



Apache Corporation

Eddy County, NM (NAD27 NME)

Washington 33 State

#68 API #30-015-41681

WB1/Job #1311577

Survey: Phoenix MWD Survey

Apache Corporation

24 November, 2013



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #68
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3693.00usft (Capstar 114)
Site:	Washington 33 State	MD Reference:	KB @ 3693.00usft (Capstar 114)
Well:	#68	North Reference:	Grid
Wellbore:	WB1/Job #1311577	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	Compass 5000 GCR DB

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

Site		Washington 33 State				
Site Position:		Northing:	653,591.90	usft	Latitude:	32° 47' 48.16208 N
From:	Map	Easting:	549,165.70	usft	Longitude:	104° 10' 23.99797 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16	"	Grid Convergence:	0.09 °

Well	#68					
Well Position	+N/-S	0.00 usft	Northing:	653,929.60 usft	Latitude:	32° 47' 51.54004 N
	+E/-W	0.00 usft	Easting:	546,679.10 usft	Longitude:	104° 10' 53.12402 W
Position Uncertainty	0.00 usft		Wellhead Elevation:	usft	Ground Level:	3,682.00 usft

Wellbore		WB1/Job #1311577			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2013	11/05/13	7.74	60.54	48,632

Design		Surveys (Capstar 114)		
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	185.50

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Survey Program		Date 11/24/13		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	500.00	Gyrodata Survey (WB1/Job #1311577)	CB-GYRO-MS	Camera based gyro multishot
615.00	4,517.00	Phoenix MWD Survey (WB1/Job #131157)	MWD	MWD - Standard

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)
500.00	1.04	92.91	-3,193.08	499.92	-0.76	8.38	-0.04	0.00	653,928.84	546,687.48
615.00	1.00	65.60	-3,078.10	614.90	-0.40	10.34	-0.59	0.42	653,929.20	546,689.44
First Phoenix MWD Survey										
701.00	1.00	58.50	-2,992.11	700.89	0.30	11.66	-1.42	0.14	653,929.90	546,690.76
786.00	1.80	103.90	-2,907.14	785.86	0.37	13.59	-1.67	1.54	653,929.97	546,692.69
872.00	1.30	105.90	-2,821.17	871.83	-0.22	15.84	-1.29	0.58	653,929.38	546,694.94
957.00	2.60	102.30	-2,736.22	956.78	-0.90	18.65	-0.89	1.54	653,928.70	546,697.75
1,043.00	3.60	116.70	-2,650.35	1,042.65	-2.53	22.97	0.31	1.47	653,927.07	546,702.07
1,129.00	4.90	130.00	-2,564.58	1,128.42	-6.10	28.19	3.37	1.89	653,923.50	546,707.29
1,214.00	5.30	143.50	-2,479.92	1,213.08	-11.59	33.31	8.35	1.48	653,918.01	546,712.41
1,300.00	5.20	165.80	-2,394.27	1,298.73	-18.56	36.63	14.97	2.36	653,911.04	546,715.73
1,385.00	5.30	186.30	-2,309.62	1,383.38	-26.20	37.14	22.52	2.20	653,903.40	546,716.24
1,471.00	5.50	191.10	-2,224.00	1,469.00	-34.19	35.91	30.59	0.57	653,895.41	546,715.01
1,557.00	6.50	189.60	-2,138.47	1,554.53	-43.04	34.31	39.55	1.18	653,886.56	546,713.41
1,642.00	5.70	189.40	-2,053.95	1,639.05	-51.94	32.82	48.56	0.94	653,877.66	546,711.92
1,728.00	6.50	192.10	-1,968.44	1,724.56	-60.92	31.10	57.66	0.99	653,868.68	546,710.20
1,814.00	6.30	192.60	-1,882.98	1,810.02	-70.28	29.05	67.17	0.24	653,859.32	546,708.15
1,899.00	7.30	202.20	-1,798.57	1,894.43	-79.83	25.99	76.98	1.78	653,849.77	546,705.09
1,985.00	6.90	200.20	-1,713.23	1,979.77	-89.74	22.14	87.21	0.55	653,839.86	546,701.24
2,070.00	6.60	198.60	-1,628.82	2,064.18	-99.16	18.82	96.90	0.42	653,830.44	546,697.92
2,156.00	6.50	199.60	-1,543.38	2,149.62	-108.43	15.61	106.44	0.18	653,821.17	546,694.71

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Well:	#68	North Reference:	Grid
Wellbore:	WB1/Job #1311577	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	Compass 5000 GCR DB

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)	
2,242.00	6.40	199.80	-1,457.93	2,235.07	-117.53	12.36	115.80	0.12	653,812.07	546,691.46	
2,327.00	6.20	199.10	-1,373.44	2,319.56	-126.32	9.25	124.85	0.25	653,803.28	546,688.35	
2,413.00	6.20	199.20	-1,287.94	2,405.06	-135.10	6.20	133.88	0.01	653,794.50	546,685.30	
2,499.00	6.20	200.10	-1,202.45	2,490.55	-143.84	3.08	142.89	0.11	653,785.76	546,682.18	
2,584.00	6.20	200.00	-1,117.94	2,575.06	-152.47	-0.07	151.77	0.01	653,777.13	546,679.03	
2,670.00	5.20	208.50	-1,032.37	2,660.63	-160.26	-3.52	159.86	1.52	653,769.34	546,675.58	
2,755.00	3.40	206.80	-947.61	2,745.39	-165.89	-6.49	165.75	2.12	653,763.71	546,672.61	
2,840.00	3.30	210.70	-862.75	2,830.25	-170.25	-8.88	170.31	0.29	653,759.35	546,670.22	
2,926.00	3.00	206.90	-776.88	2,916.12	-174.38	-11.16	174.65	0.42	653,755.22	546,667.94	
3,012.00	3.10	206.40	-691.01	3,001.99	-178.47	-13.21	178.91	0.12	653,751.13	546,665.89	
3,097.00	1.60	219.90	-606.08	3,086.92	-181.44	-14.99	182.04	1.87	653,748.16	546,664.11	
3,183.00	1.10	223.70	-520.10	3,172.90	-182.96	-16.33	183.68	0.59	653,746.64	546,662.77	
3,268.00	1.20	230.90	-435.12	3,257.88	-184.11	-17.59	184.95	0.21	653,745.49	546,661.51	
3,354.00	0.20	40.60	-349.13	3,343.87	-184.56	-18.19	185.46	1.62	653,745.04	546,660.91	
3,439.00	0.50	32.00	-264.13	3,428.87	-184.14	-17.90	185.00	0.36	653,745.46	546,661.20	
3,525.00	0.40	43.80	-178.13	3,514.87	-183.60	-17.49	184.43	0.16	653,746.00	546,661.61	
3,610.00	0.30	19.80	-93.13	3,599.87	-183.18	-17.21	183.98	0.21	653,746.42	546,661.89	
3,696.00	0.40	45.20	-7.13	3,685.87	-182.75	-16.92	183.53	0.21	653,746.85	546,662.18	
3,782.00	0.50	65.60	78.86	3,771.86	-182.39	-16.37	183.12	0.22	653,747.21	546,662.73	
3,867.00	0.60	73.00	163.86	3,856.86	-182.10	-15.60	182.76	0.14	653,747.50	546,663.50	
3,953.00	0.60	62.20	249.85	3,942.85	-181.76	-14.77	182.34	0.13	653,747.84	546,664.33	
4,039.00	0.60	51.00	335.85	4,028.85	-181.27	-14.02	181.78	0.14	653,748.33	546,665.08	
4,127.00	0.60	37.90	423.85	4,116.85	-180.62	-13.38	181.07	0.16	653,748.98	546,665.72	
4,213.00	0.60	46.70	509.84	4,202.84	-179.95	-12.78	180.35	0.11	653,749.65	546,666.32	
4,298.00	0.70	42.40	594.84	4,287.84	-179.26	-12.11	179.60	0.13	653,750.34	546,666.99	
4,384.00	0.70	41.30	680.83	4,373.83	-178.48	-11.40	178.75	0.02	653,751.12	546,667.70	

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Well:	#68	North Reference:	Grid
Wellbore:	WB1/Job #1311577	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	Compass 5000 GCR DB

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)	
4,468.00	0.80	44.60	764.82	4,457.82	-177.68	-10.65	177.88	0.13	653,751.92	546,668.45	
Last Phoenix MWD Survey											
4,517.00	0.80	41.30	813.82	4,506.82	-177.18	-10.19	177.34	0.09	653,752.42	546,668.91	
Projection to TD											

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
615.00	614.90	-0.40	10.34	First Phoenix MWD Survey	
4,468.00	4,457.82	-177.68	-10.65	Last Phoenix MWD Survey	
4,517.00	4,506.82	-177.18	-10.19	Projection to TD	

Checked By: _____ Approved By: _____ Date: _____



Apache Corporation

Eddy County, NM (NAD27 NME)

Washington 33 State

#68 API#30-015-41681

WB1/Job #1311577

Survey: Phoenix MWD Survey

Anticollision Report

24 November, 2013



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #68
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3693.00usft (Capstar 114)
Reference Site:	Washington 33 State	MD Reference:	KB @ 3693.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#68	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	WB1/Job #1311577	Database:	Compass 5000 GCR DB
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Reference Datum

Reference	Survey: Phoenix MWD Survey		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD + Stations Interval 50.00usft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum separation factor of 1,000.00	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Program	Date: 11/24/13			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	500.00	Gyrodatta Survey (WB1/Job #1311577)	CB-GYRO-MS	Camera based gyro multishot
615.00	4,517.00	Phoenix MWD Survey (WB1/Job #131157)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Washington 33 State						
#5 - WB1 - WB1	2,182.87	2,158.87	39.76	-467.07	0.078	Level 1, CC
#5 - WB1 - WB1	2,300.00	2,275.21	41.97	-521.07	0.075	Level 1, SF
#5 - WB1 - WB1	3,000.00	2,950.00	85.35	-846.68	0.092	Level 1, ES

Offset Design												
Survey Program: 505-BLIND												
Reference: Washington 33 State - #5 - WB1 - WB1												
Offset Site Error: 0.00 usft												
Offset Well Error: 0.00 usft												
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Semi Major Axis	Azimuth from North (°)	Offset Wellbore Centre	Distance	Minimum Separation (usft)	Separation Factor	Warning
								+N/S (usft)	+E/W (usft)	Between Centres (usft)	Between Ellipses (usft)	
50.00	50.00	32.01	50.01	0.24	1.72	-156.54	-90.98	-39.37	99.19	97.23	1.96	50.513
100.00	100.00	82.02	100.02	0.56	4.41	-156.37	-90.99	-39.34	99.37	94.40	4.96	20.021
150.00	149.99	132.02	150.02	1.07	7.09	-156.06	-90.99	-39.30	99.58	91.42	8.17	12.196
200.00	199.99	182.02	200.02	1.59	9.78	-155.57	-91.00	-39.23	99.77	88.40	11.37	8.777
250.00	249.97	232.03	250.03	2.01	12.47	-155.00	-91.02	-39.14	100.00	85.52	14.47	6.908
300.00	299.96	282.03	300.03	2.43	15.15	-154.47	-91.04	-39.03	100.33	82.75	17.58	5.707
350.00	349.95	332.03	350.03	2.85	17.84	-153.96	-91.06	-38.90	100.72	80.03	20.69	4.867
400.00	399.94	382.03	400.03	3.28	20.53	-153.47	-91.09	-38.75	101.09	77.29	23.80	4.247
450.00	449.93	432.04	450.04	3.74	23.21	-153.03	-91.12	-38.58	101.45	74.49	26.96	3.763
500.00	499.92	482.05	500.04	4.21	25.90	-152.64	-91.15	-38.38	101.77	71.66	30.11	3.380
550.00	549.91	532.05	550.05	4.44	31.44	-152.33	-91.19	-38.17	102.15	68.28	35.87	2.848
600.00	599.90	582.06	600.06	4.66	39.40	-152.11	-91.23	-37.93	102.66	58.60	44.06	2.330
615.00	614.90	597.07	615.06	4.73	41.79	-152.05	-91.25	-37.85	102.84	56.32	46.51	2.211
650.00	649.89	632.07	650.07	4.73	47.36	-151.95	-91.28	-37.67	103.27	51.18	52.09	1.983
700.00	699.89	682.08	700.08	4.74	55.32	-151.85	-91.33	-37.39	103.92	43.87	60.05	1.730
701.00	700.89	683.08	701.08	4.74	55.48	-151.84	-91.33	-37.38	103.93	43.72	60.21	1.726
750.00	749.88	732.09	750.09	4.75	63.28	-151.60	-91.38	-37.08	104.47	36.45	68.02	1.536
786.00	785.86	768.10	786.09	4.75	69.01	-151.21	-91.42	-36.85	104.74	30.98	73.76	1.420 Level 3
800.00	799.86	782.10	800.09	4.76	71.24	-151.03	-91.44	-36.76	104.82	28.82	75.99	1.379 Level 3
850.00	849.84	832.10	850.09	4.77	79.20	-150.49	-91.50	-36.41	105.05	21.08	83.97	1.251 Level 3
872.00	871.83	854.10	872.10	4.78	82.70	-150.30	-91.53	-36.25	105.12	17.65	87.47	1.202 Level 2
900.00	899.82	882.11	900.10	4.79	87.16	-150.02	-91.57	-36.04	105.24	13.30	91.94	1.145 Level 2
950.00	949.79	932.10	950.09	4.80	95.11	-149.26	-91.64	-35.65	105.64	5.73	99.91	1.057 Level 2

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

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Reference Site:	Washington 33 State	MD Reference:	KB @ 3693.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#68	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	WB1/Job #1311577	Database:	Compass 5000 GCR DB
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Reference Datum

Offset Design Washington 33 State - #5 - WB1 - WB1														Offset Site Error:	0.00 usft
Survey Program: 505-BLIND														Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning									
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
957.00	956.78	939.10	957.09	4.81	96.23	-149.13	-91.65	-35.59	105.72	4.70	101.02	1.046	Level 2		
1,000.00	999.73	982.08	1,000.07	4.82	103.07	-148.20	-91.71	-35.23	106.12	-1.77	107.89	0.984	Level 1		
1,043.00	1,042.65	1,025.04	1,043.03	4.84	113.56	-147.06	-91.78	-34.86	106.34	-12.06	118.40	0.898	Level 1		
1,050.00	1,049.64	1,032.03	1,050.02	4.85	115.43	-146.85	-91.79	-34.80	106.36	-13.90	120.27	0.884	Level 1		
1,100.00	1,099.51	1,081.95	1,099.94	4.87	128.73	-145.17	-91.87	-34.34	106.26	-27.34	133.60	0.795	Level 1		
1,129.00	1,128.42	1,110.89	1,128.87	4.89	136.44	-144.04	-91.92	-34.07	106.02	-35.30	141.32	0.750	Level 1		
1,150.00	1,149.34	1,131.83	1,149.81	4.90	142.02	-143.16	-91.95	-33.86	105.76	-41.15	146.91	0.720	Level 1		
1,200.00	1,199.14	1,181.69	1,199.67	4.94	155.31	-141.03	-92.04	-33.37	104.78	-55.42	160.20	0.654	Level 1		
1,214.00	1,213.08	1,195.64	1,213.62	4.95	159.03	-140.42	-92.06	-33.22	104.42	-59.50	163.92	0.637	Level 1		
1,250.00	1,248.94	1,231.53	1,249.51	4.97	168.60	-138.88	-92.13	-32.85	103.23	-70.21	173.44	0.595	Level 1		
1,300.00	1,298.73	1,281.37	1,299.35	5.01	181.88	-136.90	-92.22	-32.31	100.89	-85.73	186.62	0.541	Level 1		
1,350.00	1,348.53	1,331.21	1,349.18	5.05	195.16	-135.12	-92.32	-31.76	97.82	-101.95	199.76	0.490	Level 1		
1,385.00	1,383.38	1,366.08	1,384.05	5.08	204.46	-134.02	-92.39	-31.35	95.26	-113.67	208.92	0.456	Level 1		
1,400.00	1,398.32	1,381.02	1,398.99	5.09	208.44	-133.57	-92.42	-31.18	94.08	-118.81	212.89	0.442	Level 1		
1,450.00	1,448.10	1,430.82	1,448.78	5.14	221.71	-132.05	-92.53	-30.58	90.04	-136.07	226.11	0.398	Level 1		
1,471.00	1,469.00	1,451.73	1,469.70	5.16	227.28	-131.39	-92.58	-30.32	88.30	-143.36	231.66	0.381	Level 1		
1,500.00	1,497.86	1,480.60	1,498.56	5.19	234.98	-130.41	-92.64	-29.96	85.82	-153.48	239.30	0.359	Level 1		
1,550.00	1,547.57	1,530.33	1,548.28	5.24	250.04	-128.37	-92.75	-29.33	81.34	-172.92	254.26	0.320	Level 1		
1,557.00	1,554.53	1,537.28	1,555.24	5.25	252.67	-128.05	-92.77	-29.24	80.69	-176.18	256.87	0.314	Level 1		
1,600.00	1,597.27	1,580.02	1,597.97	5.29	268.80	-125.99	-92.86	-28.69	76.89	-196.27	273.16	0.281	Level 1		
1,642.00	1,639.05	1,621.79	1,639.74	5.34	284.57	-123.93	-92.96	-28.15	73.48	-215.61	289.09	0.254	Level 1		
1,650.00	1,647.01	1,629.75	1,647.70	5.35	287.58	-123.53	-92.98	-28.05	72.86	-219.22	292.08	0.249	Level 1		
1,700.00	1,696.73	1,679.47	1,697.42	5.41	306.34	-120.77	-93.09	-27.40	68.83	-241.92	310.75	0.221	Level 1		
1,728.00	1,724.56	1,707.30	1,725.24	5.44	316.85	-119.00	-93.15	-27.05	66.49	-254.71	321.20	0.207	Level 1		
1,750.00	1,746.42	1,729.15	1,747.09	5.47	325.10	-117.51	-93.20	-26.76	64.65	-264.86	329.52	0.196	Level 1		
1,800.00	1,796.11	1,778.84	1,796.77	5.54	343.85	-113.85	-93.32	-26.12	60.69	-287.74	348.44	0.174	Level 1		
1,814.00	1,810.02	1,792.75	1,810.68	5.56	349.10	-112.75	-93.35	-25.94	59.64	-294.10	353.74	0.169	Level 1		
1,850.00	1,845.79	1,828.51	1,846.44	5.61	362.60	-109.76	-93.43	-25.48	56.84	-310.23	367.07	0.155	Level 1		
1,899.00	1,894.43	1,877.13	1,895.05	5.68	380.96	-105.08	-93.54	-24.86	52.67	-332.53	385.19	0.137	Level 1		
1,900.00	1,895.42	1,878.12	1,896.04	5.68	381.33	-104.98	-93.54	-24.84	52.58	-333.00	385.58	0.136	Level 1		
1,950.00	1,945.03	1,927.71	1,945.63	5.75	400.05	-99.37	-93.65	-24.20	48.50	-356.25	404.75	0.120	Level 1		
1,985.00	1,979.77	1,962.43	1,980.35	5.81	413.16	-94.97	-93.73	-23.76	46.08	-372.10	418.18	0.110	Level 1		
2,000.00	1,994.66	1,977.32	1,995.24	5.83	418.78	-92.97	-93.77	-23.56	45.16	-378.77	423.92	0.107	Level 1		
2,050.00	2,044.31	2,026.96	2,044.87	5.90	437.52	-85.83	-93.88	-22.92	42.61	-400.44	443.05	0.096	Level 1		
2,070.00	2,064.18	2,046.81	2,064.72	5.93	446.39	-82.81	-93.93	-22.67	41.82	-410.24	452.06	0.093	Level 1		
2,100.00	2,093.98	2,076.59	2,094.50	5.98	460.84	-78.11	-93.99	-22.29	40.89	-425.78	466.66	0.088	Level 1		
2,150.00	2,143.66	2,126.24	2,144.14	6.06	484.93	-69.95	-94.10	-21.68	39.95	-450.99	490.94	0.081	Level 1		
2,156.00	2,149.62	2,132.19	2,150.10	6.07	487.83	-68.96	-94.11	-21.61	39.89	-453.96	493.84	0.081	Level 1		
2,182.87	2,176.31	2,158.87	2,176.77	6.12	500.77	-64.49	-94.17	-21.29	39.76	-467.07	506.84	0.078	Level 1, CC		
2,200.00	2,193.34	2,175.88	2,193.79	6.15	509.03	-61.65	-94.20	-21.09	39.81	-475.29	515.10	0.077	Level 1		
2,242.00	2,235.07	2,217.60	2,235.49	6.22	529.27	-54.82	-94.29	-20.61	40.34	-494.95	535.29	0.075	Level 1		
2,250.00	2,243.02	2,225.54	2,243.44	6.23	533.12	-53.55	-94.30	-20.52	40.50	-498.63	539.13	0.075	Level 1		
2,300.00	2,292.72	2,275.21	2,293.10	6.32	557.23	-46.00	-94.40	-19.98	41.97	-521.07	563.04	0.075	Level 1, SF		
2,327.00	2,319.56	2,302.03	2,319.93	6.37	570.24	-42.24	-94.45	-19.69	43.05	-532.87	575.92	0.075	Level 1		
2,350.00	2,342.43	2,324.89	2,342.78	6.41	581.33	-39.21	-94.49	-19.45	44.11	-542.77	586.89	0.075	Level 1		
2,400.00	2,392.13	2,374.57	2,392.46	6.50	605.44	-33.17	-94.58	-18.95	46.82	-563.87	610.69	0.077	Level 1		
2,413.00	2,405.06	2,387.49	2,405.37	6.53	611.71	-31.72	-94.60	-18.82	47.60	-569.28	616.88	0.077	Level 1		
2,450.00	2,441.84	2,424.25	2,442.14	6.60	629.55	-27.84	-94.67	-18.47	49.99	-584.52	634.50	0.079	Level 1		
2,499.00	2,490.55	2,472.94	2,490.82	6.69	653.18	-23.25	-94.75	-18.02	53.44	-604.42	657.86	0.081	Level 1		
2,500.00	2,491.55	2,473.93	2,491.82	6.70	653.66	-23.16	-94.75	-18.01	53.51	-604.82	658.33	0.081	Level 1		
2,550.00	2,541.26	2,523.62	2,541.50	6.79	677.77	-19.09	-94.82	-17.57	57.35	-624.79	682.14	0.084	Level 1		
2,584.00	2,575.06	2,557.41	2,575.29	6.86	697.13	-16.64	-94.88	-17.28	60.11	-641.19	701.30	0.086	Level 1		

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

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #68
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3693.00usft (Capstar 114)
Reference Site:	Washington 33 State	MD Reference:	KB @ 3693.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#68	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	WB1/Job #1311577	Database:	Compass 5000 GCR.DB
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Reference Datum

Offset Design Washington 33 State - #5 - WB1 - WB1												Offset Site Error:	0.00 usft
Survey Program: 505-BLIND												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Azimuth from North (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
2,600.00	2,590.97	2,573.32	2,591.20	6.89	706.40	-15.56	-94.90	-17.14	61.41	-649.31	710.72	0.086	Level 1
2,650.00	2,640.72	2,623.06	2,640.94	6.98	735.39	-12.45	-94.98	-16.71	65.17	-675.02	740.19	0.088	Level 1
2,670.00	2,660.63	2,642.97	2,660.84	7.02	746.99	-11.29	-95.01	-16.54	66.54	-685.45	751.98	0.088	Level 1
2,700.00	2,690.52	2,672.85	2,690.73	7.08	764.40	-9.72	-95.05	-16.28	68.44	-701.27	769.71	0.089	Level 1
2,750.00	2,740.40	2,722.71	2,740.59	7.17	793.46	-7.68	-95.13	-15.86	71.13	-728.17	799.30	0.089	Level 1
2,755.00	2,745.39	2,727.70	2,745.58	7.18	796.37	-7.51	-95.13	-15.81	71.37	-730.89	802.26	0.089	Level 1
2,800.00	2,790.31	2,772.62	2,790.49	7.25	822.54	-6.02	-95.20	-15.43	73.44	-755.07	828.50	0.089	Level 1
2,840.00	2,830.25	2,812.54	2,830.41	7.32	845.81	-4.73	-95.26	-15.08	75.24	-776.59	851.83	0.088	Level 1
2,850.00	2,840.23	2,822.52	2,840.39	7.34	851.62	-4.42	-95.28	-15.00	75.69	-781.97	857.66	0.088	Level 1
2,900.00	2,890.15	2,872.44	2,890.30	7.43	880.71	-2.98	-95.35	-14.57	77.91	-808.90	886.80	0.088	Level 1
2,926.00	2,916.12	2,898.39	2,916.26	7.47	895.83	-2.31	-95.39	-14.35	79.05	-822.92	901.97	0.088	Level 1
2,950.00	2,940.08	2,922.36	2,940.22	7.51	909.80	-1.73	-95.43	-14.14	80.11	-835.81	915.92	0.087	Level 1
3,000.00	2,990.01	2,950.00	2,967.87	7.60	925.91	-0.68	-95.47	-13.90	85.35	-846.68	932.03	0.092	Level 1, ES
3,012.00	3,001.99	2,950.00	2,967.87	7.62	925.91	-0.48	-95.47	-13.90	89.74	-842.29	932.04	0.096	Level 1
3,050.00	3,039.95	2,950.00	2,967.87	7.68	925.91	0.11	-95.47	-13.90	111.15	-821.39	932.54	0.119	Level 1
3,097.00	3,086.92	2,950.00	2,967.87	7.76	925.91	0.73	-95.47	-13.90	146.85	-786.13	932.98	0.157	Level 1
3,100.00	3,089.92	2,950.00	2,967.87	7.77	925.91	0.76	-95.47	-13.90	149.33	-783.66	932.99	0.160	Level 1
3,150.00	3,139.90	2,950.00	2,967.87	7.85	925.91	1.29	-95.47	-13.90	192.79	-740.35	933.13	0.207	Level 1
3,183.00	3,172.90	2,950.00	2,967.87	7.90	925.91	1.59	-95.47	-13.90	222.93	-710.29	933.22	0.239	Level 1
3,200.00	3,189.89	2,950.00	2,967.87	7.93	925.91	1.74	-95.47	-13.90	238.74	-694.51	933.25	0.256	Level 1
3,250.00	3,239.88	2,950.00	2,967.87	8.01	925.91	2.20	-95.47	-13.90	286.04	-647.30	933.34	0.306	Level 1
3,268.00	3,257.88	2,950.00	2,967.87	8.04	925.91	2.38	-95.47	-13.90	303.28	-630.09	933.37	0.325	Level 1
3,300.00	3,289.87	2,950.00	2,967.87	8.09	925.91	2.64	-95.47	-13.90	334.10	-599.36	933.46	0.358	Level 1
3,350.00	3,339.87	2,950.00	2,967.87	8.16	925.91	2.76	-95.47	-13.90	382.55	-550.99	933.54	0.410	Level 1
3,354.00	3,343.87	2,950.00	2,967.87	8.17	925.91	2.75	-95.47	-13.90	386.44	-547.10	933.54	0.414	Level 1
3,400.00	3,389.87	2,950.00	2,967.87	8.24	925.91	2.67	-95.47	-13.90	431.29	-502.31	933.60	0.462	Level 1
3,439.00	3,428.87	2,950.00	2,967.87	8.30	925.91	2.58	-95.47	-13.90	469.47	-464.18	933.65	0.503	Level 1
3,450.00	3,439.87	2,950.00	2,967.87	8.31	925.91	2.55	-95.47	-13.90	480.26	-453.41	933.67	0.514	Level 1
3,500.00	3,489.87	2,950.00	2,967.87	8.39	925.91	2.41	-95.47	-13.90	529.43	-404.33	933.76	0.567	Level 1
3,525.00	3,514.87	2,950.00	2,967.87	8.42	925.91	2.33	-95.47	-13.90	554.07	-379.74	933.81	0.593	Level 1
3,550.00	3,539.87	2,950.00	2,967.87	8.46	925.91	2.26	-95.47	-13.90	578.74	-355.10	933.85	0.620	Level 1
3,600.00	3,589.87	2,950.00	2,967.87	8.54	925.91	2.17	-95.47	-13.90	628.17	-305.76	933.93	0.673	Level 1
3,610.00	3,599.87	2,950.00	2,967.87	8.55	925.91	2.16	-95.47	-13.90	638.07	-295.88	933.95	0.683	Level 1
3,650.00	3,639.87	2,950.00	2,967.87	8.61	925.91	2.10	-95.47	-13.90	677.68	-256.33	934.01	0.726	Level 1
3,696.00	3,685.87	2,950.00	2,967.87	8.68	925.91	1.98	-95.47	-13.90	723.29	-210.79	934.09	0.774	Level 1
3,700.00	3,689.87	2,950.00	2,967.87	8.69	925.91	1.97	-95.47	-13.90	727.26	-206.83	934.09	0.779	Level 1
3,750.00	3,739.86	2,950.00	2,967.87	8.77	925.91	1.78	-95.47	-13.90	776.89	-157.28	934.18	0.832	Level 1
3,782.00	3,771.86	2,950.00	2,967.87	8.82	925.91	1.62	-95.47	-13.90	808.69	-125.55	934.23	0.866	Level 1
3,800.00	3,789.86	2,950.00	2,967.87	8.84	925.91	1.53	-95.47	-13.90	826.58	-107.69	934.26	0.885	Level 1
3,850.00	3,839.86	2,950.00	2,967.87	8.92	925.91	1.23	-95.47	-13.90	876.29	-58.05	934.35	0.938	Level 1
3,867.00	3,856.86	2,950.00	2,967.87	8.95	925.91	1.12	-95.47	-13.90	893.21	-41.17	934.38	0.956	Level 1
3,900.00	3,889.86	2,950.00	2,967.87	9.00	925.91	0.91	-95.47	-13.90	926.04	-8.39	934.43	0.991	Level 1
3,950.00	3,939.85	2,950.00	2,967.87	9.08	925.91	0.60	-95.47	-13.90	975.81	41.30	934.51	1.044	Level 2
3,953.00	3,942.85	2,950.00	2,967.87	9.09	925.91	0.58	-95.47	-13.90	978.80	44.29	934.51	1.047	Level 2
4,000.00	3,989.85	2,950.00	2,967.87	9.16	925.91	0.30	-95.47	-13.90	1,025.60	91.01	934.59	1.097	Level 2
4,039.00	4,028.85	2,950.00	2,967.87	9.23	925.91	0.08	-95.47	-13.90	1,064.45	129.79	934.65	1.139	Level 2
4,050.00	4,039.85	2,950.00	2,967.87	9.25	925.91	0.02	-95.47	-13.90	1,075.41	140.73	934.67	1.151	Level 2
4,100.00	4,089.85	2,950.00	2,967.87	9.33	925.91	-0.23	-95.47	-13.90	1,125.22	190.47	934.75	1.204	Level 2
4,127.00	4,116.85	2,950.00	2,967.87	9.37	925.91	-0.35	-95.47	-13.90	1,152.13	217.33	934.80	1.232	Level 2
4,150.00	4,139.84	2,950.00	2,967.87	9.41	925.91	-0.45	-95.47	-13.90	1,175.05	240.22	934.84	1.257	Level 3
4,200.00	4,189.84	2,950.00	2,967.87	9.49	925.91	-0.69	-95.47	-13.90	1,224.90	289.97	934.93	1.310	Level 3
4,213.00	4,202.84	2,950.00	2,967.87	9.51	925.91	-0.76	-95.47	-13.90	1,237.86	302.91	934.95	1.324	Level 3

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

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #68
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3693.00usft (Capstar 114)
Reference Site:	Washington 33 State	MD Reference:	KB @ 3693.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#68	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	WB1/Job #1311577	Database:	Compass 5000 GCR DB
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Reference Datum

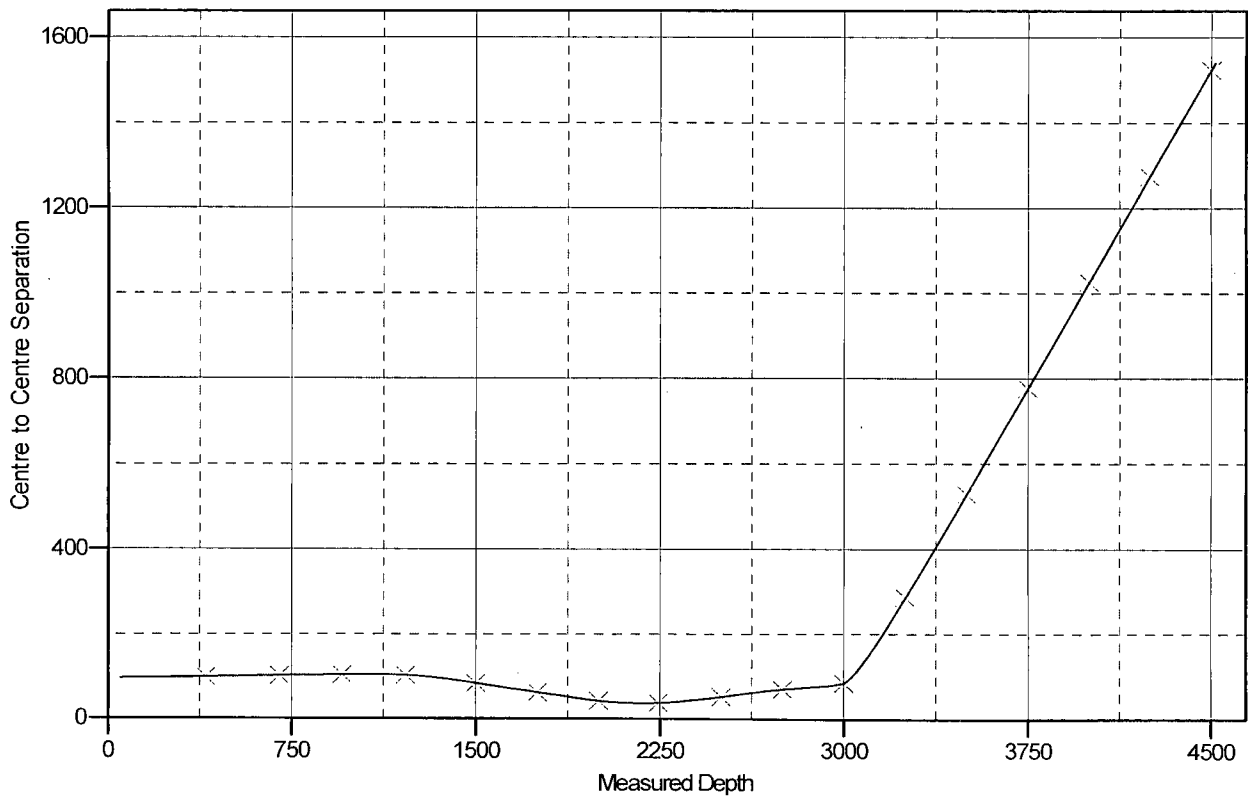
Offset Design														Offset Site Error:	0.00 usft
Survey Program: 505-BLIND														Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Azimuth from North (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)					
4,250.00	4,239.84	2,950.00	2,967.87	9.57	925.91	-0.96	-95.47	-13.90	1,274.76	339.75	935.01	1.363	Level 3		
4,298.00	4,287.84	2,950.00	2,967.87	9.65	925.91	-1.23	-95.47	-13.90	1,322.63	387.54	935.09	1.414	Level 3		
4,300.00	4,289.84	2,950.00	2,967.87	9.66	925.91	-1.24	-95.47	-13.90	1,324.62	389.53	935.09	1.417	Level 3		
4,350.00	4,339.83	2,950.00	2,967.87	9.74	925.91	-1.53	-95.47	-13.90	1,374.50	439.32	935.18	1.470	Level 3		
4,384.00	4,373.83	2,950.00	2,967.87	9.80	925.91	-1.72	-95.47	-13.90	1,408.41	473.17	935.24	1.506			
4,400.00	4,389.83	2,950.00	2,967.87	9.82	925.91	-1.82	-95.47	-13.90	1,424.38	489.11	935.27	1.523			
4,450.00	4,439.82	2,950.00	2,967.87	9.91	925.91	-2.14	-95.47	-13.90	1,474.26	538.91	935.35	1.576			
4,468.00	4,457.82	2,950.00	2,967.87	9.94	925.91	-2.26	-95.47	-13.90	1,492.23	556.84	935.38	1.595			
4,500.00	4,489.82	2,950.00	2,967.87	9.99	925.91	-2.49	-95.47	-13.90	1,524.16	588.72	935.43	1.629			
4,517.00	4,506.82	2,950.00	2,967.87	10.02	925.91	-2.60	-95.47	-13.90	1,541.12	605.66	935.46	1.647			

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #68
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3693.00usft (Capstar 114)
Reference Site:	Washington 33 State	MD Reference:	KB @ 3693.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#68	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	WB1/Job #1311577	Database:	Compass 5000 GCR DB
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Reference Datum

Reference Depths are relative to KB @ 3693.00usft (Capstar 114)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 19' 60.00000 W

Coordinates are relative to: #68
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.08°

Ladder Plot



LEGEND

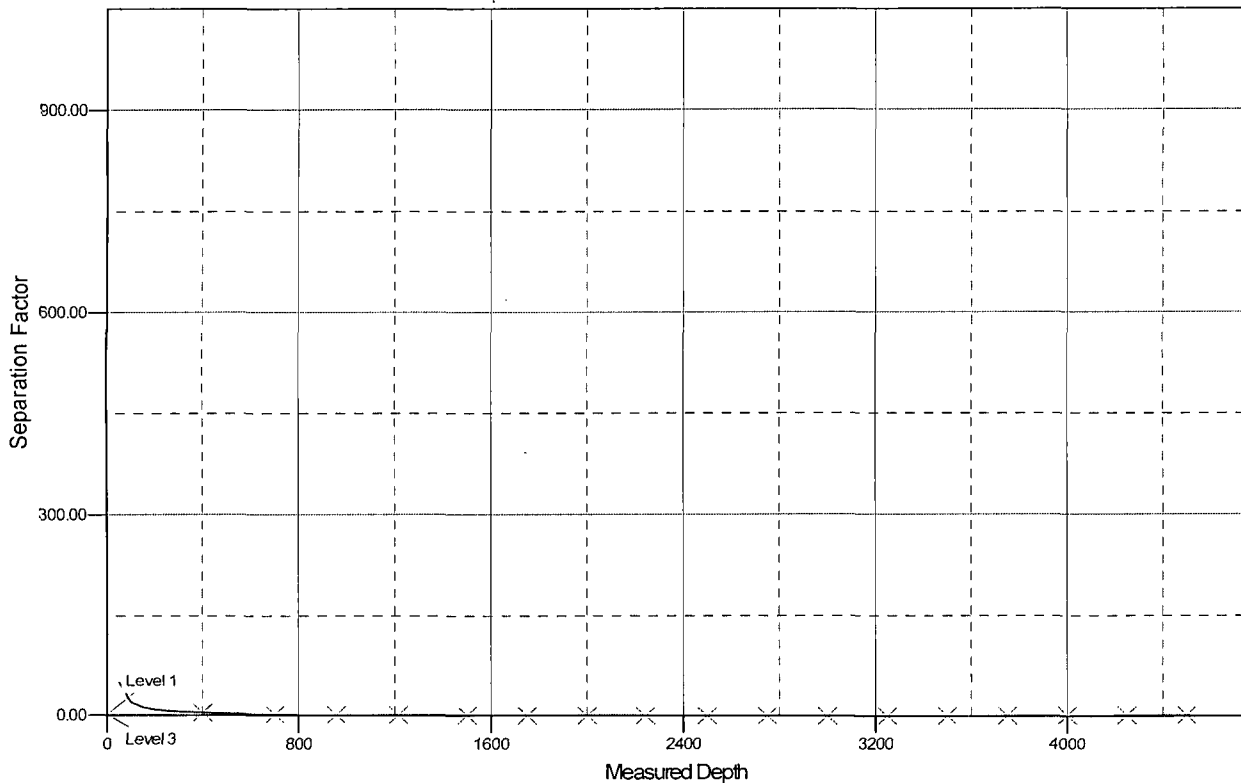
✕ #5, WB1, WB1V0

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #68
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3693.00usft (Capstar 114)
Reference Site:	Washington 33 State	MD Reference:	KB @ 3693.00usft (Capstar 114)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#68	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	WB1/Job #1311577	Database:	Compass 5000 GCR DB
Reference Design:	Survey: Phoenix MWD Survey	Offset TVD Reference:	Reference Datum

Reference Depths are relative to KB @ 3693.00usft (Capstar 114)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 19' 60.00000 W

Coordinates are relative to: #68
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.08°

Separation Factor Plot



LEGEND

✕ #5, WB1, WB1 V0



PHOENIX
TECHNOLOGY SERVICES

December 18, 2013

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

Received

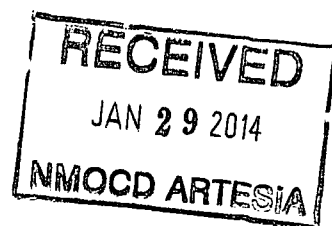
JAN 2 2014

Apache Corp
Permian

Dear District 2 - Artesia

Attention: Regulatory Department

Re: Apache Corporation
* Washington 33 State #68
Eddy County, NM
* API #30-015-41681
Job No. 1311577



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

Name & Title of Surveyor	Drainhole Number	Surveyed Depths		Dates Performed		Type of Survey
		From	To	Start	End	
Brad Hill	66	560	4,460	11/10/13	11/12/13	MWD

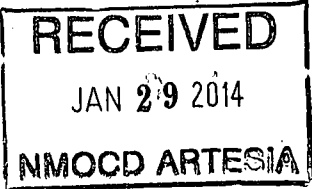
A certified plat on which the bottom hole location is oriented both to the surface location and to the lease lines (or unit lines in case of pooling) is attached to the survey report. If any other information is required, please contact the undersigned at the letterhead address and phone number.

Best Regards,

Sonya Thomas

Sonya Thomas
Operations Administrator

Certified mail receipt number: 7011 1570 0001 4364 8929



Project: Eddy County, NM (NAD27 NME)
Site: Washington 33 State
Well: #68 API#30-05-41681
Wellbore: WB1/Job #1311577
Design: Plan #2 11-22-13
Rig: Capstar 114



Azimuths to Grid North
True North: -0.08°
Magnetic North: 7.66°

Magnetic Field
Strength: 48631.8snT
Dip Angle: 60.54°
Date: 11/05/2013
Model: BGGM2013

WELL DETAILS						
			Ground Level:	3682.00		
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	
0.00	0.00	653929.60	546679.10	32° 47' 51.54004 N	104° 10' 53.12402 W	

SECTION DETAILS											
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target	Annotation
1	500.00	1.04	92.91	499.92	-0.76	8.38	0.00	0.00	-0.04		Tie-on to Gyro
2	550.00	1.04	92.91	549.91	-0.81	9.29	0.00	0.00	-0.08		KOP Start DLS 0.50 TFO 43.83
3	878.75	2.50	120.00	878.50	-4.55	18.48	0.50	43.83	2.75		Start 8.50 hold at 878.75 MD
4	887.25	2.50	120.00	886.99	-4.73	18.80	0.00	0.00	2.91		Start DLS 1.00 TFO 84.89
5	1400.02	5.90	180.00	1398.50	-36.70	28.49	1.00	84.89	33.80		Start 200.00 hold at 1400.02 MD
6	1600.02	5.90	180.00	1597.44	-57.26	28.49	0.00	0.00	54.26		Start DLS 0.50 TFO 104.78
7	2111.69	5.80	205.29	2106.53	-106.94	17.45	0.50	104.78	104.77		Start 517.19 hold at 2111.69 MD
8	2628.88	5.80	205.29	2621.08	-154.19	-4.88	0.00	0.00	153.94		Start Drop -1.00
9	3208.80	0.00	0.00	3200.00	-180.70	-17.40	1.00	180.00	181.54	TG1-Washington 33 State #68	Start 1300.00 hold at 3208.80 MD
10	4508.80	0.00	0.00	4500.00	-180.70	-17.40	0.00	0.00	181.54	PBHL-Washington 33 State #68	TD at 4508.80

DESIGN TARGET DETAILS									
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape	
TG1-Washington 33 State #68	3200.00	-180.70	-17.40	653748.90	546661.70	32° 47' 49.75219 N	104° 10' 53.33091 W	Point	
PBHL-Washington 33 State #68	4500.00	-180.70	-17.40	653748.90	546661.70	32° 47' 49.75219 N	104° 10' 53.33091 W	Circle (Radius: 20.00)	
plan hits target center									

Map System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone Name: New Mexico East 3001
Local Origin: Well #68, Grid North
Latitude: 32° 47' 51.54004 N
Longitude: 104° 10' 53.12402 W
Grid East: 546679.10
Grid North: 653929.60
Scale Factor: 1.000
Geomagnetic Model: BGGM2013
Sample Date: 05-Nov-13
Magnetic Declination: 7.74°
Dip Angle from Horizontal: 60.54°
Magnetic Field Strength: 48632
To convert a Magnetic Direction to a Grid Direction, Add 7.65°
To convert a Magnetic Direction to a True Direction, Add 7.74° East
To convert a True Direction to a Grid Direction, Subtract 0.08°

FORMATION TOP DETAILS				
TVDPath	MDPath	Formation	DipAngle	DipDir
681.00	681.13	Seven Rivers	0.00	
1260.00	1260.93	Queen	0.00	
1697.00	1700.10	Grayburg	0.00	
1998.00	2002.61	San Andres	0.00	
3443.00	3451.80	Glorieta	0.00	
3520.00	3528.80	Yeso	0.00	

