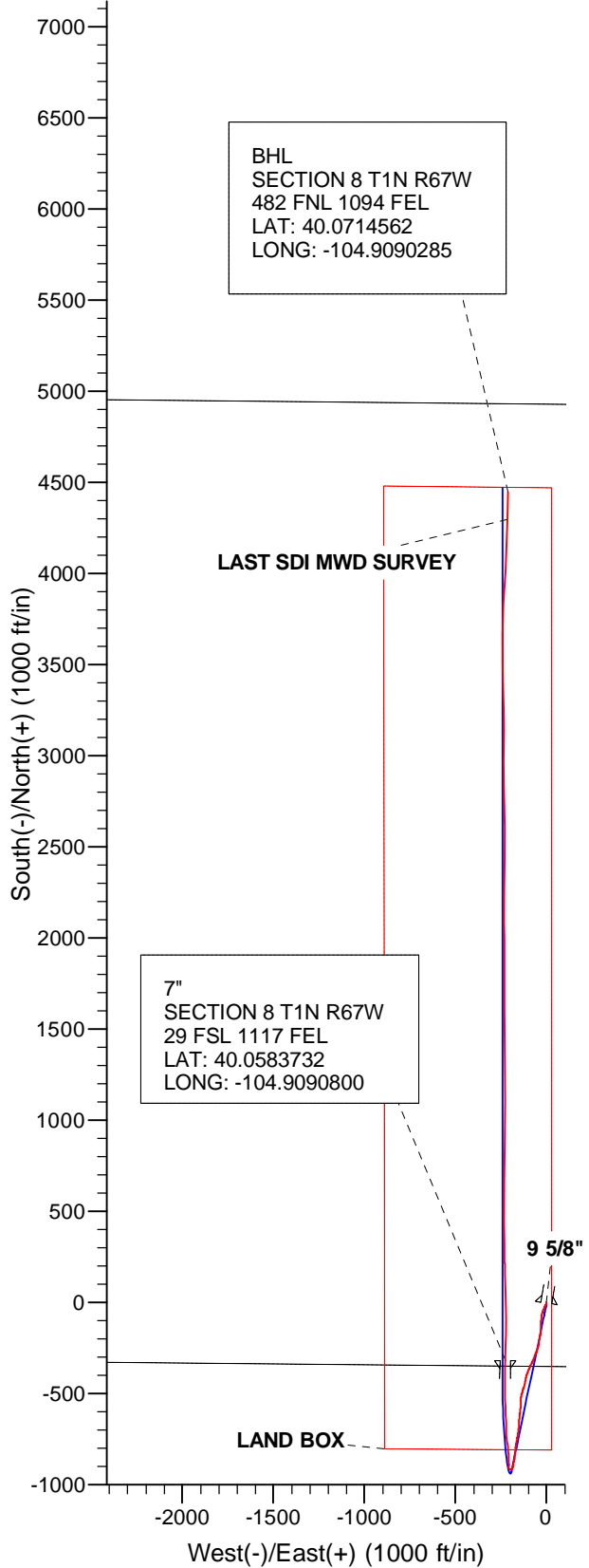
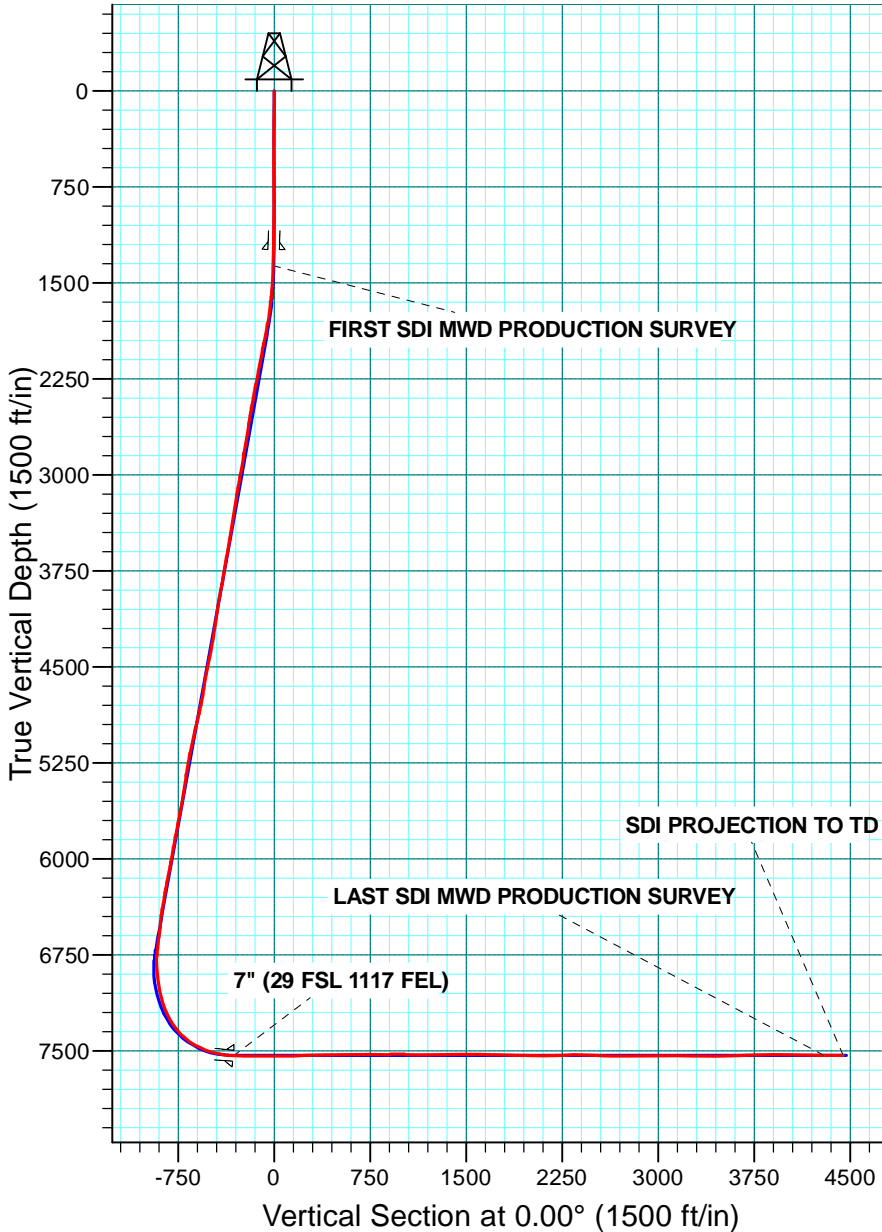


WELL DETAILS: NRC 27N-8HZ					
GL 5074 & KB 25 @ 5099.00ft (H&P 311)					
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	1264982.37	3165629.19	40.0592490	-104.9082730





Scientific Drilling

US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

NRC 16-8HZ PAD

NRC 27N-8HZ

OH

Design: OH

Standard Survey Report

21 April, 2014



Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well NRC 27N-8HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 5074 & KB 25 @ 5099.00ft (H&P 311)
Site:	NRC 16-8HZ PAD	MD Reference:	GL 5074 & KB 25 @ 5099.00ft (H&P 311)
Well:	NRC 27N-8HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales Office

Project	COLORADO NORTHERN ZONE - 83, KERR MCGEE OIL & GAS ONSHORE LP		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site	NRC 16-8HZ PAD, SESE SECTION 8 T1N R67W				
Site Position:		Northing:	1,264,982.38 usft	Latitude:	40.0592490
From:	Lat/Long	Easting:	3,165,629.19 usft	Longitude:	-104.9082730
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	0.38 °

Well	NRC 27N-8HZ, 350 FSL 890 FEL					
Well Position	+N/-S	0.00 ft	Northing:	1,264,982.37 usft	Latitude:	40.0592490
	+E/-W	0.00 ft	Easting:	3,165,629.19 usft	Longitude:	-104.9082730
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	5,074.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2013	4/1/2014	8.58	66.64	52,558

Design	OH				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	0.00	

Survey Program	Date	4/21/2014			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
25.00	1,148.00	Survey #1 SURFACE GYRO (OH)	NS-GYRO-MS	North sensing gyrocompassing m/s	
1,365.00	12,720.00	Survey #2 SDI MWD PRODUCTION (OH)	SDI_MWD+CRUST_1.0	SDI MWD + Crustal anomaly, Version 1.0	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
25.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00	0.00	0.00	
125.00	0.52	180.13	125.00	-0.45	0.00	-0.45	0.52	0.52	0.00	
FIRST GYRO SURFACE SURVEY										
225.00	0.66	173.93	224.99	-1.48	0.06	-1.48	0.15	0.14	-6.20	
325.00	0.62	2.50	324.99	-1.51	0.14	-1.51	1.28	-0.04	-171.43	
425.00	0.60	150.83	424.99	-1.43	0.42	-1.43	1.17	-0.02	148.33	
525.00	0.44	300.81	524.99	-1.69	0.35	-1.69	1.01	-0.16	149.98	
625.00	0.50	71.97	624.99	-1.36	0.43	-1.36	0.86	0.06	131.16	
725.00	0.84	262.90	724.98	-1.31	0.12	-1.31	1.33	0.34	-169.07	

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well NRC 27N-8HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 5074 & KB 25 @ 5099.00ft (H&P 311)
Site:	NRC 16-8HZ PAD	MD Reference:	GL 5074 & KB 25 @ 5099.00ft (H&P 311)
Well:	NRC 27N-8HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales Office

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
825.00	0.48	109.18	824.98	-1.54	-0.21	-1.54	1.29	-0.36	-153.72	
925.00	0.54	300.13	924.98	-1.44	-0.22	-1.44	1.02	0.06	-169.05	
1,025.00	0.42	64.53	1,024.98	-1.05	-0.30	-1.05	0.85	-0.12	124.40	
1,125.00	0.66	170.04	1,124.97	-1.46	0.13	-1.46	0.87	0.24	105.51	
1,148.00	0.67	176.64	1,147.97	-1.72	0.16	-1.72	0.34	0.04	28.70	
LAST GYRO SURFACE SURVEY										
1,239.00	1.24	189.06	1,238.96	-3.23	0.04	-3.23	0.66	0.63	13.65	
9 5/8"										
1,365.00	2.06	194.62	1,364.91	-6.76	-0.75	-6.76	0.66	0.65	4.41	
FIRST SDI MWD PRODUCTION SURVEY										
1,457.00	2.97	206.88	1,456.82	-10.49	-2.24	-10.49	1.14	0.99	13.33	
1,562.00	4.74	207.09	1,561.58	-16.78	-5.45	-16.78	1.69	1.69	0.20	
1,653.00	8.17	208.01	1,651.99	-25.84	-10.20	-25.84	3.77	3.77	1.01	
1,744.00	9.14	203.19	1,741.95	-38.19	-16.08	-38.19	1.33	1.07	-5.30	
1,836.00	10.79	198.20	1,832.56	-53.09	-21.65	-53.09	2.02	1.79	-5.42	
1,927.00	11.15	191.68	1,921.90	-69.80	-26.09	-69.80	1.42	0.40	-7.16	
2,018.00	10.69	183.05	2,011.26	-86.84	-28.32	-86.84	1.86	-0.51	-9.48	
2,109.00	11.13	185.25	2,100.61	-104.02	-29.58	-104.02	0.67	0.48	2.42	
2,201.00	11.49	185.68	2,190.83	-121.98	-31.30	-121.98	0.40	0.39	0.47	
2,384.00	10.01	176.58	2,370.62	-156.00	-32.15	-156.00	1.23	-0.81	-4.97	
2,475.00	10.96	189.82	2,460.12	-172.42	-33.15	-172.42	2.84	1.04	14.55	
2,566.00	9.38	193.75	2,549.68	-188.15	-36.39	-188.15	1.90	-1.74	4.32	
2,658.00	9.60	185.54	2,640.43	-203.06	-38.91	-203.06	1.49	0.24	-8.92	
2,750.00	10.23	186.67	2,731.06	-218.81	-40.60	-218.81	0.72	0.68	1.23	
2,841.00	8.86	190.09	2,820.79	-233.74	-42.77	-233.74	1.63	-1.51	3.76	
2,933.00	9.39	199.02	2,911.63	-247.81	-46.46	-247.81	1.64	0.58	9.71	
3,116.00	11.80	203.00	3,091.50	-279.16	-58.64	-279.16	1.38	1.32	2.17	
3,208.00	9.46	201.65	3,181.92	-294.84	-65.10	-294.84	2.56	-2.54	-1.47	
3,299.00	9.62	200.94	3,271.66	-308.90	-70.58	-308.90	0.22	0.18	-0.78	
3,394.00	10.67	204.33	3,365.17	-324.32	-77.04	-324.32	1.27	1.11	3.57	
3,488.00	10.22	207.45	3,457.62	-339.65	-84.47	-339.65	0.77	-0.48	3.32	
3,582.00	9.53	202.28	3,550.23	-354.25	-91.26	-354.25	1.19	-0.73	-5.50	
3,677.00	11.59	202.82	3,643.61	-370.33	-97.95	-370.33	2.17	2.17	0.57	
3,866.00	9.63	198.27	3,829.37	-402.84	-110.27	-402.84	1.13	-1.04	-2.41	
3,960.00	11.56	189.11	3,921.77	-419.61	-114.22	-419.61	2.72	2.05	-9.74	
4,055.00	9.21	188.54	4,015.21	-436.53	-116.86	-436.53	2.48	-2.47	-0.60	
4,243.00	8.74	200.47	4,200.93	-464.79	-124.09	-464.79	1.02	-0.25	6.35	
4,337.00	10.01	197.67	4,293.67	-479.27	-129.07	-479.27	1.44	1.35	-2.98	
4,431.00	11.28	196.23	4,386.05	-495.88	-134.12	-495.88	1.38	1.35	-1.53	
4,526.00	12.15	188.96	4,479.07	-514.68	-138.27	-514.68	1.80	0.92	-7.65	
4,714.00	8.51	180.50	4,664.01	-548.15	-141.48	-548.15	2.09	-1.94	-4.50	
4,809.00	10.45	181.96	4,757.71	-563.79	-141.83	-563.79	2.06	2.04	1.54	
4,903.00	12.58	185.83	4,849.81	-582.49	-143.16	-582.49	2.41	2.27	4.12	
4,998.00	14.00	185.84	4,942.26	-604.22	-145.38	-604.22	1.49	1.49	0.01	

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well NRC 27N-8HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 5074 & KB 25 @ 5099.00ft (H&P 311)
Site:	NRC 16-8HZ PAD	MD Reference:	GL 5074 & KB 25 @ 5099.00ft (H&P 311)
Well:	NRC 27N-8HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales Office

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
5,092.00	12.92	185.97	5,033.68	-625.98	-147.63	-625.98	1.15	-1.15	0.14	
5,281.00	10.04	181.24	5,218.88	-663.48	-150.19	-663.48	1.60	-1.52	-2.50	
5,375.00	10.70	187.84	5,311.35	-680.31	-151.56	-680.31	1.44	0.70	7.02	
5,469.00	8.57	187.26	5,404.02	-695.91	-153.63	-695.91	2.27	-2.27	-0.62	
5,658.00	9.77	186.15	5,590.60	-725.82	-157.13	-725.82	0.64	0.63	-0.59	
5,847.00	11.64	194.93	5,776.32	-760.19	-163.76	-760.19	1.31	0.99	4.65	
5,941.00	10.23	186.16	5,868.61	-777.66	-167.10	-777.66	2.32	-1.50	-9.33	
6,036.00	9.68	186.66	5,962.18	-793.98	-168.93	-793.98	0.59	-0.58	0.53	
6,130.00	11.81	183.48	6,054.53	-811.43	-170.43	-811.43	2.35	2.27	-3.38	
6,225.00	10.33	187.17	6,147.76	-829.59	-172.09	-829.59	1.73	-1.56	3.88	
6,319.00	10.58	185.01	6,240.20	-846.55	-173.89	-846.55	0.49	0.27	-2.30	
6,413.00	10.11	194.28	6,332.68	-863.14	-176.68	-863.14	1.84	-0.50	9.86	
6,508.00	8.33	190.82	6,426.45	-877.98	-180.03	-877.98	1.96	-1.87	-3.64	
6,602.00	6.56	188.09	6,519.65	-889.98	-182.06	-889.98	1.92	-1.88	-2.90	
6,697.00	6.56	194.32	6,614.03	-900.62	-184.17	-900.62	0.75	0.00	6.56	
6,791.00	7.31	208.66	6,707.35	-911.07	-188.37	-911.07	2.00	0.80	15.26	
6,838.00	6.75	224.84	6,754.00	-915.65	-191.75	-915.65	4.36	-1.19	34.43	
6,885.00	6.17	267.19	6,800.73	-917.73	-196.22	-917.73	9.98	-1.23	90.11	
6,932.00	7.88	299.94	6,847.39	-916.25	-201.54	-916.25	9.10	3.64	69.68	
6,980.00	5.98	327.95	6,895.05	-912.48	-205.72	-912.48	7.96	-3.96	58.35	
7,027.00	7.81	4.91	6,941.73	-907.23	-206.74	-907.23	9.99	3.89	78.64	
7,074.00	9.20	5.79	6,988.21	-900.31	-206.09	-900.31	2.97	2.96	1.87	
7,121.00	12.27	359.63	7,034.39	-891.57	-205.74	-891.57	6.96	6.53	-13.11	
7,168.00	15.80	357.15	7,079.98	-880.18	-206.09	-880.18	7.62	7.51	-5.28	
7,215.00	18.41	357.00	7,124.90	-866.38	-206.80	-866.38	5.55	5.55	-0.32	
7,263.00	18.68	356.03	7,170.40	-851.14	-207.73	-851.14	0.85	0.56	-2.02	
7,310.00	23.31	355.64	7,214.27	-834.35	-208.96	-834.35	9.86	9.85	-0.83	
7,357.00	29.43	355.05	7,256.36	-813.55	-210.66	-813.55	13.03	13.02	-1.26	
7,404.00	35.28	354.35	7,296.05	-788.52	-213.00	-788.52	12.47	12.45	-1.49	
7,451.00	40.54	353.12	7,333.12	-759.83	-216.17	-759.83	11.31	11.19	-2.62	
7,498.00	43.87	355.41	7,367.93	-728.42	-219.30	-728.42	7.80	7.09	4.87	
7,546.00	48.64	358.25	7,401.11	-693.81	-221.18	-693.81	10.82	9.94	5.92	
7,593.00	54.93	358.62	7,430.17	-656.92	-222.19	-656.92	13.40	13.38	0.79	
7,640.00	60.66	357.62	7,455.21	-617.19	-223.50	-617.19	12.32	12.19	-2.13	
7,687.00	65.49	357.70	7,476.49	-575.33	-225.21	-575.33	10.28	10.28	0.17	
7,734.00	69.64	358.89	7,494.42	-531.92	-226.50	-531.92	9.13	8.83	2.53	
7,781.00	74.00	359.84	7,509.08	-487.28	-226.99	-487.28	9.47	9.28	2.02	
7,829.00	77.43	0.19	7,520.92	-440.77	-226.97	-440.77	7.18	7.15	0.73	
7,876.00	81.52	0.36	7,529.51	-394.57	-226.75	-394.57	8.71	8.70	0.36	
7,907.00	83.59	0.59	7,533.52	-363.83	-226.50	-363.83	6.72	6.68	0.74	
7,952.00	85.95	0.92	7,537.63	-319.03	-225.91	-319.03	5.29	5.24	0.73	
7" (29 FSL 1117 FEL)										
8,044.00	90.77	1.58	7,540.26	-227.11	-223.90	-227.11	5.29	5.24	0.72	

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well NRC 27N-8HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 5074 & KB 25 @ 5099.00ft (H&P 311)
Site:	NRC 16-8HZ PAD	MD Reference:	GL 5074 & KB 25 @ 5099.00ft (H&P 311)
Well:	NRC 27N-8HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales Office

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
8,138.00	90.50	1.34	7,539.22	-133.15	-221.51	-133.15	0.38	-0.29	-0.26	
8,421.00	89.87	356.78	7,538.30	149.73	-226.15	149.73	1.63	-0.22	-1.61	
8,515.00	92.36	358.80	7,536.47	243.63	-229.77	243.63	3.41	2.65	2.15	
8,798.00	90.91	359.70	7,528.40	526.48	-233.48	526.48	0.60	-0.51	0.32	
8,986.00	89.87	1.17	7,527.12	714.47	-232.05	714.47	0.96	-0.55	0.78	
9,081.00	89.40	0.63	7,527.72	809.45	-230.56	809.45	0.75	-0.49	-0.57	
9,175.00	90.67	1.25	7,527.67	903.44	-229.01	903.44	1.50	1.35	0.66	
9,364.00	88.62	0.07	7,528.84	1,092.41	-226.84	1,092.41	1.25	-1.08	-0.62	
9,458.00	90.34	359.91	7,529.69	1,186.40	-226.85	1,186.40	1.84	1.83	-0.17	
9,552.00	89.93	359.10	7,529.47	1,280.40	-227.67	1,280.40	0.97	-0.44	-0.86	
9,646.00	91.41	359.47	7,528.37	1,374.38	-228.84	1,374.38	1.62	1.57	0.39	
9,740.00	91.04	359.35	7,526.36	1,468.35	-229.81	1,468.35	0.41	-0.39	-0.13	
9,835.00	89.19	359.37	7,526.17	1,563.34	-230.87	1,563.34	1.95	-1.95	0.02	
10,023.00	88.55	0.05	7,529.88	1,751.30	-231.82	1,751.30	0.50	-0.34	0.36	
10,212.00	88.25	359.75	7,535.16	1,940.23	-232.15	1,940.23	0.22	-0.16	-0.16	
10,307.00	89.76	359.28	7,536.80	2,035.21	-232.95	2,035.21	1.66	1.59	-0.49	
10,401.00	92.22	359.30	7,535.18	2,129.18	-234.12	2,129.18	2.62	2.62	0.02	
10,590.00	90.44	1.66	7,530.79	2,318.10	-232.53	2,318.10	1.56	-0.94	1.25	
10,684.00	88.32	2.17	7,531.81	2,412.04	-229.39	2,412.04	2.32	-2.26	0.54	
10,967.00	88.79	357.70	7,538.95	2,694.87	-229.71	2,694.87	1.59	0.17	-1.58	
11,061.00	90.81	358.15	7,539.28	2,788.80	-233.12	2,788.80	2.20	2.15	0.48	
11,156.00	90.77	359.73	7,537.97	2,883.78	-234.88	2,883.78	1.66	-0.04	1.66	
11,250.00	89.53	0.04	7,537.72	2,977.77	-235.06	2,977.77	1.36	-1.32	0.33	
11,345.00	90.81	0.03	7,537.44	3,072.77	-235.01	3,072.77	1.35	1.35	-0.01	
11,439.00	90.17	0.33	7,536.64	3,166.77	-234.71	3,166.77	0.75	-0.68	0.32	
11,533.00	89.13	358.60	7,537.21	3,260.76	-235.59	3,260.76	2.15	-1.11	-1.84	
11,722.00	89.73	358.90	7,539.09	3,449.70	-239.71	3,449.70	0.35	0.32	0.16	
11,816.00	91.21	358.20	7,538.32	3,543.66	-242.09	3,543.66	1.74	1.57	-0.74	
12,005.00	92.38	3.24	7,532.40	3,732.49	-239.72	3,732.49	2.74	0.62	2.67	
12,099.00	91.14	3.29	7,529.51	3,826.29	-234.37	3,826.29	1.32	-1.32	0.05	
12,194.00	89.76	2.44	7,528.76	3,921.17	-229.62	3,921.17	1.71	-1.45	-0.89	
12,288.00	89.06	2.61	7,529.73	4,015.07	-225.48	4,015.07	0.77	-0.74	0.18	
12,477.00	89.13	2.32	7,532.72	4,203.87	-217.35	4,203.87	0.16	0.04	-0.15	
12,571.00	89.83	1.17	7,533.57	4,297.82	-214.49	4,297.82	1.43	0.74	-1.22	
LAST SDI MWD PRODUCTION SURVEY										
12,720.00	89.83	1.17	7,534.01	4,446.79	-211.45	4,446.79	0.00	0.00	0.00	
SDI PROJECTION TO TD										

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well NRC 27N-8HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 5074 & KB 25 @ 5099.00ft (H&P 311)
Site:	NRC 16-8HZ PAD	MD Reference:	GL 5074 & KB 25 @ 5099.00ft (H&P 311)
Well:	NRC 27N-8HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales Office

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)	
1,239.00	1,238.96	9 5/8"	9.625	12.250	
7,952.00	7,537.63	7" (29 FSL 1117 FEL)	7.000	7.500	

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
125.00	125.00	-0.45	0.00	FIRST GYRO SURFACE SURVEY	
1,148.00	1,147.97	-1.72	0.16	LAST GYRO SURFACE SURVEY	
1,365.00	1,364.91	-6.76	-0.75	FIRST SDI MWD PRODUCTION SURVEY	
12,571.00	7,533.57	4,297.82	-214.49	LAST SDI MWD PRODUCTION SURVEY	
12,720.00	7,534.01	4,446.79	-211.45	SDI PROJECTION TO TD	

Checked By: _____ Approved By: _____ Date: _____