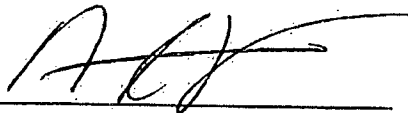


Apache Corporation
303 Veterans Airpark Lane, #3000
Midland, TX 79705

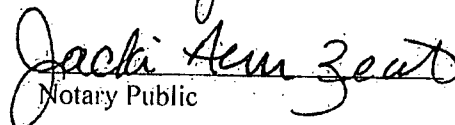
Crow Federal #011 H API #30-015-40575
Eddy County, New Mexico 948' FSL & 250' FWL, M-10-17S-31E

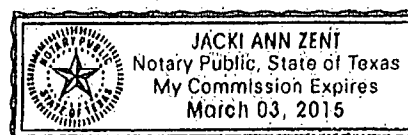
185	1.85	0.25	0.44	0.81	0.81
393	3.93	0.50	0.88	3.44	3.44
597	5.97	0.50	0.88	5.22	5.22



Archie Brown - General Manager

The attached instrument was acknowledged before me on the 8th day of July, 2013 by
Archie Brown - General Manager, CapStar Drilling, Inc.


Notary Public





Apache Corporation

Eddy County, NM (NAD27 NME)

Crow Federal

#11H

OH/Job #1310714

Survey: Phoenix MWD Survey

Anticollision Report

25 June, 2013



PHOENIX
TECHNOLOGY SERVICES



Anticollision Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #11H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3894.00usft (Capstar 114)
Reference Site:	Crow Federal	MD Reference:	KB @ 3894.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#11H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	OH/Job #1310714	Database:	GCR DB v5000
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:	MD Interval 100.00usft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 10,000.00 u	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Program:	Date 06/25/13		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
622.00	10,262.00	Phoenix MWD Survey (OH/Job #1310714)	MWD
			Description
			MWD - Standard

Summary						
Site Name	Reference	Offset	Distance	Separation	Warning	
Offset Well - Wellbore - Design	Measured Depth (usft)	Measured Depth (usft)	Between Centres (usft)	Between Ellipses (usft)	Factor	
Crow Federal						
#10H - OH / Job #1310298 - Surveys (Capstar 114)	5,009.98	5,052.07	59.92	40.67	3.113	CC, ES, SF
#12H - Wellbore #1 / Job #1210350 - Plan 1 4-25-2012	600.00	620.99	67.31	66.03	52.439	CC
#12H - Wellbore #1 / Job #1210350 - Plan 1 4-25-2012	3,742.80	3,761.71	70.13	55.17	4.686	ES
#12H - Wellbore #1 / Job #1210350 - Plan 1 4-25-2012	5,339.44	5,358.06	84.26	62.36	3.849	SF
#13H - OH / Job #1310316 - Surveys (Capstar 114)	710.48	709.66	89.74	88.64	82.004	CC
#13H - OH / Job #1310316 - Surveys (Capstar 114)	800.00	798.54	90.07	88.59	60.923	ES
#13H - OH / Job #1310316 - Surveys (Capstar 114)	4,816.67	4,816.90	141.62	123.32	7.738	SF
#14H - OH/Job #1310557 - Surveys (Capstar 114)	600.00	599.71	26.16	25.50	39.401	CC
#14H - OH/Job #1310557 - Surveys (Capstar 114)	800.00	799.77	26.32	24.85	17.839	ES
#14H - OH/Job #1310557 - Surveys (Capstar 114)	5,200.00	5,198.00	65.16	45.27	3.276	SF
#15H - OH / Job #1310461 - Plan #2 04-18-13	600.00	603.99	42.32	41.09	34.387	CC, ES
#15H - OH / Job #1310461 - Plan #2 04-18-13	5,330.19	5,331.82	68.34	46.56	3.137	SF

Offset Design:	Crow Federal - #10H - OH / Job #1310298 - Surveys (Capstar 114)										Offset Site Error:	0.00 usft
Survey Program:	629-MWD										Offset Well Error:	0.00 usft
Reference:	Offset	Semi-Major Axis		Distance		Minimum		Separation		Warning		
Measured Vertical Depth (usft)	Measured Vertical Depth (usft)	Reference	Offset	Azimuth from North (°)	Offset Wellbore Centre N-S (usft)	E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
600.00	599.99	630.73	630.73	0.00	0.70	179.64	-66.32	-1.37	64.02	63.32	0.70	91.403
700.00	699.99	730.72	730.71	0.20	0.91	179.60	-66.76	-1.91	63.64	62.54	1.10	57.659
800.00	799.98	830.73	830.72	0.41	1.11	-179.69	-67.13	-2.51	63.10	61.58	1.52	41.444
853.38	853.35	883.99	883.98	0.53	1.22	-178.63	-67.39	-2.85	62.97	61.22	1.75	35.953
900.00	899.95	930.46	930.44	0.64	1.33	-177.16	-67.70	-3.17	63.11	61.15	1.96	32.255
1,000.00	999.88	1,030.27	1,030.25	0.86	1.54	-173.22	-68.61	-3.86	63.85	61.45	2.39	26.659
1,100.00	1,099.76	1,130.11	1,130.08	1.10	1.74	-168.42	-69.52	-4.47	65.38	62.55	2.83	23.089
1,200.00	1,199.55	1,229.59	1,229.55	1.33	1.96	-162.32	-70.47	-5.65	68.38	65.10	3.29	20.812
1,300.00	1,299.28	1,329.33	1,329.28	1.58	2.16	-155.85	-71.44	-7.18	72.37	68.63	3.74	19.368
1,400.00	1,398.96	1,429.32	1,429.24	1.84	2.36	-149.08	-71.77	-9.08	76.89	72.70	4.18	18.373
1,500.00	1,498.60	1,529.16	1,529.07	2.09	2.56	-142.49	-71.34	-10.96	81.76	77.14	4.62	17.692
1,600.00	1,598.39	1,629.13	1,629.02	2.30	2.77	-137.51	-70.63	-12.73	85.71	80.69	5.02	17.065
1,700.00	1,698.33	1,728.84	1,728.71	2.49	2.97	-134.18	-69.64	-14.43	87.61	82.20	5.41	16.187
1,800.00	1,798.31	1,828.49	1,828.33	2.69	3.19	-131.60	-68.71	-16.54	88.37	82.55	5.82	15.177
1,900.00	1,898.29	1,928.61	1,928.42	2.90	3.40	-128.98	-67.51	-18.86	90.40	84.16	6.24	14.482
2,000.00	1,998.26	2,028.46	2,028.25	3.11	3.61	-127.34	-66.99	-20.68	93.88	87.23	6.65	14.122

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



Anticollision Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #11H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3894.00usft (Capstar 114)
Reference Site:	Crow Federal	MD Reference:	KB @ 3894.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#11H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	OH/Job #1310714	Database:	GCR/DB V5000
Reference Design:	Survey Phoenix MWD Survey	Offset TVD Reference:	Offset Datum

Offset Design Crow Federal - #10H - OH/Job #1310298 - Surveys (Capstar 114)												Offset Site Error:
Survey Program: 629-MWD												0.00 usft
Reference	Offset	Semi-Major Axis		Distance		Minimum Separation		Warning		Offset Well Error:		0.00 usft
Measured Vertical	Measured Vertical	Reference	Offset	From North	From North	Centres	Ellipses	Centres	Ellipses	Centres	Ellipses	
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	
2,100.00	2,098.22	2,128.47	2,128.26	3.31	3.82	-126.53	-67.04	-21.77	97.20	90.15	7.05	13.784
2,200.00	2,198.20	2,228.62	2,228.40	3.51	4.03	-126.41	-67.07	-23.05	100.16	92.70	7.46	13.433
2,300.00	2,298.18	2,329.21	2,328.98	3.71	4.24	-126.64	-66.62	-23.99	102.49	94.63	7.86	13.034
2,400.00	2,398.15	2,430.27	2,430.04	3.91	4.44	-127.11	-65.89	-24.14	104.09	95.81	8.27	12.581
2,500.00	2,498.12	2,530.71	2,530.47	4.12	4.65	-127.75	-64.86	-23.60	104.95	96.26	8.68	12.085
2,600.00	2,598.08	2,631.21	2,630.95	4.32	4.86	-128.36	-63.30	-22.76	105.22	96.12	9.10	11.585
2,700.00	2,698.04	2,731.28	2,731.00	4.52	5.07	-128.63	-61.07	-22.24	105.35	95.83	9.51	11.074
2,800.00	2,798.04	2,831.13	2,830.83	4.72	5.27	-128.65	-59.26	-21.34	104.15	94.23	9.92	10.497
2,900.00	2,898.03	2,931.20	2,930.88	4.92	5.48	-128.63	-57.52	-20.53	102.58	92.25	10.33	9.928
3,000.00	2,998.03	3,031.60	3,031.25	5.13	5.69	-128.46	-55.06	-19.92	100.88	90.13	10.75	9.382
3,100.00	3,098.01	3,131.46	3,131.06	5.33	5.91	-128.17	-52.12	-19.35	99.00	87.82	11.17	8.862
3,200.00	3,198.00	3,230.20	3,229.77	5.53	6.11	-127.76	-49.52	-19.66	97.85	86.27	11.58	8.449
3,286.96	3,284.95	3,316.45	3,316.00	5.71	6.30	-127.56	-47.86	-20.53	97.62	85.68	11.94	8.175
3,300.00	3,297.99	3,329.41	3,328.96	5.74	6.32	-127.54	-47.65	-20.69	97.60	85.60	12.00	8.136
3,400.00	3,397.97	3,428.81	3,428.33	5.94	6.53	-127.50	-46.32	-22.18	98.07	85.65	12.41	7.900
3,500.00	3,497.95	3,529.11	3,528.61	6.15	6.75	-127.48	-45.09	-23.75	98.79	85.96	12.83	7.699
3,600.00	3,597.93	3,630.25	3,629.75	6.35	6.96	-128.03	-44.17	-24.26	98.72	85.47	13.25	7.452
3,700.00	3,697.91	3,730.34	3,729.82	6.55	7.16	-129.66	-44.24	-23.04	97.82	84.16	13.66	7.160
3,800.00	3,797.91	3,830.56	3,830.01	6.76	7.37	-130.80	-45.27	-20.70	96.39	82.31	14.07	6.849
3,900.00	3,897.87	3,929.86	3,929.24	6.96	7.57	-131.25	-47.21	-17.84	95.06	80.57	14.49	6.562
3,968.45	3,966.29	3,997.62	3,997.00	7.11	7.71	-130.73	-48.02	-17.17	94.85	80.08	14.77	6.420
4,000.00	3,997.83	4,029.14	4,028.52	7.17	7.78	-130.36	-48.27	-17.09	94.86	79.96	14.91	6.364
4,100.00	4,097.80	4,129.46	4,128.83	7.39	7.99	-129.24	-49.00	-16.79	94.86	79.54	15.33	6.190
4,200.00	4,197.77	4,229.88	4,229.24	7.60	8.20	-129.01	-50.38	-15.30	94.37	78.62	15.75	5.993
4,300.00	4,297.75	4,330.03	4,329.34	7.81	8.41	-129.58	-52.28	-12.99	93.72	77.55	16.17	5.797
4,400.00	4,397.73	4,429.74	4,428.97	8.02	8.61	-130.75	-54.90	-10.07	92.87	76.28	16.59	5.599
4,445.14	4,442.86	4,474.43	4,473.63	8.11	8.71	-131.17	-56.02	-9.09	92.72	75.94	16.78	5.527
4,500.00	4,497.71	4,528.81	4,528.00	8.23	8.82	-131.46	-57.17	-8.45	92.95	75.94	17.01	5.465
4,600.00	4,597.71	4,629.39	4,628.56	8.44	9.03	-131.67	-58.94	-8.01	93.56	76.14	17.43	5.369
4,700.00	4,697.70	4,731.15	4,730.32	8.65	9.24	-130.99	-58.62	-7.15	92.54	74.70	17.85	5.185
4,800.00	4,797.69	4,831.86	4,831.00	8.85	9.45	-130.63	-57.35	-5.54	89.95	71.68	18.26	4.925
4,900.00	4,897.68	4,947.50	4,944.86	9.06	9.71	-139.56	-57.61	11.68	78.44	59.71	18.73	4.187
5,000.00	4,997.67	5,043.70	5,031.65	9.27	9.94	-172.73	-58.95	52.67	60.17	40.97	19.20	3.134
5,009.98	5,007.65	5,052.07	5,038.73	9.29	9.96	-177.10	-59.16	57.13	59.92	40.67	19.25	3.113 CC, ES, SF
5,100.00	5,097.67	5,119.22	5,092.44	9.48	10.22	148.49	-61.04	97.28	81.30	61.66	19.65	4.138
5,200.00	5,197.66	5,175.68	5,131.54	9.69	10.54	128.68	-61.76	137.92	140.86	120.87	19.98	7.049
5,300.00	5,297.64	5,213.00	5,153.80	9.90	10.81	120.74	-61.74	167.86	216.81	196.55	20.26	10.702
5,400.00	5,397.45	5,245.00	5,170.54	10.12	11.10	116.94	-61.63	195.13	298.29	277.88	20.40	14.620
5,500.00	5,494.38	5,287.24	5,189.58	10.38	11.57	117.13	-62.14	232.81	375.17	355.14	20.03	18.730
5,600.00	5,584.54	5,325.87	5,203.82	10.72	12.07	121.99	-62.76	268.70	445.31	426.17	19.14	23.264
5,700.00	5,664.03	5,377.70	5,219.17	11.23	12.83	126.00	-63.11	318.20	503.67	485.94	17.73	28.410
5,800.00	5,730.85	5,451.76	5,238.45	12.01	14.09	124.95	-62.68	389.70	547.26	531.04	16.22	33.745
5,900.00	5,780.76	5,495.00	5,247.28	13.18	14.90	133.51	-61.80	432.00	577.19	563.25	13.94	41.409
6,000.00	5,809.37	5,550.00	5,253.59	14.77	16.01	148.83	-60.28	486.61	593.57	580.76	12.81	46.325
6,100.00	5,822.23	5,617.96	5,257.11	16.67	17.47	168.73	-58.34	554.43	601.17	588.67	12.50	48.094
6,200.00	5,823.81	5,705.79	5,257.28	18.79	19.45	177.71	-55.45	642.21	602.28	588.94	13.35	45.131
6,300.00	5,826.03	5,810.21	5,257.81	21.06	21.91	174.21	-52.37	746.59	603.72	589.31	14.41	41.893
6,400.00	5,828.28	5,911.09	5,259.01	23.42	24.38	173.52	-50.69	847.45	604.78	589.19	15.59	38.804
6,500.00	5,829.96	6,008.74	5,260.05	25.86	26.82	175.35	-49.39	945.09	605.45	588.69	16.76	36.116
6,600.00	5,830.14	6,107.30	5,260.80	28.36	29.34	176.37	-48.71	1,043.63	604.62	586.67	17.96	33.672
6,700.00	5,830.06	6,203.87	5,261.53	30.90	31.84	179.13	-50.67	1,140.18	603.91	584.61	19.30	31.290
6,800.00	5,829.89	6,319.54	5,263.27	33.48	34.86	167.43	-53.34	1,255.79	602.53	581.64	20.90	28.835

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



Anticollision Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #11H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3894.00usft (Capstar 114)
Reference Site:	Crow Federal	MD Reference:	KB @ 3894.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#11H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	QH/Job #1310714	Database:	GCR-DB v5000
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Offset Datum

Offset Design: Crow Federal - #10H - QH / Job #1310298 - Surveys (Capstar 114)													Offset Site Error:
Survey Program: 629-MWD													Offset Well Error:
Reference	Offset	Semi-Major Axis		Distance		Offset Wellbore Centre		Between Centres		Between Ellipses		Minimum Separation	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Azimuth from North (°)	N-S (usft)	E-W (usft)	Centres (usft)	Ellipses (usft)	Separation (usft)	Factor	
6,900.00	5,829.82	6,433.02	5,268.13	36.08	37.84	157.92	-51.91	1,369.15	598.06	575.64	22.42	26.677	
7,000.00	5,829.64	6,518.36	5,270.90	38.70	40.10	167.89	-48.44	1,454.37	594.24	570.62	23.62	25.159	
7,100.00	5,830.06	6,613.20	5,272.59	41.34	42.62	171.51	-46.14	1,549.16	592.44	567.58	24.86	23.832	
7,200.00	5,830.53	6,717.42	5,274.70	44.00	45.41	167.78	-45.87	1,653.36	590.72	564.44	26.28	22.478	
7,300.00	5,831.49	6,824.23	5,277.85	46.67	48.27	161.94	-45.84	1,760.12	588.58	560.83	27.74	21.215	
7,400.00	5,833.16	6,924.40	5,281.91	49.35	50.97	161.27	-45.25	1,860.21	585.98	556.84	29.14	20.111	
7,459.09	5,834.46	6,975.10	5,283.33	50.94	52.33	168.14	-44.68	1,910.89	585.46	555.58	29.88	19.593	
7,500.00	5,835.50	7,016.82	5,284.14	52.04	53.45	167.15	-44.02	1,952.59	585.57	555.15	30.42	19.249	
7,589.82	5,837.98	7,109.30	5,286.55	54.46	55.95	163.73	-41.54	2,045.01	585.33	553.78	31.55	18.553	
7,600.00	5,838.29	7,118.54	5,286.77	54.74	56.20	164.53	-41.28	2,054.24	585.34	553.67	31.67	18.482	
7,700.00	5,841.15	7,209.93	5,288.28	57.44	58.67	172.70	-39.22	2,145.60	586.27	553.39	32.89	17.826	
7,800.00	5,843.40	7,305.82	5,288.73	60.13	61.27	177.15	-37.87	2,241.48	588.11	553.75	34.36	17.114	
7,900.00	5,846.01	7,408.30	5,289.35	62.83	64.05	174.64	-36.72	2,343.95	590.31	554.33	35.98	16.405	
8,000.00	5,846.80	7,505.16	5,290.06	65.54	66.68	177.89	-35.58	2,440.79	590.60	553.06	37.54	15.732	
8,020.58	5,846.74	7,523.94	5,290.10	66.09	67.19	179.66	-35.61	2,459.58	590.56	552.68	37.88	15.590	
8,100.00	5,846.60	7,601.72	5,289.97	68.24	69.31	-178.84	-36.71	2,537.35	590.90	551.58	39.32	15.026	
8,200.00	5,846.65	7,704.42	5,290.23	70.96	72.11	178.73	-38.09	2,640.04	590.97	549.89	41.07	14.388	
8,300.00	5,847.14	7,805.69	5,290.63	73.68	74.87	177.67	-38.78	2,741.30	591.27	548.48	42.79	13.818	
8,400.00	5,848.24	7,912.00	5,291.56	76.40	77.77	172.38	-38.99	2,847.61	591.61	547.11	44.50	13.295	
8,500.00	5,850.33	8,012.84	5,293.17	79.13	80.52	171.45	-37.00	2,948.41	591.88	546.01	45.87	12.904	
8,600.00	5,852.54	8,109.71	5,294.41	81.86	83.16	174.11	-35.81	3,045.27	592.77	545.42	47.35	12.518	
8,700.00	5,854.83	8,201.20	5,294.85	84.58	85.67	-178.48	-35.15	3,136.75	594.64	545.79	48.85	12.173	
8,800.00	5,857.43	8,294.25	5,293.99	87.31	88.21	-172.75	-35.65	3,229.79	598.39	547.87	50.52	11.844	
8,900.00	5,860.30	8,403.30	5,292.98	90.04	91.20	179.65	-37.14	3,338.83	602.48	550.07	52.41	11.495	
9,000.00	5,862.78	8,516.80	5,294.58	92.78	94.31	169.20	-38.65	3,452.31	603.80	549.49	54.31	11.117	
9,100.00	5,864.27	8,623.97	5,298.05	95.51	97.24	164.43	-40.90	3,559.39	602.33	546.08	56.25	10.707	
9,200.00	5,865.86	8,722.81	5,301.64	98.25	99.95	165.52	-42.40	3,658.16	600.47	542.45	58.02	10.350	
9,300.00	5,868.00	8,819.55	5,304.61	100.99	102.60	167.77	-42.33	3,754.85	599.50	539.94	59.56	10.065	
9,330.98	5,868.76	8,848.87	5,305.36	101.84	103.40	168.93	-42.16	3,784.16	599.42	539.42	60.01	9.989	
9,400.00	5,870.55	8,915.44	5,306.79	103.73	105.23	170.66	-41.86	3,850.72	599.67	538.65	61.02	9.828	
9,500.00	5,873.09	9,019.89	5,309.46	106.47	108.09	167.28	-40.90	3,955.12	599.55	537.02	62.53	9.588	
9,506.05	5,873.26	9,025.43	5,309.60	106.63	108.24	167.63	-40.82	3,960.67	599.55	536.93	62.62	9.575	
9,600.00	5,875.95	9,113.94	5,311.28	109.21	110.66	171.49	-39.18	4,049.14	600.23	536.41	63.83	9.404	
9,700.00	5,877.16	9,217.67	5,313.31	111.95	113.50	168.13	-35.84	4,152.79	599.06	534.23	64.83	9.241	
9,800.00	5,877.05	9,311.64	5,314.84	114.69	116.07	172.75	-33.39	4,246.72	597.04	530.98	66.06	9.037	
9,900.00	5,877.22	9,410.32	5,315.66	117.43	118.77	173.72	-31.31	4,345.37	596.18	528.79	67.39	8.847	
10,000.00	5,877.76	9,521.93	5,317.86	120.17	121.83	163.35	-28.59	4,456.93	594.50	525.79	68.71	8.652	
10,100.00	5,878.66	9,632.77	5,322.13	122.92	124.87	153.95	-26.40	4,567.67	591.35	521.27	70.07	8.439	
10,200.00	5,879.76	9,740.24	5,328.23	125.66	127.81	147.75	-24.52	4,674.94	586.60	515.13	71.46	8.208	
10,254.48	5,880.42	9,765.00	5,329.74	127.16	128.48	173.08	-24.04	4,699.65	584.58	512.56	72.02	8.117	
10,262.00	5,880.52	9,765.00	5,329.74	127.36	128.48	-179.48	-24.04	4,699.65	584.63	512.56	72.07	8.111	



Anticollision Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #11H
Project:	Eddy County NM (NAD27-NME)	TVD Reference:	KB @ 3894.00usft (Capstar 114)
Reference Site:	Crow Federal	MD Reference:	KB @ 3894.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#11H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	OH/Job #1310714	Database:	GCR DB v5000
Reference Design:	Survey Phoenix MWD Survey	Offset TVD Reference:	Offset Datum

Offset Design Crow Federal #12H Wellbore #1 / Job #1210350 Plan 1 4-25-2012												Offset Site Error:	0.00 usft
Survey Program: #0 MWD												Offset Well Error:	0.00 usft
Reference	Offset	Semi-Major Axis		Azimuth		Offset Wellbore Centre		Distance		Minimum Separation		Warning	
Measured Vertical	Measured Vertical	Reference	Offset	Reference	Offset	N-S	E-W	Between Centres	Between Ellipses	Minimum Separation	Separation Factor		
Depth (usft)	Depth (usft)	Depth (usft)	Depth (usft)	Depth (usft)	Depth (usft)	(usft)	(usft)	(usft)	(usft)	(usft)			
600.00	599.99	620.99	620.99	0.00	1.28	1.17	65.00	-0.40	67.31	66.03	1.28	52.439	CC
700.00	699.99	720.99	720.99	0.20	1.51	1.65	65.00	-0.40	68.15	66.44	1.70	40.030	
800.00	799.98	820.98	820.98	0.41	1.73	1.47	65.00	-0.40	69.05	66.91	2.14	32.211	
900.00	899.95	920.95	920.95	0.64	1.96	-0.29	65.00	-0.40	69.67	67.09	2.59	26.912	
1,000.00	999.88	1,020.88	1,020.88	0.86	2.18	-3.32	65.00	-0.40	70.33	67.29	3.04	23.136	
1,100.00	1,099.76	1,120.76	1,120.76	1.10	2.41	-7.32	65.00	-0.40	71.06	67.56	3.50	20.327	
1,200.00	1,199.55	1,220.55	1,220.55	1.33	2.63	-12.44	65.00	-0.40	72.01	68.06	3.96	18.200	
1,300.00	1,299.28	1,320.28	1,320.28	1.58	2.86	-17.96	65.00	-0.40	74.02	69.60	4.42	16.735	
1,400.00	1,398.96	1,419.96	1,419.96	1.84	3.08	-23.53	65.00	-0.40	77.23	72.34	4.89	15.790	
1,500.00	1,498.60	1,519.60	1,519.60	2.09	3.30	-28.76	65.00	-0.40	81.54	76.19	5.35	15.246	
1,600.00	1,598.39	1,619.39	1,619.39	2.30	3.53	-32.17	65.00	-0.40	85.56	79.79	5.77	14.819	
1,700.00	1,698.33	1,719.33	1,719.33	2.49	3.75	-33.55	65.00	-0.40	88.30	82.11	6.18	14.277	
1,800.00	1,798.31	1,819.31	1,819.31	2.69	3.98	-33.64	65.00	-0.40	90.14	83.53	6.61	13.645	
1,900.00	1,898.29	1,919.29	1,919.29	2.90	4.20	-34.41	65.00	-0.40	91.69	84.64	7.04	13.021	
2,000.00	1,998.26	2,019.26	2,019.26	3.11	4.43	-35.91	65.00	-0.40	92.67	85.20	7.47	12.404	
2,100.00	2,098.22	2,119.22	2,119.22	3.31	4.65	-37.41	65.00	-0.40	93.40	85.50	7.90	11.827	
2,200.00	2,198.20	2,219.20	2,219.20	3.51	4.88	-38.59	65.00	-0.40	92.92	84.60	8.32	11.169	
2,300.00	2,298.18	2,319.18	2,319.18	3.71	5.10	-39.77	65.00	-0.40	91.67	82.92	8.75	10.479	
2,400.00	2,398.15	2,419.15	2,419.15	3.91	5.33	-41.03	65.00	-0.40	90.28	81.10	9.18	9.835	
2,500.00	2,498.12	2,519.12	2,519.12	4.12	5.55	-42.33	65.00	-0.40	88.75	79.14	9.61	9.235	
2,600.00	2,598.08	2,619.08	2,619.08	4.32	5.77	-43.66	65.00	-0.40	87.10	77.06	10.04	8.674	
2,700.00	2,698.04	2,719.04	2,719.04	4.52	6.00	-45.06	65.00	-0.40	85.40	74.92	10.47	8.153	
2,800.00	2,798.04	2,819.04	2,819.04	4.72	6.22	-45.56	65.00	-0.40	84.58	73.68	10.90	7.757	
2,900.00	2,898.03	2,919.03	2,919.03	4.92	6.45	-45.73	65.00	-0.40	83.78	72.45	11.33	7.395	
3,000.00	2,998.03	3,019.03	3,019.03	5.13	6.67	-46.04	65.00	-0.40	82.59	70.83	11.76	7.021	
3,100.00	3,098.01	3,119.01	3,119.01	5.33	6.90	-46.45	65.00	-0.40	81.22	69.03	12.19	6.660	
3,200.00	3,198.00	3,219.00	3,219.00	5.53	7.12	-46.78	65.00	-0.40	79.72	67.10	12.62	6.315	
3,300.00	3,297.99	3,318.99	3,318.99	5.74	7.35	-47.03	65.00	-0.40	78.03	64.98	13.05	5.978	
3,400.00	3,397.97	3,418.97	3,418.97	5.94	7.57	-47.34	65.00	-0.40	76.18	62.70	13.49	5.649	
3,500.00	3,497.95	3,518.95	3,518.95	6.15	7.80	-47.76	65.00	-0.40	74.35	60.43	13.92	5.342	
3,600.00	3,597.93	3,618.93	3,618.93	6.35	8.02	-48.10	65.00	-0.40	72.41	58.06	14.35	5.046	
3,700.00	3,697.91	3,718.91	3,718.91	6.55	8.25	-48.36	65.00	-0.40	70.46	55.68	14.78	4.767	
3,742.80	3,740.71	3,761.71	3,761.71	6.64	8.34	-48.36	65.00	-0.40	70.13	55.17	14.97	4.686	ES
3,800.00	3,797.91	3,818.91	3,818.91	6.76	8.47	-48.07	65.00	-0.40	70.78	55.57	15.21	4.654	
3,900.00	3,897.87	3,918.87	3,918.87	6.96	8.70	-47.49	65.00	-0.40	73.30	57.66	15.64	4.688	
4,000.00	3,997.83	4,018.83	4,018.83	7.17	8.92	-47.00	65.00	-0.40	76.01	59.94	16.07	4.729	
4,100.00	4,097.80	4,118.80	4,118.80	7.39	9.15	-46.59	65.00	-0.40	78.58	62.07	16.51	4.761	
4,200.00	4,197.77	4,218.77	4,218.77	7.60	9.37	-46.22	65.00	-0.40	80.92	63.98	16.94	4.777	
4,300.00	4,297.75	4,318.75	4,318.75	7.81	9.59	-46.01	65.00	-0.40	82.89	65.52	17.38	4.771	
4,400.00	4,397.73	4,418.73	4,418.73	8.02	9.82	-45.67	65.00	-0.40	84.84	67.03	17.81	4.764	
4,500.00	4,497.71	4,518.71	4,518.71	8.23	10.04	-45.45	65.00	-0.40	86.44	68.19	18.24	4.738	
4,600.00	4,597.71	4,618.71	4,618.71	8.44	10.27	-45.25	65.00	-0.40	87.69	69.02	18.68	4.695	
4,700.00	4,697.70	4,718.70	4,718.70	8.65	10.49	-45.08	65.00	-0.40	89.10	69.99	19.11	4.663	
4,800.00	4,797.69	4,818.69	4,818.69	8.85	10.72	-44.69	65.00	-0.40	89.73	70.19	19.54	4.592	
4,900.00	4,897.68	4,918.68	4,918.68	9.06	10.94	-43.94	65.00	-0.40	89.16	69.18	19.98	4.463	
5,000.00	4,997.67	5,018.67	5,018.67	9.27	11.17	-43.33	65.00	-0.40	88.43	68.02	20.41	4.333	
5,100.00	5,097.67	5,118.67	5,118.67	9.48	11.39	-42.99	65.00	-0.40	87.47	66.63	20.85	4.196	
5,200.00	5,197.66	5,218.66	5,218.66	9.69	11.62	-42.97	65.00	-0.40	86.09	64.80	21.28	4.045	
5,300.00	5,297.64	5,318.64	5,318.64	9.90	11.84	-43.49	65.00	-0.40	84.38	62.66	21.72	3.885	
5,339.44	5,337.06	5,358.06	5,358.06	9.99	11.93	-44.26	65.00	-0.40	84.26	62.36	21.89	3.849	SF
5,400.00	5,397.45	5,418.45	5,418.45	10.12	12.07	-46.52	65.00	-0.40	85.36	63.23	22.13	3.857	
5,500.00	5,494.38	5,515.38	5,515.38	10.38	12.28	-58.91	65.00	-0.40	98.46	76.21	22.25	4.425	

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



Anticollision Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #11H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3894.00usft (Capstar 114)
Reference Site:	Crow Federal	MD Reference:	KB @ 3894.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#11H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	OH/Job #1310714	Database:	GCR-DB v5000
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Offset Datum

Offset Design: Crow Federal - #12H - Wellbore #17 Job #1210350 - Plan 1 - 4-25-2012													Offset Site Error:
Survey Program: O-MWD													Offset Well Error:
Reference	Offset	Semi-Major Axis		Distance		Minimum Separation		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Azimuth from North (°)	Offset Wellbore Centre N/S (usft)	E/W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
5,600.00	5,584.54	5,605.54	5,605.54	10.72	12.49	-73.17	65.00	-0.40	130.79	109.43	21.36	6.124	
5,700.00	5,664.03	5,665.03	5,665.03	11.23	12.67	-80.46	65.00	-0.40	187.67	168.54	19.14	9.807	
5,800.00	5,730.85	5,751.85	5,751.85	12.01	12.82	-82.07	65.00	-0.40	261.59	244.60	16.99	15.397	
5,900.00	5,780.76	5,801.76	5,801.76	13.18	12.93	-82.75	65.00	-0.40	347.85	333.36	14.49	24.000	
6,000.00	5,809.37	5,830.37	5,830.37	14.77	12.99	-83.70	65.00	-0.40	443.31	426.83	16.47	26.910	
6,100.00	5,822.23	6,634.57	6,273.97	16.67	19.32	-12.52	68.98	527.90	433.90	420.30	13.60	31.899	
6,120.72	5,822.92	6,655.29	6,274.49	17.11	19.72	-12.61	69.13	548.62	433.69	419.93	13.76	31.522	
6,200.00	5,823.81	6,734.55	6,276.51	18.79	21.30	-12.85	69.73	627.85	434.70	420.32	14.38	30.225	
6,300.00	5,826.03	6,834.55	6,279.05	21.06	23.43	-12.87	70.49	727.81	435.01	419.65	15.36	28.319	
6,400.00	5,828.28	6,934.54	6,281.59	23.42	25.68	-13.12	71.25	827.77	435.19	418.79	16.40	26.536	
6,500.00	5,829.96	7,034.53	6,284.13	25.86	28.03	-13.42	72.01	927.72	435.93	418.49	17.44	24.994	
6,600.00	5,830.14	7,134.48	6,286.67	28.36	30.44	-12.96	72.76	1,027.64	438.51	419.82	18.69	23.467	
6,700.00	5,830.06	7,234.43	6,289.21	30.90	32.90	-12.60	73.52	1,127.55	441.33	421.31	20.02	22.047	
6,800.00	5,829.89	7,334.38	6,291.75	33.48	35.41	-12.42	74.28	1,227.47	444.15	422.77	21.38	20.776	
6,900.00	5,829.82	7,434.35	6,294.29	36.08	37.95	-12.46	75.04	1,327.40	446.75	424.03	22.73	19.658	
7,000.00	5,829.64	7,534.31	6,296.83	38.70	40.52	-12.51	75.79	1,427.33	449.46	425.38	24.08	18.662	
7,100.00	5,830.06	7,634.27	6,299.37	41.34	43.11	-12.12	76.55	1,527.25	451.82	426.22	25.60	17.647	
7,200.00	5,830.53	7,734.22	6,301.91	44.00	45.72	-11.76	77.31	1,627.17	454.13	426.95	27.18	16.710	
7,300.00	5,831.49	7,834.19	6,304.45	46.67	48.35	-11.39	78.07	1,727.10	455.98	427.17	28.80	15.830	
7,400.00	5,833.16	7,934.16	6,306.99	49.35	50.99	-11.01	78.82	1,827.03	457.15	426.64	30.50	14.987	
7,500.00	5,835.50	8,034.13	6,309.53	52.04	53.64	-10.64	79.58	1,926.97	457.67	425.42	32.24	14.195	
7,600.00	5,838.29	8,134.10	6,312.06	54.74	56.30	-10.28	80.34	2,026.91	457.76	423.73	34.03	13.453	
7,685.48	5,840.61	8,219.57	6,314.24	57.04	58.58	-10.13	80.99	2,112.35	457.75	422.29	35.46	12.909	
7,700.00	5,841.15	8,234.08	6,314.61	57.44	58.97	-10.05	81.10	2,126.85	457.66	421.91	35.75	12.803	
7,800.00	5,843.40	8,334.07	6,317.15	60.13	61.64	-10.27	81.85	2,226.81	457.72	420.58	37.14	12.324	
7,900.00	5,846.01	8,434.04	6,319.68	62.83	64.33	-10.66	82.61	2,326.74	457.29	418.88	38.41	11.904	
7,914.31	5,846.34	8,448.34	6,320.05	63.22	64.71	-10.73	82.72	2,341.03	457.26	418.68	38.58	11.851	
8,000.00	5,846.80	8,533.98	6,322.22	65.54	67.02	-11.14	83.37	2,426.65	458.65	419.05	39.60	11.582	
8,100.00	5,846.60	8,633.91	6,324.76	68.24	69.71	-11.62	84.13	2,526.55	461.07	420.25	40.82	11.294	
8,200.00	5,846.65	8,733.88	6,327.30	70.96	72.41	-11.73	84.88	2,626.48	463.50	421.22	42.29	10.961	
8,300.00	5,847.14	8,833.86	6,329.84	73.68	75.11	-11.88	85.64	2,726.42	465.47	421.73	43.75	10.640	
8,400.00	5,848.24	8,933.85	6,332.38	76.40	77.82	-11.90	86.40	2,826.37	466.92	421.61	45.31	10.306	
8,500.00	5,850.33	9,033.84	6,334.92	79.13	80.53	-11.78	87.16	2,926.33	467.45	420.50	46.95	9.957	
8,600.00	5,852.54	9,133.84	6,337.46	81.86	83.24	-11.83	87.91	3,026.30	467.75	419.27	48.47	9.649	
8,700.00	5,854.83	9,233.84	6,340.00	84.58	85.95	-11.91	88.67	3,126.26	467.94	417.96	49.98	9.363	
8,800.00	5,857.43	9,333.84	6,342.54	87.31	88.67	-12.09	89.43	3,226.22	467.77	416.36	51.41	9.098	
8,900.00	5,860.30	9,433.84	6,345.09	90.04	91.39	-12.18	90.19	3,326.19	467.39	414.47	52.92	8.833	
8,947.32	5,861.57	9,481.16	6,346.29	91.34	92.68	-12.20	90.55	3,373.49	467.30	413.68	53.63	8.714	
9,000.00	5,862.78	9,533.83	6,347.63	92.78	94.11	-12.20	90.94	3,426.15	467.44	413.01	54.42	8.589	
9,100.00	5,864.27	9,633.83	6,350.17	95.51	96.84	-12.11	91.70	3,526.11	468.55	412.50	56.05	8.360	
9,200.00	5,865.86	9,733.82	6,352.71	98.25	99.56	-11.92	92.46	3,626.06	469.62	411.85	57.77	8.129	
9,300.00	5,868.00	9,833.81	6,355.25	100.99	102.29	-11.72	93.22	3,726.02	470.16	410.62	59.54	7.897	
9,400.00	5,870.55	9,933.80	6,357.79	103.73	105.02	-11.54	93.98	3,825.98	470.28	408.99	61.29	7.672	
9,500.00	5,873.09	10,033.80	6,360.33	106.47	107.75	-11.43	94.73	3,925.94	470.36	407.36	63.00	7.466	
9,600.00	5,875.95	10,133.80	6,362.87	109.21	110.48	-11.30	95.49	4,025.90	470.14	405.41	64.73	7.263	
9,609.04	5,876.20	10,142.84	6,363.10	109.45	110.72	-11.28	95.56	4,034.94	470.13	405.24	64.88	7.246	
9,700.00	5,877.16	10,233.78	6,365.41	111.95	113.21	-11.15	96.25	4,125.85	471.59	405.21	66.38	7.105	
9,800.00	5,877.05	10,333.74	6,367.95	114.69	115.94	-11.09	97.01	4,225.77	474.32	406.24	68.08	6.967	
9,900.00	5,877.22	10,433.71	6,370.49	117.43	118.67	-11.07	97.76	4,325.71	476.73	407.01	69.72	6.838	
10,000.00	5,877.76	10,533.69	6,373.03	120.17	121.41	-11.01	98.52	4,425.65	478.80	407.39	71.40	6.706	
10,100.00	5,878.66	10,633.67	6,375.57	122.92	124.14	-10.90	99.28	4,525.60	480.55	407.39	73.16	6.568	
10,200.00	5,879.76	10,733.66	6,378.11	125.66	126.88	-10.79	100.04	4,625.55	482.09	407.16	74.94	6.433	

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



Anticollision Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #11H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3894.00usft (Capstar 114)
Reference Site:	Crow Federal	MD Reference:	KB @ 3894.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#11H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	OH/Job #1310714	Database:	GCR/DB v5000
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Offset Datum

Offset Design:	Crow Federal - #12H - Wellbore #1 / Job: #1210350 - Plan 1 - 4-25-2012										Offset Site Error:	0.00 usft
Survey Program:	10: MWD	Offset:		Semi-Major Axis:		Distance:		Offset Well Error:	0.00 usft			
Reference:	Offset:	Reference:	Offset:	Azimuth:	Offset Wellbore Centre:	Between:	Between:	Minimum:	Separation:	Warning:		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	from North (°)	N/S (usft)	E/W (usft)	Centres (usft)	Ellipses (usft)	Separation (usft)	Factor		
10,262.00	5,880.52	10,795.65	6,379.68	127.36	128.57	-10.72	100.51	4,687.52	482.98	406.94	76.04	6.352



Anticollision Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #11H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3894.00usft (Capstar 114)
Reference Site:	Crow Federal	MD Reference:	KB @ 3894.00usft (Capstar 114)
Site Error:	0:00 usft	North Reference:	Grid
Reference Well:	#11H	Survey Calculation Method:	Minimum Curvature
Well Error:	0:00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	QH/Job #1310714	Database:	GCR DB v5000
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Offset Datum

Offset Design Crow Federal - #13H - QH / Job #1310316 - Surveys (Capstar 114)														Offset Site Error:	0:00 usft
Survey Program: 613 MWD														Offset Well Error:	0:00 usft
Reference	Offset	Semi-Major Axis		Distance		Minimum Separation		Warning							
Measured Vertical	Measured Vertical	Reference	Offset	Azimuth	Offset Wellbore Centre	Between Centres	Between Ellipses	Minimum Separation	Separation Factor						
Depth (usft)	Depth (usft)	Depth (usft)	Depth (usft)	(°)	N-S (usft)	E-W (usft)	(usft)	(usft)	(usft)						
600.00	599.99	599.39	599.38	0.00	0.66	178.39	-92.03	0.75	89.77	89.11	0.66	135.402			
700.00	699.99	699.21	699.20	0.20	0.86	178.52	-92.83	-0.04	89.74	88.69	1.05	85.493			
710.48	710.46	709.66	709.64	0.22	0.88	178.68	-92.93	-0.32	89.74	88.64	1.09	82.004 CC			
800.00	799.98	798.54	798.38	0.41	1.08	-178.10	-94.04	-5.15	90.07	88.59	1.48	60.923 ES			
900.00	899.95	897.79	897.20	0.64	1.30	-171.23	-95.67	-14.09	92.12	90.20	1.92	47.996			
1,000.00	999.88	999.75	998.86	0.86	1.52	-164.28	-96.30	-21.97	94.63	92.26	2.37	39.972			
1,100.00	1,099.76	1,098.18	1,097.03	1.10	1.74	-157.43	-95.87	-28.91	97.92	95.10	2.82	34.708			
1,200.00	1,199.55	1,195.09	1,193.59	1.33	1.98	-150.07	-96.16	-37.19	104.99	101.71	3.29	31.950			
1,300.00	1,299.28	1,294.03	1,292.05	1.58	2.23	-142.91	-97.10	-46.90	115.17	111.42	3.75	30.683			
1,400.00	1,398.96	1,395.20	1,392.89	1.84	2.47	-137.09	-97.74	-55.01	125.65	121.44	4.20	29.890			
1,500.00	1,498.60	1,497.09	1,494.64	2.09	2.70	-132.89	-98.29	-60.01	134.96	130.32	4.64	29.088			
1,600.00	1,598.39	1,599.42	1,596.94	2.30	2.92	-130.09	-98.31	-62.81	141.14	136.09	5.04	27.990			
1,700.00	1,698.33	1,701.47	1,698.99	2.49	3.12	-128.80	-98.21	-63.06	143.02	137.58	5.44	26.310			
1,800.00	1,798.31	1,803.01	1,800.52	2.69	3.32	-128.19	-97.83	-62.08	142.01	136.17	5.84	24.306			
1,892.80	1,891.09	1,896.57	1,894.05	2.89	3.50	-127.96	-97.52	-60.12	141.25	135.02	6.23	22.687			
1,900.00	1,898.29	1,903.76	1,901.25	2.90	3.51	-127.96	-97.51	-59.93	141.25	134.99	6.26	22.560			
2,000.00	1,998.26	2,003.29	2,000.75	3.11	3.70	-127.85	-96.92	-57.82	141.58	134.92	6.66	21.248			
2,100.00	2,098.22	2,101.87	2,099.32	3.31	3.89	-127.75	-96.64	-56.60	142.84	135.79	7.06	20.237			
2,200.00	2,198.20	2,201.24	2,198.69	3.51	4.08	-128.17	-96.74	-55.80	144.19	136.74	7.46	19.337			
2,300.00	2,298.18	2,301.29	2,298.74	3.71	4.28	-128.77	-96.77	-55.46	145.83	137.97	7.86	18.553			
2,400.00	2,398.15	2,400.94	2,398.38	3.91	4.48	-129.24	-96.37	-55.34	147.45	139.18	8.27	17.838			
2,500.00	2,498.12	2,500.98	2,498.43	4.12	4.69	-129.63	-95.82	-55.59	149.27	140.59	8.67	17.208			
2,600.00	2,598.08	2,601.73	2,599.16	4.32	4.89	-129.85	-94.54	-55.91	150.64	141.55	9.09	16.579			
2,700.00	2,698.04	2,700.91	2,698.32	4.52	5.10	-129.72	-92.55	-56.99	152.16	142.66	9.50	16.020			
2,800.00	2,798.04	2,800.68	2,798.07	4.72	5.31	-129.33	-91.06	-58.20	152.81	142.90	9.91	15.420			
2,900.00	2,898.03	2,900.63	2,898.01	4.92	5.52	-129.16	-90.04	-58.97	152.91	142.58	10.32	14.814			
3,000.00	2,998.03	2,999.37	2,996.74	5.13	5.72	-129.02	-89.01	-60.25	153.56	142.83	10.74	14.302			
3,100.00	3,098.01	3,098.85	3,096.18	5.33	5.94	-128.70	-87.88	-62.50	155.01	143.85	11.16	13.895			
3,200.00	3,198.00	3,198.70	3,196.01	5.53	6.15	-128.51	-87.03	-64.75	156.49	144.92	11.57	13.524			
3,300.00	3,297.99	3,299.11	3,296.41	5.74	6.37	-128.85	-87.20	-66.22	157.85	145.86	11.99	13.165			
3,400.00	3,397.97	3,399.79	3,397.09	5.94	6.58	-129.75	-88.07	-66.36	158.65	146.24	12.41	12.783			
3,500.00	3,497.95	3,500.34	3,497.62	6.15	6.78	-130.77	-89.09	-66.09	159.43	146.60	12.83	12.429			
3,600.00	3,597.93	3,602.37	3,599.65	6.35	6.99	-131.76	-89.50	-65.40	159.39	146.15	13.24	12.036			
3,700.00	3,697.91	3,703.49	3,700.74	6.55	7.19	-133.14	-89.70	-62.86	157.79	144.14	13.66	11.555			
3,800.00	3,797.91	3,802.87	3,800.09	6.76	7.39	-133.71	-89.98	-60.38	155.84	141.77	14.07	11.079			
3,900.00	3,897.87	3,903.20	3,900.39	6.96	7.60	-133.48	-90.35	-57.97	153.81	139.33	14.48	10.622			
4,000.00	3,997.83	4,003.22	4,000.38	7.17	7.80	-133.12	-90.55	-55.57	151.76	136.86	14.90	10.187			
4,100.00	4,097.80	4,103.49	4,100.61	7.39	8.00	-132.74	-90.43	-53.07	149.48	134.17	15.31	9.762			
4,200.00	4,197.77	4,202.89	4,200.00	7.60	8.20	-132.36	-90.34	-50.93	147.47	131.74	15.73	9.377			
4,300.00	4,297.75	4,302.25	4,299.34	7.81	8.40	-132.06	-90.34	-49.11	145.96	129.81	16.15	9.039			
4,400.00	4,397.73	4,402.53	4,399.61	8.02	8.61	-131.70	-90.41	-47.58	144.50	127.93	16.57	8.723			
4,500.00	4,497.71	4,502.28	4,499.35	8.23	8.81	-131.36	-90.14	-46.13	143.02	126.04	16.98	8.421			
4,600.00	4,597.71	4,600.83	4,597.89	8.44	9.02	-130.89	-89.85	-45.64	142.23	124.83	17.40	8.174			
4,698.00	4,695.69	4,698.59	4,695.66	8.64	9.23	-130.32	-89.80	-45.62	142.06	124.25	17.81	7.977			
4,700.00	4,697.70	4,700.58	4,697.64	8.65	9.23	-130.31	-89.80	-45.62	142.03	124.21	17.82	7.972			
4,800.00	4,797.69	4,800.04	4,797.10	8.85	9.44	-130.05	-90.01	-45.83	141.77	123.54	18.23	7.776			
4,816.67	4,814.36	4,816.90	4,813.96	8.89	9.47	-130.04	-89.97	-45.94	141.62	123.32	18.30	7.738 SF			
4,900.00	4,897.68	4,876.06	4,872.69	9.06	9.61	-128.67	-90.05	-52.07	147.55	128.94	18.61	7.929			
5,000.00	4,997.67	4,946.00	4,938.69	9.27	9.79	-123.89	-90.04	-74.78	173.05	154.06	18.99	9.112			
5,100.00	5,097.67	5,011.00	4,995.46	9.48	10.02	-118.94	-90.54	-106.34	215.05	195.68	19.37	11.105			
5,200.00	5,197.66	5,064.37	5,038.74	9.69	10.26	-115.60	-91.79	-137.50	269.04	249.33	19.71	13.651			
5,300.00	5,297.64	5,107.00	5,070.91	9.90	10.50	-113.43	-92.87	-165.41	332.44	312.42	20.02	16.608			

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



Anticollision Report



Company	Apache Corporation	Local Co-ordinate Reference	Well #11H
Project	Eddy County, NM (NAD27 NME)	TVD Reference	KB @ 3894.00usft (Capstar 114)
Reference Site	Crow Federal	MD Reference	KB @ 3894.00usft (Capstar 114)
Site Error	0.00 usft	North Reference	Grid
Reference Well	#11H	Survey Calculation Method	Minimum Curvature
Well Error	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH/Job #1310714	Database	GCR DB v5000
Reference Design	Survey Phoenix MWD Survey	Offset TVD Reference	Offset Datum

Offset Design Crow Federal - #13H - OH/Job #1310316 - Surveys (Capstar 114)											Offset Site Error
Survey Program 613-MWD											Offset Well Error
Reference	Offset	Semi-Major Axis		Distance		Warning					
Measured Vertical	Measured Vertical	Reference	Offset	Azimuths	Offset Wellbore Centre	Between Centres	Between Ellipses	Minimum Separation	Separation Factor	Warning	
Depth (usft)	Depth (usft)	Depth (usft)	Depth (usft)	from North (°)	N-S (usft)	E-W (usft)	(usft)	(usft)	(usft)		
5,400.00	5,397.45	5,139.00	5,092.83	10.12	10.73	-111.72	-93.44	-188.71	406.64	386.45	20.18
5,500.00	5,494.38	5,159.27	5,105.46	10.38	10.90	-110.49	-93.63	-204.55	496.07	476.48	19.60
5,600.00	5,584.54	5,171.00	5,112.28	10.72	11.00	-109.62	-93.67	-214.10	593.68	573.98	19.70
5,700.00	5,664.03	5,171.00	5,112.28	11.23	11.00	-107.74	-93.67	-214.10	692.62	671.78	20.84
5,800.00	5,730.85	5,159.49	5,105.59	12.01	10.90	-104.81	-93.63	-204.73	787.85	769.58	18.26
5,900.00	5,780.76	5,139.00	5,092.83	13.18	10.73	-102.12	-93.44	-188.71	877.99	863.62	14.37
6,000.00	5,809.37	5,139.00	5,092.83	14.77	10.73	-99.90	-93.44	-188.71	959.71	947.56	12.15
6,100.00	5,822.23	5,107.00	5,070.91	16.67	10.50	-98.94	-92.87	-165.41	1,036.00	1,024.88	11.12
6,200.00	5,823.81	5,107.00	5,070.91	18.79	10.50	-97.98	-92.87	-165.41	1,107.70	1,096.00	11.69
6,300.00	5,826.03	5,075.00	5,047.01	21.06	10.32	-97.28	-92.08	-144.17	1,183.18	1,171.05	12.13
6,400.00	5,828.28	5,075.00	5,047.01	23.42	10.32	-96.65	-92.08	-144.17	1,261.11	1,248.58	12.53
6,500.00	5,829.96	5,043.00	5,021.83	25.86	10.16	-96.20	-91.19	-124.45	1,340.73	1,327.33	13.40
6,600.00	5,830.14	5,043.00	5,021.83	28.36	10.16	-95.61	-91.19	-124.45	1,421.34	1,407.13	14.21
6,700.00	5,830.06	5,011.00	4,995.46	30.90	10.02	-95.16	-90.54	-106.34	1,503.42	1,488.78	14.64
6,800.00	5,829.89	5,011.00	4,995.46	33.48	10.02	-94.76	-90.54	-106.34	1,587.13	1,571.97	15.16
6,900.00	5,829.82	4,991.96	4,979.20	36.08	9.95	-94.48	-90.32	-96.43	1,672.39	1,656.78	15.61
7,000.00	5,829.64	4,979.00	4,967.99	38.70	9.90	-94.23	-90.18	-89.93	1,758.72	1,742.04	16.67
7,100.00	5,830.06	4,979.00	4,967.99	41.34	9.90	-93.92	-90.18	-89.93	1,846.42	1,828.65	17.77
7,200.00	5,830.53	4,960.35	4,951.58	44.00	9.84	-93.67	-90.05	-81.09	1,934.84	1,916.43	18.40
7,300.00	5,831.49	4,946.00	4,938.69	46.67	9.79	-93.44	-90.04	-74.78	2,024.56	2,005.24	19.32
7,400.00	5,833.16	4,946.00	4,938.69	49.35	9.79	-93.21	-90.04	-74.78	2,115.22	2,095.04	20.18
7,500.00	5,835.50	4,946.00	4,938.69	52.04	9.79	-93.01	-90.04	-74.78	2,206.95	2,185.91	21.04
7,600.00	5,838.29	4,946.00	4,938.69	54.74	9.79	-92.82	-90.04	-74.78	2,299.53	2,277.57	21.96
7,700.00	5,841.15	4,930.54	4,924.55	57.44	9.75	-92.68	-90.07	-68.53	2,392.38	2,371.49	20.89
7,800.00	5,843.40	4,915.00	4,910.07	60.13	9.70	-92.63	-90.12	-62.89	2,485.99	2,464.89	21.10
7,900.00	5,846.01	4,915.00	4,910.07	62.83	9.70	-92.60	-90.12	-62.89	2,579.86	2,558.31	21.55
8,000.00	5,846.80	4,915.00	4,910.07	65.54	9.70	-92.57	-90.12	-62.89	2,673.55	2,651.26	22.29
8,100.00	5,846.60	4,915.00	4,910.07	68.24	9.70	-92.54	-90.12	-62.89	2,767.36	2,744.02	23.34
8,200.00	5,846.65	4,915.00	4,910.07	70.96	9.70	-92.47	-90.12	-62.89	2,861.62	2,836.94	24.68
8,300.00	5,847.14	4,915.00	4,910.07	73.68	9.70	-92.41	-90.12	-62.89	2,956.41	2,931.12	25.29
8,400.00	5,848.24	4,915.00	4,910.07	76.40	9.70	-92.34	-90.12	-62.89	3,051.69	3,024.09	27.59
8,500.00	5,850.33	4,915.00	4,910.07	79.13	9.70	-92.26	-90.12	-62.89	3,147.52	3,120.02	27.50
8,600.00	5,852.54	4,915.00	4,910.07	81.86	9.70	-92.21	-90.12	-62.89	3,243.67	3,215.96	27.71
8,700.00	5,854.83	4,898.38	4,894.29	84.58	9.66	-92.16	-90.14	-57.66	3,339.56	3,311.36	28.19
8,800.00	5,857.43	4,883.00	4,879.46	87.31	9.62	-92.13	-90.09	-53.62	3,436.45	3,407.58	28.87
8,900.00	5,860.30	4,883.00	4,879.46	90.04	9.62	-92.09	-90.09	-53.62	3,533.16	3,503.08	30.08
9,000.00	5,862.78	4,883.00	4,879.46	92.78	9.62	-92.04	-90.09	-53.62	3,629.93	3,598.67	31.27
9,100.00	5,864.27	4,883.00	4,879.46	95.51	9.62	-91.99	-90.09	-53.62	3,726.62	3,693.46	33.16
9,200.00	5,865.86	4,883.00	4,879.46	98.25	9.62	-91.93	-90.09	-53.62	3,823.49	3,789.20	34.29
9,300.00	5,868.00	4,883.00	4,879.46	100.99	9.62	-91.87	-90.09	-53.62	3,920.64	3,885.33	35.31
9,400.00	5,870.55	4,883.00	4,879.46	103.73	9.62	-91.82	-90.09	-53.62	4,018.03	3,982.52	35.50
9,500.00	5,873.09	4,883.00	4,879.46	106.47	9.62	-91.78	-90.09	-53.62	4,115.55	4,079.58	35.97
9,600.00	5,875.95	4,883.00	4,879.46	109.21	9.62	-91.74	-90.09	-53.62	4,213.25	4,175.67	37.58
9,700.00	5,877.16	4,883.00	4,879.46	111.95	9.62	-91.69	-90.09	-53.62	4,310.69	4,273.09	37.60
9,800.00	5,877.05	4,883.00	4,879.46	114.69	9.62	-91.65	-90.09	-53.62	4,407.97	4,370.46	37.52
9,900.00	5,877.22	4,883.00	4,879.46	117.43	9.62	-91.62	-90.09	-53.62	4,505.44	4,467.16	38.28
10,000.00	5,877.76	4,883.00	4,879.46	120.17	9.62	-91.58	-90.09	-53.62	4,603.09	4,563.24	39.85
10,100.00	5,878.66	4,883.00	4,879.46	122.92	9.62	-91.55	-90.09	-53.62	4,700.91	4,659.85	41.06
10,200.00	5,879.76	4,883.00	4,879.46	125.66	9.62	-91.51	-90.09	-53.62	4,798.86	4,756.91	41.94
10,262.00	5,880.52	4,883.00	4,879.46	127.36	9.62	-91.49	-90.09	-53.62	4,859.64	4,817.19	42.45

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



Anticollision Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #11H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3894.00usft (Capstar 114)
Reference Site:	Crow Federal	MD Reference:	KB @ 3894.00usft (Capstar 114)
Site Error:	0.00usft	North Reference:	Grid
Reference Well:	#11H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00usft	Output errors are at:	2.00 sigma
Reference Wellbore:	OH/Job #1310714	Database:	GCR DB v5000
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Offset Datum

Offset Design: Crow Federal - #14H - OH/Job #1310557 - Surveys (Capstar 114)													Offset Site Error:	0.00usft
Survey Program: #601 MWD													Offset Well Error:	0.00usft
Reference	Offset	Semi-Major Axis		Distance		Between		Minimum		Separation		Warning		
Measured Vertical	Measured Vertical	Reference	Offset	Azimuth	Offset Wellbore Centre	Between	Between	Separation	Factor	Warning				
Depth	Depth	Depth	Depth	from North	N-S	E-W	Centres	Ellipses	Separation	Factor	Warning			
(usft)	(usft)	(usft)	(usft)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)			
600.00	599.99	599.71	599.69	0.00	0.67	178.52	-28.45	-1.10	26.16	25.50	0.66	39.401	CC	
700.00	699.99	699.76	699.74	0.20	0.87	178.34	-29.55	-1.59	26.44	25.38	1.06	24.894		
791.43	791.41	791.21	791.18	0.39	1.05	179.86	-30.28	-2.09	26.35	24.91	1.44	18.301		
800.00	799.98	799.77	799.74	0.41	1.07	179.92	-30.36	-2.13	26.32	24.85	1.48	17.839	ES	
900.00	899.95	899.69	899.66	0.64	1.28	-174.51	-31.43	-2.62	26.88	24.97	1.90	14.116		
1,000.00	999.88	999.60	999.56	0.86	1.49	-164.82	-32.34	-3.68	28.10	25.76	2.34	11.990		
1,100.00	1,099.76	1,099.64	1,099.57	1.10	1.70	-151.64	-32.43	-5.89	30.62	27.84	2.79	10.985		
1,200.00	1,199.55	1,199.29	1,199.18	1.33	1.91	-137.91	-31.52	-8.55	35.31	32.08	3.23	10.934		
1,300.00	1,299.28	1,298.88	1,298.73	1.58	2.12	-126.36	-30.26	-11.33	41.92	38.25	3.67	11.424		
1,400.00	1,398.96	1,398.79	1,398.60	1.84	2.32	-117.74	-28.91	-13.50	49.63	45.53	4.10	12.108		
1,500.00	1,498.60	1,498.62	1,498.42	2.09	2.52	-111.79	-27.76	-14.41	57.34	52.82	4.52	12.686		
1,600.00	1,598.39	1,598.46	1,598.25	2.30	2.73	-107.78	-26.75	-15.11	63.29	58.37	4.92	12.871		
1,700.00	1,698.33	1,698.47	1,698.25	2.49	2.93	-105.11	-25.86	-15.55	66.24	60.93	5.31	12.483		
1,800.00	1,798.31	1,798.58	1,798.36	2.69	3.14	-103.07	-25.20	-15.74	67.01	61.30	5.71	11.730		
1,900.00	1,898.29	1,898.74	1,898.53	2.90	3.35	-101.67	-24.50	-15.67	68.50	62.36	6.13	11.167		
2,000.00	1,998.26	1,998.82	1,998.60	3.11	3.56	-101.12	-23.69	-15.39	70.67	64.13	6.55	10.796		
2,100.00	2,098.22	2,098.76	2,098.53	3.31	3.77	-100.71	-22.70	-15.10	72.70	65.75	6.95	10.455		
2,200.00	2,198.20	2,198.88	2,198.64	3.51	3.98	-100.90	-21.57	-14.83	73.73	66.36	7.36	10.015		
2,300.00	2,298.18	2,298.67	2,298.43	3.71	4.19	-101.39	-20.13	-14.63	74.34	66.57	7.77	9.562		
2,400.00	2,398.15	2,399.66	2,399.40	3.91	4.40	-101.89	-18.42	-13.93	74.40	66.21	8.19	9.081		
2,500.00	2,498.12	2,500.23	2,499.93	4.12	4.61	-102.26	-16.16	-12.16	73.21	64.60	8.61	8.502		
2,600.00	2,598.08	2,600.13	2,599.78	4.32	4.82	-102.77	-13.85	-10.14	71.66	62.63	9.03	7.938		
2,700.00	2,698.04	2,699.22	2,698.85	4.52	5.02	-103.98	-12.40	-8.51	70.66	61.22	9.44	7.484		
2,800.00	2,798.04	2,799.00	2,798.62	4.72	5.23	-104.87	-12.20	-7.74	70.09	60.24	9.85	7.114		
2,900.00	2,898.03	2,899.02	2,898.64	4.92	5.44	-105.52	-11.95	-6.92	69.03	58.76	10.27	6.724		
3,000.00	2,998.03	2,999.14	2,998.75	5.13	5.65	-106.47	-11.56	-6.03	67.87	57.18	10.69	6.352		
3,100.00	3,098.01	3,099.29	3,098.90	5.33	5.86	-108.03	-11.54	-4.75	66.49	55.38	11.10	5.987		
3,200.00	3,198.00	3,199.35	3,198.93	5.53	6.07	-110.52	-12.31	-3.03	64.84	53.32	11.52	5.629		
3,300.00	3,297.99	3,299.26	3,298.82	5.74	6.28	-113.66	-13.47	-1.02	63.02	51.09	11.94	5.280		
3,400.00	3,397.97	3,399.14	3,398.67	5.94	6.49	-116.94	-14.48	0.82	61.48	49.12	12.36	4.975		
3,500.00	3,497.95	3,498.98	3,498.49	6.15	6.69	-120.46	-15.61	2.57	60.42	47.65	12.77	4.730		
3,600.00	3,597.93	3,598.93	3,598.43	6.35	6.90	-123.89	-16.48	4.17	59.42	46.23	13.19	4.505		
3,679.18	3,677.10	3,677.54	3,677.03	6.51	7.06	-126.30	-17.04	5.18	58.80	45.29	13.52	4.351		
3,700.00	3,697.91	3,697.76	3,697.25	6.55	7.11	-127.03	-17.30	5.22	58.93	45.33	13.60	4.333		
3,800.00	3,797.91	3,796.11	3,795.54	6.76	7.31	-127.63	-19.91	3.47	61.65	47.64	14.01	4.400		
3,900.00	3,897.87	3,897.03	3,896.40	6.96	7.52	-126.01	-22.64	1.19	64.84	50.41	14.43	4.493		
4,000.00	3,997.83	3,997.25	3,996.58	7.17	7.73	-122.19	-22.35	-1.22	66.67	51.81	14.85	4.489		
4,100.00	4,097.80	4,096.97	4,096.27	7.39	7.94	-118.72	-22.10	-3.73	68.90	53.63	15.27	4.512		
4,200.00	4,197.77	4,197.11	4,196.38	7.60	8.15	-115.81	-22.09	-6.29	71.45	55.76	15.69	4.554		
4,300.00	4,297.75	4,297.83	4,297.09	7.81	8.36	-114.15	-22.44	-7.37	73.01	56.90	16.11	4.531		
4,400.00	4,397.73	4,397.45	4,396.71	8.02	8.57	-112.87	-23.21	-8.30	74.44	57.91	16.53	4.503		
4,500.00	4,497.71	4,498.87	4,498.12	8.23	8.79	-112.02	-23.97	-8.86	75.58	58.63	16.96	4.458		
4,600.00	4,597.71	4,599.29	4,598.53	8.44	8.99	-111.46	-24.09	-7.69	74.76	57.38	17.38	4.303		
4,700.00	4,697.70	4,699.49	4,698.72	8.65	9.20	-110.54	-23.82	-6.43	73.82	56.03	17.79	4.149		
4,800.00	4,797.69	4,799.41	4,798.64	8.85	9.41	-109.98	-23.45	-5.10	72.16	53.95	18.21	3.963		
4,900.00	4,897.68	4,899.22	4,898.43	9.06	9.62	-110.29	-23.36	-3.87	69.67	51.04	18.63	3.740		
5,000.00	4,997.67	4,999.04	4,998.25	9.27	9.83	-110.84	-23.35	-2.84	67.54	48.49	19.05	3.545		
5,100.00	5,097.67	5,098.92	5,098.13	9.48	10.04	-111.73	-23.40	-2.01	65.94	46.47	19.47	3.386		
5,177.65	5,175.31	5,175.86	5,175.07	9.64	10.20	-112.76	-23.43	-1.51	65.13	45.33	19.80	3.289		
5,200.00	5,197.66	5,198.00	5,197.21	9.69	10.25	-113.04	-23.50	-1.69	65.16	45.27	19.89	3.276	SF	
5,300.00	5,297.64	5,288.43	5,287.28	9.90	10.44	-112.35	-23.55	-8.79	72.60	52.30	20.30	3.577		
5,400.00	5,397.45	5,375.09	5,371.77	10.12	10.63	-108.16	-23.02	-27.75	97.41	76.83	20.58	4.732		

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



Anticollision Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #11H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3894.00usft (Capstar 114)
Reference Site:	Crow Federal	MD Reference:	KB @ 3894.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#11H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	OH/Job #1310714	Database:	GCR/DB v5000
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Offset Datum

Offset Design Crow Federal - #14H - OH/Job #1310557 - Surveys (Capstar 114)												Offset Site Error: 0.00 usft	
Survey Program: 601-MWD												Offset Well Error: 0.00 usft	
Reference		Offset		Semi-Major Axis		Distance							
Measured	Vertical	Measured	Vertical	Reference	Offset	Azimuth	Offset Wellbore Centre	Between	Between	Minimum	Separation	Warning	
Depth	Depth	Depth	Depth	Reference	Offset	From North	N-S	E-W	Centres	Ellipses	Separation	Factor	
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
5,500.00	5,494.38	5,443.40	5,435.93	10.38	10.80	-104.60	-20.97	-50.97	151.15	130.98	20.17	7.494	
5,600.00	5,584.54	5,487.42	5,475.24	10.72	10.92	-103.49	-19.76	-70.70	228.82	209.65	19.16	11.940	
5,700.00	5,664.03	5,511.06	5,495.50	11.23	11.00	-101.23	-19.21	-82.87	320.63	301.66	18.98	16.897	
5,800.00	5,730.85	5,520.07	5,503.06	12.01	11.04	-97.88	-19.07	-87.76	417.39	394.77	22.61	18.458	
5,900.00	5,780.76	5,517.24	5,500.70	13.18	11.03	-95.33	-19.11	-86.21	515.48	497.36	18.12	28.449	
6,000.00	5,809.37	5,497.00	5,483.52	14.77	10.95	-93.98	-19.52	-75.51	611.10	598.36	12.74	47.966	
6,100.00	5,822.23	5,497.00	5,483.52	16.67	10.95	-93.48	-19.52	-75.51	702.88	691.43	11.45	61.375	
6,200.00	5,823.81	5,471.23	5,461.01	18.79	10.88	-93.27	-20.19	-62.99	791.39	779.41	11.98	66.036	
6,300.00	5,826.03	5,454.00	5,445.57	21.06	10.82	-92.99	-20.66	-55.36	881.90	869.50	12.41	71.090	
6,400.00	5,828.28	5,454.00	5,445.57	23.42	10.82	-92.76	-20.66	-55.36	973.88	961.14	12.74	76.430	
6,500.00	5,829.96	5,431.89	5,425.35	25.86	10.77	-92.65	-21.31	-46.46	1,066.35	1,052.63	13.72	77.711	
6,600.00	5,830.14	5,412.00	5,406.81	28.36	10.72	-92.39	-21.94	-39.28	1,159.35	1,144.80	14.55	79.680	
6,700.00	5,830.06	5,412.00	5,406.81	30.90	10.72	-92.13	-21.94	-39.28	1,252.83	1,237.89	14.94	83.831	
6,800.00	5,829.89	5,412.00	5,406.81	33.48	10.72	-91.95	-21.94	-39.28	1,347.25	1,331.90	15.35	87.759	
6,900.00	5,829.82	5,390.78	5,386.75	36.08	10.67	-91.87	-22.59	-32.40	1,441.96	1,426.27	15.69	91.887	
7,000.00	5,829.64	5,369.00	5,365.92	38.70	10.62	-91.80	-23.17	-26.05	1,537.45	1,520.60	16.84	91.292	
7,100.00	5,830.06	5,369.00	5,365.92	41.34	10.62	-91.64	-23.17	-26.05	1,633.09	1,614.96	18.13	90.061	
7,200.00	5,830.53	5,369.00	5,365.92	44.00	10.62	-91.49	-23.17	-26.05	1,729.25	1,710.48	18.77	92.120	
7,300.00	5,831.49	5,369.00	5,365.92	46.67	10.62	-91.36	-23.17	-26.05	1,825.94	1,806.04	19.89	91.789	
7,400.00	5,833.16	5,369.00	5,365.92	49.35	10.62	-91.24	-23.17	-26.05	1,923.12	1,902.30	20.82	92.384	
7,500.00	5,835.50	5,347.43	5,345.09	52.04	10.57	-91.15	-23.55	-20.47	2,020.26	1,998.74	21.52	93.889	
7,600.00	5,838.29	5,326.00	5,324.22	54.74	10.53	-91.05	-23.68	-15.60	2,118.19	2,095.89	22.30	94.977	
7,700.00	5,841.15	5,326.00	5,324.22	57.44	10.53	-90.98	-23.68	-15.60	2,215.92	2,195.20	20.72	106.940	
7,800.00	5,843.40	5,326.00	5,324.22	60.13	10.53	-91.00	-23.68	-15.60	2,313.76	2,292.17	21.59	107.190	
7,900.00	5,846.01	5,326.00	5,324.22	62.83	10.53	-91.04	-23.68	-15.60	2,411.83	2,388.38	23.45	102.840	
8,000.00	5,846.80	5,326.00	5,324.22	65.54	10.53	-91.08	-23.68	-15.60	2,509.70	2,486.53	23.17	108.301	
8,100.00	5,846.60	5,326.00	5,324.22	68.24	10.53	-91.10	-23.68	-15.60	2,607.54	2,584.11	23.43	111.288	
8,200.00	5,846.65	5,326.00	5,324.22	70.96	10.53	-91.08	-23.68	-15.60	2,705.60	2,681.25	24.35	111.124	
8,300.00	5,847.14	5,326.00	5,324.22	73.68	10.53	-91.07	-23.68	-15.60	2,803.87	2,778.91	24.96	112.356	
8,400.00	5,848.24	5,326.00	5,324.22	76.40	10.53	-91.05	-23.68	-15.60	2,902.36	2,874.75	27.60	105.140	
8,500.00	5,850.33	5,307.27	5,305.86	79.13	10.49	-91.01	-23.65	-11.92	3,000.75	2,973.80	26.96	111.314	
8,600.00	5,852.54	5,304.63	5,303.26	81.86	10.48	-91.00	-23.64	-11.45	3,099.50	3,072.36	27.14	114.203	
8,700.00	5,854.83	5,302.13	5,300.80	84.58	10.47	-90.99	-23.63	-11.01	3,198.33	3,170.60	27.73	115.346	
8,800.00	5,857.43	5,283.00	5,281.91	87.31	10.43	-90.99	-23.51	-7.99	3,297.53	3,269.13	28.41	116.085	
8,900.00	5,860.30	5,283.00	5,281.91	90.04	10.43	-90.98	-23.51	-7.99	3,396.49	3,367.11	29.38	115.602	
9,000.00	5,862.78	5,283.00	5,281.91	92.78	10.43	-90.96	-23.51	-7.99	3,495.45	3,464.82	30.63	114.113	
9,100.00	5,864.27	5,283.00	5,281.91	95.51	10.43	-90.94	-23.51	-7.99	3,594.31	3,561.38	32.93	109.145	
9,200.00	5,865.86	5,283.00	5,281.91	98.25	10.43	-90.91	-23.51	-7.99	3,693.25	3,659.02	34.23	107.909	
9,300.00	5,868.00	5,283.00	5,281.91	100.99	10.43	-90.88	-23.51	-7.99	3,792.31	3,756.98	35.33	107.329	
9,400.00	5,870.55	5,283.00	5,281.91	103.73	10.43	-90.85	-23.51	-7.99	3,891.48	3,856.37	35.11	110.844	
9,500.00	5,873.09	5,283.00	5,281.91	106.47	10.43	-90.83	-23.51	-7.99	3,990.69	3,955.34	35.35	112.890	
9,600.00	5,875.95	5,283.00	5,281.91	109.21	10.43	-90.81	-23.51	-7.99	4,089.98	4,052.58	37.40	109.372	
9,700.00	5,877.16	5,283.00	5,281.91	111.95	10.43	-90.79	-23.51	-7.99	4,189.09	4,151.90	37.19	112.635	
9,800.00	5,877.05	5,283.00	5,281.91	114.69	10.43	-90.77	-23.51	-7.99	4,288.07	4,251.32	36.75	116.672	
9,900.00	5,877.22	5,283.00	5,281.91	117.43	10.43	-90.76	-23.51	-7.99	4,387.15	4,349.68	37.46	117.101	
10,000.00	5,877.76	5,283.00	5,281.91	120.17	10.43	-90.74	-23.51	-7.99	4,486.30	4,447.08	39.22	114.381	
10,100.00	5,878.66	5,283.00	5,281.91	122.92	10.43	-90.72	-23.51	-7.99	4,585.54	4,544.96	40.58	113.011	
10,200.00	5,879.76	5,283.00	5,281.91	125.66	10.43	-90.71	-23.51	-7.99	4,684.83	4,643.37	41.46	112.992	
10,262.00	5,880.52	5,283.00	5,281.91	127.36	10.43	-90.70	-23.51	-7.99	4,746.42	4,704.46	41.96	113.121	

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



Anticollision Report



Company	Apache Corporation	Local Co-ordinate Reference	Well #11H
Project	Eddy County, NM (NAD27 NME)	TVD Reference	KB @ 3894.00usft (Capstar 114)
Reference Site	Crow Federal	MD Reference	KB @ 3894.00usft (Capstar 114)
Site Error	0.00 usft	North Reference	Grid
Reference Well	#11H	Survey Calculation Method	Minimum Curvature
Well Error	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH/Job #1310714	Database	GCR DB v5000
Reference Design	Survey: Phoenix MWD Survey	Offset TVD Reference	Offset Datum

Offset Design: Crow Federal - #15H - OH/Job #1310461 - Plan #2 04-18-13												Offset Site Error	0.00 usft
Survey Program: 50-MWD												Offset Well Error	0.00 usft
Reference	Offset	Semi-Major Axis		Distance		Offset Wellbore Control		Between		Minimum	Separation	Warning	
Measured Vertical	Measured Vertical	Reference	Offset	Azimuth		N-S	E-W	Centres	Ellipses	Separation	Factor		
Depth (usft)	Depth (usft)	Depth (usft)	Depth (usft)	from North (°)		(usft)	(usft)	(usft)	(usft)	(usft)			
600.00	599.99	603.99	603.99	0.00	1.23	2.00	40.00	-0.30	42.32	41.09	1.23	34.387	CC, ES
700.00	699.99	703.99	703.99	0.20	1.46	2.73	40.00	-0.30	43.17	41.52	1.65	26.169	
800.00	799.98	803.98	803.98	0.41	1.68	2.43	40.00	-0.30	44.07	41.98	2.09	21.077	
900.00	899.95	903.95	903.95	0.64	1.90	-0.32	40.00	-0.30	44.67	42.14	2.54	17.615	
1,000.00	999.88	1,003.88	1,003.88	0.86	2.13	-5.02	40.00	-0.30	45.39	42.40	2.99	15.196	
1,100.00	1,099.76	1,103.76	1,103.76	1.10	2.35	-11.13	40.00	-0.30	46.35	42.91	3.44	13.466	
1,200.00	1,199.55	1,203.55	1,203.55	1.33	2.58	-18.79	40.00	-0.30	47.87	43.97	3.90	12.272	
1,300.00	1,299.28	1,303.28	1,303.28	1.58	2.80	-26.58	40.00	-0.30	50.79	46.42	4.36	11.640	
1,400.00	1,398.96	1,402.96	1,402.96	1.84	3.03	-33.85	40.00	-0.30	55.16	50.34	4.82	11.436	
1,500.00	1,498.60	1,502.60	1,502.60	2.09	3.25	-40.09	40.00	-0.30	60.76	55.48	5.27	11.523	
1,600.00	1,598.39	1,602.39	1,602.39	2.30	3.47	-43.79	40.00	-0.30	65.69	60.00	5.70	11.535	
1,700.00	1,698.33	1,702.33	1,702.33	2.49	3.70	-45.06	40.00	-0.30	68.79	62.69	6.11	11.267	
1,800.00	1,798.31	1,802.31	1,802.31	2.69	3.92	-44.88	40.00	-0.30	70.62	64.09	6.53	10.818	
1,900.00	1,898.29	1,902.29	1,902.29	2.90	4.15	-45.60	40.00	-0.30	72.38	65.42	6.96	10.394	
2,000.00	1,998.26	2,002.26	2,002.26	3.11	4.37	-47.30	40.00	-0.30	73.82	66.42	7.39	9.985	
2,100.00	2,098.22	2,102.22	2,102.22	3.31	4.60	-49.03	40.00	-0.30	75.01	67.19	7.82	9.595	
2,200.00	2,198.20	2,202.20	2,202.20	3.51	4.82	-50.54	40.00	-0.30	74.94	66.70	8.24	9.094	
2,300.00	2,298.18	2,302.18	2,302.18	3.71	5.05	-52.18	40.00	-0.30	74.12	65.45	8.67	8.549	
2,400.00	2,398.15	2,402.15	2,402.15	3.91	5.27	-53.93	40.00	-0.30	73.20	64.10	9.10	8.044	
2,500.00	2,498.12	2,502.12	2,502.12	4.12	5.50	-55.76	40.00	-0.30	72.18	62.65	9.53	7.573	
2,600.00	2,598.08	2,602.08	2,602.08	4.32	5.72	-57.66	40.00	-0.30	71.06	61.09	9.96	7.132	
2,700.00	2,698.04	2,702.04	2,702.04	4.52	5.95	-59.66	40.00	-0.30	69.92	59.53	10.40	6.727	
2,800.00	2,798.04	2,802.04	2,802.04	4.72	6.17	-60.43	40.00	-0.30	69.33	58.50	10.82	6.405	
2,900.00	2,898.03	2,902.03	2,902.03	4.92	6.40	-60.79	40.00	-0.30	68.61	57.36	11.25	6.098	
3,000.00	2,998.03	3,002.03	3,002.03	5.13	6.62	-61.42	40.00	-0.30	67.58	55.90	11.68	5.784	
3,100.00	3,098.01	3,102.01	3,102.01	5.33	6.85	-62.21	40.00	-0.30	66.42	54.31	12.12	5.482	
3,200.00	3,198.00	3,202.00	3,202.00	5.53	7.07	-62.97	40.00	-0.30	65.11	52.56	12.55	5.189	
3,300.00	3,297.99	3,301.99	3,301.99	5.74	7.29	-63.69	40.00	-0.30	63.59	50.61	12.98	4.900	
3,400.00	3,397.97	3,401.97	3,401.97	5.94	7.52	-64.54	40.00	-0.30	61.94	48.53	13.41	4.618	
3,500.00	3,497.95	3,501.95	3,501.95	6.15	7.74	-65.56	40.00	-0.30	60.35	46.51	13.84	4.360	
3,600.00	3,597.93	3,601.93	3,601.93	6.35	7.97	-66.53	40.00	-0.30	58.64	44.37	14.27	4.109	
3,700.00	3,697.91	3,701.91	3,701.91	6.55	8.19	-67.46	40.00	-0.30	56.91	42.20	14.71	3.870	
3,746.16	3,744.07	3,748.07	3,748.07	6.65	8.30	-67.56	40.00	-0.30	56.59	41.69	14.91	3.797	
3,800.00	3,797.91	3,801.91	3,801.91	6.76	8.42	-67.01	40.00	-0.30	57.09	41.95	15.14	3.772	
3,900.00	3,897.87	3,901.87	3,901.87	6.96	8.64	-65.54	40.00	-0.30	59.25	43.68	15.57	3.806	
4,000.00	3,997.83	4,001.83	4,001.83	7.17	8.87	-64.19	40.00	-0.30	61.64	45.64	16.00	3.852	
4,100.00	4,097.80	4,101.80	4,101.80	7.39	9.09	-63.03	40.00	-0.30	63.94	47.50	16.44	3.890	
4,200.00	4,197.77	4,201.77	4,201.77	7.60	9.32	-62.02	40.00	-0.30	66.05	49.18	16.87	3.915	
4,300.00	4,297.75	4,301.75	4,301.75	7.81	9.54	-61.32	40.00	-0.30	67.87	50.56	17.31	3.921	
4,400.00	4,397.73	4,401.73	4,401.73	8.02	9.77	-60.50	40.00	-0.30	69.61	51.87	17.74	3.924	
4,500.00	4,497.71	4,501.71	4,501.71	8.23	9.99	-59.91	40.00	-0.30	71.08	52.91	18.18	3.911	
4,600.00	4,597.71	4,601.71	4,601.71	8.44	10.22	-59.43	40.00	-0.30	72.22	53.61	18.61	3.881	
4,700.00	4,697.70	4,701.70	4,701.70	8.65	10.44	-58.95	40.00	-0.30	73.52	54.48	19.04	3.861	
4,800.00	4,797.69	4,801.69	4,801.69	8.85	10.67	-58.38	40.00	-0.30	73.99	54.51	19.47	3.799	
4,900.00	4,897.68	4,901.68	4,901.68	9.06	10.89	-57.60	40.00	-0.30	73.16	53.25	19.91	3.675	
5,000.00	4,997.67	5,001.67	5,001.67	9.27	11.12	-57.01	40.00	-0.30	72.23	51.88	20.34	3.550	
5,100.00	5,097.67	5,101.67	5,101.67	9.48	11.34	-56.79	40.00	-0.30	71.17	50.39	20.78	3.425	
5,200.00	5,197.66	5,201.66	5,201.66	9.69	11.56	-57.03	40.00	-0.30	69.82	48.60	21.22	3.291	
5,300.00	5,297.64	5,301.64	5,301.64	9.90	11.79	-58.00	40.00	-0.30	68.35	46.70	21.65	3.157	
5,330.19	5,327.82	5,331.82	5,331.82	9.97	11.86	-58.63	40.00	-0.30	68.34	46.56	21.79	3.137	SF
5,400.00	5,397.45	5,401.45	5,401.45	10.12	12.01	-61.38	40.00	-0.30	70.44	48.41	22.03	3.197	
5,500.00	5,494.38	5,498.38	5,498.38	10.38	12.23	-72.94	40.00	-0.30	88.09	66.16	21.93	4.017	

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



Anticollision Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #11H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3894.00usft (Capstar 114)
Reference Site:	Crow Federal	MD Reference:	KB @ 3894.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#11H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00usft	Output errors are at:	2.00 sigma
Reference Wellbore:	OH/Job #1310714	Database:	GCR DB v5000
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Offset Datum

Offset Design: Crow Federal - #15H - OH / Job #1310461 - Plan #2 04-18-13												Offset Site Error:	0.00usft
Survey Program: OH-MWD												Offset Well Error:	0.00usft
Reference	Offset	Semi-Major Axis		Distance		Minimum Separation		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference Offset (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre N-S (usft)	E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
5,600.00	5,584.54	5,588.54	5,588.54	10.72	12.43	-84.12	40.00	-0.30	125.75	104.92	20.83	6.038	
5,700.00	5,664.03	5,668.03	5,668.03	11.23	12.61	-88.11	40.00	-0.30	185.08	166.29	18.79	9.849	
5,800.00	5,730.85	5,725.00	5,725.00	12.01	12.74	-87.54	40.00	-0.36	259.47	242.52	16.95	15.310	
5,900.00	5,780.76	5,750.00	5,749.96	13.18	12.79	-86.88	39.99	-1.63	348.55	334.37	14.18	24.578	
6,000.00	5,809.37	5,762.18	5,762.08	14.77	12.81	-86.95	39.98	-2.83	446.65	430.69	15.96	27.991	
6,100.00	5,822.23	5,762.75	5,762.65	16.67	12.82	-87.67	39.98	-2.90	546.30	525.08	21.22	25.742	
6,200.00	5,823.81	5,759.01	5,758.93	18.79	12.81	-88.21	39.99	-2.48	645.68	628.35	17.33	37.267	
6,300.00	5,826.03	5,750.00	5,749.96	21.06	12.79	-88.52	39.99	-1.63	745.36	727.51	17.85	41.754	
6,400.00	5,828.28	5,750.00	5,749.96	23.42	12.79	-88.81	39.99	-1.63	844.96	823.24	21.72	38.907	
6,500.00	5,829.96	5,750.00	5,749.96	25.86	12.79	-89.05	39.99	-1.63	944.59	929.70	14.89	63.429	
6,600.00	5,830.14	5,750.00	5,749.96	28.36	12.79	-89.07	39.99	-1.63	1,044.25	1,030.07	14.18	73.662	
6,700.00	5,830.06	5,750.00	5,749.96	30.90	12.79	-89.09	39.99	-1.63	1,143.94	1,128.36	15.58	73.413	
6,800.00	5,829.89	5,750.00	5,749.96	33.48	12.79	-89.15	39.99	-1.63	1,243.67	1,225.48	18.20	68.349	
6,900.00	5,829.82	5,750.00	5,749.96	36.08	12.79	-89.24	39.99	-1.63	1,343.44	1,321.06	22.37	60.043	
7,000.00	5,829.64	5,750.00	5,749.96	38.70	12.79	-89.32	39.99	-1.63	1,443.23	1,425.36	17.86	80.798	
7,100.00	5,830.06	5,750.00	5,749.96	41.34	12.79	-89.31	39.99	-1.63	1,543.09	1,525.72	17.37	88.831	
7,200.00	5,830.53	5,750.00	5,749.96	44.00	12.79	-89.31	39.99	-1.63	1,642.97	1,625.11	17.86	91.975	
7,300.00	5,831.49	5,739.26	5,739.25	46.67	12.77	-89.30	40.00	-0.88	1,742.71	1,723.61	19.09	91.268	
7,400.00	5,833.16	5,738.60	5,738.59	49.35	12.77	-89.29	40.00	-0.85	1,842.63	1,822.53	20.10	91.659	
7,500.00	5,835.50	5,738.10	5,738.09	52.04	12.77	-89.28	40.00	-0.82	1,942.59	1,921.37	21.22	91.536	
7,600.00	5,838.29	5,737.72	5,737.71	54.74	12.77	-89.27	40.00	-0.80	2,042.56	2,018.75	23.82	85.764	
7,700.00	5,841.15	5,737.38	5,737.37	57.44	12.76	-89.29	40.00	-0.78	2,142.53	2,092.03	50.50	42.425	
7,800.00	5,843.40	5,736.97	5,736.96	60.13	12.76	-89.38	40.00	-0.76	2,242.43	2,180.87	61.56	36.427	
7,900.00	5,846.01	5,736.65	5,736.64	62.83	12.76	-89.48	40.00	-0.75	2,342.31	2,273.32	68.99	33.949	
8,000.00	5,846.80	5,736.10	5,736.09	65.54	12.76	-89.59	40.00	-0.72	2,442.14	2,390.39	51.75	47.193	
8,100.00	5,846.60	5,725.00	5,725.00	68.24	12.74	-89.67	40.00	-0.36	2,542.12	2,498.01	44.11	57.634	
8,200.00	5,846.65	5,725.00	5,725.00	70.96	12.74	-89.71	40.00	-0.36	2,641.99	2,605.66	36.33	72.715	
8,300.00	5,847.14	5,725.00	5,725.00	73.68	12.74	-89.74	40.00	-0.36	2,741.89	2,700.79	41.09	66.726	
8,400.00	5,848.24	5,725.00	5,725.00	76.40	12.74	-89.77	40.00	-0.36	2,841.82	2,815.00	26.81	105.979	
8,500.00	5,850.33	5,725.00	5,725.00	79.13	12.74	-89.78	40.00	-0.36	2,941.79	2,897.72	44.07	66.750	
8,600.00	5,852.54	5,725.00	5,725.00	81.86	12.74	-89.80	40.00	-0.36	3,041.76	2,981.08	60.68	50.126	
8,700.00	5,854.83	5,725.00	5,725.00	84.58	12.74	-89.83	40.00	-0.36	3,141.73	3,071.85	69.88	44.959	
8,800.00	5,857.43	5,725.00	5,725.00	87.31	12.74	-89.86	40.00	-0.36	3,241.69	3,163.25	78.44	41.326	
8,900.00	5,860.30	5,725.00	5,725.00	90.04	12.74	-89.89	40.00	-0.36	3,341.67	3,261.42	80.25	41.641	
9,000.00	5,862.78	5,725.00	5,725.00	92.78	12.74	-89.91	40.00	-0.36	3,441.65	3,400.97	40.69	84.588	
9,100.00	5,864.27	5,725.00	5,725.00	95.51	12.74	-89.91	40.00	-0.36	3,541.62	3,510.47	31.15	113.708	
9,200.00	5,865.86	5,725.00	5,725.00	98.25	12.74	-89.91	40.00	-0.36	3,641.59	3,608.47	33.12	109.961	
9,300.00	5,868.00	5,725.00	5,725.00	100.99	12.74	-89.91	40.00	-0.36	3,741.57	3,706.35	35.23	106.215	
9,400.00	5,870.55	5,725.00	5,725.00	103.73	12.74	-89.91	40.00	-0.36	3,841.56	3,806.38	35.19	109.176	
9,500.00	5,873.09	5,725.00	5,725.00	106.47	12.74	-89.91	40.00	-0.36	3,941.55	3,894.67	46.88	84.072	
9,600.00	5,875.95	5,725.00	5,725.00	109.21	12.74	-89.91	40.00	-0.36	4,041.55	4,006.81	34.74	116.335	
9,700.00	5,877.16	5,725.00	5,725.00	111.95	12.74	-89.91	40.00	-0.36	4,141.51	4,105.93	35.58	116.403	
9,800.00	5,877.05	5,725.00	5,725.00	114.69	12.74	-89.91	40.00	-0.36	4,241.44	4,203.66	38.38	110.526	
9,900.00	5,877.22	5,725.00	5,725.00	117.43	12.74	-89.92	40.00	-0.36	4,341.37	4,301.23	40.14	108.143	
10,000.00	5,877.76	5,725.00	5,725.00	120.17	12.74	-89.92	40.00	-0.36	4,441.33	4,403.50	37.83	117.405	
10,100.00	5,878.66	5,725.00	5,725.00	122.92	12.74	-89.92	40.00	-0.36	4,541.29	4,502.94	38.35	118.418	
10,200.00	5,879.76	5,725.00	5,725.00	125.66	12.74	-89.92	40.00	-0.36	4,641.27	4,602.18	39.09	118.738	
10,262.00	5,880.52	5,725.00	5,725.00	127.36	12.74	-89.92	40.00	-0.36	4,703.25	4,663.71	39.54	118.952	

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



Anticollision Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #11H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3894.00usft (Capstar 114)
Reference Site:	Crow Federal	MD Reference:	KB @ 3894.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#11H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	OH/Job #1310714	Database:	GCR-DB v5000
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB @ 3894.00usft (Capstar 114)

Coordinates are relative to: #11H

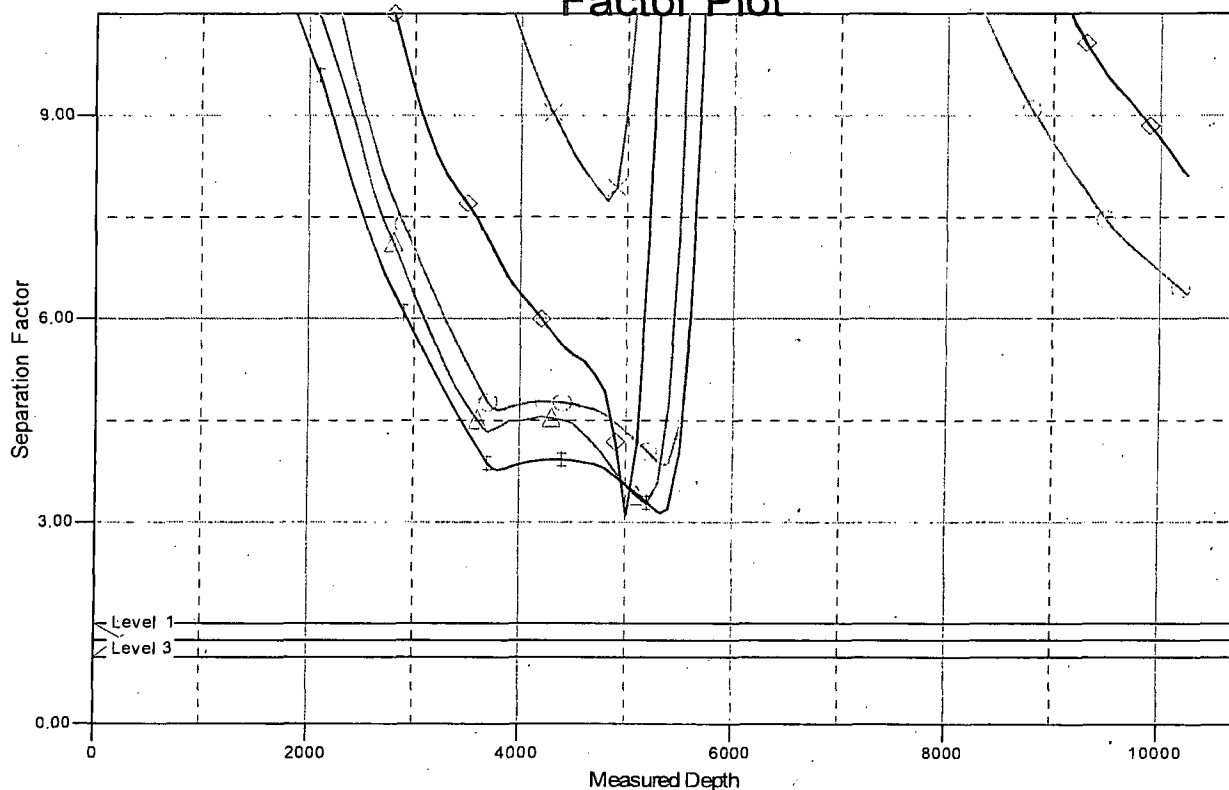
Offset Depths are relative to Offset Datum

Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30

Central Meridian is 104° 19' 60.000000 W

Grid Convergence at Surface is: 0.25°

Separation Factor Plot



LEGEND

Wellbore #1 / Job #1210350, Plan 1 4-25-2012 V0 #13H, OH/Job #1310316, Surveys (Capstar 114) V0 #15H, OH/Job #1310461, Plan #2 04-18-1
H/Job #1310298, Surveys (Capstar 114) V0 #14H, OH/Job #1310557, Surveys (Capstar 114) V0



Apache Corporation

Eddy County, NM (NAD27 NME)

Crow Federal

#11H

OH/Job #1310714

Survey: Phoenix MWD Survey

Survey Report

25 June, 2013



PHOENIX
TECHNOLOGY SERVICES



Survey Report



Company	Apache Corporation	Local Co-ordinate Reference	Well #11H
Project	Eddy County, NM (NAD27 NME)	TVD Reference	KB @ 3894.00usft (Capstar 114)
Site	Crow Federal	MD Reference	KB @ 3894.00usft (Capstar 114)
Well	#11H	North Reference	Grid
Wellbore	OH/Job #1310714	Survey Calculation Method	Minimum Curvature
Design	Surveys (Capstar 114)	Database	GCR DB v5000

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	Latitude:	32° 50' 38.927956 N
From:	Map	Easting:	643,906.80	usft	Longitude:	103° 51' 53.166888 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "		Grid Convergence:	0.25 °

Well	#11H					
Well Position	+N/-S	0.00 usft	Northing:	671,195.90 usft	Latitude:	32° 50' 39.571153 N
	+E/-W	0.00 usft	Easting:	643,906.40 usft	Longitude:	103° 51' 53.168197 W
Position Uncertainty	0.00 usft		Wellhead Elevation:	usft	Ground Level:	3,884.00 usft

Wellbore	OH/Job #1310714
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Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
	IGRF2010_14	06/10/13	(°) 7.52	(°) 60.66	(nT) 48,755

Design	Surveys (Capstar 114)
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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	89.57

Survey Program		Date 06/25/13		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
622.00	10,262.00	Phoenix MWD Survey (OH/Job #1310714)	MWD	MWD - Standard



Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #11H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3894.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3894.00usft (Capstar 114)
Well:	#11H	North Reference:	Grid
Wellbore:	OH/Job #1310714	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	GCR DB v5000

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	N/S (usft)	E/W (usft)	V:Sec (usft)	DLeg (%/100usft)	Northing (usft)	Easting (usft)	
600.00	0.43	226.12	-3,294.01	599.99	-2.30	-1.78	-1.80	0.00	671,193.60	643,904.62	
Gyro Tie-on											
622.00	0.60	221.50	-3,272.01	621.99	-2.44	-1.91	-1.93	0.79	671,193.46	643,904.49	
First Phoenix MWD Survey											
695.00	0.60	206.10	-3,199.01	694.99	-3.07	-2.34	-2.36	0.22	671,192.83	643,904.06	
781.00	0.60	150.20	-3,113.02	780.98	-3.87	-2.31	-2.34	0.65	671,192.03	643,904.09	
866.00	1.50	102.10	-3,028.03	865.97	-4.49	-1.00	-1.03	1.40	671,191.41	643,905.40	
952.00	2.20	98.50	-2,942.08	951.92	-4.97	1.73	1.70	0.82	671,190.93	643,908.13	
1,038.00	2.70	94.90	-2,856.16	1,037.84	-5.38	5.38	5.34	0.61	671,190.52	643,911.78	
1,123.00	3.60	87.40	-2,771.29	1,122.71	-5.43	10.04	10.00	1.16	671,190.47	643,916.44	
1,209.00	4.00	90.20	-2,685.47	1,208.53	-5.32	15.74	15.70	0.51	671,190.58	643,922.14	
1,294.00	4.40	91.30	-2,600.70	1,293.30	-5.41	21.97	21.92	0.48	671,190.49	643,928.37	
1,380.00	4.70	93.60	-2,514.97	1,379.03	-5.70	28.78	28.74	0.41	671,190.20	643,935.18	
1,466.00	5.00	94.60	-2,429.28	1,464.72	-6.22	36.03	35.98	0.36	671,189.68	643,942.43	
1,550.00	3.70	98.60	-2,345.53	1,548.47	-6.92	42.36	42.31	1.59	671,188.98	643,948.76	
1,636.00	2.20	106.60	-2,259.64	1,634.36	-7.81	46.69	46.63	1.80	671,188.09	643,953.09	
1,721.00	1.00	144.60	-2,174.67	1,719.33	-8.88	48.68	48.61	1.81	671,187.02	643,955.08	
1,807.00	1.10	142.90	-2,088.69	1,805.31	-10.15	49.61	49.53	0.12	671,185.75	643,956.01	
1,893.00	1.50	82.90	-2,002.71	1,891.29	-10.67	51.23	51.15	1.56	671,185.23	643,957.63	
1,978.00	1.50	73.80	-1,917.74	1,976.26	-10.22	53.40	53.32	0.28	671,185.68	643,959.80	
2,064.00	1.50	71.30	-1,831.77	2,062.23	-9.55	55.55	55.47	0.08	671,186.35	643,961.95	
2,149.00	1.10	35.00	-1,746.79	2,147.21	-8.52	57.07	57.00	1.05	671,187.38	643,963.47	
2,235.00	1.30	16.20	-1,660.80	2,233.20	-6.91	57.81	57.76	0.51	671,188.99	643,964.21	
2,321.00	1.40	17.00	-1,574.83	2,319.17	-4.97	58.39	58.35	0.12	671,190.93	643,964.79	
2,405.00	1.40	11.00	-1,490.85	2,403.15	-2.98	58.89	58.87	0.17	671,192.92	643,965.29	
2,491.00	1.50	11.80	-1,404.88	2,489.12	-0.84	59.32	59.31	0.12	671,195.06	643,965.72	
2,577.00	1.50	6.00	-1,318.91	2,575.09	1.38	59.67	59.68	0.18	671,197.28	643,966.07	



Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #11H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3894.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3894.00usft (Capstar 114)
Well:	#11H	North Reference:	Grid
Wellbore:	OH/Job #1310714	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	GCR DB v5000

Survey											
MD (usft)	Inc. (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	N/S (usft)	E/W (usft)	V Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)	
2,662.00	1.70	7.20	-1,233.94	2,660.06	3.73	59.94	59.97	0.24	671,199.63	643,966.34	
2,748.00	0.50	355.90	-1,147.96	2,746.04	5.37	60.08	60.11	1.41	671,201.27	643,966.48	
2,833.00	0.40	328.70	-1,062.96	2,831.04	6.00	59.89	59.94	0.27	671,201.90	643,966.29	
2,919.00	0.70	330.70	-976.97	2,917.03	6.71	59.48	59.53	0.35	671,202.61	643,965.88	
3,005.00	0.80	340.80	-890.98	3,003.02	7.74	59.03	59.08	0.19	671,203.64	643,965.43	
3,090.00	0.90	333.60	-805.98	3,088.02	8.90	58.54	58.60	0.17	671,204.80	643,964.94	
3,176.00	0.90	329.50	-720.00	3,174.00	10.08	57.89	57.97	0.07	671,205.98	643,964.29	
3,261.00	1.00	323.40	-635.01	3,258.99	11.25	57.11	57.19	0.17	671,207.15	643,963.51	
3,347.00	1.10	324.70	-549.02	3,344.98	12.53	56.19	56.28	0.12	671,208.43	643,962.59	
3,432.00	1.10	330.40	-464.04	3,429.96	13.90	55.31	55.41	0.13	671,209.80	643,961.71	
3,451.00	1.10	329.70	-445.04	3,448.96	14.22	55.13	55.24	0.07	671,210.12	643,961.53	
3,516.00	1.10	327.40	-380.05	3,513.95	15.28	54.48	54.59	0.07	671,211.18	643,960.88	
3,602.00	1.20	321.10	-294.07	3,599.93	16.68	53.47	53.59	0.19	671,212.58	643,959.87	
3,688.00	1.10	321.50	-208.09	3,685.91	18.03	52.39	52.52	0.12	671,213.93	643,958.79	
3,773.00	0.80	160.30	-123.09	3,770.91	18.11	52.08	52.22	2.21	671,214.01	643,958.48	
3,859.00	1.70	147.20	-37.11	3,856.89	16.47	52.97	53.10	1.09	671,212.37	643,959.37	
3,944.00	1.60	145.90	47.85	3,941.85	14.43	54.32	54.43	0.13	671,210.33	643,960.72	
4,030.00	1.50	144.60	133.82	4,027.82	12.52	55.65	55.74	0.12	671,208.42	643,962.05	
4,116.00	1.50	147.00	219.79	4,113.79	10.65	56.91	56.99	0.07	671,206.55	643,963.31	
4,201.00	1.20	144.20	304.77	4,198.77	9.00	58.04	58.11	0.36	671,204.90	643,964.44	
4,287.00	1.10	140.90	390.75	4,284.75	7.63	59.09	59.14	0.14	671,203.53	643,965.49	
4,372.00	1.20	152.30	475.73	4,369.73	6.21	60.02	60.06	0.29	671,202.11	643,966.42	
4,458.00	0.90	143.10	561.72	4,455.72	4.87	60.84	60.87	0.40	671,200.77	643,967.24	
4,543.00	0.70	149.20	646.71	4,540.71	3.89	61.51	61.53	0.26	671,199.79	643,967.91	
4,629.00	0.80	148.90	732.70	4,626.70	2.92	62.09	62.11	0.12	671,198.82	643,968.49	
4,714.00	0.90	139.20	817.69	4,711.69	1.91	62.83	62.84	0.21	671,197.81	643,969.23	
4,800.00	0.80	251.20	903.69	4,797.69	1.21	62.70	62.71	1.64	671,197.11	643,969.10	



Survey Report



Company	Apache Corporation	Local Co-ordinate Reference:	Well #11H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3894.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3894.00usft (Capstar 114)
Well:	#11H	North Reference:	Grid
Wellbore:	OH/Job #1310714	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	GCR DB v5000

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)	
4,885.00	0.70	252.20	988.68	4,882.68	0.86	61.65	61.65	0.12	671,196.76	643,968.05	
4,971.00	0.70	266.70	1,074.67	4,968.67	0.67	60.62	60.62	0.21	671,196.57	643,967.02	
5,057.00	0.60	291.70	1,160.67	5,054.67	0.80	59.68	59.68	0.35	671,196.70	643,966.08	
5,142.00	0.80	306.40	1,245.66	5,139.66	1.32	58.79	58.79	0.31	671,197.22	643,965.19	
5,227.00	1.10	347.00	1,330.65	5,224.65	2.47	58.13	58.14	0.84	671,198.37	643,964.53	
5,295.00	1.10	335.50	1,398.64	5,292.64	3.70	57.71	57.73	0.32	671,199.60	643,964.11	
5,327.00	1.00	351.50	1,430.63	5,324.63	4.25	57.54	57.57	0.96	671,200.15	643,963.94	
5,370.00	3.80	65.10	1,473.60	5,367.60	5.22	58.78	58.81	8.48	671,201.12	643,965.18	
5,413.00	9.10	72.60	1,516.31	5,410.31	6.84	63.32	63.37	12.45	671,202.74	643,969.72	
5,454.00	14.20	71.00	1,556.45	5,450.45	9.45	71.17	71.24	12.46	671,205.35	643,977.57	
5,497.00	19.80	68.90	1,597.56	5,491.56	13.79	82.96	83.06	13.10	671,209.69	643,989.36	
5,540.00	24.30	70.50	1,637.40	5,531.40	19.37	98.10	98.25	10.56	671,215.27	644,004.50	
5,583.00	29.00	74.80	1,675.83	5,569.83	25.06	116.52	116.70	11.81	671,220.96	644,022.92	
5,625.00	34.50	80.00	1,711.54	5,605.54	29.80	138.07	138.29	14.62	671,225.70	644,044.47	
5,668.00	39.40	85.30	1,745.90	5,639.90	33.03	163.69	163.93	13.58	671,228.93	644,070.09	
5,711.00	43.90	91.20	1,778.03	5,672.03	33.84	192.22	192.47	13.87	671,229.74	644,098.62	
5,754.00	48.40	94.80	1,807.82	5,701.82	32.18	223.17	223.40	12.08	671,228.08	644,129.57	
5,797.00	53.00	95.70	1,835.05	5,729.05	29.13	256.29	256.51	10.82	671,225.03	644,162.69	
5,840.00	58.00	95.50	1,859.40	5,753.40	25.68	291.55	291.74	11.63	671,221.58	644,197.95	
5,882.00	64.80	94.70	1,879.49	5,773.49	22.41	328.26	328.42	16.28	671,218.31	644,234.66	
5,925.00	71.30	93.80	1,895.55	5,789.55	19.46	368.01	368.15	15.24	671,215.36	644,274.41	
5,968.00	75.30	92.50	1,907.91	5,801.91	17.20	409.13	409.24	9.74	671,213.10	644,315.53	
6,011.00	78.60	89.90	1,917.62	5,811.62	16.33	451.00	451.11	9.67	671,212.23	644,357.40	
6,054.00	82.70	88.90	1,924.60	5,818.60	16.78	493.41	493.53	9.81	671,212.68	644,399.81	
6,096.00	87.80	88.30	1,928.08	5,822.08	17.80	535.24	535.36	12.23	671,213.70	644,441.64	
6,139.00	89.90	88.40	1,928.94	5,822.94	19.04	578.21	578.34	4.89	671,214.94	644,484.61	
6,182.00	88.80	89.50	1,929.43	5,823.43	19.83	621.20	621.33	3.62	671,215.73	644,527.60	



Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #11H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3894.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3894.00usft (Capstar 114)
Well:	#11H	North Reference:	Grid
Wellbore:	OH/Job #1310714	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	GCR DB v5000

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (%/100usft)	Northing (usft)	Easting (usft)	
6,267.00	88.70	89.60	1,931.29	5,825.29	20.49	706.18	706.31	0.17	671,216.39	644,612.58	
6,353.00	88.70	89.00	1,933.24	5,827.24	21.54	792.15	792.29	0.70	671,217.44	644,698.55	
6,438.00	88.80	88.30	1,935.09	5,829.09	23.55	877.11	877.26	0.83	671,219.45	644,783.51	
6,524.00	89.90	90.90	1,936.07	5,830.07	24.15	963.09	963.24	3.28	671,220.05	644,869.49	
6,609.00	90.00	90.80	1,936.14	5,830.14	22.89	1,048.08	1,048.22	0.17	671,218.79	644,954.48	
6,695.00	90.10	90.40	1,936.07	5,830.07	21.99	1,134.08	1,134.21	0.48	671,217.89	645,040.48	
6,780.00	90.10	90.10	1,935.92	5,829.92	21.61	1,219.08	1,219.20	0.35	671,217.51	645,125.48	
6,866.00	90.00	89.50	1,935.84	5,829.84	21.91	1,305.07	1,305.20	0.71	671,217.81	645,211.47	
6,952.00	90.20	89.40	1,935.69	5,829.69	22.74	1,391.07	1,391.20	0.26	671,218.64	645,297.47	
7,037.00	89.70	90.90	1,935.77	5,829.77	22.52	1,476.07	1,476.19	1.86	671,218.42	645,382.47	
7,123.00	89.80	90.80	1,936.14	5,830.14	21.24	1,562.06	1,562.17	0.16	671,217.14	645,468.46	
7,208.00	89.60	90.70	1,936.59	5,830.59	20.13	1,647.05	1,647.15	0.26	671,216.03	645,553.45	
7,294.00	89.30	90.90	1,937.41	5,831.41	18.93	1,733.04	1,733.13	0.42	671,214.83	645,639.44	
7,380.00	88.90	90.90	1,938.76	5,832.76	17.58	1,819.01	1,819.10	0.47	671,213.48	645,725.41	
7,465.00	88.60	90.90	1,940.62	5,834.62	16.24	1,903.98	1,904.05	0.35	671,212.14	645,810.38	
7,551.00	88.40	90.90	1,942.87	5,836.87	14.89	1,989.94	1,990.00	0.23	671,210.79	645,896.34	
7,636.00	88.20	91.00	1,945.39	5,839.39	13.48	2,074.89	2,074.94	0.26	671,209.38	645,981.29	
7,722.00	88.80	88.70	1,947.64	5,841.64	13.71	2,160.86	2,160.90	2.76	671,209.61	646,067.26	
7,807.00	88.60	88.50	1,949.57	5,843.57	15.79	2,245.81	2,245.87	0.33	671,211.69	646,152.21	
7,893.00	88.40	87.70	1,951.82	5,845.82	18.64	2,331.73	2,331.81	0.96	671,214.54	646,238.13	
7,979.00	90.20	88.20	1,952.87	5,846.87	21.71	2,417.67	2,417.76	2.17	671,217.61	646,324.07	
8,064.00	90.10	88.10	1,952.65	5,846.65	24.46	2,502.62	2,502.74	0.17	671,220.36	646,409.02	
8,150.00	90.00	89.70	1,952.57	5,846.57	26.11	2,588.61	2,588.73	1.86	671,222.01	646,495.01	
8,235.00	89.70	89.20	1,952.80	5,846.80	26.92	2,673.60	2,673.73	0.69	671,222.82	646,580.00	
8,321.00	89.70	89.30	1,953.25	5,847.25	28.05	2,759.59	2,759.72	0.12	671,223.95	646,665.99	
8,406.00	88.80	90.20	1,954.36	5,848.36	28.42	2,844.58	2,844.72	1.50	671,224.32	646,750.98	
8,492.00	88.80	89.70	1,956.16	5,850.16	28.49	2,930.56	2,930.69	0.58	671,224.39	646,836.96	



Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #11H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3894.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3894.00usft (Capstar 114)
Well:	#11H	North Reference:	Grid
Wellbore:	OH/Job #1310714	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	GCR DB v5000

Survey										
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
8,577.00	88.70	89.30	1,958.02	5,852.02	29.24	3,015.54	3,015.67	0.48	671,225.14	646,921.94
8,663.00	88.70	89.40	1,959.97	5,853.97	30.21	3,101.51	3,101.65	0.12	671,226.11	647,007.91
8,748.00	88.50	88.90	1,962.04	5,856.04	31.47	3,186.48	3,186.62	0.63	671,227.37	647,092.88
8,834.00	88.40	89.30	1,964.37	5,858.37	32.82	3,272.43	3,272.59	0.48	671,228.72	647,178.83
8,920.00	88.20	89.40	1,966.92	5,860.92	33.80	3,358.39	3,358.55	0.26	671,229.70	647,264.79
9,005.00	89.20	89.70	1,968.85	5,862.85	34.46	3,443.37	3,443.53	1.23	671,230.36	647,349.77
9,091.00	89.10	90.10	1,970.12	5,864.12	34.62	3,529.36	3,529.52	0.48	671,230.52	647,435.76
9,176.00	89.10	90.20	1,971.46	5,865.46	34.39	3,614.34	3,614.50	0.12	671,230.29	647,520.74
9,262.00	88.70	90.20	1,973.11	5,867.11	34.09	3,700.33	3,700.48	0.47	671,229.99	647,606.73
9,347.00	88.50	90.20	1,975.19	5,869.19	33.80	3,785.30	3,785.45	0.24	671,229.70	647,691.70
9,433.00	88.60	89.90	1,977.36	5,871.36	33.72	3,871.27	3,871.42	0.37	671,229.62	647,777.67
9,518.00	88.40	89.90	1,979.59	5,873.59	33.87	3,956.25	3,956.39	0.24	671,229.77	647,862.65
9,604.00	88.30	90.10	1,982.07	5,876.07	33.87	4,042.21	4,042.35	0.26	671,229.77	647,948.61
9,690.00	90.20	90.20	1,983.19	5,877.19	33.64	4,128.20	4,128.33	2.21	671,229.54	648,034.60
9,775.00	90.00	89.90	1,983.04	5,877.04	33.57	4,213.20	4,213.33	0.42	671,229.47	648,119.60
9,861.00	89.90	89.80	1,983.12	5,877.12	33.79	4,299.20	4,299.33	0.16	671,229.69	648,205.60
9,946.00	89.70	89.90	1,983.41	5,877.41	34.02	4,384.20	4,384.33	0.26	671,229.92	648,290.60
10,032.00	89.50	90.10	1,984.01	5,878.01	34.02	4,470.19	4,470.32	0.33	671,229.92	648,376.59
10,118.00	89.40	90.10	1,984.84	5,878.84	33.87	4,556.19	4,556.32	0.12	671,229.77	648,462.59
10,208.00	89.30	90.10	1,985.86	5,879.86	33.71	4,646.18	4,646.31	0.11	671,229.61	648,552.58
Final MWD Survey										
10,262.00	89.30	90.10	1,986.52	5,880.52	33.62	4,700.18	4,700.30	0.00	671,229.52	648,606.58
Projection to TD										



Survey Report



Company:	Apache Corporation	Local Co-ordinate/Reference:	Well #11H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3894.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3894.00usft (Capstar 114)
Well:	#11H	North Reference:	Grid
Wellbore:	OH/Job #1310714	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	GCR DB v5000

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
600.00	599.99	-2.30	-1.78	Gyro Tie-on
622.00	621.99	-2.44	-1.91	First Phoenix MWD Survey
10,208.00	5,879.86	33.71	4,646.18	Final MWD Survey
10,262.00	5,880.52	33.62	4,700.18	Projection to TD



Project: Eddy County, NM (NAD27 NME)
Site: Crow Federal
Well: #11H
Wellbore: OH/Job #1310714
Design: Plan #2 06-10-13
Rig: Capstar 114

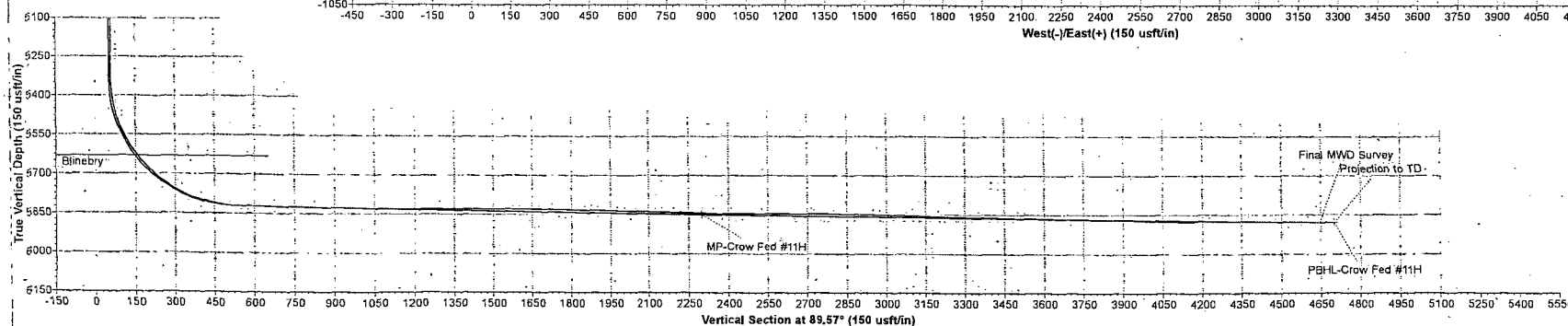
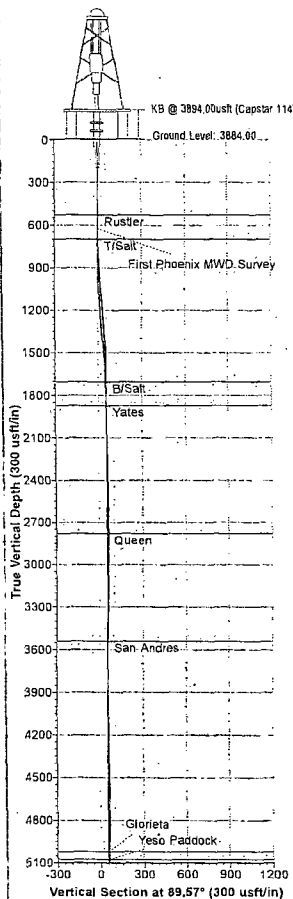


PHOENIX
TECHNOLOGY SERVICES



Azimuths to Grid North
True North: -0.25°
Magnetic North: 7.27°

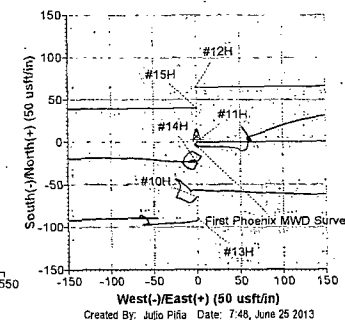
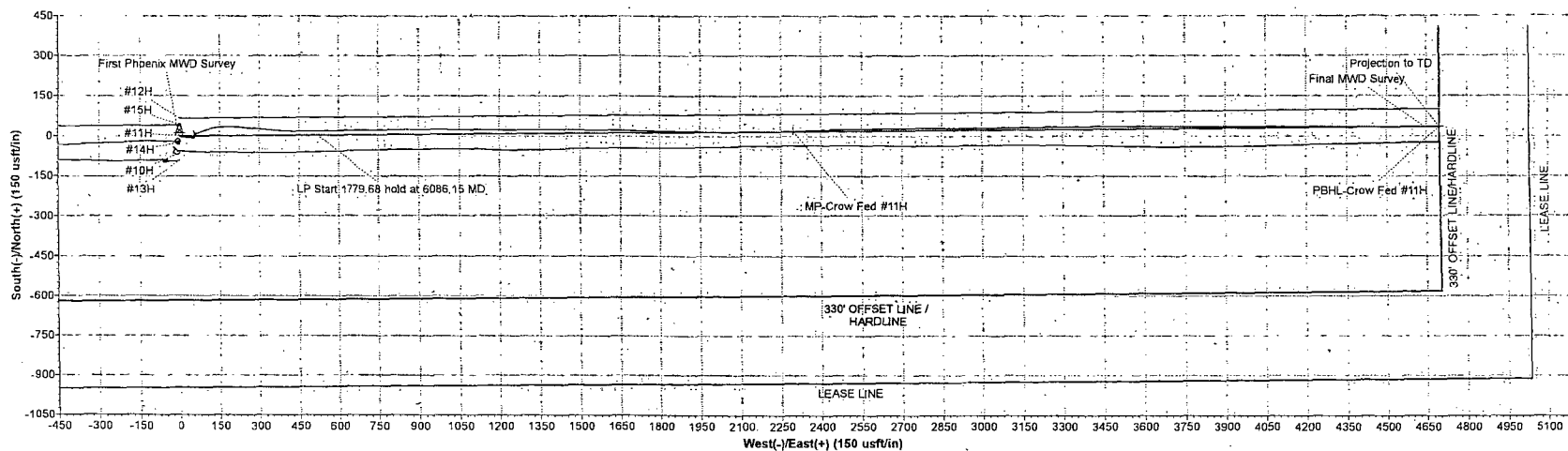
Magnetic Field
Strength: 48755.0nT
Dip Angle: 60.66°
Date: 06/10/2013
Model: IGRF2010_14



WELL DETAILS													
+N-S		+E-W		Northing		Ground Level: 3884.00		Easting		Latitude		Longitude	
0.00		0.00		671195.99		643906.40		32° 50' 39.571153 N		103° 51' 53.168197 W			
SECTION DETAILS													
Sec	MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	VSec	Target	Annotation		
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.00		
2	675.00	0.00	0.00	675.00	0.00	0.00	0.00	0.00	0.00	0.00	Start 500.00 hold at 875.00 MD		
3	875.00	4.00	85.57	874.94	0.05	9.98	2.00	89.57	6.98		Start Drop -1.50		
4	1375.00	4.00	89.57	1373.92	0.31	41.86	0.00	0.00	41.86		Start 3702.53 hold at 1641.67 MD		
5	1641.67	0.00	0.00	1640.87	0.38	51.16	1.50	180.00	51.16		KOP Start Build 12.00 ~		
6	5344.20	0.00	0.00	5342.80	0.38	51.16	0.00	0.00	51.16		LP Start 1779.68 hold at 6086.15 MD		
7	6086.14	89.03	89.57	5820.00	3.94	520.56	12.00	85.57	520.57		Start DLS 2.00 TFO 0.02		
8	7865.92	85.03	89.57	5950.00	17.42	2299.93	0.00	0.00	2300.00	MP-Crow Fed #11H	Start 2386.19 hold at 7676.35 MD		
9	7676.35	86.28	89.57	5850.16	17.51	2312.46	2.00	0.02	2312.53		TD at 10266.55		
10	10266.55	89.26	89.57	5880.00	35.60	4700.40	0.00	0.00	4700.53	PBHL-Crow Fed #11H			
DESIGN TARGET DETAILS													
Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude	Shape					
MP-Crow Fed #11H	5850.00	17.42	2299.93	671213.32	646206.33	32° 50' 39.641768 N	103° 51' 25.208673 W	Point					
- plan hits target center													
PBHL-Crow Fed #11H	5880.00	35.60	4700.40	671231.50	648606.80	32° 50' 39.713749 N	103° 50' 58.071144 W	Point					
- plan hits target center													

PROJECT DETAILS: Eddy County, NM (NAD27 NME)											
Geodetic System: US State Plane 1927 (Exact solution)											
Datum: NAD 1927 (NADCON CONUS)											
Ellipsoid: Clarke 1866											
Zone: New Mexico East 3001											
System Datum: Mean Sea Level											
SITE DETAILS: Crow Federal											
Site Centre Northing: 671130.90											
Easting: 643906.80											
Posterior Uncertainty: 0.00											
Convergence: 0.25											
Local North: Grid											
FORMATION TOP DETAILS											
TVDPath	MDPath	Formation	DipAngle	DipDir							
530.00	530.00	Rustler	0.00								
701.00	701.00	T/Salt	0.00								
1705.00	1705.00	B/Salt	0.00								
1872.00	1873.00	Yates	0.00								
2781.00	2782.00	Queen	0.00								
3541.00	3542.00	San Andres	0.00								
5021.00	5022.00	Glorieta	0.00								
5075.00	5076.00	Yeso Paddock	0.00								
5633.00	5636.37	Blinebry	0.00								

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 #11H, Grid North											
Latitude: 32° 50' 39.571153 N											
Longitude: 103° 51' 53.168197 W											
Grid East: 643906.40											
Grid North: 671195.90											
Scale Factor: 1.000											
Geomagnetic Model: IGRF2010_14											
Sample Date: 10-Jun-13											
Magnetic Declination: 7.52°											
Dip Angle from Horizontal: 60.66°											
Magnetic Field Strength: 48755											
To convert a Magnetic Direction to a Grid Direction, Add 7.27°											
To convert a Magnetic Direction to a True Direction, Add 7.52° East											
To convert a True Direction to a Grid Direction, Subtract 0.25°											
LEGEND											
— #12H, Wellbore #1 / Job #1210350, Plan 1 4-25-2012 V0											
— #10H, OH / Job #1310298, Surveys (Capstar 114) V0											
— #11H, OH/Job #1310714, Surveys (Capstar 114) V0											
— #13H, OH / Job #1310316, Surveys (Capstar 114) V0											
— #14H, OH/Job #1310557, Surveys (Capstar 114) V0											
— #15H, OH / Job #1310461, Plan #2 04-18-13 V0											
— Plan #2 06-10-13											



Created By: Julio Pilla Date: 7-48, June 25 2013

Hydraulic Fracturing Fluid Product Component Information Disclosure

Fracture Date:	8/30/2013
State:	NM
County:	Eddy
API Number:	30-015-40575
Operator Name:	Apache Corporation
Well Name and Number:	Crow Federal 11H
Longitude:	-103.8647286
Latitude:	32.8443354
Long/Lat Projection:	NAD27
Production Type:	Gas
True Vertical Depth (TVD):	5,880
Total Water Volume (gal):	2,643,648

Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	Swire	Carrier/Base Fluid	Water	7732-18-5	100.000%	86.41077%	
Sand (Proppant)	TSS	Proppant	Silica Substrate	14808-60-7	100.000%	9.52149%	
Hydrochloric Acid (15%)	Reagent	Acidizing	Hydrochloric Acid	7647-01-0	15.00000%	0.53345%	
AP-Bio-1	Dow Chemical	Biocide	Glutaraldehyde	111-30-8	42.50000%	0.01853%	
			Quaternary ammonium compounds, benzalkonium	68424-85-1	7.50000%	0.00327%	
			Ethanol	64-17-5	1.00000%	0.00044%	
AP-FR-1	Ashland	Friction Reducer	Hydrocarbon, aliphatic	25450-40-01	30.00000%	0.02696%	
			Fatty alcohol alkoxylate	Proprietary	5.00000%	0.00449%	
			Polyacrylate, based copolymer	Proprietary	35.00000%	0.03146%	
Ferriplex 40	Chemplex	Iron Control	Sodium Hydroxide	1310-73-2	1.00000%	0.00017%	
			Sodium Sulfate Anhydrous	7757-82-6	2.00000%	0.00034%	
			Trisodium Nitrilotriacetate	5064-31-3	40.00000%	0.00672%	
Plexbreak 145	Chemplex	Non-Emulsifier	2-Butoxyethanol	111-76-2	15.00000%	0.00095%	
			Cocamide Based Surfactant	Proprietary	10.00000%	0.00064%	
			Diethanolamine	111-42-2	3.00000%	0.00019%	
			Methyl Alcohol	67-56-1	15.00000%	0.00095%	
AP-Scale-1	Blentech	Scale Inhibitor	Ethylene Glycol	107-21-1	35.00000%	0.01597%	
			Polyacrylate blend	Proprietary	7.00000%	0.00319%	
Plexhib 256	Chemplex	Acid Inhibitor	Methyl Alcohol	67-56-1	60.00000%	0.00341%	
			Propargyl Alcohol	107-19-7	10.00000%	0.00057%	
			Thiourea/Formaldehyde Copolymer	68527-49-1	30.00000%	0.00171%	
			Polyethoxylated Alcohol Surfactant	68951-67-7	30.00000%	0.00171%	
			C-14 to C-16 Alpha Olefins	64743-02-8	5.00000%	0.00028%	
AP-Surf-1A	Blentech	Surfactant	Methanol	67-56-1	25.00000%	0.02099%	
			Sulfonate	Proprietary	4.00000%	0.00336%	
			Alkyl alkoxylate	Proprietary	11.00000%	0.00924%	
Claymax	Chemplex	Clay Stabilizer	Choline Chloride	67-48-1	65.00000%	0.11328%	

Hydraulic Fracturing Fluid Composition

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Plexset 730	Chemplex	Proppant Consolidator	Alcohol Ethoxylates	Proprietary	60.00000%	0.02712%	
			Methyl Alcohol	67-56-1	50.00000%	0.02260%	

* Total Water Volume sources may include fresh water, produced water, and/or recycled water

** Information is based on the maximum potential for concentration and thus the total may be over 100%

All component information listed was obtained from the supplier's Material Safety Data Sheets (MSDS). As such, the Operator is not responsible for inaccurate and/or incomplete information. Any questions regarding the content of the MSDS should be directed to the supplier who provided it. The Occupational Safety and Health Administration's (OSHA) regulations govern the criteria for the disclosure of this information. Please note that Federal Law protects "proprietary", "trade secret", and "confidential business information" and the criteria for how this information is reported on an MSDS is subject to 29 CFR 1910.1200(i) and Appendix D.

DISTRICT I
1625 N. French Dr., Hobbs, NM 88240
Phone: (505) 393-6161 Fax: (505) 393-0720

DISTRICT II
811 S. First St., Artesia, NM 88210
Phone: (505) 748-1283 Fax: (505) 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

DAMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-15-40575	Pool Code 26770	Pool Name FREN; GLORIETA-YESO
Property Code 308711	Property Name CROW FEDERAL	Well Number 11H
OXIRID No. 873	Operator Name APACHE CORPORATION	Elevation 3884'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	10	17-S	31-E		948	SOUTH	250	WEST	EDDY

As-Drilled 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
P	10	17-S	31-E		946	SOUTH	331	EAST	EDDY
Dedicated Acres 160	Joint or Infill	Consolidation Code	Order No.						

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

CORNER COORDINATES TABLE A - Y=671567.1 N, X=643654.3 E B - Y=671606.0 N, X=648934.5 E C - Y=670246.2 N, X=643662.0 E D - Y=670286.2 N, X=648942.1 E		GEODETIC COORDINATES NAD 27 NME SURFACE LOCATION Y=671195.9 N X=643906.4 E LAT.=32°44'32.5" N LONG.=103°86'47.69" W LAT.=32° 50' 40" N LONG.=103° 51' 53" W AS-DRILL BOTTOM HOLE LOCATION NAD 27 NME Y= 671229.5 N X=648605.5 E		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 unleased 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. Signature: <i>Fatima Vasquez</i> Date: 11/20/2013 Printed Name: Fatima Vasquez E-mail Address: Fatima.Vasquez@apachecorp.com			
DETAIL		KICK OFF POINT NAD 27 NME Y= 671200.5 N X=643964.4 E		FIRST TAKE POINT NAD 27 NME Y= 671212.9 N X=644407.6 E		LAST TAKE POINT NAD 27 NME Y= 671229.6 N X=648505.5 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. JANUARY 19, 2012 Date of Survey: 11/20/2013 Signature: <i>Ronald J. Eidson</i> Seal of Professional Surveyor: 3239 Certification: Ronald J. Eidson 12641 Ronald J. Eidson 3239 ACK. REC. W.O. 12110635 JWSC W.O. 13.13.1252	

District I
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1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources

Form C-104
Revised August 1, 2011

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Submit one copy to appropriate District Office

☐ AMENDED REPORT

I. REQUEST FOR ALLOWABLE AND AUTHORIZATION TO TRANSPORT

¹ Operator name and Address Apache Corporation 303 Veterans Airpark Lane Suite 3000 Midland TX 79705		² OGRID Number 873
		³ Reason for Filing Code/ Effective Date NW / 11/04/2013
⁴ API Number 30-015-40575	⁵ Pool Name Fren; Glorieta-Yeso	⁶ Pool Code 26770
⁷ Property Code 308711	⁸ Property Name Crow Federal	⁹ Well Number 11H

II. ¹⁰Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South Line	Feet from the	East/West line	County
M	10	17S	31E		948	South	250	West	Eddy

¹¹ Bottom Hole Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	10	17S	31E		946	South	331	East	Eddy
¹² Use Code F	¹³ Producing Method Code P	¹⁴ Gas Connection Date 11/04/2013	¹⁵ C-129 Permit Number	¹⁶ C-129 Effective Date	¹⁷ C-129 Expiration Date				

III. Oil and Gas Transporters

¹⁸ Transporter OGRID	¹⁹ Transporter Name and Address	²⁰ O/G/W
221115	Frontier Field Services LLC 4200 East Skelly Drive Suite 700 Tulsa OK 74135	G
15694	Navajo Refining Co P/L Division PO Box 159 Artesia NM 88211	O

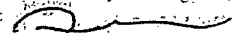
IV. Well Completion Data

²¹ Spud Date 06/11/2013	²² Ready Date 11/04/2013	²³ TD 10,262'	²⁴ PBTD 10,262'	²⁵ Perforations 6062'-10,162'	²⁶ DHC, MC
²⁷ Hole Size	²⁸ Casing & Tubing Size	²⁹ Depth Set	³⁰ Sacks Cement		
17-1/2"	13-3/8"	597'	650 sx Class C		
11"	8-5/8"	3502'	1610 sx Class C & Poz		
7-7/8"	5-1/2"	10,262'	1820 sx Class H & PVL		
Tubing	2-7/8"	5679'			

V. Well Test Data

³¹ Date New Oil 11/04/2013	³² Gas Delivery Date 11/04/2013	³³ Test Date 12/01/2013	³⁴ Test Length 24	³⁵ Tbg. Pressure	³⁶ Csg. Pressure
³⁷ Choke Size	³⁸ Oil	³⁹ Water	⁴⁰ Gas		⁴¹ Test Method P
	166	1435	305		

⁴² I hereby certify that the rules of the Oil Conservation Division have been complied with and that the information given above is true and complete to the best of my knowledge and belief.

Signature: 

OIL CONSERVATION DIVISION

Approved by:

Printed name:
Fatima Vasquez

Title:

Title:
Regulatory Tech II

Approval Date:

E-mail Address:
Fatima.Vasquez@apachecorp.com

Date:
12/04/2013

Phone:
(432) 818-1015