordinate Reference: Well #47H
TVD Reference: KB @ 3805.00usft (Capstar 119)
MD Reference: KB @ 3805.00usft (Capstar 119)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Compass 5000 GCR

Project	Eddy County, NM (NAD27 NME)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site NFE Federal COM

Site Position:
From: Map
Position Uncertainty: 0.00 usft
Northing: 673,264.70 usft
Easting: 633,303.50 usft
Slot Radius: 13-3/16 "
Latitude: 32° 51' 0.49036 N
Longitude: 103° 53' 57.34966 W
Grid Convergence: 0.24 °

Well #47H
Well Position +N/-S 0.00 usft
+E/-W 0.00 usft
Position Uncertainty 0.00 usft
Northing: 678,204.70 usft
Easting: 633,770.30 usft
Wellhead Elevation: usft
Latitude: 32° 51' 49.35308 N
Longitude: 103° 53' 51.63884 W
Ground Level: 3,794.00 usft

Wellbore OH / Job #1610026

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	12/31/2015	7.60	60.80	48,541

Design Surveys (Capstar 119)

Audit Notes:

Version: 1.0
Phase: ACTUAL
Tie On Depth: 0.00

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	82.68

Survey Program Date 1/20/2016

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	4,356.00	Phoenix Gyro Surveys (OH / Job #161002	PHX_SPT_GTD	PHX Continuous north-seeking gyro
4,396.00	8,343.00	Phoenix MWD Surveys (OH / Job #161002	PHX+MWD+HDGM	PHX+OWSG MWD + HDGM

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
100.00	0.12	203.53	100.00	-0.10	-0.04	-0.05	0.12	0.12	0.00
200.00	1.34	3.00	199.99	0.98	-0.02	0.10	1.45	1.22	159.47
300.00	1.25	356.37	299.97	3.23	-0.03	0.38	0.17	-0.09	-6.63
400.00	1.49	20.49	399.94	5.54	0.36	1.06	0.62	0.24	24.12
500.00	2.05	3.52	499.89	8.54	0.92	2.00	0.76	0.56	-16.97
600.00	1.67	344.33	599.84	11.73	0.64	2.13	0.72	-0.38	-19.19
700.00	1.64	342.89	699.80	14.50	-0.18	1.67	0.05	-0.03	-1.44
800.00	1.15	342.38	799.77	16.82	-0.90	1.25	0.49	-0.49	-0.51
900.00	1.08	345.20	899.75	18.69	-1.45	0.95	0.09	-0.07	2.82



Phoenix Technology Services LP

Survey Report



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Database: Compass 5000 GCR

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)
1,000.00	1.18	352.57	999.73	20.62	-1.82	0.82	0.18	0.10	7.37
1,100.00	0.85	354.82	1,099.71	22.38	-2.02	0.85	0.33	-0.33	2.25
1,200.00	0.81	208.66	1,199.71	22.50	-2.43	0.46	1.59	-0.04	-146.16
1,300.00	0.69	85.89	1,299.70	21.93	-2.17	0.65	1.32	-0.12	-122.77
1,400.00	0.85	98.99	1,399.70	21.85	-0.83	1.96	0.24	0.16	13.10
1,500.00	0.85	112.08	1,499.68	21.46	0.59	3.32	0.19	0.00	13.09
1,600.00	0.66	126.39	1,599.68	20.84	1.74	4.38	0.27	-0.19	14.31
1,700.00	0.43	187.73	1,699.67	20.12	2.15	4.70	0.59	-0.23	61.34
1,800.00	0.35	242.33	1,799.67	19.61	1.83	4.31	0.36	-0.08	54.60
1,900.00	0.41	274.66	1,899.67	19.50	1.20	3.68	0.22	0.06	32.33
2,000.00	0.33	98.33	1,999.67	19.48	1.13	3.61	0.74	-0.08	-176.33
2,100.00	0.44	330.83	2,099.67	19.78	1.23	3.74	0.69	0.11	-127.50
2,200.00	0.16	202.14	2,199.67	19.98	0.99	3.53	0.55	-0.28	-128.69
2,300.00	0.19	358.22	2,299.67	20.02	0.93	3.48	0.34	0.03	156.08
2,400.00	0.16	68.51	2,399.67	20.24	1.06	3.63	0.20	-0.03	70.29
2,500.00	0.27	238.70	2,499.66	20.17	0.99	3.55	0.43	0.11	170.19
2,600.00	0.63	273.51	2,599.66	20.08	0.24	2.79	0.44	0.36	34.81
2,700.00	0.40	29.19	2,699.66	20.42	-0.14	2.46	0.88	-0.23	115.68
2,800.00	0.62	238.20	2,799.66	20.44	-0.43	2.18	0.99	0.22	-150.99
2,900.00	0.25	338.87	2,899.66	20.35	-0.97	1.63	0.71	-0.37	100.67
3,000.00	0.71	276.44	2,999.65	20.63	-1.67	0.98	0.63	0.46	-62.43
3,100.00	0.14	256.72	3,099.65	20.67	-2.40	0.25	0.58	-0.57	-19.72
3,200.00	0.72	282.20	3,199.65	20.77	-3.13	-0.46	0.60	0.58	25.48
3,300.00	0.15	242.03	3,299.64	20.84	-3.86	-1.17	0.61	-0.57	-40.17
3,400.00	0.67	255.01	3,399.64	20.63	-4.54	-1.88	0.52	0.52	12.98
3,500.00	0.69	331.33	3,499.63	21.01	-5.40	-2.68	0.84	0.02	76.32
3,600.00	0.44	169.72	3,599.63	21.16	-5.62	-2.87	1.12	-0.25	-161.61
3,700.00	1.19	304.66	3,699.63	21.37	-6.40	-3.63	1.53	0.75	134.94
3,800.00	0.60	323.03	3,799.61	22.38	-7.57	-4.66	0.65	-0.59	18.37
3,900.00	1.24	284.34	3,899.60	23.07	-8.93	-5.92	0.86	0.64	-38.69
4,000.00	1.57	256.08	3,999.57	23.01	-11.31	-8.29	0.76	0.33	-28.26
4,100.00	1.78	304.56	4,099.53	23.56	-13.92	-10.81	1.39	0.21	48.48
4,200.00	1.60	294.83	4,199.49	25.02	-16.47	-13.14	0.34	-0.18	-9.73
4,300.00	1.86	325.47	4,299.45	26.95	-18.65	-15.07	0.95	0.26	30.64
4,356.00	1.47	329.17	4,355.42	28.31	-19.54	-15.77	0.72	-0.70	6.61
Tie In to Phoenix Gyro Surveys									
4,396.00	1.90	309.60	4,395.41	29.18	-20.31	-16.43	1.78	1.08	-48.93
First Phoenix MWD Survey									
4,439.00	2.50	9.10	4,438.38	30.56	-20.71	-16.65	5.22	1.40	138.37
4,482.00	6.00	40.80	4,481.26	33.19	-19.10	-14.71	9.51	8.14	73.72
4,524.00	10.60	47.20	4,522.81	37.47	-14.82	-9.93	11.15	10.95	15.24
4,567.00	15.40	49.50	4,564.70	43.87	-7.58	-1.92	11.23	11.16	5.35
4,609.00	20.10	51.00	4,604.69	52.04	2.28	8.89	11.24	11.19	3.57



Phoenix Technology Services LP

Survey Report



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North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Compass 5000 GCR

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)
4,652.00	25.20	52.60	4,644.36	62.26	15.30	23.11	11.95	11.86	3.72
4,694.00	30.80	54.00	4,681.43	74.02	31.12	40.29	13.42	13.33	3.33
4,737.00	36.00	57.30	4,717.31	87.33	50.67	61.39	12.81	12.09	7.67
4,780.00	40.70	60.50	4,751.03	101.07	73.52	85.80	11.86	10.93	7.44
4,822.00	45.60	63.30	4,781.67	114.56	98.86	112.66	12.52	11.67	6.67
4,865.00	50.60	64.50	4,810.37	128.63	127.60	142.95	11.81	11.63	2.79
4,907.00	55.80	63.90	4,835.52	143.26	157.87	174.84	12.43	12.38	-1.43
4,950.00	61.30	62.60	4,857.95	159.78	190.61	209.41	13.05	12.79	-3.02
4,992.00	67.10	62.50	4,876.22	177.20	224.15	244.90	13.81	13.81	-0.24
5,035.00	72.90	61.80	4,890.92	196.07	259.86	282.72	13.57	13.49	-1.63
5,077.00	76.30	61.30	4,902.08	215.36	295.45	320.49	8.18	8.10	-1.19
5,120.00	80.70	61.80	4,910.65	235.43	332.49	359.78	10.30	10.23	1.16
5,159.00	84.00	62.30	4,915.84	253.54	366.63	395.95	8.56	8.46	1.28
5,201.00	87.30	62.70	4,919.02	272.88	403.77	435.25	7.91	7.86	0.95
5,329.00	89.40	67.60	4,922.71	326.62	519.83	557.22	4.16	1.64	3.83
5,457.00	90.60	71.00	4,922.71	371.86	639.55	681.72	2.82	0.94	2.66
5,584.00	86.60	71.40	4,925.81	412.77	759.71	806.12	3.17	-3.15	0.31
5,712.00	87.50	73.60	4,932.40	451.21	881.62	931.93	1.85	0.70	1.72
5,840.00	86.50	78.30	4,939.10	482.23	1,005.58	1,058.84	3.75	-0.78	3.67
5,968.00	88.10	82.00	4,945.14	504.10	1,131.53	1,186.54	3.15	1.25	2.89
6,096.00	89.90	86.20	4,947.37	517.25	1,258.80	1,314.45	3.57	1.41	3.28
6,223.00	89.20	90.20	4,948.37	521.23	1,385.71	1,440.83	3.20	-0.55	3.15
6,351.00	89.70	90.60	4,949.60	520.34	1,513.70	1,567.66	0.50	0.39	0.31
6,479.00	89.10	90.20	4,950.94	519.45	1,641.69	1,694.49	0.56	-0.47	-0.31
6,606.00	88.30	89.40	4,953.82	519.89	1,768.65	1,820.48	0.89	-0.63	-0.63
6,734.00	87.90	87.40	4,958.06	523.46	1,896.52	1,947.77	1.59	-0.31	-1.56
6,862.00	88.80	87.80	4,961.75	528.82	2,024.36	2,075.24	0.77	0.70	0.31
6,990.00	89.10	87.90	4,964.09	533.62	2,152.24	2,202.70	0.25	0.23	0.08
7,117.00	91.40	88.80	4,963.54	537.28	2,279.18	2,329.06	1.94	1.81	0.71
7,245.00	90.90	89.60	4,960.97	539.06	2,407.14	2,456.21	0.74	-0.39	0.63
7,373.00	91.40	90.20	4,958.40	539.29	2,535.11	2,583.17	0.61	0.39	0.47
7,501.00	89.70	90.80	4,957.17	538.17	2,663.10	2,709.97	1.41	-1.33	0.47
7,628.00	91.00	91.30	4,956.40	535.84	2,790.07	2,835.61	1.10	1.02	0.39
7,756.00	89.70	91.00	4,955.62	533.27	2,918.04	2,962.21	1.04	-1.02	-0.23
7,884.00	89.00	89.10	4,957.07	533.16	3,046.03	3,089.13	1.58	-0.55	-1.48
8,012.00	90.00	88.60	4,958.19	535.73	3,173.99	3,216.38	0.87	0.78	-0.39
8,140.00	88.70	89.10	4,959.64	538.30	3,301.96	3,343.63	1.09	-1.02	0.39
8,268.00	89.50	90.30	4,961.65	538.97	3,429.93	3,470.65	1.13	0.63	0.94
8,343.00	89.50	90.30	4,962.30	538.58	3,504.93	3,544.99	0.00	0.00	0.00

Projection to Bit



Phoenix Technology Services LP

Survey Report



Company: Apache Corporation
Project: Eddy County, NM (NAD27 NME)
Site: NFE Federal COM
Well: #47H
Wellbore: OH / Job #1610026
Design: Surveys (Capstar 119)

Local Co-ordinate Reference: Well #47H
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MD Reference: KB @ 3805.00usft (Capstar 119)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Compass 5000 GCR

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4,356.00	4,355.42	28.31	-19.54	Tie In to Phoenix Gyro Surveys
4,396.00	4,395.41	29.18	-20.31	First Phoenix MWD Survey
8,343.00	4,962.30	538.58	3,504.93	Projection to Bit



Apache Corporation

Eddy County, NM (NAD27 NME)

NFE Federal COM

#47H

OH / Job #1610026

Surveys (Capstar 119)

Anticollision Report

20 January, 2016





Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Eddy County, NM (NAD27 NME)
Reference Site: NFE Federal COM
Site Error: 0.00 usft
Reference Well: #47H
Well Error: 0.00 usft
Reference Wellbore: OH / Job #1610026
Reference Design: Surveys (Capstar 119)

Local Co-ordinate Reference: Well #47H
TVD Reference: KB @ 3805.00usft (Capstar 119)
MD Reference: KB @ 3805.00usft (Capstar 119)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Offset Datum

Reference Surveys (Capstar 119)

Filter type: NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method: MD Interval 100.00usft
Depth Range: Unlimited
Results Limited by: Maximum center-center distance of 10,000.00 u
Warning Levels Evaluated at: 2.00 Sigma

Error Model: ISCWSA
Scan Method: Closest Approach 3D
Error Surface: Elliptical Conic
Casing Method: Not applied

Survey Program Date 1/20/2016

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	4,356.00	Phoenix Gyro Surveys (OH / Job #161002	PHX_SPT_GTD	PHX Continuous north-seeking gyro
4,396.00	8,343.00	Phoenix MWD Surveys (OH / Job #161002	PHX+MWD+HDGM	PHX+OWSG 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						
Hawk Federal Com						
#1H - OH - Plan #1 06-11-15	8,343.00	10,122.10	1,394.09	1,150.06	5.713	CC, ES, SF
#3H - OH - Plan #1 06-11-15	8,343.00	10,534.05	1,465.39	1,336.40	11.361	CC, ES, SF
NFE Federal COM						
#46H - OH / Job #1514748 - Surveys (Capstar 119)	4,862.34	9,827.00	511.17	370.32	3.629	CC, ES
#46H - OH / Job #1514748 - Surveys (Capstar 119)	4,900.00	9,827.00	514.01	371.35	3.603	SF
#49H - OH - Plan #3 09-09-15	1,142.23	1,142.94	3.02	-4.80	0.386	Level 1, CC
#49H - OH - Plan #3 09-09-15	3,000.00	3,000.65	4.64	-16.25	0.222	Level 1, SF
#49H - OH - Plan #3 09-09-15	3,800.00	3,800.61	7.92	-18.61	0.298	Level 1, ES
#51H - OH - Plan #3 11-11-15	4,600.00	4,599.21	0.27	-29.52	0.009	Level 1, CC, ES, SF

Offset Design Hawk Federal Com - #1H - OH - Plan #1 06-11-15

Survey Program: O-PHX+MWD+HDGM

Offset Site Error: 0.00 usft

Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	Offset Wellbore Centre +E-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	10,122.10	5,133.00	0.00	146.32	81.99	688.30	4,890.90	7,010.37				
100.00	100.00	10,122.10	5,133.00	0.17	146.32	-121.64	688.30	4,890.90	6,939.80	6,912.04	27.76	249.948	
200.00	199.99	10,122.10	5,133.00	0.51	146.32	80.28	688.30	4,890.90	6,869.81	6,844.06	25.74	266.844	
300.00	299.97	10,122.10	5,133.00	0.86	146.32	86.84	688.30	4,890.90	6,800.48	6,774.26	26.22	259.383	
400.00	399.94	10,122.10	5,133.00	1.24	146.32	62.80	688.30	4,890.90	6,731.63	6,705.22	26.41	254.903	
500.00	499.89	10,122.10	5,133.00	1.62	146.32	80.41	688.30	4,890.90	6,663.38	6,637.58	25.79	258.358	
600.00	599.84	10,122.10	5,133.00	2.00	146.32	99.25	688.30	4,890.90	6,596.55	6,569.84	26.71	246.953	
700.00	699.80	10,122.10	5,133.00	2.38	146.32	100.66	688.30	4,890.90	6,531.00	6,503.89	27.12	240.847	
800.00	799.77	10,122.10	5,133.00	2.77	146.32	100.76	688.30	4,890.90	6,466.31	6,438.20	28.11	230.011	
900.00	899.75	10,122.10	5,133.00	3.16	146.32	97.89	688.30	4,890.90	6,402.43	6,373.89	28.54	224.334	
1,000.00	999.73	10,122.10	5,133.00	3.55	146.32	90.61	688.30	4,890.90	6,339.34	6,310.61	28.74	220.612	
1,100.00	1,099.71	10,122.10	5,133.00	3.94	146.32	88.10	688.30	4,890.90	6,277.10	6,247.59	29.51	212.703	
1,200.00	1,199.71	10,122.10	5,133.00	4.27	146.32	-126.90	688.30	4,890.90	6,216.17	6,184.30	31.87	195.069	
1,300.00	1,299.70	10,122.10	5,133.00	4.57	146.32	-3.68	688.30	4,890.90	6,155.81	6,124.43	31.38	196.184	
1,400.00	1,399.70	10,122.10	5,133.00	4.90	146.32	-16.93	688.30	4,890.90	6,095.57	6,063.58	31.99	190.553	
1,500.00	1,499.68	10,122.10	5,133.00	5.22	146.32	-30.15	688.30	4,890.90	6,036.36	6,003.79	32.57	185.308	
1,600.00	1,599.68	10,122.10	5,133.00	5.55	146.32	-44.48	688.30	4,890.90	5,978.48	5,945.50	32.98	181.276	

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: Eddy County, NM (NAD27 NME)
Reference Site: NFE Federal COM
Site Error: 0.00 usft
Reference Well: #47H
Well Error: 0.00 usft
Reference Wellbore: OH / Job #1610026
Reference Design: Surveys (Capstar 119)

Local Co-ordinate Reference: Well #47H
TVD Reference: KB @ 3805.00usft (Capstar 119)
MD Reference: KB @ 3805.00usft (Capstar 119)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Offset Datum

Offset Design Hawk Federal Com - #1H - OH - Plan #1 06-11-15												Offset Site Error:	0.00 usft
Survey Program: 0-PHX+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	
1,700.00	1,699.67	10,122.10	5,133.00	5.86	146.32	-105.79	688.30	4,890.90	5,922.34	5,889.05	33.28	177.936	
1,800.00	1,799.67	10,122.10	5,133.00	6.18	146.32	-160.19	688.30	4,890.90	5,867.95	5,834.66	33.29	176.257	
1,900.00	1,899.67	10,122.10	5,133.00	6.51	146.32	-167.61	688.30	4,890.90	5,814.99	5,781.58	33.41	174.051	
2,000.00	1,999.67	10,122.10	5,133.00	6.86	146.32	-16.17	688.30	4,890.90	5,762.79	5,728.87	33.92	169.881	
2,100.00	2,099.67	10,122.10	5,133.00	7.21	146.32	111.62	688.30	4,890.90	5,711.68	5,677.91	33.78	169.094	
2,200.00	2,199.67	10,122.10	5,133.00	7.55	146.32	-120.00	688.30	4,890.90	5,662.19	5,627.52	34.66	163.359	
2,300.00	2,299.67	10,122.10	5,133.00	7.90	146.32	84.10	688.30	4,890.90	5,613.89	5,579.20	34.69	161.825	
2,400.00	2,399.67	10,122.10	5,133.00	8.26	146.32	13.73	688.30	4,890.90	5,566.80	5,531.62	35.18	158.256	
2,500.00	2,499.66	10,122.10	5,133.00	8.61	146.32	-156.53	688.30	4,890.90	5,521.32	5,485.65	35.67	154.796	
2,600.00	2,599.66	10,122.10	5,133.00	8.95	146.32	-168.77	688.30	4,890.90	5,477.90	5,442.06	35.84	152.862	
2,700.00	2,699.66	10,122.10	5,133.00	9.31	146.32	53.18	688.30	4,890.90	5,435.58	5,399.60	35.99	151.048	
2,800.00	2,799.66	10,122.10	5,133.00	9.66	146.32	-156.08	688.30	4,890.90	5,394.75	5,357.94	36.81	146.556	
2,900.00	2,899.66	10,122.10	5,133.00	10.01	146.32	103.46	688.30	4,890.90	5,355.71	5,318.93	36.77	145.637	
3,000.00	2,999.65	10,122.10	5,133.00	10.37	146.32	165.86	688.30	4,890.90	5,318.36	5,281.16	37.20	142.957	
3,100.00	3,099.65	10,122.10	5,133.00	10.72	146.32	-174.49	688.30	4,890.90	5,282.71	5,245.06	37.66	140.289	
3,200.00	3,199.65	10,122.10	5,133.00	11.08	146.32	160.12	688.30	4,890.90	5,248.72	5,210.84	37.87	138.586	
3,300.00	3,299.64	10,122.10	5,133.00	11.43	146.32	-159.81	688.30	4,890.90	5,216.42	5,178.04	38.38	135.905	
3,400.00	3,399.64	10,122.10	5,133.00	11.79	146.32	-172.80	688.30	4,890.90	5,185.84	5,147.06	38.78	133.724	
3,500.00	3,499.63	10,122.10	5,133.00	12.15	146.32	111.10	688.30	4,890.90	5,157.10	5,118.36	38.74	133.121	
3,600.00	3,599.63	10,122.10	5,133.00	12.50	146.32	-87.60	688.30	4,890.90	5,129.58	5,089.96	39.62	129.485	
3,700.00	3,699.63	10,122.10	5,133.00	12.84	146.32	137.79	688.30	4,890.90	5,104.40	5,064.95	39.45	129.384	
3,800.00	3,799.61	10,122.10	5,133.00	13.21	146.32	119.35	688.30	4,890.90	5,081.34	5,041.45	39.89	127.399	
3,900.00	3,899.60	10,122.10	5,133.00	13.58	146.32	158.02	688.30	4,890.90	5,060.38	5,020.06	40.32	125.520	
4,000.00	3,999.57	10,122.10	5,133.00	13.95	146.32	-173.84	688.30	4,890.90	5,042.40	5,001.50	40.90	123.287	
4,100.00	4,099.53	10,122.10	5,133.00	14.32	146.32	137.92	688.30	4,890.90	5,026.49	4,985.62	40.87	122.983	
4,200.00	4,199.49	10,122.10	5,133.00	14.69	146.32	147.60	688.30	4,890.90	5,012.35	4,971.03	41.32	121.308	
4,300.00	4,299.45	10,122.10	5,133.00	15.06	146.32	117.07	688.30	4,890.90	4,999.75	4,958.28	41.47	120.573	
4,400.00	4,399.40	10,122.10	5,133.00	15.34	146.32	126.70	688.30	4,890.90	4,988.65	4,946.85	41.80	119.352	
4,500.00	4,499.13	10,122.10	5,133.00	15.35	146.32	38.72	688.30	4,890.90	4,974.63	4,934.54	40.10	124.068	
4,600.00	4,596.21	10,122.10	5,133.00	15.37	146.32	34.14	688.30	4,890.90	4,946.94	4,909.98	36.97	133.819	
4,700.00	4,686.56	10,122.10	5,133.00	15.43	146.32	33.37	688.30	4,890.90	4,904.22	4,866.17	38.05	128.901	
4,800.00	4,765.93	10,122.10	5,133.00	15.57	146.32	29.02	688.30	4,890.90	4,845.16	4,799.56	45.60	106.250	
4,900.00	4,831.55	10,122.10	5,133.00	15.87	146.32	32.72	688.30	4,890.90	4,771.90	4,710.47	61.43	77.683	
5,000.00	4,879.27	10,122.10	5,133.00	16.47	146.32	48.15	688.30	4,890.90	4,688.74	4,591.59	97.15	48.261	
5,100.00	4,907.06	10,122.10	5,133.00	17.42	146.32	66.56	688.30	4,890.90	4,599.52	4,469.14	130.38	35.278	
5,200.00	4,918.98	10,122.10	5,133.00	18.68	146.32	85.04	688.30	4,890.90	4,507.59	4,359.01	148.58	30.338	
5,300.00	4,922.29	10,122.10	5,133.00	20.23	146.32	88.95	688.30	4,890.90	4,413.87	4,258.97	154.91	28.494	
5,400.00	4,923.04	10,122.10	5,133.00	21.99	146.32	92.72	688.30	4,890.90	4,318.37	4,159.08	159.29	27.110	
5,500.00	4,922.77	10,122.10	5,133.00	23.91	146.32	89.92	688.30	4,890.90	4,221.85	4,059.17	162.68	25.951	
5,600.00	4,926.75	10,122.10	5,133.00	25.97	146.32	80.11	688.30	4,890.90	4,125.19	3,962.81	162.39	25.403	
5,700.00	4,931.87	10,122.10	5,133.00	28.15	146.32	81.72	688.30	4,890.90	4,028.19	3,861.59	166.60	24.179	
5,800.00	4,936.77	10,122.10	5,133.00	30.43	146.32	75.50	688.30	4,890.90	3,930.36	3,763.16	167.21	23.506	
5,900.00	4,942.38	10,122.10	5,133.00	32.79	146.32	72.31	688.30	4,890.90	3,831.57	3,663.21	168.36	22.758	
6,000.00	4,946.07	10,122.10	5,133.00	35.20	146.32	76.51	688.30	4,890.90	3,732.11	3,557.17	174.95	21.333	
6,100.00	4,947.38	10,122.10	5,133.00	37.66	146.32	107.77	688.30	4,890.90	3,632.23	3,457.58	174.65	20.797	
6,200.00	4,948.07	10,122.10	5,133.00	40.15	146.32	-83.84	688.30	4,890.90	3,532.25	3,348.36	183.89	19.208	
6,300.00	4,949.24	10,122.10	5,133.00	42.68	146.32	-88.79	688.30	4,890.90	3,432.39	3,245.15	187.24	18.332	
6,400.00	4,949.95	10,122.10	5,133.00	45.23	146.32	-88.32	688.30	4,890.90	3,332.56	3,142.69	189.86	17.552	
6,500.00	4,951.29	10,122.10	5,133.00	47.83	146.32	-78.72	688.30	4,890.90	3,232.72	3,043.39	189.33	17.074	
6,600.00	4,953.64	10,122.10	5,133.00	50.46	146.32	-63.25	688.30	4,890.90	3,132.85	2,956.45	176.41	17.759	
6,700.00	4,956.85	10,122.10	5,133.00	53.13	146.32	-33.03	688.30	4,890.90	3,032.94	2,915.20	117.74	25.760	
6,800.00	4,960.21	10,122.10	5,133.00	55.81	146.32	-29.82	688.30	4,890.90	2,932.99	2,821.67	111.32	26.348	

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



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Eddy County, NM (NAD27 NME)
Reference Site: NFE Federal COM
Site Error: 0.00 usft
Reference Well: #47H
Well Error: 0.00 usft
Reference Wellbore: OH / Job #1610026
Reference Design: Surveys (Capstar 119)

Local Co-ordinate Reference: Well #47H
TVD Reference: KB @ 3805.00usft (Capstar 119)
MD Reference: KB @ 3805.00usft (Capstar 119)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Offset Datum

Offset Design Hawk Federal Com - #1H - OH - Plan#1 06-11-15													Offset Site Error:	0.00 usft
Survey Program: 0-PHX+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	
6,900.00	4,962.52	10,122.10	5,133.00	58.52	146.32	-50.13	688.30	4,890.90	2,833.02	2,672.11	160.91	17.607		
7,000.00	4,964.24	10,122.10	5,133.00	61.24	146.32	-67.79	688.30	4,890.90	2,733.04	2,540.29	192.76	14.179		
7,100.00	4,963.91	10,122.10	5,133.00	63.97	146.32	-124.01	688.30	4,890.90	2,633.09	2,456.99	176.10	14.952		
7,200.00	4,961.75	10,122.10	5,133.00	66.71	146.32	-116.93	688.30	4,890.90	2,533.21	2,342.69	190.52	13.296		
7,300.00	4,960.00	10,122.10	5,133.00	69.45	146.32	-113.53	688.30	4,890.90	2,433.38	2,235.44	197.94	12.294		
7,400.00	4,957.83	10,122.10	5,133.00	72.21	146.32	-110.11	688.30	4,890.90	2,333.63	2,128.73	204.90	11.389		
7,500.00	4,957.17	10,122.10	5,133.00	74.97	146.32	-92.12	688.30	4,890.90	2,233.92	2,013.97	219.95	10.157		
7,600.00	4,956.82	10,122.10	5,133.00	77.74	146.32	-102.83	688.30	4,890.90	2,134.31	1,916.82	217.48	9.814		
7,700.00	4,955.60	10,122.10	5,133.00	80.51	146.32	-98.47	688.30	4,890.90	2,034.78	1,811.51	223.26	9.114		
7,800.00	4,955.94	10,122.10	5,133.00	83.30	146.32	-90.30	688.30	4,890.90	1,935.22	1,706.55	228.67	8.463		
7,900.00	4,957.33	10,122.10	5,133.00	86.09	146.32	-85.26	688.30	4,890.90	1,835.51	1,604.44	231.07	7.944		
8,000.00	4,958.18	10,122.10	5,133.00	88.90	146.32	-97.12	688.30	4,890.90	1,735.73	1,502.84	232.89	7.453		
8,100.00	4,958.87	10,122.10	5,133.00	91.70	146.32	-85.58	688.30	4,890.90	1,635.97	1,399.16	236.81	6.908		
8,200.00	4,960.80	10,122.10	5,133.00	94.51	146.32	-85.72	688.30	4,890.90	1,536.30	1,296.76	239.54	6.413		
8,300.00	4,961.93	10,122.10	5,133.00	97.32	146.32	-90.22	688.30	4,890.90	1,436.83	1,194.01	242.81	5.917		
8,343.00	4,962.30	10,122.10	5,133.00	98.53	146.32	-90.22	688.30	4,890.90	1,394.09	1,150.06	244.03	5.713 CC, ES, SF		

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



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Eddy County, NM (NAD27 NME)
Reference Site: NFE Federal COM
Site Error: 0.00 usft
Reference Well: #47H
Well Error: 0.00 usft
Reference Wellbore: OH / Job #1610026
Reference Design: Surveys (Capstar 119)

Local Co-ordinate Reference: Well #47H
TVD Reference: KB @ 3805.00usft (Capstar 119)
MD Reference: KB @ 3805.00usft (Capstar 119)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Offset Datum

Offset Design Hawk Federal Com - #3H - OH - Plan #1 06-11-15												Offset Site Error:	0.00 usft
Survey Program: 0-PHX+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)	Offset Wellbore Centre +E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	10,534.05	5,546.00	0.00	145.78	81.24	753.20	4,890.60	7,315.45				
100.00	100.00	10,534.05	5,546.00	0.17	145.78	-122.39	753.20	4,890.60	7,242.15	7,212.08	30.08	240.783	
200.00	199.99	10,534.05	5,546.00	0.51	145.78	79.64	753.20	4,890.60	7,169.34	7,141.48	27.87	257.284	
300.00	299.97	10,534.05	5,546.00	0.86	145.78	86.20	753.20	4,890.60	7,097.10	7,068.75	28.34	250.391	
400.00	399.94	10,534.05	5,546.00	1.24	145.78	62.15	753.20	4,890.60	7,025.26	6,996.72	28.54	246.147	
500.00	499.89	10,534.05	5,546.00	1.62	145.78	79.82	753.20	4,890.60	6,953.93	6,926.11	27.82	249.955	
600.00	599.84	10,534.05	5,546.00	2.00	145.78	98.64	753.20	4,890.60	6,883.89	6,855.12	28.78	239.229	
700.00	699.80	10,534.05	5,546.00	2.38	145.78	100.05	753.20	4,890.60	6,815.03	6,785.85	29.18	233.517	
800.00	799.77	10,534.05	5,546.00	2.77	145.78	100.11	753.20	4,890.60	6,746.92	6,716.67	30.25	223.053	
900.00	899.75	10,534.05	5,546.00	3.16	145.78	97.23	753.20	4,890.60	6,679.52	6,648.84	30.68	217.683	
1,000.00	999.73	10,534.05	5,546.00	3.55	145.78	89.96	753.20	4,890.60	6,612.82	6,581.95	30.87	214.225	
1,100.00	1,099.71	10,534.05	5,546.00	3.94	145.78	87.42	753.20	4,890.60	6,546.85	6,515.16	31.69	206.582	
1,200.00	1,199.71	10,534.05	5,546.00	4.27	145.78	-127.69	753.20	4,890.60	6,482.08	6,447.84	34.25	189.274	
1,300.00	1,299.70	10,534.05	5,546.00	4.57	145.78	-4.43	753.20	4,890.60	6,417.79	6,384.09	33.70	190.420	
1,400.00	1,399.70	10,534.05	5,546.00	4.90	145.78	-17.70	753.20	4,890.60	6,353.55	6,319.20	34.35	184.972	
1,500.00	1,499.68	10,534.05	5,546.00	5.22	145.78	-30.94	753.20	4,890.60	6,290.20	6,255.24	34.96	179.928	
1,600.00	1,599.68	10,534.05	5,546.00	5.55	145.78	-45.27	753.20	4,890.60	6,228.06	6,192.70	35.36	176.117	
1,700.00	1,699.67	10,534.05	5,546.00	5.86	145.78	-106.57	753.20	4,890.60	6,167.50	6,131.86	35.64	173.032	
1,800.00	1,799.67	10,534.05	5,546.00	6.18	145.78	-160.95	753.20	4,890.60	6,108.55	6,072.94	35.60	171.574	
1,900.00	1,899.67	10,534.05	5,546.00	6.51	145.78	166.87	753.20	4,890.60	6,050.87	6,015.18	35.69	169.546	
2,000.00	1,999.67	10,534.05	5,546.00	6.86	145.78	-16.93	753.20	4,890.60	5,993.83	5,957.59	36.25	165.369	
2,100.00	2,099.67	10,534.05	5,546.00	7.21	145.78	110.91	753.20	4,890.60	5,937.76	5,901.74	36.02	164.859	
2,200.00	2,199.67	10,534.05	5,546.00	7.55	145.78	-120.76	753.20	4,890.60	5,883.14	5,846.16	36.98	159.087	
2,300.00	2,299.67	10,534.05	5,546.00	7.90	145.78	83.37	753.20	4,890.60	5,829.60	5,792.63	36.97	157.703	
2,400.00	2,399.67	10,534.05	5,546.00	8.26	145.78	12.99	753.20	4,890.60	5,777.11	5,739.84	37.48	154.157	
2,500.00	2,499.66	10,534.05	5,546.00	8.61	145.78	-157.29	753.20	4,890.60	5,726.09	5,688.11	37.98	150.766	
2,600.00	2,599.66	10,534.05	5,546.00	8.95	145.78	168.04	753.20	4,890.60	5,676.97	5,638.86	38.11	148.980	
2,700.00	2,699.66	10,534.05	5,546.00	9.31	145.78	52.46	753.20	4,890.60	5,628.81	5,590.57	38.25	147.176	
2,800.00	2,799.66	10,534.05	5,546.00	9.66	145.78	-156.85	753.20	4,890.60	5,581.99	5,542.86	39.14	142.632	
2,900.00	2,899.66	10,534.05	5,546.00	10.01	145.78	102.73	753.20	4,890.60	5,536.82	5,497.78	39.04	141.829	
3,000.00	2,999.65	10,534.05	5,546.00	10.37	145.78	165.13	753.20	4,890.60	5,493.19	5,453.73	39.46	139.195	
3,100.00	3,099.65	10,534.05	5,546.00	10.72	145.78	-175.24	753.20	4,890.60	5,451.11	5,411.15	39.96	136.431	
3,200.00	3,199.65	10,534.05	5,546.00	11.08	145.78	159.40	753.20	4,890.60	5,410.54	5,370.42	40.12	134.844	
3,300.00	3,299.64	10,534.05	5,546.00	11.43	145.78	-160.56	753.20	4,890.60	5,371.53	5,330.84	40.69	132.022	
3,400.00	3,399.64	10,534.05	5,546.00	11.79	145.78	-173.55	753.20	4,890.60	5,334.10	5,293.02	41.08	129.851	
3,500.00	3,499.63	10,534.05	5,546.00	12.15	145.78	110.41	753.20	4,890.60	5,298.38	5,257.44	40.94	129.414	
3,600.00	3,599.63	10,534.05	5,546.00	12.50	145.78	-88.38	753.20	4,890.60	5,263.75	5,221.77	41.98	125.394	
3,700.00	3,699.63	10,534.05	5,546.00	12.84	145.78	137.11	753.20	4,890.60	5,231.33	5,189.71	41.62	125.692	
3,800.00	3,799.61	10,534.05	5,546.00	13.21	145.78	118.65	753.20	4,890.60	5,200.88	5,158.78	42.10	123.528	
3,900.00	3,899.60	10,534.05	5,546.00	13.58	145.78	157.32	753.20	4,890.60	5,172.41	5,129.89	42.53	121.627	
4,000.00	3,999.57	10,534.05	5,546.00	13.95	145.78	-174.59	753.20	4,890.60	5,146.81	5,103.62	43.19	119.154	
4,100.00	4,099.53	10,534.05	5,546.00	14.32	145.78	137.28	753.20	4,890.60	5,123.17	5,080.19	42.98	119.208	
4,200.00	4,199.49	10,534.05	5,546.00	14.69	145.78	146.93	753.20	4,890.60	5,101.19	5,057.72	43.47	117.347	
4,300.00	4,299.45	10,534.05	5,546.00	15.06	145.78	116.47	753.20	4,890.60	5,080.67	5,037.15	43.51	116.761	
4,400.00	4,399.40	10,534.05	5,546.00	15.34	145.78	126.09	753.20	4,890.60	5,061.56	5,017.70	43.86	115.390	
4,500.00	4,499.13	10,534.05	5,546.00	15.35	145.78	38.39	753.20	4,890.60	5,039.52	4,997.75	41.76	120.675	
4,600.00	4,596.21	10,534.05	5,546.00	15.37	145.78	34.30	753.20	4,890.60	5,003.98	4,965.85	38.13	131.225	
4,700.00	4,686.56	10,534.05	5,546.00	15.43	145.78	34.17	753.20	4,890.60	4,953.88	4,914.29	39.59	125.119	
4,800.00	4,765.93	10,534.05	5,546.00	15.57	145.78	30.32	753.20	4,890.60	4,888.31	4,840.37	47.94	101.960	
4,900.00	4,831.55	10,534.05	5,546.00	15.87	145.78	35.44	753.20	4,890.60	4,809.63	4,743.04	66.59	72.225	
5,000.00	4,879.27	10,534.05	5,546.00	16.47	145.78	54.94	753.20	4,890.60	4,722.42	4,613.87	108.55	43.505	
5,100.00	4,907.06	10,534.05	5,546.00	17.42	145.78	77.84	753.20	4,890.60	4,630.73	4,490.17	140.56	32.945	

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: Eddy County, NM (NAD27 NME)
Reference Site: NFE Federal COM
Site Error: 0.00 usft
Reference Well: #47H
Well Error: 0.00 usft
Reference Wellbore: OH / Job #1610026
Reference Design: Surveys (Capstar 119)

Local Co-ordinate Reference: Well #47H
TVD Reference: KB @ 3805.00usft (Capstar 119)
MD Reference: KB @ 3805.00usft (Capstar 119)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at
Database: Compass 5000 GCR
Offset TVD Reference: Offset Datum

Offset Design Hawk Federal Com - #3H - OH - Plan #1 06-11-15													Offset Site Error:	0.00 usft
Survey Program: 0-PHX+MWD+HDGM													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 +N/-S (usft)	Centre +E/-W (usft)						
5,200.00	4,918.98	10,534.05	5,546.00	18.68	145.78	99.21	753.20	4,890.60	4,537.70	4,389.90	147.80	30.701		
5,300.00	4,922.29	10,534.05	5,546.00	20.23	145.78	105.95	753.20	4,890.60	4,443.69	4,294.22	149.46	29.731		
5,400.00	4,923.04	10,534.05	5,546.00	21.99	145.78	112.51	753.20	4,890.60	4,348.22	4,200.22	148.00	29.379		
5,500.00	4,922.77	10,534.05	5,546.00	23.91	145.78	112.08	753.20	4,890.60	4,251.90	4,100.24	151.67	28.034		
5,600.00	4,926.75	10,534.05	5,546.00	25.97	145.78	103.29	753.20	4,890.60	4,155.06	3,993.78	161.28	25.763		
5,700.00	4,931.87	10,534.05	5,546.00	28.15	145.78	107.98	753.20	4,890.60	4,057.78	3,896.61	161.16	25.178		
5,800.00	4,936.77	10,534.05	5,546.00	30.43	145.78	110.65	753.20	4,890.60	3,959.75	3,796.93	162.82	24.320		
5,900.00	4,942.38	10,534.05	5,546.00	32.79	145.78	122.82	753.20	4,890.60	3,860.78	3,709.85	150.94	25.579		
6,000.00	4,946.07	10,534.05	5,546.00	35.20	145.78	149.11	753.20	4,890.60	3,761.45	3,659.71	101.74	36.973		
6,100.00	4,947.38	10,534.05	5,546.00	37.66	145.78	-179.64	753.20	4,890.60	3,662.06	3,612.45	49.61	73.814		
6,200.00	4,948.07	10,534.05	5,546.00	40.15	145.78	-153.37	753.20	4,890.60	3,562.78	3,469.08	93.70	38.023		
6,300.00	4,949.24	10,534.05	5,546.00	42.68	145.78	-147.67	753.20	4,890.60	3,463.67	3,355.24	108.43	31.943		
6,400.00	4,949.95	10,534.05	5,546.00	45.23	145.78	-147.52	753.20	4,890.60	3,364.71	3,254.35	110.36	30.487		
6,500.00	4,951.29	10,534.05	5,546.00	47.83	145.78	-147.88	753.20	4,890.60	3,265.71	3,154.50	111.20	29.368		
6,600.00	4,953.64	10,534.05	5,546.00	50.46	145.78	-149.45	753.20	4,890.60	3,166.57	3,057.52	109.05	29.038		
6,700.00	4,956.85	10,534.05	5,546.00	53.13	145.78	-159.49	753.20	4,890.60	3,067.29	2,981.64	85.65	35.813		
6,800.00	4,960.21	10,534.05	5,546.00	55.81	145.78	-163.11	753.20	4,890.60	2,967.94	2,889.72	78.22	37.944		
6,900.00	4,962.52	10,534.05	5,546.00	58.52	145.78	-162.66	753.20	4,890.60	2,868.78	2,788.43	80.35	35.703		
7,000.00	4,964.24	10,534.05	5,546.00	61.24	145.78	-162.54	753.20	4,890.60	2,769.77	2,688.05	81.72	33.894		
7,100.00	4,963.91	10,534.05	5,546.00	63.97	145.78	-161.83	753.20	4,890.60	2,671.18	2,586.80	84.38	31.656		
7,200.00	4,961.75	10,534.05	5,546.00	66.71	145.78	-158.72	753.20	4,890.60	2,573.09	2,479.75	93.34	27.566		
7,300.00	4,960.00	10,534.05	5,546.00	69.45	145.78	-156.37	753.20	4,890.60	2,475.15	2,374.41	100.74	24.569		
7,400.00	4,957.83	10,534.05	5,546.00	72.21	145.78	-154.30	753.20	4,890.60	2,377.55	2,269.89	107.66	22.084		
7,500.00	4,957.17	10,534.05	5,546.00	74.97	145.78	-149.63	753.20	4,890.60	2,279.93	2,157.69	122.24	18.652		
7,600.00	4,956.82	10,534.05	5,546.00	77.74	145.78	-150.31	753.20	4,890.60	2,182.54	2,060.92	121.62	17.945		
7,700.00	4,955.60	10,534.05	5,546.00	80.51	145.78	-149.64	753.20	4,890.60	2,085.64	1,960.44	125.20	16.658		
7,800.00	4,955.94	10,534.05	5,546.00	83.30	145.78	-150.71	753.20	4,890.60	1,988.63	1,864.69	123.94	16.045		
7,900.00	4,957.33	10,534.05	5,546.00	86.09	145.78	-154.85	753.20	4,890.60	1,891.42	1,777.92	113.51	16.664		
8,000.00	4,958.18	10,534.05	5,546.00	88.90	145.78	-157.50	753.20	4,890.60	1,794.50	1,687.43	107.07	16.760		
8,100.00	4,958.87	10,534.05	5,546.00	91.70	145.78	-155.31	753.20	4,890.60	1,697.96	1,583.05	114.91	14.776		
8,200.00	4,960.80	10,534.05	5,546.00	94.51	145.78	-152.98	753.20	4,890.60	1,601.63	1,478.29	123.34	12.986		
8,300.00	4,961.93	10,534.05	5,546.00	97.32	145.78	-151.79	753.20	4,890.60	1,506.19	1,377.85	128.34	11.736		
8,343.00	4,962.30	10,534.05	5,546.00	98.53	145.78	-151.79	753.20	4,890.60	1,465.39	1,336.40	128.99	11.361	CC, ES, 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: Eddy County, NM (NAD27 NME)
Reference Site: NFE Federal COM
Site Error: 0.00 usft
Reference Well: #47H
Well Error: 0.00 usft
Reference Wellbore: OH / Job #1610026
Reference Design: Surveys (Capstar 119)

Local Co-ordinate Reference: Well #47H
TVD Reference: KB @ 3805.00usft (Capstar 119)
MD Reference: KB @ 3805.00usft (Capstar 119)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Offset Datum

Offset Design NFE Federal COM - #46H - OH / Job #1514748 - Surveys (Capstar 119)													Offset Site Error: 0.00 usft
Survey Program: 99-CB-GYRO-MS, 4225-PHX+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	9,827.00	4,870.56	0.00	153.87	-17.52	534.85	-168.85	4,937.52				
100.00	100.00	9,827.00	4,870.56	0.17	153.87	139.62	534.85	-168.85	4,838.19	4,689.94	148.25	32.634	
200.00	199.99	9,827.00	4,870.56	0.51	153.87	-25.39	534.85	-168.85	4,738.77	4,594.75	144.02	32.903	
300.00	299.97	9,827.00	4,870.56	0.86	153.87	-17.01	534.85	-168.85	4,639.25	4,493.30	145.95	31.787	
400.00	399.94	9,827.00	4,870.56	1.24	153.87	-47.12	534.85	-168.85	4,539.77	4,399.32	140.44	32.325	
500.00	499.89	9,827.00	4,870.56	1.62	153.87	-29.48	534.85	-168.85	4,440.25	4,298.75	141.50	31.381	
600.00	599.84	9,827.00	4,870.56	2.00	153.87	-2.96	534.85	-168.85	4,340.70	4,191.99	148.70	29.190	
700.00	699.80	9,827.00	4,870.56	2.38	153.87	-1.09	534.85	-168.85	4,241.19	4,091.77	149.42	28.384	
800.00	799.77	9,827.00	4,870.56	2.77	153.87	-0.40	534.85	-168.85	4,141.75	3,991.78	149.97	27.617	
900.00	899.75	9,827.00	4,870.56	3.16	153.87	-3.68	534.85	-168.85	4,042.40	3,892.39	150.01	26.947	
1,000.00	999.73	9,827.00	4,870.56	3.55	153.87	-12.40	534.85	-168.85	3,943.08	3,793.77	149.31	26.408	
1,100.00	1,099.71	9,827.00	4,870.56	3.94	153.87	-14.34	534.85	-168.85	3,843.82	3,693.85	149.97	25.631	
1,200.00	1,199.71	9,827.00	4,870.56	4.27	153.87	137.14	534.85	-168.85	3,744.81	3,590.74	154.06	24.307	
1,300.00	1,299.70	9,827.00	4,870.56	4.57	153.87	-108.28	534.85	-168.85	3,645.97	3,497.86	148.11	24.617	
1,400.00	1,399.70	9,827.00	4,870.56	4.90	153.87	-121.82	534.85	-168.85	3,547.18	3,399.18	148.01	23.967	
1,500.00	1,499.68	9,827.00	4,870.56	5.22	153.87	-134.18	534.85	-168.85	3,448.52	3,299.53	148.99	23.146	
1,600.00	1,599.68	9,827.00	4,870.56	5.55	153.87	-146.95	534.85	-168.85	3,349.96	3,199.27	150.69	22.231	
1,700.00	1,699.67	9,827.00	4,870.56	5.86	153.87	154.97	534.85	-168.85	3,251.45	3,097.87	153.58	21.170	
1,800.00	1,799.67	9,827.00	4,870.56	6.18	153.87	101.31	534.85	-168.85	3,152.96	2,998.39	154.58	20.397	
1,900.00	1,899.67	9,827.00	4,870.56	6.51	153.87	69.20	534.85	-168.85	3,054.49	2,899.41	155.08	19.696	
2,000.00	1,999.67	9,827.00	4,870.56	6.86	153.87	-118.14	534.85	-168.85	2,956.14	2,803.47	152.66	19.364	
2,100.00	2,099.67	9,827.00	4,870.56	7.21	153.87	11.34	534.85	-168.85	2,857.85	2,703.27	154.57	18.488	
2,200.00	2,199.67	9,827.00	4,870.56	7.55	153.87	140.12	534.85	-168.85	2,759.68	2,604.69	154.99	17.806	
2,300.00	2,299.67	9,827.00	4,870.56	7.90	153.87	-16.74	534.85	-168.85	2,661.69	2,506.94	154.75	17.200	
2,400.00	2,399.67	9,827.00	4,870.56	8.26	153.87	-87.52	534.85	-168.85	2,563.83	2,409.11	154.72	16.571	
2,500.00	2,499.66	9,827.00	4,870.56	8.61	153.87	104.20	534.85	-168.85	2,466.19	2,309.68	156.51	15.758	
2,600.00	2,599.66	9,827.00	4,870.56	8.95	153.87	70.84	534.85	-168.85	2,368.71	2,210.86	157.85	15.006	
2,700.00	2,699.66	9,827.00	4,870.56	9.31	153.87	-48.57	534.85	-168.85	2,271.37	2,115.90	155.47	14.610	
2,800.00	2,799.66	9,827.00	4,870.56	9.66	153.87	105.99	534.85	-168.85	2,174.36	2,015.91	158.45	13.723	
2,900.00	2,899.66	9,827.00	4,870.56	10.01	153.87	3.11	534.85	-168.85	2,077.63	1,920.39	157.24	13.213	
3,000.00	2,999.65	9,827.00	4,870.56	10.37	153.87	67.87	534.85	-168.85	1,981.13	1,821.88	159.25	12.441	
3,100.00	3,099.65	9,827.00	4,870.56	10.72	153.87	85.81	534.85	-168.85	1,885.05	1,726.69	158.36	11.903	
3,200.00	3,199.65	9,827.00	4,870.56	11.08	153.87	61.94	534.85	-168.85	1,789.39	1,629.55	159.84	11.195	
3,300.00	3,299.64	9,827.00	4,870.56	11.43	153.87	100.61	534.85	-168.85	1,694.23	1,535.08	159.15	10.646	
3,400.00	3,399.64	9,827.00	4,870.56	11.79	153.87	89.14	534.85	-168.85	1,599.76	1,439.22	160.54	9.965	
3,500.00	3,499.63	9,827.00	4,870.56	12.15	153.87	11.38	534.85	-168.85	1,505.79	1,345.90	159.89	9.418	
3,600.00	3,599.63	9,827.00	4,870.56	12.50	153.87	172.78	534.85	-168.85	1,412.79	1,252.70	160.09	8.825	
3,700.00	3,699.63	9,827.00	4,870.56	12.84	153.87	39.48	534.85	-168.85	1,320.73	1,159.17	161.57	8.175	
3,800.00	3,799.61	9,827.00	4,870.56	13.21	153.87	19.92	534.85	-168.85	1,229.54	1,068.42	161.12	7.631	
3,900.00	3,899.60	9,827.00	4,870.56	13.58	153.87	60.34	534.85	-168.85	1,139.94	977.29	162.65	7.009	
4,000.00	3,999.57	9,827.00	4,870.56	13.95	153.87	89.47	534.85	-168.85	1,052.44	888.89	163.55	6.435	
4,100.00	4,099.53	9,827.00	4,870.56	14.32	153.87	40.33	534.85	-168.85	967.01	803.54	163.47	5.916	
4,200.00	4,199.49	9,827.00	4,870.56	14.69	153.87	50.17	534.85	-168.85	884.13	720.22	163.91	5.394	
4,300.00	4,299.45	9,827.00	4,870.56	15.06	153.87	18.75	534.85	-168.85	804.93	641.19	163.73	4.916	
4,400.00	4,399.40	9,827.00	4,870.56	15.34	153.87	28.69	534.85	-168.85	730.65	566.44	164.21	4.449	
4,500.00	4,499.13	9,827.00	4,870.56	15.35	153.87	-67.22	534.85	-168.85	661.92	503.84	158.08	4.187	
4,600.00	4,596.21	9,827.00	4,870.56	15.37	153.87	-82.30	534.85	-168.85	599.29	451.27	148.02	4.049	
4,700.00	4,686.56	9,827.00	4,870.56	15.43	153.87	-93.25	534.85	-168.85	547.42	408.09	139.33	3.929	
4,800.00	4,765.93	9,827.00	4,870.56	15.57	153.87	-102.70	534.85	-168.85	516.42	377.13	139.29	3.707	
4,862.34	4,808.62	9,827.00	4,870.56	15.75	153.87	-104.25	534.85	-168.85	511.17	370.32	140.85	3.629 CC, ES	
4,900.00	4,831.55	9,827.00	4,870.56	15.87	153.87	-104.42	534.85	-168.85	514.01	371.35	142.65	3.603 SF	
5,000.00	4,879.27	9,827.00	4,870.56	16.47	153.87	-100.77	534.85	-168.85	534.62	387.01	147.61	3.622	

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: Eddy County, NM (NAD27 NME)
Reference Site: NFE Federal COM
Site Error: 0.00 usft
Reference Well: #47H
Well Error: 0.00 usft
Reference Wellbore: OH / Job #1610026
Reference Design: Surveys (Capstar 119)

Local Co-ordinate Reference: Well #47H
TVD Reference: KB @ 3805.00usft (Capstar 119)
MD Reference: KB @ 3805.00usft (Capstar 119)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at
Database: Compass 5000 GCR
Offset TVD Reference: Offset Datum

Offset Design NFE Federal COM - #46H - OH / Job #1514748 - Surveys (Capstar 119)														Offset Site Error:	0.00 usft
Survey Program: 99-CB-GYRO-MS, 4225-PHX+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)					
5,100.00	4,907.06	9,827.00	4,870.56	17.42	153.87	-96.07	534.85	-168.85	574.12	421.69	152.43	3.766			
5,200.00	4,918.98	9,827.00	4,870.56	18.68	153.87	-90.62	534.85	-168.85	629.24	472.13	157.10	4.005			
5,300.00	4,922.29	9,827.00	4,870.56	20.23	153.87	-89.14	534.85	-168.85	697.64	534.97	162.67	4.289			
5,400.00	4,923.04	9,827.00	4,870.56	21.99	153.87	-87.60	534.85	-168.85	776.65	609.66	166.99	4.651			
5,500.00	4,922.77	9,827.00	4,870.56	23.91	153.87	-89.00	534.85	-168.85	862.23	691.87	170.36	5.061			
5,600.00	4,926.75	9,827.00	4,870.56	25.97	153.87	-93.94	534.85	-168.85	951.18	778.90	172.28	5.521			
5,700.00	4,931.87	9,827.00	4,870.56	28.15	153.87	-92.63	534.85	-168.85	1,042.95	866.99	175.96	5.927			
5,800.00	4,936.77	9,827.00	4,870.56	30.43	153.87	-95.31	534.85	-168.85	1,137.52	957.94	179.58	6.334			
5,900.00	4,942.38	9,827.00	4,870.56	32.79	153.87	-94.77	534.85	-168.85	1,234.52	1,051.07	183.45	6.730			
6,000.00	4,946.07	9,827.00	4,870.56	35.20	153.87	-87.83	534.85	-168.85	1,332.98	1,145.75	187.23	7.120			
6,100.00	4,947.38	9,827.00	4,870.56	37.66	153.87	-70.43	534.85	-168.85	1,432.36	1,252.29	180.07	7.954			
6,200.00	4,948.07	9,827.00	4,870.56	40.15	153.87	-48.50	534.85	-168.85	1,532.21	1,383.84	148.37	10.327			
6,300.00	4,949.24	9,827.00	4,870.56	42.68	153.87	-2.92	534.85	-168.85	1,632.20	1,578.73	53.47	30.526			
6,400.00	4,949.95	9,827.00	4,870.56	45.23	153.87	-2.93	534.85	-168.85	1,732.18	1,677.91	54.27	31.920			
6,500.00	4,951.29	9,827.00	4,870.56	47.83	153.87	-46.25	534.85	-168.85	1,832.17	1,682.55	149.62	12.246			
6,600.00	4,953.64	9,827.00	4,870.56	50.46	153.87	-103.19	534.85	-168.85	1,932.16	1,734.09	198.07	9.755			
6,700.00	4,956.85	9,827.00	4,870.56	53.13	153.87	-102.68	534.85	-168.85	2,032.11	1,830.81	201.30	10.095			
6,800.00	4,960.21	9,827.00	4,870.56	55.81	153.87	-93.61	534.85	-168.85	2,132.00	1,923.62	208.37	10.232			
6,900.00	4,962.52	9,827.00	4,870.56	58.52	153.87	-81.25	534.85	-168.85	2,231.91	2,022.62	209.29	10.664			
7,000.00	4,964.24	9,827.00	4,870.56	61.24	153.87	-70.56	534.85	-168.85	2,331.83	2,128.73	203.10	11.481			
7,100.00	4,963.91	9,827.00	4,870.56	63.97	153.87	-27.28	534.85	-168.85	2,431.74	2,318.93	112.81	21.556			
7,200.00	4,961.75	9,827.00	4,870.56	66.71	153.87	-14.24	534.85	-168.85	2,531.63	2,452.18	79.45	31.864			
7,300.00	4,960.00	9,827.00	4,870.56	69.45	153.87	-1.12	534.85	-168.85	2,631.55	2,571.14	60.41	43.559			
7,400.00	4,957.83	9,827.00	4,870.56	72.21	153.87	11.04	534.85	-168.85	2,731.46	2,658.16	73.30	37.262			
7,500.00	4,957.17	9,827.00	4,870.56	74.97	153.87	48.71	534.85	-168.85	2,831.42	2,655.89	175.54	16.130			
7,600.00	4,956.82	9,827.00	4,870.56	77.74	153.87	35.45	534.85	-168.85	2,931.38	2,789.00	142.38	20.588			
7,700.00	4,955.60	9,827.00	4,870.56	80.51	153.87	42.71	534.85	-168.85	3,031.32	2,866.91	164.41	18.438			
7,800.00	4,955.94	9,827.00	4,870.56	83.30	153.87	38.99	534.85	-168.85	3,131.30	2,974.81	156.48	20.010			
7,900.00	4,957.33	9,827.00	4,870.56	86.09	153.87	-87.50	534.85	-168.85	3,231.29	2,992.17	239.12	13.513			
8,000.00	4,958.18	9,827.00	4,870.56	88.90	153.87	-58.86	534.85	-168.85	3,331.27	3,120.91	210.35	15.837			
8,100.00	4,958.87	9,827.00	4,870.56	91.70	153.87	-90.20	534.85	-168.85	3,431.24	3,186.26	244.98	14.006			
8,200.00	4,960.80	9,827.00	4,870.56	94.51	153.87	-96.05	534.85	-168.85	3,531.23	3,284.87	246.36	14.334			
8,300.00	4,961.93	9,827.00	4,870.56	97.32	153.87	42.94	534.85	-168.85	3,631.23	3,453.86	177.37	20.473			
8,343.00	4,962.30	9,827.00	4,870.56	98.53	153.87	42.94	534.85	-168.85	3,674.22	3,495.99	178.23	20.615			



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Eddy County, NM (NAD27 NME)
Reference Site: NFE Federal COM
Site Error: 0.00 usft
Reference Well: #47H
Well Error: 0.00 usft
Reference Wellbore: OH / Job #1610026
Reference Design: Surveys (Capstar 119)

Local Co-ordinate Reference: Well #47H
TVD Reference: KB @ 3805.00usft (Capstar 119)
MD Reference: KB @ 3805.00usft (Capstar.119)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at
Database: Compass 5000 GCR
Offset TVD Reference: Offset Datum

Offset Design NFE Federal COM - #49H - OH - Plan#3 09-09-15													Offset Site Error: 0.00 usft
Survey Program: 0-PHX-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)			
0.00	0.00	1.00	1.00	0.00	0.00	-0.23	25.00	-0.10	25.00				
100.00	100.00	101.00	101.00	0.17	0.16	156.34	25.00	-0.10	25.10	24.76	0.33	75.090	
200.00	199.99	200.99	200.99	0.51	0.52	-3.19	25.00	-0.10	24.02	22.97	1.05	22.851	
300.00	299.97	300.97	300.97	0.86	0.88	3.45	25.00	-0.10	21.77	20.02	1.75	12.430	
400.00	399.94	400.94	400.94	1.24	1.24	-21.84	25.00	-0.10	19.47	16.98	2.48	7.843	
500.00	499.89	500.89	500.89	1.62	1.60	-7.07	25.00	-0.10	16.49	13.27	3.23	5.113	
600.00	599.84	600.84	600.84	2.00	1.95	12.50	25.00	-0.10	13.29	9.33	3.96	3.355	
700.00	699.80	700.80	700.80	2.38	2.31	17.54	25.00	-0.10	10.50	5.80	4.70	2.233	
800.00	799.77	800.77	800.77	2.77	2.67	23.23	25.00	-0.10	8.21	2.78	5.44	1.511	
900.00	899.75	900.75	900.75	3.16	3.03	26.86	25.00	-0.10	6.45	0.28	6.17	1.046 Level 2	
1,000.00	999.73	1,000.73	1,000.73	3.55	3.39	28.90	25.00	-0.10	4.70	-2.18	6.88	0.683 Level 1	
1,100.00	1,099.71	1,100.71	1,100.71	3.94	3.75	41.47	25.00	-0.10	3.25	-4.31	7.55	0.430 Level 1	
1,142.23	1,141.94	1,142.94	1,142.94	4.08	3.90	90.00	25.00	-0.10	3.02	-4.80	7.82	0.386 Level 1, CC	
1,200.00	1,199.71	1,200.71	1,200.71	4.27	4.11	-165.68	25.00	-0.10	3.41	-4.80	8.21	0.416 Level 1	
1,300.00	1,299.70	1,300.70	1,300.70	4.57	4.46	-52.00	25.00	-0.10	3.70	-5.24	8.94	0.414 Level 1	
1,400.00	1,399.70	1,400.70	1,400.70	4.90	4.82	-85.90	25.00	-0.10	3.23	-6.48	9.71	0.333 Level 1	
1,410.45	1,410.14	1,411.14	1,411.14	4.93	4.86	-90.00	25.00	-0.10	3.23	-6.56	9.78	0.330 Level 1	
1,500.00	1,499.68	1,500.68	1,500.68	5.22	5.18	-123.07	25.00	-0.10	3.61	-6.78	10.39	0.347 Level 1	
1,600.00	1,599.68	1,600.68	1,600.68	5.55	5.54	-150.22	25.00	-0.10	4.55	-6.48	11.03	0.412 Level 1	
1,700.00	1,699.67	1,700.67	1,700.67	5.86	5.90	147.48	25.00	-0.10	5.37	-6.34	11.71	0.459 Level 1	
1,800.00	1,799.67	1,800.67	1,800.67	6.18	6.26	97.96	25.00	-0.10	5.73	-6.68	12.41	0.461 Level 1	
1,900.00	1,899.67	1,900.67	1,900.67	6.51	6.61	72.01	25.00	-0.10	5.66	-7.46	13.12	0.431 Level 1	
1,950.45	1,950.12	1,951.12	1,951.12	6.68	6.80	90.00	25.00	-0.10	5.60	-7.87	13.48	0.416 Level 1	
2,000.00	1,999.67	2,000.67	2,000.67	6.86	6.97	-110.92	25.00	-0.10	5.65	-8.17	13.82	0.409 Level 1	
2,100.00	2,099.67	2,100.67	2,100.67	7.21	7.33	14.88	25.00	-0.10	5.39	-9.14	14.53	0.371 Level 1	
2,176.27	2,175.93	2,176.93	2,176.93	7.47	7.60	90.00	25.00	-0.10	5.11	-9.97	15.07	0.339 Level 1	
2,200.00	2,199.67	2,200.67	2,200.67	7.55	7.69	145.60	25.00	-0.10	5.13	-10.11	15.24	0.337 Level 1	
2,300.00	2,299.67	2,300.67	2,300.67	7.90	8.05	-9.93	25.00	-0.10	5.09	-10.86	15.95	0.319 Level 1	
2,400.00	2,399.67	2,400.67	2,400.67	8.26	8.41	-82.17	25.00	-0.10	4.90	-11.76	16.66	0.294 Level 1	
2,420.44	2,420.11	2,421.11	2,421.11	8.33	8.48	-90.00	25.00	-0.10	4.90	-11.91	16.81	0.291 Level 1	
2,500.00	2,499.66	2,500.66	2,500.66	8.61	8.77	108.64	25.00	-0.10	4.95	-12.41	17.37	0.285 Level 1	
2,600.00	2,599.66	2,600.66	2,600.66	8.95	9.12	82.59	25.00	-0.10	4.93	-13.14	18.07	0.273 Level 1	
2,700.00	2,699.66	2,700.66	2,700.66	9.31	9.48	-28.66	25.00	-0.10	4.58	-14.20	18.79	0.244 Level 1	
2,751.46	2,751.12	2,752.12	2,752.12	9.49	9.67	90.00	25.00	-0.10	4.43	-14.72	19.15	0.231 Level 1	
2,800.00	2,799.66	2,800.66	2,800.66	9.66	9.84	125.96	25.00	-0.10	4.58	-14.92	19.49	0.235 Level 1	
2,900.00	2,899.66	2,900.66	2,900.66	10.01	10.20	31.75	25.00	-0.10	4.73	-15.47	20.20	0.234 Level 1	
2,965.24	2,964.89	2,965.89	2,965.89	10.24	10.43	90.01	25.00	-0.10	4.60	-16.06	20.66	0.223 Level 1	
3,000.00	2,999.65	3,000.65	3,000.65	10.37	10.56	103.25	25.00	-0.10	4.64	-16.25	20.90	0.222 Level 1, SF	
3,100.00	3,099.65	3,100.65	3,100.65	10.72	10.92	131.24	25.00	-0.10	4.90	-16.68	21.58	0.227 Level 1	
3,200.00	3,199.65	3,200.65	3,200.65	11.08	11.27	113.46	25.00	-0.10	5.20	-17.07	22.27	0.234 Level 1	
3,300.00	3,299.64	3,300.64	3,300.64	11.43	11.63	160.13	25.00	-0.10	5.61	-17.36	22.97	0.244 Level 1	
3,400.00	3,399.64	3,400.64	3,400.64	11.79	11.99	150.47	25.00	-0.10	6.23	-17.44	23.67	0.263 Level 1	
3,500.00	3,499.63	3,500.63	3,500.63	12.15	12.35	81.67	25.00	-0.10	6.63	-17.75	24.38	0.272 Level 1	
3,528.53	3,528.16	3,529.16	3,529.16	12.25	12.45	90.00	25.00	-0.10	6.61	-17.98	24.58	0.269 Level 1	
3,600.00	3,599.63	3,600.63	3,600.63	12.50	12.71	-114.56	25.00	-0.10	6.72	-18.37	25.09	0.268 Level 1	
3,700.00	3,699.63	3,700.63	3,700.63	12.84	13.07	115.41	25.00	-0.10	7.27	-18.53	25.80	0.282 Level 1	
3,800.00	3,799.61	3,800.61	3,800.61	13.21	13.43	107.65	25.00	-0.10	7.92	-18.61	26.53	0.298 Level 1, ES	
3,900.00	3,899.60	3,900.60	3,900.60	13.58	13.78	153.31	25.00	-0.10	9.04	-18.21	27.26	0.332 Level 1	
4,000.00	3,999.57	4,000.57	4,000.57	13.95	14.14	-176.16	25.00	-0.10	11.39	-16.59	27.98	0.407 Level 1	
4,100.00	4,099.53	4,100.53	4,100.53	14.32	14.50	139.47	25.00	-0.10	13.90	-14.82	28.72	0.484 Level 1	
4,200.00	4,199.49	4,200.49	4,200.49	14.69	14.86	155.25	25.00	-0.10	16.37	-13.09	29.46	0.556 Level 1	
4,300.00	4,299.45	4,300.45	4,300.45	15.06	15.22	130.51	25.00	-0.10	18.66	-11.55	30.21	0.618 Level 1	

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: Eddy County, NM (NAD27 NME)
Reference Site: NFE Federal COM
Site Error: 0.00 usft
Reference Well: #47H
Well Error: 0.00 usft
Reference Wellbore: OH / Job #1610026
Reference Design: Surveys (Capstar 119)

Local Co-ordinate Reference: Well #47H
TVD Reference: KB @ 3805.00usft (Capstar 119)
MD Reference: KB @ 3805.00usft (Capstar 119)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Offset Datum

Offset Design NFE Federal COM - #49H - OH - Plan #3 09-09-15														Offset Site Error:	0.00 usft
Survey Program: 0-PHX+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)					
4,400.00	4,399.40	4,400.40	4,400.40	15.34	15.58	146.04	25.00	-0.10	20.75	-10.11	30.86	0.672	Level 1		
4,500.00	4,499.13	4,500.13	4,500.13	15.35	15.93	74.90	25.00	-0.10	20.06	-11.20	31.25	0.642	Level 1		
4,537.38	4,535.93	4,536.93	4,536.93	15.36	16.06	90.00	25.00	-0.10	19.14	-12.28	31.42	0.609	Level 1		
4,600.00	4,596.21	4,597.21	4,597.21	15.37	16.28	127.76	25.00	-0.10	25.14	-5.77	30.90	0.813	Level 1		
4,700.00	4,686.56	4,687.56	4,687.56	15.43	16.60	155.82	25.00	-0.10	61.01	32.98	28.02	2.177			
4,800.00	4,765.93	4,766.93	4,766.93	15.57	16.89	158.67	25.00	-0.10	118.68	93.70	24.98	4.750			
4,900.00	4,831.55	4,832.55	4,832.55	15.87	17.12	161.09	25.00	-0.10	191.68	170.73	20.94	9.152			
5,000.00	4,879.27	4,826.52	4,926.14	16.47	17.46	168.07	28.63	5.49	275.55	260.84	14.71	18.732			
5,100.00	4,907.06	5,102.30	5,090.26	17.42	18.07	174.88	61.42	55.94	357.10	347.72	9.38	38.069			
5,200.00	4,918.98	5,565.81	5,323.11	18.68	20.97	-178.65	268.40	374.41	404.16	396.54	7.62	53.030			
5,293.25	4,922.21	5,679.46	5,325.36	20.12	22.31	-177.00	328.53	470.80	402.80	393.98	8.81	45.700			
5,300.00	4,922.29	5,686.24	5,325.46	20.23	22.39	-176.90	331.94	476.66	402.86	393.96	8.90	45.264			
5,400.00	4,923.04	5,786.98	5,326.95	21.99	23.82	-175.30	380.17	565.07	404.39	393.94	10.44	38.721			
5,500.00	4,922.77	5,888.42	5,328.46	23.91	25.46	-173.83	423.96	656.55	407.18	394.77	12.40	32.824			
5,600.00	4,926.75	5,990.69	5,330.00	25.97	27.29	-172.84	463.13	751.00	405.50	390.81	14.69	27.613			
5,700.00	4,931.87	6,093.37	5,331.55	28.15	29.28	-172.31	497.31	847.80	402.36	386.03	16.33	24.633			
5,800.00	4,936.77	6,196.25	5,333.10	30.43	31.40	-171.95	526.29	946.48	399.33	381.12	18.21	21.934			
5,900.00	4,942.38	6,299.23	5,334.65	32.79	33.63	-171.47	549.94	1,046.69	395.73	375.74	19.99	19.800			
6,000.00	4,946.07	6,402.45	5,336.20	35.20	35.96	-171.05	568.18	1,148.26	394.00	372.42	21.58	18.255			
6,024.09	4,946.61	6,427.34	5,336.57	35.79	36.53	-170.95	571.76	1,172.89	393.94	371.97	21.96	17.936			
6,100.00	4,947.38	6,505.85	5,337.74	37.66	38.35	-170.66	580.93	1,250.85	394.68	371.53	23.15	17.051			
6,200.00	4,948.07	6,609.43	5,339.27	40.15	40.79	-170.25	588.12	1,354.15	395.99	370.83	25.16	15.737			
6,300.00	4,949.24	6,711.88	5,340.76	42.68	43.24	-169.96	590.02	1,456.57	396.65	369.61	27.04	14.666			
6,400.00	4,949.95	6,811.87	5,342.21	45.23	45.68	-169.75	590.69	1,556.54	397.66	368.69	28.97	13.726			
6,500.00	4,951.29	6,911.86	5,343.66	47.83	48.17	-169.58	591.36	1,656.52	397.98	366.93	31.05	12.819			
6,600.00	4,953.64	7,011.86	5,345.11	50.46	50.70	-169.51	592.04	1,756.50	397.13	364.03	33.10	11.996			
6,700.00	4,956.85	7,111.83	5,346.56	53.13	53.26	-169.67	592.71	1,856.46	395.12	360.22	34.90	11.321			
6,800.00	4,960.21	7,211.74	5,348.01	55.81	55.85	-170.14	593.38	1,956.36	392.61	356.40	36.21	10.843			
6,900.00	4,962.52	7,311.68	5,349.46	58.52	58.47	-170.59	594.06	2,056.29	391.22	353.76	37.46	10.444			
7,000.00	4,964.24	7,411.64	5,350.91	61.24	61.11	-171.02	594.73	2,156.24	390.47	351.73	38.74	10.078			
7,007.62	4,964.32	7,419.25	5,351.02	61.44	61.32	-171.06	594.78	2,163.85	390.46	351.64	38.82	10.059			
7,100.00	4,963.91	7,511.59	5,352.35	63.97	63.78	-171.39	595.40	2,256.18	391.88	352.16	39.72	9.866			
7,200.00	4,961.75	7,611.52	5,353.80	66.71	66.46	-171.63	596.07	2,356.09	395.30	354.07	41.22	9.589			
7,300.00	4,960.00	7,711.47	5,355.25	69.45	69.15	-171.71	596.75	2,456.03	398.45	355.60	42.85	9.298			
7,400.00	4,957.83	7,811.40	5,356.70	72.21	71.86	-171.67	597.42	2,555.95	402.16	357.55	44.62	9.013			
7,500.00	4,957.17	7,911.36	5,358.15	74.97	74.58	-171.50	598.09	2,655.89	404.49	357.63	46.87	8.631			
7,600.00	4,956.82	8,011.31	5,359.60	77.74	77.31	-171.20	598.77	2,755.83	406.63	358.00	48.64	8.360			
7,700.00	4,955.60	8,111.24	5,361.05	80.51	80.05	-170.87	599.44	2,855.75	409.71	358.80	50.91	8.048			
7,800.00	4,955.94	8,211.21	5,362.50	83.30	82.80	-170.58	600.11	2,955.70	411.16	357.85	53.32	7.712			
7,900.00	4,957.33	8,311.20	5,363.95	86.09	85.56	-170.56	600.78	3,055.69	411.22	355.97	55.26	7.442			
7,919.51	4,957.60	8,330.71	5,364.23	86.64	86.10	-170.59	600.92	3,075.19	411.20	355.66	55.53	7.404			
8,000.00	4,958.18	8,411.19	5,365.40	88.90	88.33	-170.75	601.46	3,155.66	411.60	354.99	56.61	7.271			
8,100.00	4,958.87	8,511.18	5,366.85	91.70	91.10	-170.98	602.13	3,255.63	412.11	353.84	58.27	7.073			
8,200.00	4,960.80	8,611.17	5,368.30	94.51	93.88	-171.07	602.80	3,355.62	411.53	351.62	59.91	6.869			
8,213.84	4,961.02	8,625.01	5,368.50	94.90	94.27	-171.07	602.90	3,369.45	411.52	351.37	60.14	6.842			
8,300.00	4,961.93	8,711.17	5,369.75	97.32	96.67	-170.97	603.48	3,455.60	411.98	350.28	61.70	6.677			
8,343.00	4,962.30	8,754.16	5,370.37	98.53	97.86	-170.91	603.77	3,498.59	412.30	349.74	62.56	6.591			



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
Project: Eddy County, NM (NAD27 NME)
Reference Site: NFE Federal COM
Site Error: 0.00 usft
Reference Well: #47H
Well Error: 0.00 usft
Reference Wellbore: OH / Job #1610026
Reference Design: Surveys (Capstar 119)

Local Co-ordinate Reference: Well #47H
TVD Reference: KB @ 3805.00usft (Capstar 119)
MD Reference: KB @ 3805.00usft (Capstar 119)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Offset Datum

Offset Design NFE Federal COM - #51H - OH - Plan #3 11-11-15														Offset Site Error:	0.00 usft
Survey Program: 0-PHX+MWD+HDGM														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)	Offset Wellbore Centre +E/-W (usft)							
0.00	0.00	3.00	3.00	0.00	0.00	-0.34	50.00	-0.30	50.00						
100.00	100.00	103.00	103.00	0.17	0.17	156.17	50.00	-0.30	50.10	49.76	0.34	146.768			
200.00	199.99	202.99	202.99	0.51	0.53	-3.33	50.00	-0.30	49.03	47.97	1.06	46.321			
300.00	299.97	302.97	302.97	0.86	0.89	3.30	50.00	-0.30	46.77	45.01	1.76	26.596			
400.00	399.94	402.94	402.94	1.24	1.25	-21.34	50.00	-0.30	44.47	41.98	2.49	17.864			
500.00	499.89	502.89	502.89	1.62	1.60	-5.21	50.00	-0.30	41.48	38.24	3.23	12.832			
600.00	599.84	602.84	602.84	2.00	1.96	14.27	50.00	-0.30	38.28	34.31	3.97	9.647			
700.00	699.80	702.80	702.80	2.38	2.32	16.92	50.00	-0.30	35.50	30.79	4.71	7.538			
800.00	799.77	802.77	802.77	2.77	2.68	18.66	50.00	-0.30	33.18	27.73	5.45	6.089			
900.00	899.75	902.75	902.75	3.16	3.04	16.90	50.00	-0.30	31.33	25.14	6.19	5.060			
1,000.00	999.73	1,002.73	1,002.73	3.55	3.40	10.40	50.00	-0.30	29.42	22.48	6.93	4.242			
1,100.00	1,099.71	1,102.71	1,102.71	3.94	3.75	8.75	50.00	-0.30	27.67	19.99	7.68	3.603			
1,153.29	1,153.00	1,156.00	1,156.00	4.11	3.94	90.00	50.00	-0.30	27.28	19.24	8.04	3.392			
1,200.00	1,199.71	1,202.71	1,202.71	4.27	4.11	155.76	50.00	-0.30	27.58	19.22	8.36	3.298			
1,300.00	1,299.70	1,302.70	1,302.70	4.57	4.47	-82.09	50.00	-0.30	28.14	19.11	9.03	3.115			
1,346.14	1,345.84	1,348.84	1,348.84	4.72	4.64	-90.00	50.00	-0.30	28.10	18.75	9.35	3.004			
1,400.00	1,399.70	1,402.70	1,402.70	4.90	4.83	-97.91	50.00	-0.30	28.15	18.43	9.73	2.895			
1,500.00	1,499.68	1,502.68	1,502.68	5.22	5.19	-113.86	50.00	-0.30	28.56	18.15	10.41	2.744			
1,600.00	1,599.68	1,602.68	1,602.68	5.55	5.55	-130.39	50.00	-0.30	29.23	18.16	11.08	2.639			
1,700.00	1,699.67	1,702.67	1,702.67	5.86	5.90	167.58	50.00	-0.30	29.98	18.23	11.75	2.552			
1,800.00	1,799.67	1,802.67	1,802.67	6.18	6.26	113.66	50.00	-0.30	30.46	18.03	12.43	2.451			
1,900.00	1,899.67	1,902.67	1,902.67	6.51	6.62	82.52	50.00	-0.30	30.54	17.41	13.13	2.326			
1,945.14	1,944.81	1,947.81	1,947.81	6.67	6.78	90.00	50.00	-0.30	30.52	17.07	13.45	2.269			
2,000.00	1,999.67	2,002.67	2,002.67	6.86	6.98	-101.02	50.00	-0.30	30.55	16.71	13.83	2.208			
2,100.00	2,099.67	2,102.67	2,102.67	7.21	7.34	26.27	50.00	-0.30	30.26	15.71	14.55	2.080			
2,173.01	2,172.68	2,175.68	2,175.68	7.46	7.60	90.00	50.00	-0.30	30.01	14.95	15.06	1.993			
2,200.00	2,199.67	2,202.67	2,202.67	7.55	7.70	155.40	50.00	-0.30	30.04	14.79	15.25	1.970			
2,300.00	2,299.67	2,302.67	2,302.67	7.90	8.06	-0.57	50.00	-0.30	30.00	14.05	15.96	1.880			
2,400.00	2,399.67	2,402.67	2,402.67	8.26	8.41	-71.12	50.00	-0.30	29.79	13.12	16.68	1.787			
2,428.51	2,428.17	2,431.17	2,431.17	8.36	8.52	-90.00	50.00	-0.30	29.78	12.90	16.88	1.765			
2,500.00	2,499.66	2,502.66	2,502.66	8.61	8.77	118.83	50.00	-0.30	29.86	12.48	17.38	1.718			
2,600.00	2,599.66	2,602.66	2,602.66	8.95	9.13	85.46	50.00	-0.30	29.93	11.85	18.08	1.655			
2,700.00	2,699.66	2,702.66	2,702.66	9.31	9.49	-29.50	50.00	-0.30	29.58	10.79	18.79	1.574			
2,751.81	2,751.47	2,754.47	2,754.47	9.49	9.68	90.00	50.00	-0.30	29.43	10.27	19.16	1.536			
2,800.00	2,799.66	2,802.66	2,802.66	9.66	9.85	122.05	50.00	-0.30	29.56	10.06	19.50	1.516			
2,900.00	2,899.66	2,902.66	2,902.66	10.01	10.21	22.43	50.00	-0.30	29.65	9.44	20.21	1.467 Level 3			
3,000.00	2,999.65	3,002.65	3,002.65	10.37	10.56	86.22	50.00	-0.30	29.40	8.48	20.93	1.405 Level 3			
3,046.66	3,046.31	3,049.31	3,049.31	10.53	10.73	90.00	50.00	-0.30	29.39	8.13	21.25	1.383 Level 3			
3,100.00	3,099.65	3,102.65	3,102.65	10.72	10.92	107.37	50.00	-0.30	29.41	7.78	21.63	1.360 Level 3			
3,200.00	3,199.65	3,202.65	3,202.65	11.08	11.28	83.34	50.00	-0.30	29.36	7.04	22.33	1.315 Level 3			
3,246.00	3,245.64	3,248.64	3,248.64	11.24	11.45	90.00	50.00	-0.30	29.33	6.68	22.65	1.295 Level 3			
3,300.00	3,299.64	3,302.64	3,302.64	11.43	11.64	124.94	50.00	-0.30	29.37	6.35	23.03	1.276 Level 3			
3,400.00	3,399.64	3,402.64	3,402.64	11.79	12.00	113.21	50.00	-0.30	29.67	5.95	23.72	1.251 Level 3			
3,500.00	3,499.63	3,502.63	3,502.63	12.15	12.36	38.64	50.00	-0.30	29.44	5.01	24.43	1.205 Level 2			
3,556.53	3,556.16	3,559.16	3,559.16	12.35	12.56	90.00	50.00	-0.30	29.17	4.35	24.83	1.175 Level 2			
3,600.00	3,599.63	3,602.63	3,602.63	12.50	12.72	-159.27	50.00	-0.30	29.33	4.20	25.13	1.167 Level 2			
3,700.00	3,699.63	3,702.63	3,702.63	12.84	13.07	67.38	50.00	-0.30	29.27	3.44	25.83	1.133 Level 2			
3,800.00	3,799.61	3,802.61	3,802.61	13.21	13.43	51.72	50.00	-0.30	28.56	2.02	26.54	1.076 Level 2			
3,885.22	3,884.83	3,887.83	3,887.83	13.53	13.74	90.00	50.00	-0.30	28.27	1.13	27.14	1.042 Level 2			
3,900.00	3,899.60	3,902.60	3,902.60	13.58	13.79	93.44	50.00	-0.30	28.28	1.04	27.24	1.038 Level 2			
4,000.00	3,999.57	4,002.57	4,002.57	13.95	14.15	126.10	50.00	-0.30	29.15	1.22	27.94	1.044 Level 2			
4,100.00	4,099.53	4,102.53	4,102.53	14.32	14.51	82.70	50.00	-0.30	29.75	1.11	28.64	1.039 Level 2			

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: Eddy County, NM (NAD27 NME)
Reference Site: NFE Federal COM
Site Error: 0.00 usft
Reference Well: #47H
Well Error: 0.00 usft
Reference Wellbore: OH / Job #1610026
Reference Design: Surveys (Capstar 119)

Local Co-ordinate Reference: Well #47H
TVD Reference: KB @ 3805.00usft (Capstar 119)
MD Reference: KB @ 3805.00usft (Capstar 119)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Offset Datum

Offset Design NFE Federal COM - #51H - OH - Plan #3 11-11-15														Offset Site Error:	0.00 usft
Survey Program: 0-PHX+MWD+HDGM														Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toothface (")	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)							
4,148.65	4,148.16	4,151.16	4,151.16	14.50	14.68	90.00	50.00	-0.30	29.65	0.67	28.98	1.023	Level 2		
4,200.00	4,199.49	4,202.49	4,202.49	14.69	14.87	98.08	50.00	-0.30	29.75	0.41	29.34	1.014	Level 2		
4,300.00	4,299.45	4,302.45	4,302.45	15.06	15.22	73.07	50.00	-0.30	29.47	-0.58	30.05	0.981	Level 1		
4,400.00	4,399.40	4,402.40	4,402.40	15.34	15.58	88.31	50.00	-0.30	28.88	-1.80	30.68	0.941	Level 1		
4,500.00	4,499.13	4,502.13	4,502.13	15.35	15.94	4.29	50.00	-0.30	23.04	-7.72	30.76	0.749	Level 1		
4,584.35	4,581.34	4,584.34	4,584.34	15.37	16.23	-0.59	50.00	-0.30	4.61	-25.35	29.96	0.154	Level 1		
4,600.00	4,596.21	4,599.21	4,599.21	15.37	16.29	-170.19	50.00	-0.30	0.27	-29.52	29.79	0.009	Level 1, CC, ES, SF		
4,700.00	4,686.56	4,689.56	4,689.56	15.43	16.61	177.89	50.00	-0.30	42.65	15.47	27.18	1.569			
4,800.00	4,765.93	4,768.93	4,768.93	15.57	16.90	172.08	50.00	-0.30	103.05	79.18	23.87	4.318			
4,900.00	4,831.55	4,834.55	4,834.55	15.87	17.13	171.92	50.00	-0.30	177.87	158.45	19.42	9.157			
5,000.00	4,879.27	4,882.27	4,882.27	16.47	17.30	175.03	50.00	-0.30	265.38	251.95	13.43	19.755			
5,100.00	4,907.06	4,910.06	4,910.06	17.42	17.40	176.24	50.00	-0.30	361.29	352.30	8.99	40.192			
5,200.00	4,918.98	4,921.98	4,921.98	18.68	17.44	150.45	50.00	-0.30	460.47	441.64	18.82	24.463			
5,300.00	4,922.29	4,925.29	4,925.29	20.23	17.46	102.72	50.00	-0.30	560.24	523.45	36.79	15.227			
5,400.00	4,923.04	4,926.04	4,926.04	21.99	17.46	89.45	50.00	-0.30	659.70	620.34	39.36	16.762			
5,500.00	4,922.77	4,925.77	4,925.77	23.91	17.46	95.79	50.00	-0.30	758.87	717.81	41.06	18.481			
5,600.00	4,926.75	4,929.75	4,929.75	25.97	17.47	114.85	50.00	-0.30	858.01	818.45	39.55	21.693			
5,700.00	4,931.87	4,934.87	4,934.87	28.15	29.95	-173.36	540.37	819.29	893.18	877.10	16.08	55.533			
5,800.00	4,936.77	4,939.77	4,939.77	30.43	32.00	-173.03	573.65	919.55	890.83	872.93	17.90	49.755			
5,900.00	4,942.38	4,945.38	4,945.38	32.79	34.19	-172.64	601.42	1,021.79	887.89	868.30	19.59	45.324			
5,995.79	4,945.93	4,948.93	4,948.93	35.10	36.38	-172.30	622.73	1,121.44	886.88	865.82	21.05	42.129			
6,000.00	4,946.07	4,949.07	4,949.07	35.20	36.48	-172.29	623.55	1,125.86	886.84	865.73	21.11	42.004			
6,100.00	4,947.38	4,950.38	4,950.38	37.66	38.87	-171.96	639.90	1,231.38	888.18	865.56	22.62	39.267			
6,200.00	4,948.07	4,951.07	4,951.07	40.15	41.32	-171.64	650.34	1,338.01	890.13	865.59	24.54	36.266			
6,300.00	4,949.24	4,952.24	4,952.24	42.68	43.83	-171.36	654.80	1,445.49	891.39	865.01	26.38	33.791			
6,400.00	4,949.95	4,952.95	4,952.95	45.23	46.23	-171.27	655.53	1,546.35	892.66	864.51	28.16	31.700			
6,500.00	4,951.29	4,954.29	4,954.29	47.83	48.66	-171.19	656.21	1,646.32	893.25	863.17	30.07	29.703			
6,600.00	4,953.64	4,956.64	4,956.64	50.46	51.13	-171.16	656.89	1,746.30	892.69	860.68	32.01	27.891			
6,700.00	4,956.85	4,959.85	4,959.85	53.13	53.64	-171.22	657.57	1,846.26	891.01	857.21	33.80	26.361			
6,800.00	4,960.21	4,963.21	4,963.21	55.81	56.19	-171.43	658.25	1,946.16	888.87	853.58	35.29	25.191			
6,900.00	4,962.52	4,965.52	4,965.52	58.52	58.77	-171.63	658.93	2,046.09	887.85	851.12	36.72	24.177			
6,994.32	4,964.04	4,967.04	4,967.04	61.08	61.22	-171.82	659.57	2,140.35	887.56	849.45	38.11	23.289			
7,000.00	4,964.24	4,967.24	4,967.24	61.24	61.37	-171.83	659.61	2,146.02	887.44	849.24	38.19	23.236			
7,100.00	4,963.91	4,966.91	4,966.91	63.97	64.00	-172.00	660.29	2,245.95	889.18	849.84	39.34	22.602			
7,200.00	4,961.75	4,964.75	4,964.75	66.71	66.55	-172.11	660.94	2,342.23	893.12	852.22	40.90	21.834			
7,300.00	4,960.00	4,963.00	4,963.00	69.45	69.21	-172.15	661.62	2,442.13	896.98	854.44	42.54	21.084			
7,400.00	4,957.83	4,960.83	4,960.83	72.21	71.89	-172.15	662.29	2,542.01	901.39	857.14	44.25	20.368			
7,500.00	4,957.17	4,960.17	4,960.17	74.97	74.59	-172.09	662.97	2,641.93	904.41	858.05	46.35	19.511			
7,600.00	4,956.82	4,959.82	4,959.82	77.74	77.30	-171.96	663.64	2,741.84	907.23	859.31	47.91	18.935			
7,700.00	4,955.60	4,958.60	4,958.60	80.51	80.01	-171.82	664.32	2,841.72	910.96	861.05	49.92	18.250			
7,800.00	4,955.94	4,958.94	4,958.94	83.30	82.74	-171.68	664.99	2,941.65	913.09	861.03	52.05	17.541			
7,900.00	4,957.33	4,960.33	4,960.33	86.09	85.48	-171.66	665.67	3,041.62	913.85	859.91	53.93	16.944			
8,000.00	4,958.18	4,961.18	4,961.18	88.90	88.23	-171.75	666.34	3,141.57	914.95	859.55	55.40	16.516			
8,100.00	4,958.87	4,961.87	4,961.87	91.70	90.99	-171.86	667.02	3,241.52	916.18	859.01	57.17	16.025			
8,200.00	4,960.80	4,963.80	4,963.80	94.51	93.75	-171.92	667.69	3,341.50	916.32	857.48	58.83	15.575			
8,300.00	4,961.93	4,964.93	4,964.93	97.32	96.52	-171.89	668.37	3,441.46	917.45	856.97	60.49	15.168			
8,343.00	4,962.30	4,965.30	4,965.30	98.53	97.72	-171.86	668.66	3,484.44	918.07	856.80	61.27	14.984			

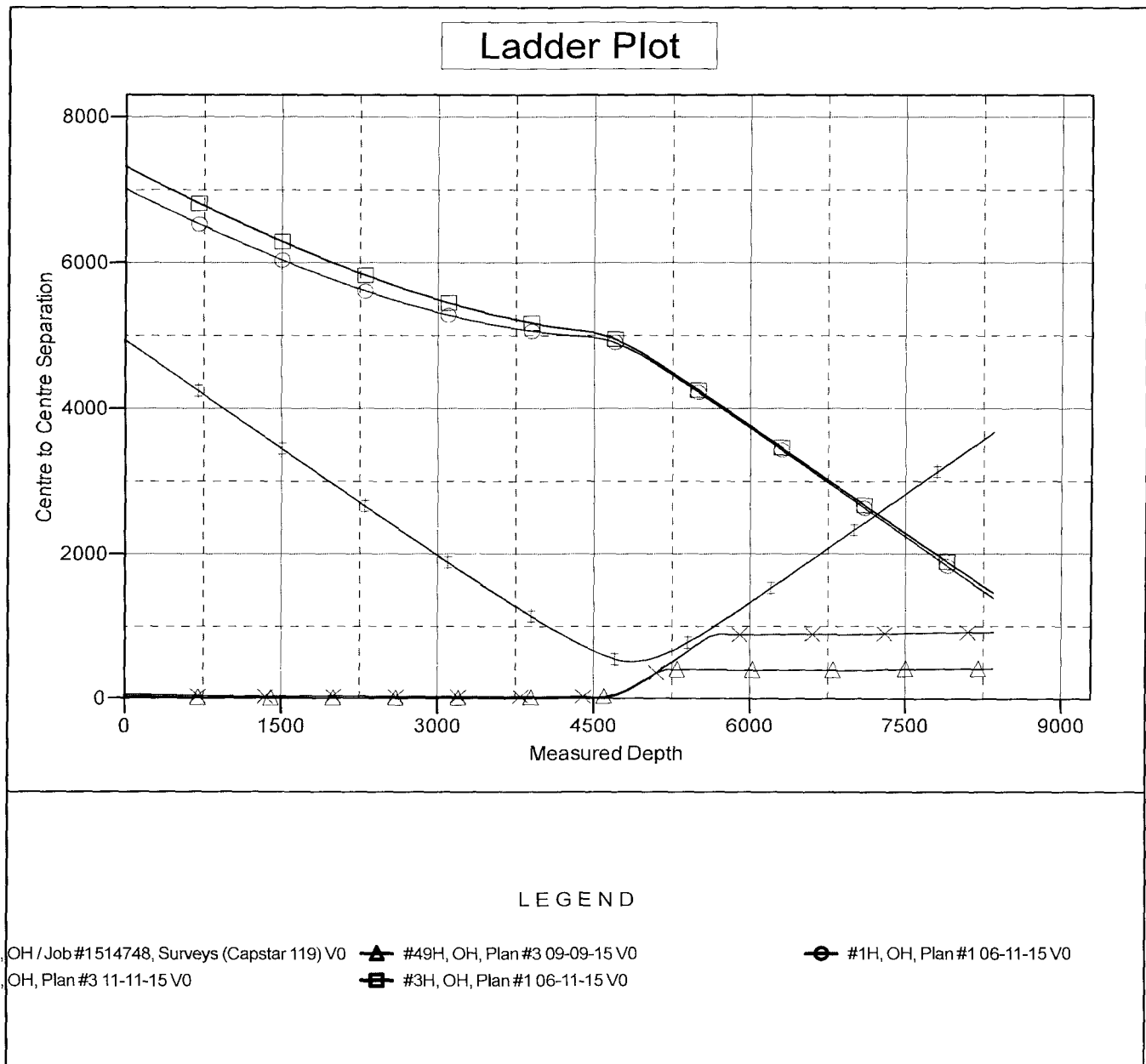
CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company: Apache Corporation
Project: Eddy County, NM (NAD27 NME)
Reference Site: NFE Federal COM
Site Error: 0.00 usft
Reference Well: #47H
Well Error: 0.00 usft
Reference Wellbore: OH / Job #1610026
Reference Design: Surveys (Capstar 119)

Local Co-ordinate Reference: Well #47H
TVD Reference: KB @ 3805.00usft (Capstar 119)
MD Reference: KB @ 3805.00usft (Capstar 119)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Offset Datum

Reference Depths are relative to KB @ 3805.00usft (Capstar 119)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 19' 60.00000 W

Coordinates are relative to: #47H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.24°



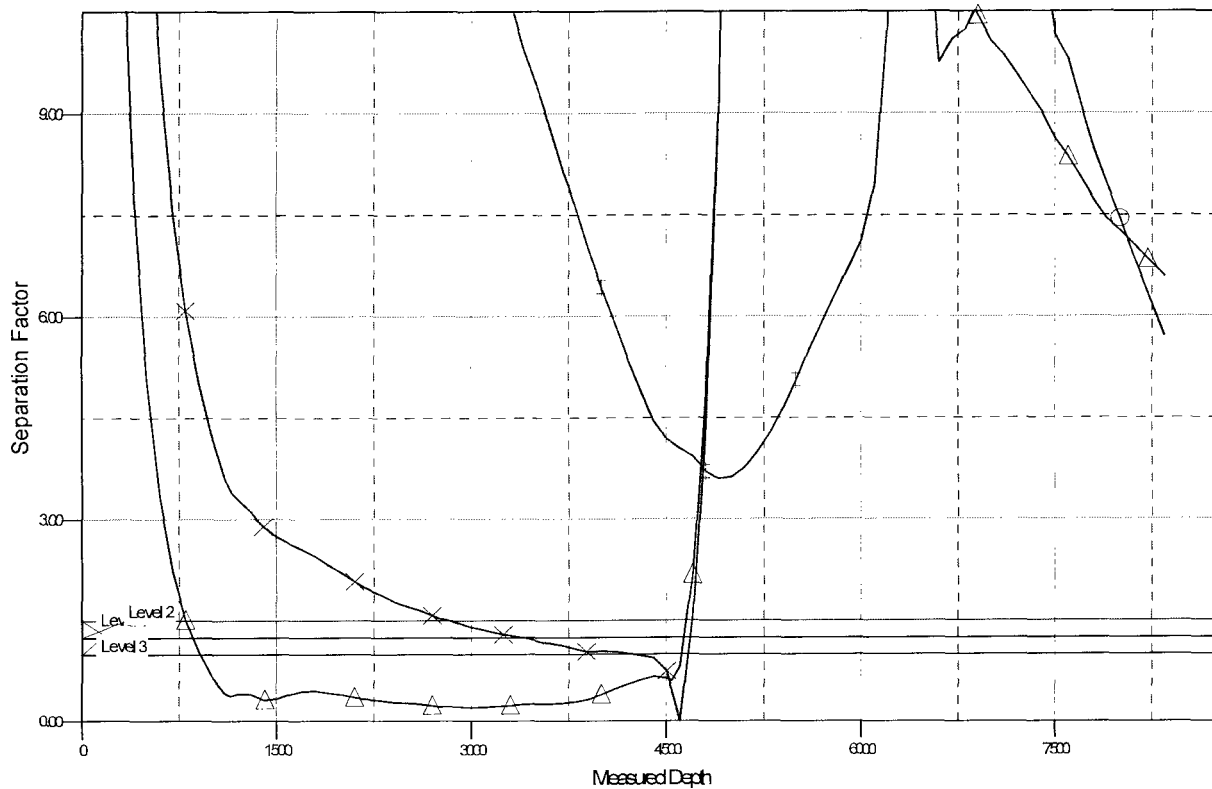
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Coordinates are relative to: #47H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.24°

Separation Factor Plot



LEGEND

H, OH / Job #1514748, Surveys (Capstar 119) V0
H, OH, Plan #3 11-11-15 V0

▲ #49H, OH, Plan #3 09-09-15 V0
■ #3H, OH, Plan #1 06-11-15 V0

● #1H, OH, Plan #1 06-11-15 V0

WELL NAME: CEDAR LAKE FEDERAL CA 547H

API: 30-015-43507

SPUD DATE: 1/1/2016

PRODUCING FORMATION: YESO PADDOCK

FIELD: CEDAR LAKE (BP)

COUNTY: EDDY

STATE: NEW MEXICO

WORKING INTEREST 60.00%

SURFACE LOC: 2535' FNL & 715' FWL

SECTION: 5

TOWNSHIP: 17-S

RANGE: 31-E

SURVEY: RONALD J. EIDSON

BOTTOM HOLE LOC: 2008.5' FNL & 333.4' FEL

SECTION: 5

TOWNSHIP: 17-S

RANGE: 31-E

SURVEY: RONALD J. EIDSON

DRILL RIG: CAPSTAR 119

RIG RELEASE: 1/23/2016

KB (ft): 3,808.00

GL (ft): 3,787.00

KBGL DIFF (ft): 11.00

TMD (ft): 9,068.00

TD OF PILOT HOLE (ft): N/A

FC DEPTH (ft): 9,051.00

PBMD (ft): 9,068.00

RDV DEPTH (ft): N/A

ORIO VALVE (ft): N/A

DEEPEST TVD (ft): 4,970.00

TAPERED CASING STRING:

7" 29# L-80 TO X-OVER @ 4.465'
TAPERING TO 5.5" 20# L-80 SET @ 9,060'

KOP (ft): 4,417
LATERAL LENGTH (ft): 3,819
TD OF PILOT HOLE (ft): N/A

COMPLETION:

STIMULATION:

STATUS:

COMMENTS:

LAST UPDATED BY: MISTI HATHCOCK
LAST UPDATED: 7/17/2017

PACKERS & SLEEVES - 14 STAGES				
TOTAL ACID (bb)	TOTAL LTR (bb)	TOTAL PROPANT (lbs)	MAX WH RATE (bpm)	MAX WH PRESSURE (psi)
2,464	83,548	3,085,740	96.00	7,030
PRODUCTION METHOD				
Pumping	LIFT TYPE	ESP	SETTING DEPTH	0
CROSSOVER SUB @ 4.465'				

PACKERS & SLEEVES
TOP PERF (MD): 5,249
BOTTOM PERF (MD): 9,068
TMD (ft): 9,068
FC DEPTH (ft): 9,051
PBMD (ft): 9,068
RDV DEPTH (ft): N/A
ORIO VALVE (ft): N/A

