



PHOENIX
TECHNOLOGY SERVICES

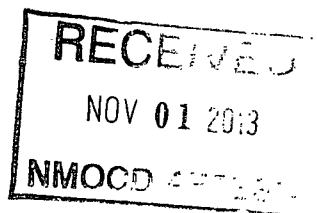
October 27, 2013

Oil Conservation Division
State of New Mexico
811 S. First St.
Artesia, New Mexico 88210

Dear District 2 - Artesia

Attention: Regulatory Department

Re: Apache Corporation
Crow Federal #24H
Eddy Co., NM
API #30-015-41168
Job No. 1311334



Enclosed please find the Survey Data Certification, and the original Plat and one copy of the Survey Report performed on the above referenced Well by Phoenix Technology Services, Inc. (P-5 No. 664171). Other information required by your office is as follows:

Name & Title of Surveyor	Drainhole Number	Surveyed Depths		Dates Performed		Type of Survey
		From	To	Start	End	
Brad Hill	24H	481	10,805	10/11/13	10/22/13	MWD

A certified plat on which the bottom hole location is oriented both to the surface location and to the lease lines (or unit lines in case of pooling) is attached to the survey report. If any other information is required, please contact the undersigned at the letterhead address and phone number.

Best Regards,

Kelly Jo Walter

Kelly Jo Walter
Operations Administrator

Certified mail receipt number: 7011 1570 0001 4364 8790

Phoenix Technology Services SURVEY DATA CERTIFICATION

RECEIVED

NOV 01 2013

NMOCD ARTES



PHOENIX
TECHNOLOGY SERVICES

PHOENIX JOB NUMBER

1311334

OPERATOR

Apache Corporation

WELL NAME

Crow Federal #24H

COUNTY & STATE

Eddy County, NM

API WELL NUMBER

30-045-41168

PROPOSED DIRECTION

89.59

TIE-IN DATA						
MEASURED DEPTH	VERTICAL DEPTH	INCLIN	AZIMUTH	N-S COORD	E-W COORD	DATA SOURCE
100 ft	100.00 ft	4 ft	341.5 ft	34 ft	11 ft	Gyrodatta

FIRST SURVEY DATE	FIRST SURVEY DEPTH	INCLIN	AZIMUTH
11-Oct-13	481 ft	0.7	18.4

SURVEY INSTRUMENT TYPE
Phoenix MWD

LAST SURVEY DATE	LAST SURVEY DEPTH	INCLIN	AZIMUTH
22-Oct-13	10,805 ft	85.6	88.8

TO THE BEST OF MY KNOWLEDGE I
CERTIFY THIS SURVEY DATA TO BE
TRUE AND CORRECT.

PROJECTED TD SURVEY DATE	PROJECTED TD SURVEY DEPTH	INCLIN	AZIMUTH
22-Oct-13	10,858 ft	85.6	88.8

Brad Hill

PRINT YOUR NAME ABOVE

Brad Hill

SIGN YOUR NAME ABOVE

MAGNETIC DECLINATION OR TOTAL GRID

TOTAL CORRECTION USED	DECLINATION OR GRID
7.4	GRID

10/22/2013

TODAY'S DATE

MWD SUPERVISOR 1

Brad Hill

DIRECTIONAL DRILLER 1

Ken Smith

MWD SUPERVISOR 2

Daryl Robles

DIRECTIONAL DRILLER 2

Joe Paup

1805 Brittmore Road

Houston, Texas 77043

(713)3370609 (Voice), (713)337-0599 (Fax)

DISTRICT I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate
District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-015-41168	Pool Code 96831	Pool Name Cedar Lake; Glorieta - Yeso
Property Code 308711	Property Name CROW FEDERAL	Well Number 24H
OGRID No. 873	Operator Name APACHE CORPORATION	Elevation 3869'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
E	9	17-S	31-E		1620	NORTH	10	WEST	EDDY

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	9	17-S	31-E		1620	NORTH	330	EAST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
1160			

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

	OPERATOR CERTIFICATION I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or, unless mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division. <i>Sorina L. Flores</i> 8/30/12 Signature Date Sorina L. Flores Printed Name <i>Sorina.flores@apachecorp.com</i> E-mail Address
CORNER COORDINATES TABLE: A) Y=674172.6 N, X=638358.2 E B) Y=674209.2 N, X=643639.5 E C) Y=672852.6 N, X=638365.7 E D) Y=672888.0 N, X=643646.5 E	SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief. MAY 17, 2012 Date of Survey Signature & Seal of Professional Surveyor: <i>GARY G. EIDSON</i> GARY G. EIDSON NEW MEXICO 12641 Certificate Number Gary G. Eidson 12641 Ronald J. Eidson 3239 AF JWSC W.O. 12-11-0473



Project: Eddy County, NM (NAD27 NME)
Site: Crow Federal
Well: #24H
Wellbore: WB1/Job #1311334
Design: Plan #2 10-04-13
Rig: Capstar 114

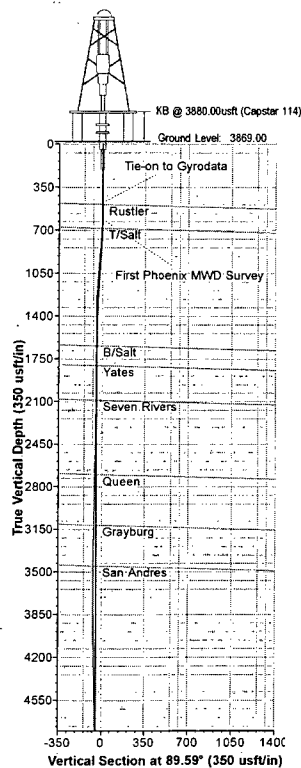


PHOENIX
TECHNOLOGY SERVICES



Azimuths to Grid North
True North: -0.24°
Magnetic North: 7.39°

Magnetic Field
Strength: 48542 nT
Dip Angle: 60.68°
Date: 08/08/2012
Model: IGRF2010_14



WELL DETAILS												
	+N/-S	+E/-W	Northing	Ground Level	3869.00	Latitude	Longitude					
	0.00	0.00	673873.20	Easting	638369.90	32° 51' 6.30158 N	103° 52' 57.92992 W					

SECTION DETAILS												
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dieg	TFace	VSec	Target	Annotation	
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
2	600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00		Start Build 2.00	
3	800.00	4.00	269.59	799.84	-0.05	-6.98	2.00	269.59	-6.98		Start 400.00 hold at 800.00 MD	
4	1200.00	4.00	269.59	1198.86	-0.25	-34.88	0.00	0.00	-34.88		Start Drop -1.50	
5	1466.67	0.00	0.00	1466.31	-0.32	-44.18	1.50	180.00	-44.19		Start 4136.33 hold at 1466.67 MD	
6	5605.00	0.00	0.00	5603.65	-0.32	-44.18	0.00	0.00	-44.19		KOP Start Build 12.00	
7	6342.39	88.48	89.59	6081.00	3.00	420.62	12.00	89.59	420.63		LP Start 1880.03 hold at 6342.39 MD	
8	8222.42	88.48	89.59	6131.00	16.43	2299.94	0.00	0.00	2300.00	MP-Crow Fed #24H	Start DLS 2.00 TFO 0.00	
9	8244.49	88.92	89.59	6131.50	16.59	2322.01	2.00	0.00	2322.07		Start 2619.93 hold at 8244.49 MD	
10	10864.32	88.92	89.59	6181.00	35.30	4941.30	0.00	0.00	4941.43	PBHL-Crow Fed #24H	TD at 10864.32	

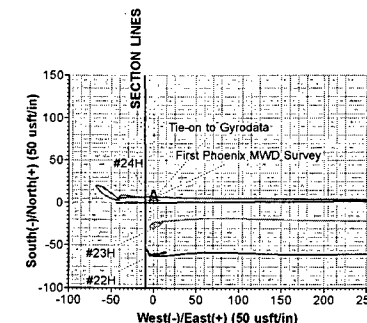
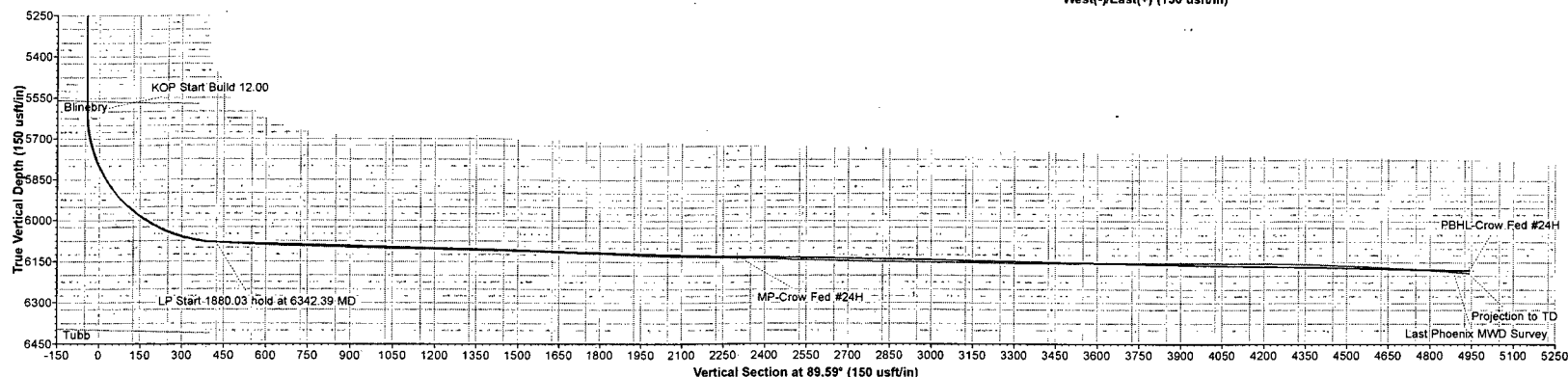
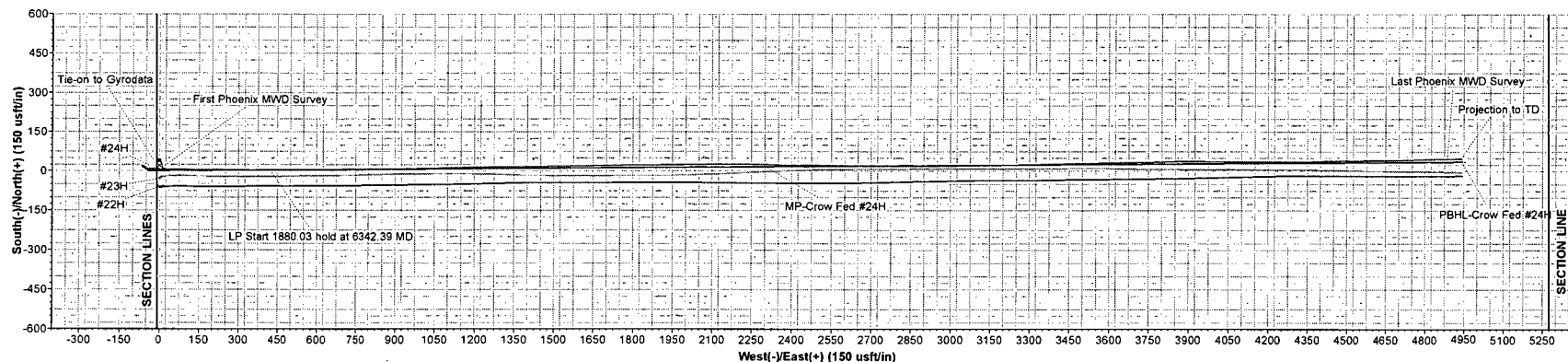
DESIGN TARGET DETAILS												
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape				
MP-Crow Fed #24H	6131.00	16.43	2299.94	673889.63	640669.84	32° 51' 6.36626 N	103° 52' 30.96828 W	Point				
			- plan hits target center									
PBHL-Crow Fed #24H	6181.00	35.30										
			- plan hits target center									

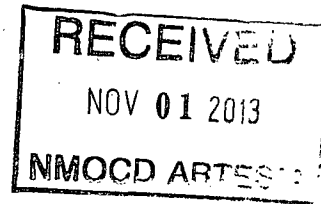
Map System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone Name: New Mexico East 3001
Local Origin: Well #24H, Grid North
Latitude: 32° 51' 6.30158 N
Longitude: 103° 52' 57.92992 W
Grid East: 638369.90
Grid North: 673873.20
Scale Factor: 1.000
Geomagnetic Model: IGRF2010_14
Sample Date: 08-Aug-12
Magnetic Declination: 7.64°
Dip Angle from Horizontal: 60.68°
Magnetic Field Strength: 48542

To convert a Magnetic Direction to a Grid Direction, Add 7.39°
To convert a Magnetic Direction to a True Direction, Add 7.64° East
To convert a True Direction to a Grid Direction, Subtract 0.24°

FORMATION TOP DETAILS				
TVDPath	MDPath	Formation	DipAngle	DpDr
492.00	492.00	Rustler	1.54	89.59
684.97	684.98	T/Salt	1.54	89.59
1644.81	1646.17	B/Salt	1.54	89.59
1806.81	1806.17	Yates	1.54	89.59
2088.81	2090.17	Seven Rivers	1.54	89.59
2701.81	2703.17	Queen	1.54	89.59
3116.81	3118.17	Grayburg	1.54	89.59
3451.81	3453.17	San Andres	1.54	89.59
4915.81	4917.17	Glorieta	1.54	89.59
4997.81	4999.17	(Yaso) Paddock	1.54	89.59
5562.81	5564.17	Glinetrey	1.54	89.59

LEGEND
— #24H, WB1/Job #1311334, Survey (Capstar 114) V0
— #22H, WB1/Job #1311192, Surveys (Capstar 114) V0
— #23H, WB1/Job #1311257, Surveys (Capstar 114) V0
— Plan #2 10-04-13





Apache Corporation

Eddy County, NM (NAD27 NME)

Crow Federal

#24H

WB1/Job #1311334

Survey: Phoenix MWD Survey

Phoenix Final Survey Report

22 October, 2013





Phoenix Technology Services
Phoenix Final Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #24H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3880.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3880.00usft (Capstar 114)
Well:	#24H	North Reference:	Grid
Wellbore:	WB1/Job #1311334	Survey Calculation Method:	Minimum Curvature
Design:	Survey (Capstar 114)	Database:	GCR.DB

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	Crow Federal		
Site Position:		Northing:	671,130.90 usft
From:	Map	Easting:	643,906.80 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"
		Latitude:	32° 50' 38.92796 N
		Longitude:	103° 51' 53.16689 W
		Grid Convergence:	0.25 °

Well	#24H		
Well Position	+N/-S	0.00 usft	Northing:
	+E/-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 51' 6.30158 N
		Longitude:	103° 52' 57.92992 W
		Ground Level:	3,869.00 usft

Wellbore	WB1/Job #1311334				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010_14	08/08/12	7.64	60.68	48,842

Design	Survey (Capstar 114)			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth:
				0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.00	0.00	0.00	89.59

Survey Program	Date 10/22/13				
From	To	Survey (Wellbore)	Tool Name	Description	
(usft)	(usft)				
100.00	478.00	Gyrodata Survey (WB1/Job #1311334)	CB-GYRO-MS	Camera based gyro multishot	
614.00	10,858.00	Phoenix MWD Survey (WB1/Job #131133)	MWD	MWD - Standard	

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
478.00	0.73	18.41	477.98	4.37	-0.07	-0.04	0.00
Tie-on to Gyrodata							
614.00	0.70	12.20	613.97	6.00	0.38	0.42	0.06
First Phoenix MWD Survey							
660.00	0.70	322.50	659.96	6.50	0.26	0.31	1.28
745.00	1.50	284.30	744.95	7.19	-1.13	-1.08	1.23
831.00	2.80	263.30	830.89	7.22	-4.31	-4.26	1.74
916.00	3.40	265.70	915.76	6.79	-8.88	-8.83	0.72
1,002.00	3.60	268.80	1,001.60	6.54	-14.12	-14.08	0.33
1,087.00	3.60	273.30	1,086.43	6.64	-19.46	-19.41	0.33
1,172.00	3.50	277.00	1,171.27	7.11	-24.70	-24.64	0.29



Phoenix Technology Services
Phoenix Final Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #24H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3880.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3880.00usft (Capstar 114)
Well:	#24H	North Reference:	Grid
Wellbore:	WB1/Job #1311334	Survey Calculation Method:	Minimum Curvature
Design:	Survey (Capstar 114)	Database:	GCR DB

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	
1,260.00	3.20	281.40	1,259.12	7.92	-29.77	-29.71	0.45	
1,348.00	2.90	277.60	1,347.00	8.70	-34.38	-34.32	0.41	
1,433.00	1.80	253.80	1,431.92	8.61	-37.80	-37.74	1.70	
1,519.00	1.40	228.70	1,517.89	7.54	-39.88	-39.83	0.93	
1,605.00	1.30	182.00	1,603.87	5.88	-40.71	-40.66	1.25	
1,690.00	1.60	177.60	1,688.84	3.73	-40.69	-40.66	0.38	
1,775.00	0.40	251.70	1,773.83	2.45	-40.92	-40.90	1.81	
1,860.00	0.40	283.60	1,858.83	2.42	-41.49	-41.48	0.26	
1,946.00	0.70	293.90	1,944.82	2.71	-42.27	-42.25	0.37	
2,032.00	0.60	272.80	2,030.82	2.94	-43.20	-43.17	0.30	
2,117.00	0.90	276.10	2,115.81	3.03	-44.30	-44.28	0.36	
2,203.00	0.90	284.10	2,201.80	3.27	-45.63	-45.61	0.15	
2,288.00	1.10	278.30	2,286.79	3.55	-47.09	-47.06	0.26	
2,374.00	1.00	289.40	2,372.77	3.92	-48.61	-48.58	0.26	
2,459.00	1.10	291.50	2,457.76	4.47	-50.07	-50.04	0.13	
2,545.00	1.20	295.10	2,543.74	5.15	-51.65	-51.61	0.14	
2,631.00	1.40	300.00	2,629.72	6.06	-53.38	-53.33	0.27	
2,716.00	1.40	304.40	2,714.69	7.16	-55.13	-55.08	0.13	
2,801.00	0.80	299.30	2,799.68	8.04	-56.51	-56.45	0.71	
2,887.00	0.90	293.00	2,885.67	8.60	-57.65	-57.59	0.16	
2,972.00	1.00	303.90	2,970.66	9.27	-58.88	-58.82	0.24	
3,058.00	1.00	301.00	3,056.64	10.08	-60.15	-60.08	0.06	
3,143.00	1.10	314.40	3,141.63	11.03	-61.37	-61.29	0.31	
3,229.00	1.30	313.70	3,227.61	12.28	-62.66	-62.57	0.23	
3,314.00	1.30	319.80	3,312.59	13.68	-63.98	-63.88	0.16	
3,400.00	1.40	323.70	3,398.57	15.28	-65.23	-65.12	0.16	
3,451.00	1.60	327.20	3,449.55	16.38	-65.99	-65.87	0.43	
3,564.00	1.60	325.10	3,562.50	19.00	-67.75	-67.61	0.05	
3,650.00	0.20	123.20	3,648.49	19.90	-68.31	-68.16	2.08	
3,735.00	0.30	108.90	3,733.49	19.75	-67.97	-67.83	0.14	
3,821.00	0.70	81.40	3,819.49	19.75	-67.24	-67.10	0.53	
3,909.00	1.20	106.90	3,907.48	19.56	-65.83	-65.69	0.73	
3,994.00	1.10	107.90	3,992.46	19.05	-64.20	-64.06	0.12	
4,080.00	1.10	103.80	4,078.45	18.60	-62.61	-62.48	0.09	
4,166.00	1.20	100.40	4,164.43	18.24	-60.92	-60.79	0.14	
4,251.00	0.60	115.40	4,249.42	17.89	-59.65	-59.52	0.75	
4,337.00	1.00	128.60	4,335.41	17.23	-58.65	-58.53	0.51	
4,422.00	1.10	139.20	4,420.39	16.15	-57.54	-57.42	0.26	
4,508.00	1.10	125.20	4,506.38	15.05	-56.33	-56.22	0.31	
4,593.00	0.90	132.00	4,591.37	14.13	-55.16	-55.06	0.27	
4,679.00	1.10	123.90	4,677.35	13.22	-53.98	-53.88	0.28	
4,764.00	1.20	119.10	4,762.34	12.33	-52.52	-52.43	0.16	
4,850.00	1.20	125.60	4,848.32	11.37	-51.00	-50.92	0.16	
4,935.00	1.10	110.90	4,933.30	10.56	-49.52	-49.44	0.37	



Phoenix Technology Services
Phoenix Final Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #24H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3880.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3880.00usft (Capstar 114)
Well:	#24H	North Reference:	Grid
Wellbore:	WB1/Job #1311334	Survey Calculation Method:	Minimum Curvature
Design:	Survey (Capstar 114)	Database:	GCR DB

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (%/100usft)
5,021.00	1.50	133.30	5,019.28	9.50	-47.93	-47.86	0.74
5,106.00	1.40	139.10	5,104.25	7.95	-46.44	-46.38	0.21
5,195.00	0.40	126.90	5,193.24	6.94	-45.48	-45.43	1.14
5,280.00	0.60	129.80	5,278.24	6.48	-44.90	-44.85	0.24
5,366.00	0.50	139.90	5,364.23	5.90	-44.31	-44.27	0.16
5,451.00	0.50	116.20	5,449.23	5.45	-43.74	-43.70	0.24
5,537.00	0.50	112.20	5,535.23	5.15	-43.05	-43.02	0.04
5,556.00	0.80	106.50	5,554.22	5.08	-42.85	-42.81	1.61
5,585.00	0.60	82.80	5,583.22	5.04	-42.51	-42.47	1.20
5,628.00	4.00	84.80	5,626.18	5.20	-40.79	-40.75	7.91
5,670.00	8.30	86.40	5,667.93	5.53	-36.30	-36.26	10.25
5,713.00	13.10	86.60	5,710.17	6.01	-28.34	-28.29	11.16
5,756.00	17.80	88.00	5,751.60	6.53	-16.90	-16.85	10.96
5,799.00	22.40	91.30	5,791.98	6.57	-2.13	-2.08	11.01
5,843.00	27.60	92.10	5,831.84	6.01	16.45	16.49	11.84
5,889.00	33.10	90.90	5,871.52	5.42	39.68	39.72	12.03
5,932.00	39.60	90.30	5,906.13	5.16	65.15	65.18	15.14
5,975.00	46.00	90.50	5,937.67	4.96	94.35	94.38	14.89
6,018.00	51.20	90.20	5,966.10	4.76	126.59	126.62	12.10
6,060.00	55.80	90.40	5,991.07	4.58	160.34	160.37	10.96
6,103.00	60.20	90.50	6,013.85	4.30	196.80	196.83	10.23
6,146.00	64.60	90.60	6,033.77	3.93	234.90	234.92	10.23
6,188.00	69.50	90.70	6,050.14	3.49	273.56	273.58	11.67
6,231.00	74.70	90.50	6,063.35	3.06	314.46	314.47	12.10
6,274.00	79.70	90.90	6,072.88	2.55	356.37	356.38	11.66
6,318.00	84.80	90.40	6,078.81	2.06	399.96	399.96	11.65
6,403.00	87.20	89.80	6,084.74	1.91	484.74	484.74	2.91
6,491.00	86.50	89.20	6,089.57	2.68	572.60	572.61	1.05
6,579.00	88.70	89.70	6,093.26	3.52	660.52	660.53	2.56
6,665.00	88.30	89.60	6,095.51	4.05	746.49	746.50	0.48
6,750.00	88.90	89.10	6,097.59	5.01	831.45	831.47	0.92
6,835.00	88.30	88.60	6,099.66	6.72	916.41	916.44	0.92
6,921.00	87.60	88.10	6,102.74	9.19	1,002.32	1,002.36	1.00
7,006.00	89.60	88.80	6,104.82	11.49	1,087.26	1,087.31	2.49
7,092.00	89.10	88.40	6,105.79	13.59	1,173.23	1,173.29	0.74
7,178.00	88.80	89.70	6,107.37	15.01	1,259.20	1,259.27	1.55
7,263.00	88.00	89.10	6,109.74	15.90	1,344.16	1,344.24	1.18
7,353.00	89.10	89.70	6,112.02	16.85	1,434.12	1,434.21	1.39
7,439.00	88.70	89.40	6,113.67	17.52	1,520.11	1,520.19	0.58
7,525.00	88.30	89.00	6,115.92	18.72	1,606.07	1,606.16	0.66
7,612.00	87.70	88.60	6,118.96	20.54	1,692.99	1,693.10	0.83
7,697.00	88.60	89.40	6,121.70	22.03	1,777.94	1,778.05	1.42
7,783.00	88.00	89.70	6,124.25	22.70	1,863.89	1,864.01	0.78
7,868.00	87.50	89.60	6,127.59	23.22	1,948.83	1,948.94	0.60



Phoenix Technology Services
Phoenix Final Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #24H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3880.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3880.00usft (Capstar 114)
Well:	#24H	North Reference:	Grid
Wellbore:	WB1/Job #1311334	Survey Calculation Method:	Minimum Curvature
Design:	Survey (Capstar 114)	Database:	GCR DB

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V-Sec (usft)	DLeg (°/100usft)	
7,954.00	89.10	89.10	6,130.14	24.19	2,034.78	2,034.90	1.95	
8,039.00	88.50	89.10	6,131.92	25.53	2,119.75	2,119.88	0.71	
8,125.00	88.90	91.00	6,133.87	25.45	2,205.73	2,205.85	2.26	
8,210.00	88.40	90.90	6,135.87	24.05	2,290.69	2,290.80	0.60	
8,296.00	88.20	90.70	6,138.42	22.85	2,376.64	2,376.75	0.33	
8,381.00	87.50	90.70	6,141.61	21.81	2,461.58	2,461.67	0.82	
8,467.00	89.10	90.50	6,144.16	20.91	2,547.53	2,547.62	1.87	
8,556.00	88.80	90.50	6,145.80	20.13	2,636.51	2,636.59	0.34	
8,641.00	88.60	90.30	6,147.72	19.54	2,721.49	2,721.56	0.33	
8,727.00	88.40	90.40	6,149.98	19.01	2,807.46	2,807.52	0.26	
8,812.00	89.60	90.10	6,151.46	18.64	2,892.44	2,892.50	1.46	
8,898.00	88.70	89.40	6,152.73	19.02	2,978.43	2,978.49	1.33	
8,983.00	90.00	89.50	6,153.70	19.83	3,063.42	3,063.48	1.53	
9,069.00	89.30	89.20	6,154.22	20.81	3,149.41	3,149.48	0.89	
9,154.00	88.70	88.80	6,155.71	22.29	3,234.38	3,234.46	0.85	
9,240.00	90.00	88.60	6,156.68	24.24	3,320.36	3,320.44	1.53	
9,326.00	89.60	88.10	6,156.98	26.72	3,406.32	3,406.42	0.74	
9,411.00	90.90	89.40	6,156.61	28.57	3,491.29	3,491.41	2.16	
9,497.00	90.50	88.40	6,155.56	30.22	3,577.27	3,577.40	1.25	
9,582.00	90.20	89.00	6,155.04	32.15	3,662.25	3,662.38	0.79	
9,668.00	89.80	88.50	6,155.04	34.03	3,748.23	3,748.37	0.74	
9,753.00	89.80	88.50	6,155.34	36.25	3,833.20	3,833.36	0.00	
9,839.00	90.10	90.60	6,155.41	36.93	3,919.19	3,919.35	2.47	
9,925.00	89.80	90.50	6,155.49	36.10	4,005.18	4,005.34	0.37	
10,010.00	89.70	90.10	6,155.86	35.66	4,090.18	4,090.33	0.49	
10,095.00	89.40	90.20	6,156.53	35.44	4,175.18	4,175.33	0.37	
10,180.00	89.10	89.80	6,157.64	35.44	4,260.17	4,260.32	0.59	
10,266.00	88.50	89.10	6,159.44	36.26	4,346.15	4,346.30	1.07	
10,351.00	88.20	89.00	6,161.89	37.67	4,431.10	4,431.26	0.37	
10,437.00	87.90	89.30	6,164.82	38.94	4,517.04	4,517.20	0.49	
10,524.00	87.30	89.00	6,168.46	40.23	4,603.95	4,604.13	0.77	
10,612.00	86.80	89.20	6,172.99	41.61	4,691.83	4,692.00	0.61	
10,697.00	86.20	88.50	6,178.18	43.32	4,776.65	4,776.84	1.08	
10,783.00	85.80	88.60	6,184.18	45.49	4,862.41	4,862.61	0.48	
10,805.00	85.60	88.80	6,185.83	45.99	4,884.35	4,884.55	1.28	
Last Phoenix MWD Survey								
10,858.00	85.60	88.80	6,189.89	47.09	4,937.18	4,937.39	0.00	
Projection to TD								



Phoenix Technology Services
Phoenix Final Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #24H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3880.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3880.00usft (Capstar 114)
Well:	#24H	North Reference:	Grid
Wellbore:	WB1/Job #1311334	Survey Calculation Method:	Minimum Curvature
Design:	Survey (Capstar 114)	Database:	GCR DB

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
478.00	477.98	4.37	-0.07	Tie-on to Gyrodota
614.00	613.97	6.00	0.38	First Phoenix MWD Survey
10,805.00	6,185.83	45.99	4,884.35	Last Phoenix MWD Survey
10,858.00	6,189.89	47.09	4,937.18	Projection to TD

Checked By: _____ Approved By: _____ Date: _____



Apache Corporation

Eddy County, NM (NAD27 NME)

Crow Federal

#24H

WB1/Job #1311334

Survey: Phoenix MWD Survey

Anticollision Report

22 October, 2013



PHOENIX
TECHNOLOGY SERVICES



Phoenix Technology Services

Anticollision Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #24H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3880.00usft (Capstar 114)
Reference Site:	Crow Federal	MD Reference:	KB @ 3880.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#24H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00' sigma
Reference Wellbore	WB1/Job #1311334	Database:	GCR DB
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Offset Datum

Reference	Survey: Phoenix MWD Survey		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 9,999.98 usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Program	Date 10/22/13	
From (usft)	To (usft)	Survey (Wellbore)
100.00	478.00	Gyrodatta Survey (WB1/Job #1311334)
614.00	10,858.00	Phoenix MWD Survey (WB1/Job #131133)
		Tool Name
		Description
		Camera based gyro multishot
		MWD - Standard

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Crow Federal						
#22H - WB1/Job #1311192 - Surveys (Capstar 114)	0.00	1.00	60.00			
#22H - WB1/Job #1311192 - Surveys (Capstar 114)	478.00	479.06	64.50	56.84	8.426	ES
#22H - WB1/Job #1311192 - Surveys (Capstar 114)	4,593.00	4,591.28	93.68	74.56	4.897	SF
#23H - WB1/Job #1311257 - Surveys (Capstar 114)	590.88	592.23	29.84	20.72	3.272	CC
#23H - WB1/Job #1311257 - Surveys (Capstar 114)	614.00	615.32	29.85	20.63	3.236	ES
#23H - WB1/Job #1311257 - Surveys (Capstar 114)	5,147.55	5,146.19	54.48	33.06	2.543	SF

Offset Design : Crow Federal - #22H - WB1/Job #1311192 - Surveys (Capstar 114)										Offset Site Error: 0.00 usft			
Survey Program: 100-CB-GYRO-MS; 481-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
0.00	0.00	1.00	1.00	0.00	0.01	179.62	-60.00	0.40	60.00				
100.00	100.00	101.04	101.03	0.56	0.57	-162.54	-59.96	0.98	60.31	59.19	1.12	53.749	
200.00	200.00	200.90	200.89	1.59	1.44	-170.87	-59.99	2.07	61.16	58.13	3.03	20.172	
300.00	299.99	300.94	300.92	2.53	2.32	177.60	-60.06	3.33	62.31	57.47	4.84	12.861	
400.00	399.98	401.03	401.01	3.44	3.19	166.24	-60.01	4.57	63.58	56.95	6.63	9.594	
478.00	477.98	479.06	479.03	4.11	3.54	156.95	-59.92	5.15	64.50	56.84	7.65	8.426 ES	
614.00	613.97	614.94	614.91	4.72	3.57	162.88	-59.73	6.03	65.98	57.69	8.29	7.962	
660.00	659.96	660.85	660.81	4.72	3.58	-147.91	-59.77	6.54	66.57	58.26	8.30	8.019	
745.00	744.95	746.24	746.20	4.74	3.61	-111.75	-59.57	7.61	67.33	58.99	8.34	8.070	
831.00	830.89	832.12	832.07	4.76	3.65	-94.48	-59.09	8.79	67.60	59.19	8.40	8.043	
916.00	915.76	916.98	916.92	4.79	3.70	-101.95	-58.53	10.17	68.04	59.56	8.48	8.021	
1,002.00	1,001.60	1,002.55	1,002.46	4.83	3.75	-110.85	-57.86	12.01	69.50	60.93	8.58	8.102	
1,087.00	1,086.43	1,087.24	1,087.14	4.87	3.81	-120.42	-57.50	13.48	72.11	63.42	8.68	8.306	
1,172.00	1,171.27	1,172.12	1,172.02	4.92	3.88	-127.78	-57.62	13.95	75.39	66.59	8.79	8.575	
1,260.00	1,259.12	1,260.07	1,259.97	4.98	3.95	-135.00	-57.84	14.01	79.00	70.08	8.92	8.856	
1,348.00	1,347.00	1,347.21	1,347.11	5.05	4.04	-133.69	-58.21	14.50	82.87	73.81	9.06	9.142	
1,433.00	1,431.92	1,433.57	1,433.46	5.11	4.12	-111.63	-58.53	14.34	85.01	75.80	9.22	9.223	
1,519.00	1,517.89	1,519.58	1,519.46	5.18	4.21	-87.24	-58.87	13.00	84.90	75.52	9.38	9.052	
1,605.00	1,603.87	1,605.33	1,605.20	5.26	4.31	-40.73	-59.41	11.63	83.67	74.12	9.55	8.762	
1,690.00	1,688.84	1,690.68	1,690.54	5.33	4.42	-36.36	-59.80	10.27	81.44	71.71	9.73	8.369	
1,775.00	1,773.83	1,775.73	1,775.57	5.42	4.52	-110.17	-60.05	8.73	79.82	69.90	9.93	8.042	

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



Phoenix Technology Services

Anticollision Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #24H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3880.00usft (Capstar 114)
Reference Site:	Crow Federal	MD Reference:	KB @ 3880.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#24H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	WB1/Job #1311334	Database:	GCR DB
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error:	0.00 usft
Crow Federal - #22H - WB1/Job #1311192 - Surveys (Capstar 114)												Offset Well Error:	0.00 usft
Survey Program: 100-CB-GYRO-MS-481-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
1,860.00	1,858.83	1,860.59	1,860.42	5.50	4.63	-141.47	-60.29	7.28	79.45	69.32	10.13	7.846	
1,881.92	1,880.75	1,882.46	1,882.29	5.53	4.66	-145.18	-60.35	6.94	79.43	69.25	10.18	7.803	
1,946.00	1,944.82	1,946.41	1,946.23	5.60	4.75	-151.20	-60.62	5.98	79.61	69.27	10.34	7.701	
2,032.00	2,030.82	2,032.32	2,032.12	5.70	4.87	-129.48	-61.20	4.58	79.99	69.43	10.56	7.577	
2,117.00	2,115.81	2,117.71	2,117.51	5.80	5.00	-132.36	-61.61	3.11	80.17	69.39	10.78	7.436	
2,203.00	2,201.80	2,203.44	2,203.22	5.91	5.12	-140.04	-61.96	1.66	80.57	69.55	11.02	7.313	
2,288.00	2,286.79	2,288.72	2,288.49	6.02	5.25	-134.07	-62.22	0.30	81.06	69.80	11.26	7.200	
2,374.00	2,372.77	2,374.90	2,374.65	6.13	5.39	-145.08	-62.20	-1.14	81.40	69.90	11.51	7.074	
2,459.00	2,457.76	2,459.80	2,459.54	6.25	5.52	-146.87	-62.26	-2.70	81.84	70.08	11.76	6.960	
2,545.00	2,543.74	2,545.80	2,545.53	6.37	5.66	-150.10	-62.42	-4.34	82.48	70.46	12.02	6.862	
2,631.00	2,629.72	2,631.69	2,631.41	6.50	5.81	-155.14	-62.17	-5.36	83.44	71.15	12.29	6.790	
2,716.00	2,714.89	2,716.04	2,715.76	6.63	5.95	-160.15	-61.81	-5.47	84.99	72.43	12.56	6.769	
2,801.00	2,799.68	2,801.11	2,800.82	6.76	6.09	-155.57	-61.62	-5.38	86.41	73.59	12.82	6.739	
2,887.00	2,885.67	2,887.64	2,887.35	6.88	6.24	-149.80	-61.16	-5.47	87.12	74.02	13.10	6.651	
2,972.00	2,970.66	2,972.49	2,972.20	7.02	6.39	-161.26	-60.51	-5.60	87.80	74.42	13.38	6.564	
3,058.00	3,056.64	3,058.39	3,058.10	7.15	6.54	-158.75	-60.07	-5.83	88.72	75.06	13.66	6.496	
3,143.00	3,141.63	3,143.40	3,143.11	7.29	6.69	-172.56	-59.56	-5.90	89.78	75.84	13.94	6.439	
3,229.00	3,227.61	3,229.68	3,229.39	7.43	6.84	-172.22	-58.88	-6.02	90.96	76.72	14.24	6.389	
3,314.00	3,312.59	3,314.38	3,314.09	7.57	6.99	-178.44	-58.40	-6.36	92.29	77.77	14.53	6.353	
3,400.00	3,398.57	3,400.92	3,400.62	7.72	7.15	177.47	-57.57	-6.60	93.52	78.69	14.83	6.308	
3,451.00	3,449.55	3,451.98	3,451.68	7.81	7.24	173.93	-57.00	-6.84	94.25	79.25	15.00	6.282	
3,564.00	3,562.50	3,564.98	3,564.67	8.00	7.45	176.10	-55.83	-7.58	96.03	80.62	15.40	6.234	
3,650.00	3,648.49	3,651.13	3,650.82	8.14	7.61	18.02	-54.94	-8.17	96.01	80.31	15.70	6.114	
3,707.52	3,706.02	3,706.95	3,706.63	8.24	7.71	29.00	-54.78	-8.45	95.49	79.59	15.90	6.005	
3,735.00	3,733.49	3,733.56	3,733.24	8.28	7.76	32.54	-55.01	-8.38	95.61	79.61	16.00	5.977	
3,821.00	3,819.49	3,819.87	3,819.54	8.42	7.92	60.58	-56.08	-7.97	96.25	79.95	16.30	5.904	
3,909.00	3,907.48	3,907.87	3,907.54	8.57	8.09	35.90	-56.97	-7.74	96.09	79.48	16.61	5.784	
3,994.00	3,992.46	3,992.96	3,992.63	8.71	8.25	35.59	-57.70	-7.38	95.49	78.57	16.92	5.644	
4,080.00	4,078.45	4,078.65	4,078.30	8.86	8.41	40.25	-58.36	-6.80	95.08	77.84	17.23	5.517	
4,166.00	4,164.43	4,165.03	4,164.68	9.01	8.57	44.22	-58.94	-6.11	94.67	77.12	17.55	5.394	
4,232.80	4,231.22	4,231.59	4,231.24	9.13	8.70	34.77	-59.28	-5.54	94.43	76.63	17.80	5.306	
4,251.00	4,249.42	4,249.72	4,249.37	9.16	8.73	29.51	-59.39	-5.35	94.45	76.59	17.86	5.287	
4,337.00	4,335.41	4,335.52	4,335.16	9.31	8.90	16.33	-60.01	-4.43	94.38	76.21	18.18	5.192	
4,422.00	4,420.39	4,420.36	4,419.99	9.45	9.06	5.68	-60.77	-3.44	94.05	75.57	18.49	5.087	
4,508.00	4,506.38	4,506.35	4,505.97	9.61	9.23	19.66	-61.60	-2.37	93.75	74.94	18.81	4.984	
4,560.63	4,559.00	4,558.86	4,558.47	9.70	9.33	15.80	-62.14	-1.70	93.67	74.66	19.01	4.928	
4,593.00	4,591.37	4,591.28	4,590.89	9.76	9.39	12.88	-62.48	-1.27	93.68	74.56	19.13	4.897 SF	
4,679.00	4,677.35	4,671.31	4,670.73	9.91	9.55	19.19	-63.16	3.34	95.80	76.36	19.44	4.928	
4,764.00	4,762.34	4,747.40	4,745.10	10.07	9.71	16.88	-61.88	19.03	104.69	84.95	19.74	5.303	
4,850.00	4,848.32	4,814.00	4,807.60	10.22	9.85	1.73	-59.43	41.78	123.95	103.91	20.03	6.187	
4,935.00	4,933.30	4,877.27	4,863.95	10.38	10.02	8.90	-58.39	70.46	155.24	134.90	20.33	7.634	
5,021.00	5,019.28	4,932.80	4,910.33	10.54	10.22	-18.28	-59.00	100.94	197.33	176.72	20.62	9.572	
5,106.00	5,104.25	4,985.00	4,950.87	10.69	10.46	-27.87	-60.20	133.75	246.87	225.98	20.89	11.819	
5,195.00	5,193.24	5,027.00	4,980.48	10.86	10.72	-18.81	-60.81	163.51	306.52	285.38	21.15	14.494	
5,280.00	5,278.24	5,051.77	4,996.51	11.02	10.91	-23.01	-60.88	182.38	368.95	347.59	21.36	17.275	
5,366.00	5,364.23	5,080.61	5,013.87	11.18	11.15	-34.57	-60.76	205.41	436.18	414.61	21.57	20.218	
5,451.00	5,449.23	5,113.00	5,031.78	11.34	11.46	-12.61	-60.48	232.39	505.66	483.87	21.79	23.206	
5,537.00	5,535.23	5,127.49	5,039.22	11.50	11.63	-9.25	-60.33	244.82	578.08	556.10	21.98	26.302	
5,556.00	5,554.22	5,131.75	5,041.33	11.54	11.67	-3.77	-60.28	248.52	594.35	572.33	22.02	26.991	
5,585.00	5,583.22	5,138.01	5,044.38	11.60	11.75	19.26	-60.21	253.99	619.35	597.27	22.08	28.048	
5,628.00	5,626.18	5,155.00	5,052.26	11.68	11.94	15.21	-60.00	269.04	656.33	634.19	22.15	29.638	
5,670.00	5,667.93	5,155.00	5,052.26	11.75	11.94	12.34	-60.00	269.04	691.23	669.15	22.09	31.297	

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



Phoenix Technology Services

Anticollision Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #24H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3880.00usft (Capstar 114)
Reference Site:	Crow Federal	MD Reference:	KB @ 3880.00usft (Capstar 114)
Site Error:	0:00 usft	North Reference:	Grid
Reference Well:	#24H	Survey Calculation Method:	Minimum Curvature
Well Error:	0:00 usft	Output errors are at	2.00 sigma
Reference Wellbore	WB1/Job #1311334	Database:	GCR DB
Reference Design:	Survey, Phoenix MWD Survey	Offset TVD Reference:	Offset Datum

Offset Design Crow Federal - #22H - WB1/Job #1311192 - Surveys (Capstar 114)													Offset Site Error:	0.00 usft
Survey Program: 100-CB-GYRO-MS-481-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		
5,713.00	5,710.17	5,155.00	5,052.26	11.83	11.94	10.88	-60.00	269.04	725.91	704.01	21.90	33.148		
5,756.00	5,751.60	5,177.19	5,061.71	11.91	12.24	8.73	-59.67	289.11	758.52	736.88	21.64	35.047		
5,799.00	5,791.98	5,197.00	5,069.31	11.99	12.50	5.96	-59.30	307.40	789.84	768.55	21.29	37.106		
5,843.00	5,831.84	5,197.00	5,069.31	12.07	12.50	5.09	-59.30	307.40	819.69	798.99	20.70	39.589		
5,889.00	5,871.52	5,213.51	5,075.05	12.18	12.75	5.08	-58.94	322.87	848.70	828.71	19.99	42.448		
5,932.00	5,906.13	5,239.00	5,082.94	12.32	13.14	4.78	-58.39	347.10	873.40	854.40	19.00	45.962		
5,975.00	5,937.67	5,239.00	5,082.94	12.49	13.14	4.42	-58.39	347.10	894.52	876.69	17.83	50.162		
6,018.00	5,966.10	5,253.87	5,086.97	12.71	13.39	4.26	-58.11	361.41	913.08	896.21	16.87	54.139		
6,060.00	5,991.07	5,267.31	5,090.25	12.99	13.62	4.03	-57.92	374.45	929.00	913.01	15.99	58.093		
6,103.00	6,013.85	5,282.00	5,093.41	13.34	13.86	3.86	-57.78	388.79	943.27	928.10	15.17	62.192		
6,146.00	6,033.77	5,282.00	5,093.41	13.77	13.86	3.75	-57.78	388.79	955.85	941.53	14.32	66.754		
6,188.00	6,050.14	5,307.26	5,097.79	14.26	14.33	3.61	-57.72	413.67	965.53	952.02	13.51	71.467		
6,231.00	6,063.35	5,325.00	5,100.03	14.84	14.66	3.56	-57.82	431.26	973.28	960.55	12.73	76.435		
6,274.00	6,072.88	5,325.00	5,100.03	15.49	14.66	3.49	-57.82	431.26	978.59	966.50	12.09	80.966		
6,318.00	6,078.81	5,352.62	5,102.33	16.22	15.20	3.49	-58.03	458.78	981.09	969.34	11.75	83.483		
6,403.00	6,084.74	5,410.35	5,104.49	17.77	16.38	3.51	-58.21	516.47	983.60	971.50	12.10	81.273		
6,491.00	6,089.57	5,494.44	5,107.00	19.54	18.20	3.54	-57.75	600.52	985.82	972.93	12.90	76.446		
6,579.00	6,093.26	5,581.73	5,109.34	21.44	20.19	3.53	-57.08	687.78	987.16	973.56	13.59	72.620		
6,636.29	6,094.69	5,639.09	5,110.92	22.74	21.54	3.51	-56.43	745.11	986.99	972.80	14.20	69.526		
6,665.00	6,095.51	5,666.24	5,111.63	23.39	22.20	3.50	-56.08	772.25	987.05	972.55	14.50	68.091		
6,750.00	6,097.59	5,747.92	5,113.53	25.38	24.19	3.50	-54.96	853.90	987.14	971.76	15.38	64.189		
6,767.55	6,097.94	5,765.12	5,113.90	25.80	24.62	3.51	-54.72	871.09	987.12	971.53	15.58	63.340		
6,835.00	6,099.66	5,831.22	5,115.28	27.43	26.27	3.54	-53.81	937.18	987.46	971.07	16.39	60.261		
6,921.00	6,102.74	5,910.20	5,116.75	29.54	28.27	3.62	-52.80	1,016.13	989.03	971.61	17.42	56.771		
7,006.00	6,104.82	5,981.68	5,117.09	31.66	30.10	3.65	-51.67	1,087.61	990.74	972.45	18.29	54.166		
7,092.00	6,105.79	6,075.70	5,117.45	33.84	32.54	3.69	-50.03	1,181.60	991.41	971.95	19.46	50.935		
7,178.00	6,107.37	6,169.94	5,118.32	36.04	34.99	3.66	-48.30	1,275.83	992.21	971.57	20.64	48.064		
7,263.00	6,109.74	6,262.85	5,120.54	38.24	37.43	3.57	-45.54	1,368.67	992.40	970.57	21.83	45.454		
7,353.00	6,112.02	6,340.46	5,121.85	40.59	39.49	3.58	-45.09	1,446.26	993.18	970.28	22.90	43.370		
7,439.00	6,113.67	6,424.37	5,122.71	42.84	41.72	3.63	-45.23	1,530.17	993.99	969.91	24.08	41.276		
7,525.00	6,115.92	6,514.33	5,123.85	45.11	44.12	3.70	-45.22	1,620.12	995.23	969.90	25.33	39.298		
7,612.00	6,118.96	6,601.51	5,125.07	47.41	46.45	3.77	-44.66	1,707.29	997.13	970.55	26.58	37.521		
7,697.00	6,121.70	6,686.82	5,126.27	49.66	48.74	3.82	-44.39	1,792.60	998.75	971.00	27.75	35.992		
7,783.00	6,124.25	6,775.98	5,127.68	51.95	51.14	3.85	-44.26	1,881.74	999.98	970.96	29.02	34.459		
7,868.00	6,127.59	6,863.90	5,129.44	54.23	53.51	3.88	-44.36	1,969.64	1,001.65	971.37	30.28	33.083		
7,954.00	6,130.14	6,951.24	5,131.30	56.53	55.88	3.95	-44.58	2,056.96	1,002.45	970.98	31.47	31.857		
8,023.41	6,131.53	7,023.83	5,133.05	58.39	57.84	4.05	-45.11	2,129.53	1,002.28	969.73	32.55	30.794		
8,039.00	6,131.92	7,040.45	5,133.49	58.81	58.29	4.07	-45.23	2,146.14	1,002.28	969.49	32.79	30.563		
8,125.00	6,133.87	7,132.91	5,136.25	61.12	60.80	4.05	-45.82	2,238.56	1,001.70	967.64	34.06	29.409		
8,210.00	6,135.87	7,224.18	5,139.62	63.42	63.28	4.02	-46.70	2,329.77	1,000.53	965.18	35.35	28.305		
8,296.00	6,138.42	7,313.56	5,143.35	65.74	65.70	4.00	-47.43	2,419.06	999.45	962.83	36.62	27.294		
8,381.00	6,141.61	7,404.75	5,147.47	68.04	68.18	3.96	-47.70	2,510.16	998.75	960.84	37.91	26.347		
8,467.00	6,144.16	7,494.60	5,152.04	70.37	70.62	3.89	-47.09	2,599.89	996.83	957.76	39.06	25.518		
8,556.00	6,145.80	7,572.83	5,155.79	72.78	72.75	3.79	-45.91	2,678.02	994.07	953.83	40.24	24.702		
8,641.00	6,147.72	7,651.48	5,158.58	75.09	74.89	3.66	-44.05	2,756.59	992.80	951.43	41.37	23.996		
8,727.00	6,149.98	7,738.93	5,161.55	77.42	77.27	3.50	-41.88	2,843.97	991.97	949.41	42.56	23.306		
8,812.00	6,151.46	7,820.29	5,164.39	79.74	79.48	3.38	-39.79	2,925.25	990.34	946.70	43.64	22.694		
8,898.00	6,152.73	7,899.49	5,166.61	82.07	81.64	3.32	-38.01	3,004.40	989.11	944.26	44.85	22.053		
8,983.00	6,153.70	7,983.13	5,168.60	84.39	83.93	3.31	-37.07	3,088.01	988.04	942.03	46.01	21.473		
9,069.00	6,154.22	8,060.90	5,170.43	86.73	86.05	3.33	-36.24	3,165.76	986.58	939.33	47.25	20.879		
9,078.74	6,154.35	8,068.35	5,170.54	86.99	86.26	3.33	-36.19	3,173.20	986.56	939.18	47.38	20.821		
9,154.00	6,155.71	8,130.56	5,170.87	89.04	87.96	3.39	-36.04	3,235.41	987.56	939.13	48.44	20.388		

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



Phoenix Technology Services
Anticollision Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #24H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3880.00usft (Capstar 114)
Reference Site:	Crow Federal	MD Reference:	KB @ 3880.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#24H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	WB1/Job #1311334	Database:	GCR DB
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Offset Datum

Offset Design Crow Federal #22H - WB1/Job #1311192 - Surveys (Capstar 114)												Offset Site Error:	0.00 usft
Survey Program: 100-CB-GYRO-MS 481-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 Tooface (")	Offset Wellbore Centre N-S (usft)	Offset Wellbore Centre E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
9,240.00	6,156.68	8,223.43	5,171.24	91.38	90.50	3.50	-35.88	3,328.28	988.30	938.54	49.76	19.860	
9,326.00	6,156.98	8,321.45	5,172.51	93.72	93.18	3.60	-34.73	3,426.29	987.59	936.38	51.20	19.288	
9,411.00	6,156.61	8,403.25	5,174.32	96.04	95.41	3.61	-33.20	3,508.05	985.38	933.02	52.36	18.820	
9,497.00	6,155.56	8,474.07	5,174.75	98.38	97.35	3.65	-32.47	3,578.87	983.81	930.23	53.58	18.360	
9,582.00	6,155.04	8,564.39	5,175.10	100.70	99.82	3.72	-31.49	3,669.18	983.03	928.10	54.93	17.895	
9,668.00	6,155.04	8,655.92	5,175.86	103.04	102.33	3.76	-30.04	3,760.70	982.35	926.06	56.30	17.450	
9,753.00	6,155.34	8,748.66	5,177.36	105.36	104.87	3.83	-28.77	3,853.41	981.35	923.68	57.67	17.017	
9,839.00	6,155.41	8,838.75	5,179.34	107.71	107.33	3.74	-27.22	3,943.46	979.48	920.59	58.88	16.635	
9,925.00	6,155.49	8,928.40	5,181.57	110.07	109.79	3.58	-25.22	4,033.07	977.24	917.16	60.08	16.266	
10,010.00	6,155.86	9,021.23	5,184.40	112.39	112.33	3.44	-22.80	4,125.82	974.87	913.59	61.28	15.908	
10,095.00	6,156.53	9,095.03	5,186.89	114.72	114.35	3.29	-20.44	4,199.54	972.55	910.19	62.36	15.596	
10,136.46	6,157.02	9,124.78	5,187.42	115.86	115.16	3.26	-19.89	4,229.28	972.25	909.38	62.87	15.465	
10,180.00	6,157.64	9,160.76	5,187.67	117.05	116.15	3.24	-19.59	4,265.27	972.54	909.09	63.45	15.327	
10,266.00	6,159.44	9,245.28	5,188.01	119.40	118.47	3.26	-19.11	4,349.77	974.01	909.27	64.74	15.046	
10,351.00	6,161.89	9,329.37	5,188.30	121.73	120.77	3.33	-18.97	4,433.87	976.24	910.19	66.04	14.781	
10,437.00	6,164.82	9,412.18	5,188.40	124.08	123.05	3.40	-19.06	4,516.68	979.14	911.77	67.36	14.535	
10,524.00	6,168.46	9,497.90	5,188.30	126.46	125.40	3.47	-19.21	4,602.40	982.95	914.25	68.70	14.308	
10,612.00	6,172.99	9,585.77	5,188.24	128.87	127.81	3.54	-19.36	4,690.26	987.63	917.55	70.08	14.093	
10,697.00	6,178.18	9,665.58	5,187.80	131.19	130.00	3.61	-19.32	4,770.07	993.37	922.05	71.32	13.929	
10,783.00	6,184.18	9,767.07	5,188.10	133.53	132.79	3.71	-18.79	4,871.56	999.19	926.40	72.79	13.726	
10,805.00	6,185.83	9,789.02	5,188.29	134.13	133.39	3.72	-18.63	4,893.51	1,000.67	927.52	73.14	13.681	
10,858.00	6,189.89	9,837.00	5,188.71	135.58	134.71	3.75	-18.30	4,941.49	1,004.32	930.40	73.92	13.587	



Phoenix Technology Services
Anticollision Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #24H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3880.00usft (Capstar 114)
Reference Site:	Crow Federal	MD Reference:	KB @ 3880.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#24H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	WB1/Job #1311334	Database:	GCR DB
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Offset Datum

Offset Design Crow Federal - #23H - WB1/Job #1311257 - Surveys (Capstar 114)												Offset Site Error:	0.00 usft
Survey Program: 100-CB-GYRO-MS 569-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	1.00	1.00	0.00	0.01	179.62	-30.00	0.20	30.00				
100.00	100.00	101.22	101.21	0.56	0.57	-162.24	-29.63	0.27	29.97	28.85	1.13	26.632	
180.80	180.80	181.85	181.85	1.39	1.42	-168.81	-29.00	0.41	29.96	27.15	2.81	10.672	
200.00	200.00	201.27	201.26	1.59	1.62	-170.08	-28.83	0.44	29.96	26.75	3.21	9.333	
300.00	299.99	301.33	301.32	2.53	2.54	179.16	-27.82	0.57	29.98	24.91	5.06	5.920	
400.00	399.98	401.39	401.37	3.44	3.41	168.51	-26.61	0.81	30.01	23.16	6.85	4.382	
478.00	477.98	479.40	479.37	4.11	4.10	159.33	-25.58	1.11	29.97	21.76	8.21	3.649	
590.88	590.84	592.23	592.20	4.61	4.51	164.33	-24.08	1.55	29.84	20.72	9.12	3.272 CC	
614.00	613.97	615.32	615.28	4.72	4.51	165.42	-23.82	1.62	29.85	20.63	9.22	3.236 ES	
660.00	659.96	661.22	661.18	4.72	4.52	-145.19	-23.40	1.67	29.93	20.70	9.23	3.242	
745.00	744.95	745.95	745.91	4.74	4.53	-109.08	-23.20	1.42	30.50	21.23	9.26	3.292	
831.00	830.89	831.82	831.78	4.76	4.56	-92.84	-23.50	0.86	31.16	21.84	9.31	3.346	
916.00	915.76	916.76	916.72	4.79	4.58	-102.55	-23.81	0.40	31.97	22.60	9.37	3.412	
1,002.00	1,001.60	1,002.66	1,002.62	4.83	4.62	-113.73	-23.96	0.08	33.65	24.21	9.44		
1,087.00	1,086.43	1,087.57	1,087.53	4.87	4.66	-125.26	-24.01	-0.30	36.15	26.62	9.53	3.794	
1,172.00	1,171.27	1,172.41	1,172.36	4.92	4.71	-134.70	-23.96	-0.64	39.30	29.68	9.62	4.085	
1,260.00	1,259.12	1,260.10	1,260.06	4.98	4.76	-143.73	-23.98	-0.67	43.18	33.45	9.73	4.438	
1,348.00	1,347.00	1,348.05	1,348.00	5.05	4.83	-143.48	-24.00	-0.62	47.01	37.16	9.85	4.772	
1,433.00	1,431.92	1,432.95	1,432.90	5.11	4.89	-122.87	-23.77	-0.43	49.45	39.47	9.98	4.954	
1,519.00	1,517.89	1,518.69	1,518.64	5.18	4.97	-100.91	-23.47	0.13	50.63	40.51	10.12	5.002	
1,605.00	1,603.87	1,604.49	1,604.43	5.26	5.05	-56.97	-23.34	0.97	50.90	40.62	10.27	4.954	
1,690.00	1,688.84	1,689.35	1,689.29	5.33	5.13	-55.16	-23.38	1.95	50.53	40.10	10.44	4.842	
1,708.94	1,707.78	1,708.27	1,708.21	5.35	5.15	-59.58	-23.41	2.18	50.48	40.01	10.47	4.820	
1,775.00	1,773.83	1,774.31	1,774.24	5.42	5.22	-131.01	-23.60	2.96	51.03	40.42	10.61	4.810	
1,860.00	1,858.83	1,859.38	1,859.31	5.50	5.31	-163.52	-23.85	3.87	52.42	41.63	10.79	4.859	
1,946.00	1,944.82	1,945.40	1,945.32	5.60	5.40	-174.35	-23.95	4.76	54.05	43.08	10.98	4.925	
2,032.00	2,030.82	2,031.42	2,031.34	5.70	5.50	-153.94	-23.97	5.65	55.77	44.60	11.17	4.992	
2,117.00	2,115.81	2,116.55	2,116.47	5.80	5.61	-158.05	-23.94	6.34	57.38	46.01	11.38	5.044	
2,203.00	2,201.80	2,202.52	2,202.43	5.91	5.72	-166.71	-23.97	6.94	59.20	47.61	11.59	5.108	
2,288.00	2,286.79	2,287.56	2,287.47	6.02	5.83	-161.40	-24.09	7.41	61.10	49.29	11.81	5.174	
2,374.00	2,372.77	2,373.55	2,373.46	6.13	5.94	-172.94	-24.18	7.85	63.07	51.03	12.04	5.239	
2,459.00	2,457.76	2,458.56	2,458.47	6.25	6.06	-175.34	-24.20	8.29	65.02	52.75	12.27	5.299	
2,545.00	2,543.74	2,544.62	2,544.53	6.37	6.18	-179.10	-24.25	8.63	67.07	54.56	12.51	5.360	
2,631.00	2,629.72	2,630.70	2,630.61	6.50	6.31	-175.88	-24.16	8.89	69.21	56.45	12.76	5.423	
2,716.00	2,714.69	2,715.65	2,715.55	6.63	6.43	171.37	-23.90	9.18	71.42	58.41	13.01	5.488	
2,801.00	2,799.68	2,800.64	2,800.55	6.76	6.56	176.31	-23.60	9.51	73.21	59.95	13.27	5.519	
2,887.00	2,885.67	2,886.78	2,886.69	6.88	6.69	-177.51	-23.49	9.64	74.55	61.03	13.53	5.512	
2,972.00	2,970.66	2,971.93	2,971.84	7.02	6.83	171.91	-23.75	9.39	75.84	62.05	13.79	5.499	
3,058.00	3,056.64	3,057.98	3,057.88	7.15	6.96	175.34	-24.12	8.92	77.08	63.01	14.06	5.482	
3,143.00	3,141.63	3,142.83	3,142.73	7.29	7.10	162.58	-24.55	8.52	78.42	64.09	14.33	5.472	
3,229.00	3,227.61	3,228.99	3,228.89	7.43	7.24	164.12	-25.02	8.02	79.93	65.31	14.61	5.470	
3,314.00	3,312.59	3,313.85	3,313.75	7.57	7.38	158.88	-25.45	7.54	81.52	66.63	14.89	5.475	
3,400.00	3,398.57	3,399.76	3,399.65	7.72	7.52	155.93	-25.91	7.16	83.29	68.11	15.18	5.487	
3,451.00	3,449.55	3,450.93	3,450.82	7.81	7.61	153.09	-26.19	6.86	84.38	69.03	15.35	5.497	
3,564.00	3,562.50	3,563.90	3,563.78	8.00	7.80	156.77	-26.89	6.03	86.88	71.15	15.73	5.522	
3,650.00	3,648.49	3,650.17	3,650.06	8.14	7.95	-0.44	-27.41	5.20	87.42	71.39	16.02	5.455	
3,735.00	3,733.49	3,735.14	3,735.02	8.28	8.09	14.36	-27.70	4.38	86.52	70.21	16.31	5.304	
3,821.00	3,819.49	3,821.05	3,820.92	8.42	8.24	42.52	-27.92	3.66	85.44	68.83	16.61	5.145	
3,909.00	3,907.48	3,909.18	3,909.05	8.57	8.40	17.98	-28.26	2.79	83.64	66.73	16.91	4.947	
3,994.00	3,992.46	3,994.08	3,993.94	8.71	8.55	17.90	-28.60	1.90	81.48	64.28	17.20	4.736	
4,080.00	4,078.45	4,080.29	4,080.15	8.86	8.70	23.02	-28.90	0.87	79.29	61.78	17.51	4.528	
4,166.00	4,164.43	4,166.23	4,166.08	9.01	8.86	27.57	-29.12	-0.22	77.00	59.18	17.82	4.321	

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



Phoenix Technology Services

Anticollision Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #24H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3880.00usft (Capstar 114)
Reference Site:	Crow Federal	MD Reference:	KB @ 3880.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Gnd
Reference Well:	#24H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	WB1/Job #1311334	Database:	GCR DB
Reference Design:	Survey Phoenix MWD Survey	Offset TVD Reference:	Offset Datum

Offset Design Crow Federal - #23H - WB1/Job #1311257 - Surveys (Capstar 114)													Offset Site Error:	0.00 usft
Survey Program: 100-CB-GYRO-MS, 569-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)	Offset Wellbore Centre -E/+W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
4,251.00	4,249.42	4,251.23	4,251.08	9.16	9.01	13.52	-29.25	-1.25	75.05	56.92	18.13	4.140		
4,337.00	4,335.41	4,337.41	4,337.25	9.31	9.17	0.96	-29.25	-2.38	72.99	54.55	18.44	3.959		
4,422.00	4,420.39	4,422.37	4,422.20	9.45	9.33	-9.21	-29.13	-3.56	70.46	51.72	18.74	3.760		
4,508.00	4,506.38	4,508.23	4,508.05	9.61	9.48	5.29	-29.04	-4.68	67.91	48.86	19.05	3.564		
4,593.00	4,591.37	4,593.19	4,593.00	9.76	9.64	-0.86	-28.99	-5.79	65.56	46.19	19.37	3.385		
4,679.00	4,677.35	4,678.20	4,678.01	9.91	9.80	7.17	-28.77	-5.79	63.91	44.23	19.68	3.248		
4,764.00	4,762.34	4,763.29	4,763.10	10.07	9.96	11.35	-28.29	-4.87	62.62	42.63	19.99	3.132		
4,850.00	4,848.32	4,849.38	4,849.17	10.22	10.12	3.89	-27.49	-3.85	61.11	40.80	20.31	3.008		
4,935.00	4,933.30	4,934.65	4,934.43	10.38	10.28	17.49	-26.35	-2.92	59.44	38.81	20.63	2.881		
5,021.00	5,019.28	5,020.47	5,020.23	10.54	10.44	-6.33	-25.07	-2.00	57.48	36.53	20.95	2.744		
5,106.00	5,104.25	5,105.75	5,105.51	10.69	10.61	-13.96	-23.80	-1.34	55.15	33.88	21.27	2.593		
5,147.55	5,145.80	5,146.19	5,145.93	10.77	10.68	-12.57	-23.22	-0.76	54.48	33.06	21.43	2.543 SF		
5,195.00	5,193.24	5,189.89	5,189.54	10.86	10.77	-4.72	-22.82	1.82	56.08	34.48	21.60	2.596		
5,280.00	5,278.24	5,264.29	5,262.48	11.02	10.92	-14.87	-21.74	15.92	69.11	47.20	21.91	3.154		
5,366.00	5,364.23	5,334.27	5,328.01	11.18	11.06	-33.02	-19.56	40.23	95.81	73.60	22.22	4.313		
5,451.00	5,449.23	5,396.05	5,382.70	11.34	11.22	-14.17	-18.39	68.86	133.44	110.94	22.50	5.930		
5,537.00	5,535.23	5,456.00	5,432.13	11.50	11.43	-12.87	-18.61	102.73	180.70	157.91	22.79	7.930		
5,556.00	5,554.22	5,456.00	5,432.13	11.54	11.43	-7.18	-18.61	102.73	192.11	169.29	22.82	8.418		
5,585.00	5,583.22	5,477.35	5,448.69	11.60	11.53	15.67	-18.97	116.20	210.08	187.16	22.92	9.166		
5,628.00	5,626.18	5,499.00	5,464.86	11.68	11.62	12.60	-19.44	130.57	237.32	214.33	22.99	10.322		
5,670.00	5,667.93	5,522.45	5,481.67	11.75	11.76	10.15	-19.97	146.92	263.22	240.26	22.96	11.464		
5,713.00	5,710.17	5,542.00	5,495.10	11.83	11.87	9.21	-20.37	161.12	288.57	265.78	22.79	12.664		
5,756.00	5,751.60	5,566.92	5,511.38	11.91	12.05	7.48	-20.79	179.97	312.56	290.06	22.50	13.890		
5,799.00	5,791.98	5,585.00	5,522.56	11.99	12.17	4.64	-21.02	194.18	335.30	313.20	22.10	15.170		
5,843.00	5,831.84	5,611.75	5,538.13	12.07	12.41	3.63	-21.24	215.93	356.91	335.38	21.53	16.579		
5,889.00	5,871.52	5,628.00	5,547.03	12.18	12.55	4.03	-21.30	229.52	377.76	356.99	20.77	18.188		
5,932.00	5,906.13	5,658.43	5,562.53	12.32	12.87	4.00	-21.46	255.70	394.67	374.96	19.72	20.016		
5,975.00	5,937.67	5,681.14	5,573.10	12.49	13.13	3.69	-21.72	275.80	409.00	390.46	18.53	22.069		
6,018.00	5,966.10	5,713.00	5,586.37	12.71	13.52	3.67	-22.09	304.76	421.21	403.66	17.55	24.000		
6,060.00	5,991.07	5,724.88	5,590.82	12.99	13.68	3.51	-22.20	315.77	431.14	414.52	16.62	25.940		
6,103.00	6,013.85	5,756.00	5,601.00	13.34	14.12	3.33	-22.22	345.17	440.44	424.65	15.79	27.894		
6,146.00	6,033.77	5,756.00	5,601.00	13.77	14.12	3.26	-22.22	345.17	448.33	433.43	14.90	30.083		
6,188.00	6,050.14	5,785.94	5,608.68	14.26	14.60	3.08	-21.93	374.10	454.45	440.39	14.05	32.335		
6,231.00	6,063.35	5,799.00	5,611.36	14.84	14.80	3.03	-21.71	386.88	459.41	446.19	13.22	34.752		
6,274.00	6,072.88	5,828.68	5,618.08	15.49	15.32	2.84	-21.25	416.17	462.30	449.65	12.65	36.553		
6,318.00	6,078.81	5,854.62	5,618.81	16.22	15.78	2.81	-20.99	441.97	463.48	451.20	12.28	37.738		
6,403.00	6,084.74	5,922.35	5,623.52	17.77	17.09	2.75	-20.21	509.53	463.41	450.78	12.63	36.691		
6,412.05	6,085.18	5,929.91	5,623.90	17.96	17.25	2.74	-20.12	517.08	463.39	450.69	12.70	36.487		
6,491.00	6,089.57	5,999.98	5,626.47	19.54	18.69	2.73	-19.26	587.09	464.85	451.51	13.34	34.844		
6,579.00	6,093.26	6,090.82	5,629.45	21.44	20.68	2.68	-18.13	677.87	465.64	451.64	14.00	33.257		
6,665.00	6,095.51	6,182.42	5,633.33	23.39	22.79	2.56	-16.54	769.38	464.20	449.32	14.88	31.188		
6,750.00	6,097.59	6,268.31	5,637.83	25.38	24.83	2.43	-14.16	855.12	461.76	446.03	15.73	29.350		
6,835.00	6,099.66	6,349.41	5,641.39	27.43	26.81	2.45	-12.51	936.11	460.10	443.42	16.68	27.581		
6,921.00	6,102.74	6,439.49	5,645.54	29.54	29.06	2.65	-11.29	1,026.09	459.27	441.51	17.76	25.862		
7,006.00	6,104.82	6,526.10	5,650.39	31.66	31.25	2.80	-10.25	1,112.56	456.64	437.94	18.70	24.418		
7,092.00	6,105.79	6,606.94	5,654.41	33.84	33.32	3.15	-10.78	1,193.30	453.48	433.67	19.81	22.887		
7,178.00	6,107.37	6,690.97	5,657.96	36.04	35.49	3.56	-12.90	1,277.22	451.63	430.64	20.99	21.514		
7,263.00	6,109.74	6,777.59	5,661.86	38.24	37.75	4.09	-15.94	1,363.70	450.43	428.14	22.29	20.210		
7,353.00	6,112.02	6,866.76	5,665.72	40.59	40.09	4.41	-17.59	1,452.77	449.01	425.48	23.53	19.085		
7,439.00	6,113.67	6,954.04	5,669.51	42.84	42.39	4.60	-18.15	1,539.96	447.02	422.24	24.79	18.033		
7,525.00	6,115.92	7,041.00	5,673.53	45.11	44.70	4.79	-18.10	1,626.84	445.40	419.33	26.07	17.086		
7,612.00	6,118.96	7,127.82	5,677.51	47.41	47.00	4.99	-17.62	1,713.56	444.56	417.18	27.39	16.233		

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



Phoenix Technology Services
Anticollision Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #24H
Project:	Eddy County, NM (NAD27: NME)	TVD Reference:	KB @ 3880.00usft (Capstar 114)
Reference Site:	Crow Federal	MD Reference:	KB @ 3880.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#24H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	WB1/Job #1311334	Database:	GCR DB
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Offset Datum

Offset Design Crow Federal - #23H - WB1/Job #1311257 - Surveys (Capstar 114)													Offset Site Error:	0.00 usft
Survey Program: 100-CB-GYRO-MS-569-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		
7,697.00	6,121.70	7,213.44	5,681.53	49.66	49.29	5.13	-17.38	1,799.09	443.43	414.81	28.63	15.491		
7,783.00	6,124.25	7,299.60	5,685.69	51.95	51.59	5.19	-17.13	1,885.15	441.88	411.96	29.91	14.772		
7,868.00	6,127.59	7,383.69	5,689.54	54.23	53.84	5.08	-15.74	1,969.14	441.24	410.15	31.10	14.190		
7,954.00	6,130.14	7,469.57	5,693.22	56.53	56.14	4.92	-13.25	2,054.91	439.98	407.81	32.17	13.677		
8,039.00	6,131.92	7,555.99	5,697.08	58.81	58.46	4.73	-10.25	2,141.18	437.83	404.50	33.33	13.136		
8,125.00	6,133.87	7,641.17	5,701.01	61.12	60.75	4.18	-6.66	2,226.19	435.53	401.26	34.27	12.709		
8,210.00	6,135.87	7,721.64	5,704.13	63.42	62.91	3.50	-2.67	2,306.51	433.85	398.69	35.16	12.339		
8,258.77	6,137.28	7,767.25	5,705.51	64.73	64.14	3.15	-0.70	2,352.05	433.62	397.93	35.69	12.148		
8,296.00	6,138.42	7,803.11	5,706.41	65.74	65.11	2.92	0.60	2,387.88	433.73	397.61	36.13	12.006		
8,381.00	6,141.61	7,887.64	5,708.38	68.04	67.39	2.36	3.80	2,472.32	434.74	397.57	37.17	11.696		
8,467.00	6,144.16	7,974.24	5,710.54	70.37	69.74	2.03	5.37	2,558.88	435.05	396.84	38.21	11.387		
8,556.00	6,145.80	8,062.14	5,712.73	72.78	72.13	1.85	5.99	2,646.75	434.42	394.99	39.43	11.018		
8,584.63	6,146.41	8,090.03	5,713.36	73.56	72.88	1.80	6.20	2,674.63	434.38	394.56	39.82	10.909		
8,641.00	6,147.72	8,145.34	5,714.47	75.09	74.39	1.69	6.66	2,729.93	434.53	393.94	40.59	10.706		
8,727.00	6,149.98	8,231.58	5,716.13	77.42	76.73	1.55	7.20	2,816.15	435.10	393.31	41.79	10.412		
8,812.00	6,151.46	8,317.45	5,717.97	79.74	79.07	1.49	7.35	2,902.00	434.74	391.82	42.92	10.129		
8,878.29	6,152.32	8,382.56	5,719.32	81.54	80.85	1.53	7.28	2,967.10	434.24	390.33	43.91	9.890		
8,898.00	6,152.73	8,401.94	5,719.69	82.07	81.37	1.56	7.25	2,986.47	434.28	390.08	44.20	9.825		
8,983.00	6,153.70	8,485.73	5,721.10	84.39	83.66	1.66	7.30	3,070.25	433.83	388.47	45.36	9.563		
9,069.00	6,154.22	8,571.99	5,722.46	86.73	86.01	1.78	7.45	3,156.50	433.03	386.36	46.67	9.278		
9,113.59	6,154.89	8,617.40	5,723.24	87.94	87.25	1.86	7.57	3,201.91	432.94	385.59	47.36	9.142		
9,154.00	6,155.71	8,658.26	5,724.02	89.04	88.36	1.95	7.71	3,242.76	433.02	385.03	47.98	9.024		
9,240.00	6,156.68	8,744.76	5,725.69	91.38	90.73	2.14	8.32	3,329.24	432.38	383.15	49.23	8.783		
9,326.00	6,156.98	8,833.10	5,727.71	93.72	93.14	2.38	9.20	3,417.55	430.77	380.16	50.61	8.512		
9,411.00	6,156.61	8,918.80	5,730.10	96.04	95.48	2.49	10.13	3,503.22	428.07	376.26	51.81	8.262		
9,497.00	6,155.56	9,001.84	5,732.07	98.38	97.75	2.85	9.35	3,586.22	425.10	371.83	53.26	7.981		
9,582.00	6,155.04	9,089.25	5,734.23	100.70	100.14	3.32	7.89	3,673.59	422.66	367.83	54.83	7.709		
9,668.00	6,155.04	9,178.12	5,737.00	103.04	102.57	3.75	6.93	3,762.42	420.15	363.71	56.44	7.444		
9,753.00	6,155.34	9,265.30	5,740.23	105.36	104.96	4.18	6.29	3,849.53	417.50	359.43	58.07	7.189		
9,839.00	6,155.41	9,353.27	5,743.96	107.71	107.37	4.29	5.78	3,937.43	414.03	354.59	59.45	6.965		
9,925.00	6,155.49	9,440.05	5,747.96	110.07	109.74	4.30	5.24	4,024.11	410.13	349.37	60.76	6.750		
10,010.00	6,155.86	9,524.20	5,751.81	112.39	112.04	4.30	5.18	4,108.17	406.60	344.57	62.03	6.555		
10,095.00	6,156.53	9,607.98	5,755.39	114.72	114.34	4.35	4.81	4,191.87	403.65	340.29	63.36	6.371		
10,180.00	6,157.84	9,690.72	5,758.80	117.05	116.61	4.41	4.61	4,274.54	401.28	336.58	64.70	6.203		
10,227.90	6,158.53	9,733.19	5,760.06	118.36	117.77	4.51	4.37	4,316.99	400.80	335.33	65.48	6.121		
10,266.00	6,159.44	9,768.03	5,760.69	119.40	118.73	4.63	3.98	4,351.83	401.09	334.93	66.16	6.062		
10,351.00	6,161.89	9,851.59	5,761.83	121.73	121.02	5.01	2.61	4,435.36	402.61	334.75	67.87	5.932		
10,437.00	6,164.82	9,938.09	5,762.89	124.08	123.39	5.33	1.40	4,521.85	404.70	335.10	69.60	5.814		
10,524.00	6,168.46	10,027.36	5,764.36	126.46	125.84	5.67	0.17	4,611.09	407.13	335.75	71.39	5.703		
10,612.00	6,172.99	10,114.95	5,766.04	128.87	128.25	6.02	-1.30	4,698.66	410.26	336.99	73.27	5.599		
10,697.00	6,178.18	10,198.64	5,767.46	131.19	130.55	6.41	-2.76	4,782.33	414.33	339.23	75.10	5.517		
10,783.00	6,184.18	10,284.04	5,768.79	133.53	132.89	6.83	-4.18	4,867.70	419.37	342.24	77.13	5.437		
10,805.00	6,185.83	10,305.29	5,769.10	134.13	133.48	6.94	-4.65	4,888.94	420.81	343.13	77.67	5.418		
10,858.00	6,189.89	10,357.00	5,769.82	135.58	134.90	7.20	-5.91	4,940.63	424.41	345.44	78.97	5.374		

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



Phoenix Technology Services

Anticollision Report

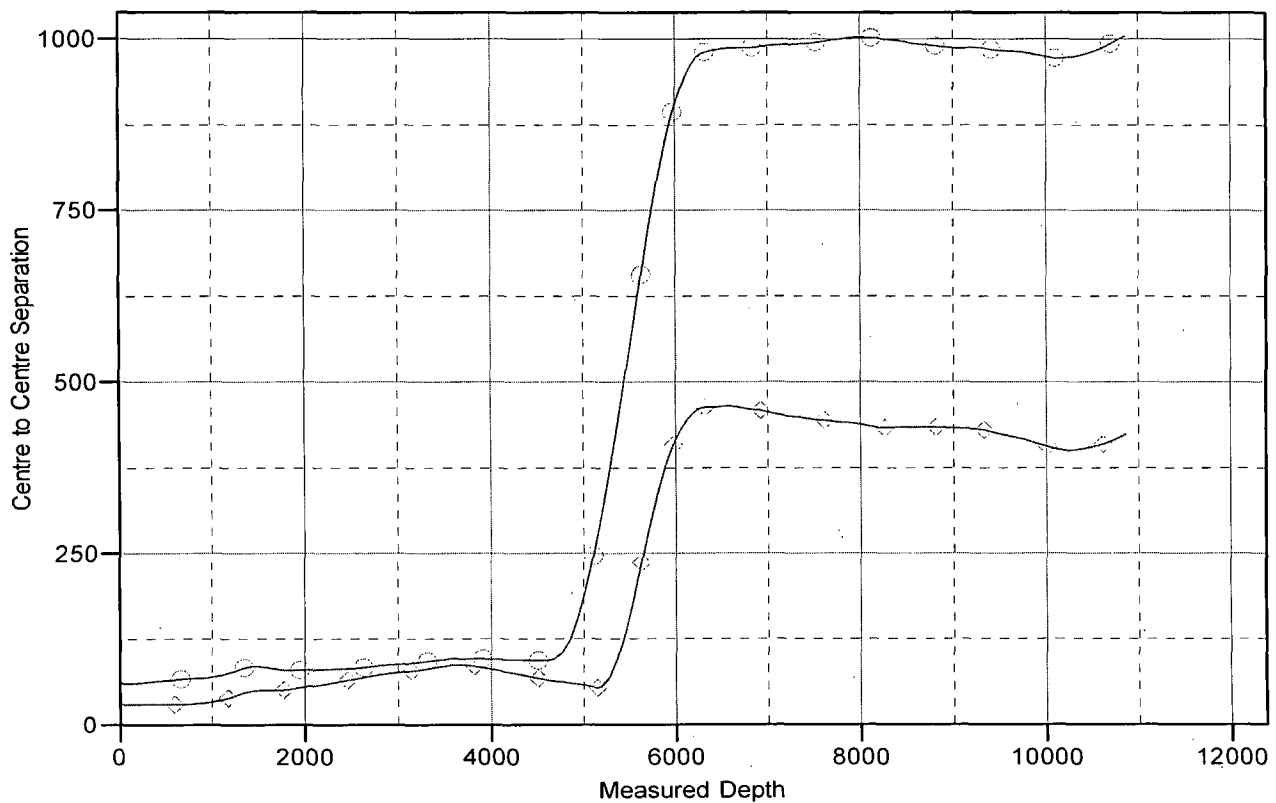


Company:	Apache Corporation	Local Co-ordinate Reference:	Well #24H
Project:	Eddy County, NM (NAD27-NME)	TVD Reference:	KB @ 3880.00usft (Capstar 114)
Reference Site:	Crow Federal	MD Reference:	KB @ 3880.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#24H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	WB1/Job #1311334	Database:	GCR DB
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB @ 3880.00usft (Capstar 114)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 19' 60.00000 W

Coordinates are relative to: #24H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.24°

Ladder Plot



LEGEND

#22H, WB1/Job#1311192, Surveys (Capstar 114) V0 —○— #23H, WB1/Job#1311257, Surveys (Capstar 114) V0



Phoenix Technology Services

Anticollision Report

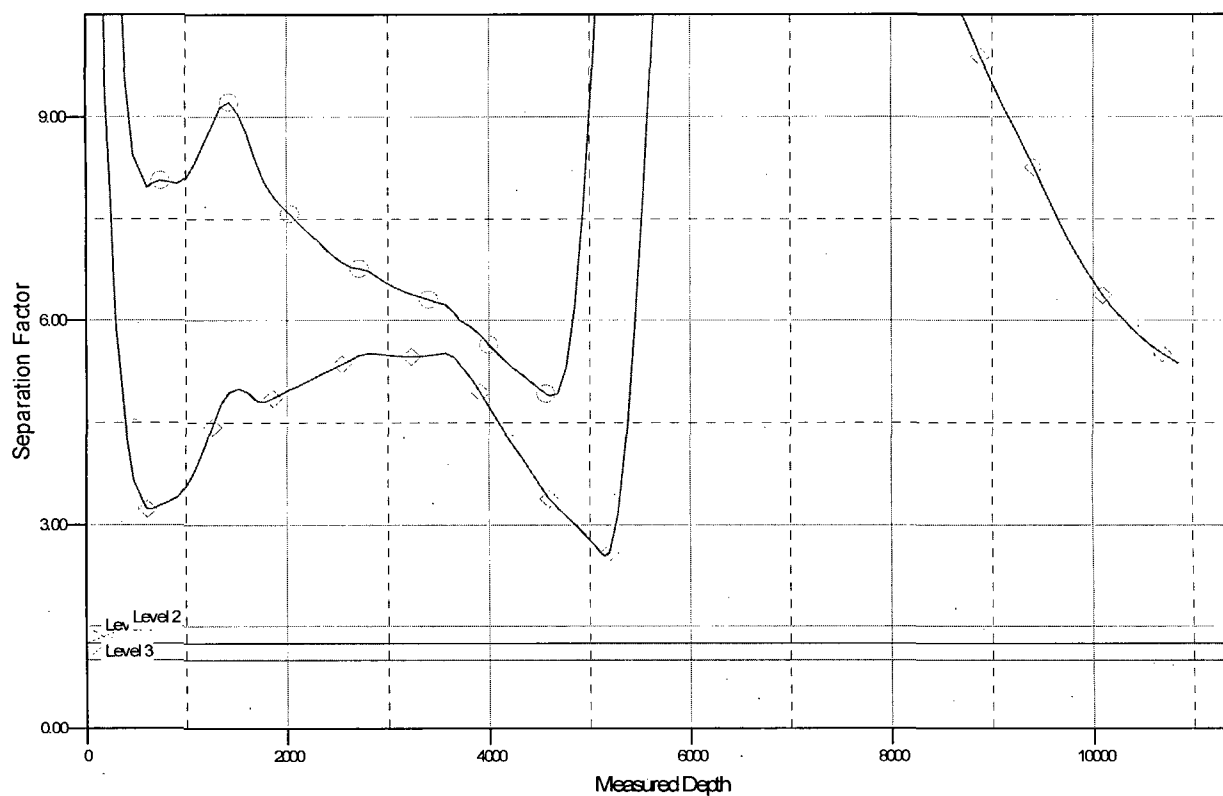


Company:	Apache Corporation	Local Co-ordinate Reference:	Well #24H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3880.00usft (Capstar 114)
Reference Site:	Crow Federal	MD Reference:	KB @ 3880.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#24H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	WB1/Job #1311334	Database:	GCR DB
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB @ 3880.00usft (Capstar 114)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 19' 60.00000 W

Coordinates are relative to: #24H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.24°

Separation Factor Plot



LEGEND

#22H, WB1/Job#1311192, Surveys (Capstar 114) V0 —◆— #23H, WB1/Job#1311257, Surveys (Capstar 114) V0