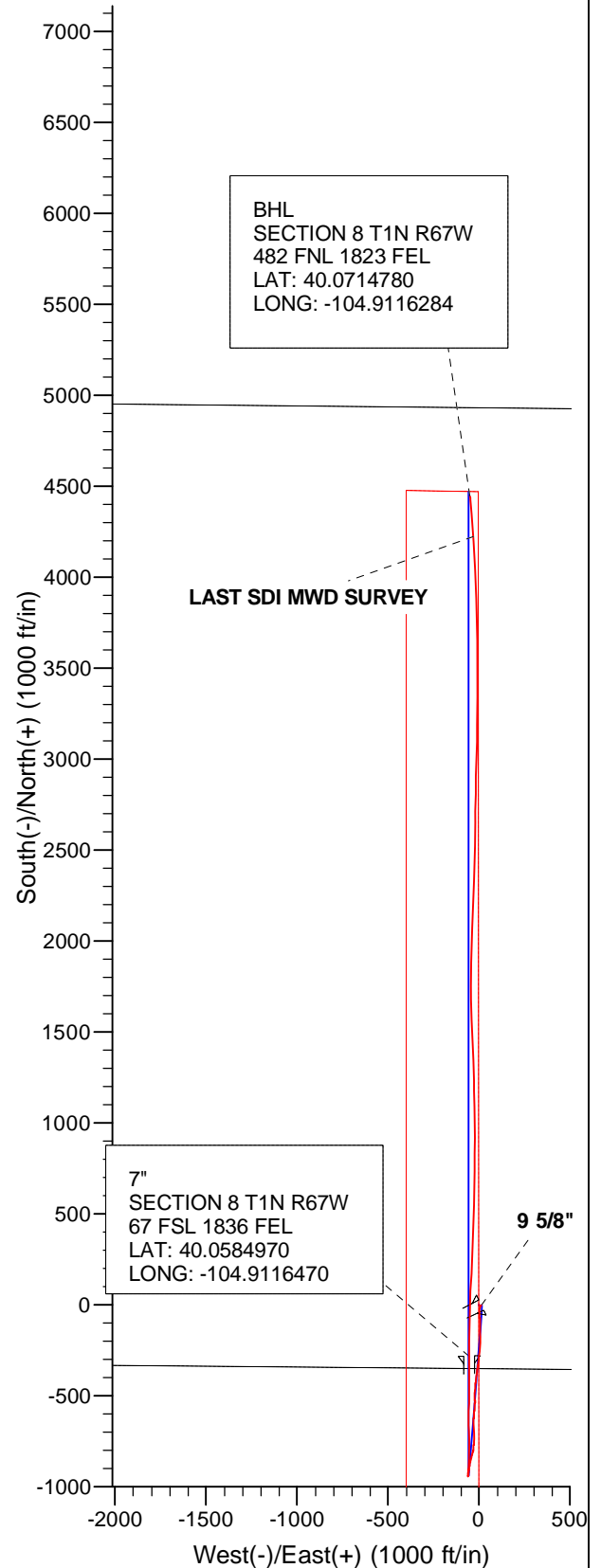
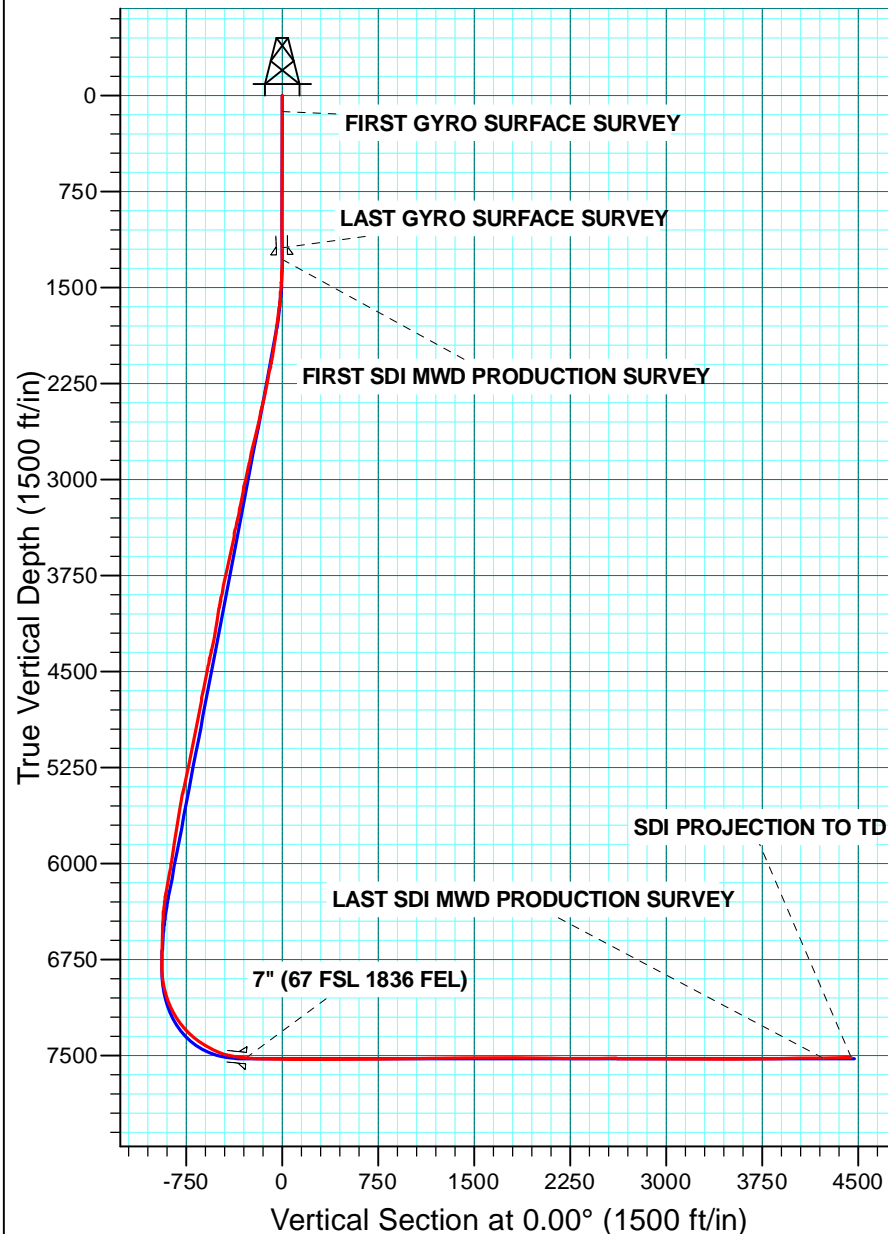


WELL DETAILS: NRC 2N-8HZ

GL 5063 & KB 25 @ 5088.00ft (H&P 311)

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	1264984.46	3164739.04	40.0592710	-104.9114530



US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

NRC 15-8HZ PAD

NRC 2N-8HZ

OH

Survey: Survey #2 SDI MWD PRODUCTION

Standard Survey Report

27 May, 2014

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well NRC 2N-8HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 5063 & KB 25 @ 5088.00ft (H&P 311)
Site:	NRC 15-8HZ PAD	MD Reference:	GL 5063 & KB 25 @ 5088.00ft (H&P 311)
Well:	NRC 2N-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 15-8HZ PAD, SWSE SECTION 8 T1N R67W		
Site Position:		Northing:	1,264,984.64 usft
From:	Lat/Long	Easting:	3,164,709.09 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in
		Latitude:	40.0592720
		Longitude:	-104.9115600
		Grid Convergence:	0.38 °

Well	NRC 2N-8HZ, 350 FSL 1780 FEL		
Well Position	+N/-S	0.00 ft	Northing: 1,264,984.46 usft
	+E/-W	0.00 ft	Easting: 3,164,739.05 usft
Position Uncertainty	0.00 ft	Wellhead Elevation:	0.00 ft
		Latitude:	40.0592710
		Longitude:	-104.9114530
		Ground Level:	5,063.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2013	4/21/2014	8.58	66.64	52,551

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	5/27/2014			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
25.00	1,193.00	Survey #1 GYRO SURFACE (OH)	NS-GYRO-MS	North sensing gyrocompassing m/s	
1,283.00	12,701.00	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)	
1,193.00	0.86	66.42	1,192.90	-2.80	11.16	-2.80	0.00	0.00	0.00	
1,243.00	0.69	64.22	1,242.89	-2.52	11.77	-2.52	0.34	-0.33	-4.40	
9 5/8"										
1,283.00	0.56	61.52	1,282.89	-2.32	12.16	-2.32	0.34	-0.33	-6.75	
FIRST SDI MWD PRODUCTION SURVEY										
1,375.00	2.26	216.20	1,374.87	-3.57	11.49	-3.57	3.02	1.85	168.13	
1,467.00	3.68	208.76	1,466.75	-7.63	8.99	-7.63	1.60	1.54	-8.09	
1,573.00	4.94	203.74	1,572.44	-14.79	5.52	-14.79	1.24	1.19	-4.74	
1,665.00	7.03	191.26	1,663.94	-23.93	2.83	-23.93	2.66	2.27	-13.57	

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well NRC 2N-8HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 5063 & KB 25 @ 5088.00ft (H&P 311)
Site:	NRC 15-8HZ PAD	MD Reference:	GL 5063 & KB 25 @ 5088.00ft (H&P 311)
Well:	NRC 2N-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)
1,757.00	7.49	184.63	1,755.21	-35.43	1.24	-35.43	1.04	0.50	-7.21
1,848.00	8.03	177.37	1,845.37	-47.69	1.06	-47.69	1.23	0.59	-7.98
1,940.00	8.77	171.79	1,936.39	-61.06	2.35	-61.06	1.20	0.80	-6.07
2,032.00	9.46	171.56	2,027.23	-75.48	4.46	-75.48	0.75	0.75	-0.25
2,124.00	11.35	178.92	2,117.71	-92.01	5.74	-92.01	2.51	2.05	8.00
2,215.00	11.97	185.74	2,206.84	-110.35	4.97	-110.35	1.66	0.68	7.49
2,307.00	11.52	178.68	2,296.92	-129.03	4.23	-129.03	1.64	-0.49	-7.67
2,397.00	12.22	174.43	2,384.99	-147.49	5.36	-147.49	1.24	0.78	-4.72
2,488.00	12.88	178.39	2,473.82	-167.22	6.58	-167.22	1.19	0.73	4.35
2,671.00	12.86	182.30	2,652.23	-207.96	6.33	-207.96	0.48	-0.01	2.14
2,762.00	13.06	181.55	2,740.91	-228.35	5.65	-228.35	0.29	0.22	-0.82
2,945.00	11.90	186.69	2,919.59	-267.76	2.89	-267.76	0.88	-0.63	2.81
3,037.00	13.13	188.69	3,009.40	-287.51	0.21	-287.51	1.42	1.34	2.17
3,128.00	11.19	186.05	3,098.35	-306.51	-2.29	-306.51	2.22	-2.13	-2.90
3,220.00	11.26	189.99	3,188.60	-324.24	-4.78	-324.24	0.84	0.08	4.28
3,312.00	12.69	187.01	3,278.59	-343.11	-7.58	-343.11	1.69	1.55	-3.24
3,406.00	11.24	188.32	3,370.55	-362.43	-10.16	-362.43	1.57	-1.54	1.39
3,689.00	12.29	187.18	3,647.60	-419.60	-17.92	-419.60	0.38	0.37	-0.40
3,784.00	11.51	185.85	3,740.56	-439.06	-20.15	-439.06	0.87	-0.82	-1.40
3,972.00	11.95	184.26	3,924.63	-477.13	-23.51	-477.13	0.29	0.23	-0.85
4,067.00	8.86	179.18	4,018.06	-494.26	-24.13	-494.26	3.39	-3.25	-5.35
4,255.00	10.37	177.00	4,203.41	-525.64	-23.04	-525.64	0.83	0.80	-1.16
4,350.00	11.71	184.33	4,296.66	-543.79	-23.32	-543.79	2.04	1.41	7.72
4,444.00	13.02	183.03	4,388.48	-563.88	-24.60	-563.88	1.42	1.39	-1.38
4,539.00	11.22	185.72	4,481.36	-583.76	-26.09	-583.76	1.99	-1.89	2.83
4,727.00	11.72	182.83	4,665.60	-621.03	-28.85	-621.03	0.41	0.27	-1.54
4,821.00	9.97	180.57	4,757.92	-638.71	-29.40	-638.71	1.92	-1.86	-2.40
4,916.00	10.56	181.80	4,851.40	-655.63	-29.76	-655.63	0.66	0.62	1.29
5,010.00	11.97	176.51	4,943.59	-673.97	-29.44	-673.97	1.86	1.50	-5.63
5,105.00	11.20	179.00	5,036.65	-693.03	-28.68	-693.03	0.97	-0.81	2.62
5,199.00	10.14	175.40	5,129.03	-710.40	-27.85	-710.40	1.33	-1.13	-3.83
5,388.00	12.50	182.68	5,314.35	-747.43	-27.47	-747.43	1.46	1.25	3.85
5,482.00	12.13	184.92	5,406.18	-767.43	-28.80	-767.43	0.64	-0.39	2.38
5,671.00	9.62	189.72	5,591.78	-802.78	-33.17	-802.78	1.41	-1.33	2.54
5,860.00	9.35	197.31	5,778.20	-833.01	-40.40	-833.01	0.68	-0.14	4.02
6,049.00	9.20	191.91	5,964.73	-862.45	-48.09	-862.45	0.47	-0.08	-2.86
6,237.00	10.59	188.86	6,149.93	-894.23	-53.85	-894.23	0.79	0.74	-1.62
6,332.00	9.35	191.84	6,243.50	-910.40	-56.78	-910.40	1.41	-1.31	3.14
6,520.00	3.47	188.54	6,430.24	-931.00	-60.76	-931.00	3.13	-3.13	-1.76
6,614.00	2.42	183.96	6,524.12	-935.79	-61.32	-935.79	1.14	-1.12	-4.87
6,708.00	1.59	186.77	6,618.06	-939.06	-61.61	-939.06	0.89	-0.88	2.99
6,803.00	0.64	180.93	6,713.04	-940.90	-61.78	-940.90	1.01	-1.00	-6.15
6,897.00	0.47	102.42	6,807.04	-941.51	-61.41	-941.51	0.76	-0.18	-83.52

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well NRC 2N-8HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 5063 & KB 25 @ 5088.00ft (H&P 311)
Site:	NRC 15-8HZ PAD	MD Reference:	GL 5063 & KB 25 @ 5088.00ft (H&P 311)
Well:	NRC 2N-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)
6,944.00	4.07	30.90	6,853.99	-940.12	-60.36	-940.12	8.40	7.66	-152.17
6,992.00	8.25	11.15	6,901.71	-935.28	-58.82	-935.28	9.64	8.71	-41.15
7,039.00	12.05	1.65	6,947.97	-927.06	-58.03	-927.06	8.81	8.09	-20.21
7,086.00	15.32	359.21	6,993.63	-915.95	-57.97	-915.95	7.06	6.96	-5.19
7,133.00	18.38	1.43	7,038.61	-902.33	-57.87	-902.33	6.65	6.51	4.72
7,180.00	21.41	2.40	7,082.80	-886.35	-57.33	-886.35	6.48	6.45	2.06
7,227.00	23.50	0.43	7,126.23	-868.40	-56.90	-868.40	4.73	4.45	-4.19
7,275.00	27.72	2.66	7,169.51	-847.67	-56.31	-847.67	9.02	8.79	4.65
7,322.00	32.92	1.34	7,210.07	-823.97	-55.50	-823.97	11.15	11.06	-2.81
7,369.00	37.82	1.09	7,248.38	-796.77	-54.93	-796.77	10.43	10.43	-0.53
7,416.00	42.10	0.55	7,284.40	-766.60	-54.50	-766.60	9.14	9.11	-1.15
7,463.00	46.18	359.00	7,318.12	-733.88	-54.65	-733.88	8.98	8.68	-3.30
7,510.00	49.09	357.60	7,349.79	-699.17	-55.69	-699.17	6.57	6.19	-2.98
7,558.00	53.36	358.87	7,379.84	-661.78	-56.83	-661.78	9.13	8.90	2.65
7,605.00	58.01	0.03	7,406.33	-622.97	-57.19	-622.97	10.10	9.89	2.47
7,652.00	60.27	2.06	7,430.44	-582.64	-56.44	-582.64	6.07	4.81	4.32
7,699.00	63.11	2.22	7,452.73	-541.29	-54.90	-541.29	6.05	6.04	0.34
7,747.00	68.12	0.19	7,472.54	-497.60	-54.00	-497.60	11.12	10.44	-4.23
7,794.00	71.59	359.48	7,488.72	-453.48	-54.13	-453.48	7.52	7.38	-1.51
7,841.00	76.50	359.38	7,501.64	-408.31	-54.58	-408.31	10.45	10.45	-0.21
7,888.00	80.77	0.55	7,510.90	-362.24	-54.60	-362.24	9.41	9.09	2.49
7,969.00	84.31	359.87	7,521.41	-281.94	-54.31	-281.94	4.45	4.37	-0.84
7" (67 FSL 1836 FEL)									
8,044.00	87.59	359.24	7,526.71	-207.14	-54.89	-207.14	4.45	4.37	-0.83
8,327.00	90.50	3.56	7,531.43	75.64	-47.98	75.64	1.84	1.03	1.53
8,421.00	89.90	3.16	7,531.10	169.47	-42.47	169.47	0.77	-0.64	-0.43
8,609.00	90.94	2.48	7,529.72	357.24	-33.22	357.24	0.66	0.55	-0.36
8,703.00	90.13	0.88	7,528.85	451.19	-30.47	451.19	1.91	-0.86	-1.70
8,798.00	90.57	1.61	7,528.26	546.16	-28.40	546.16	0.90	0.46	0.77
8,986.00	89.93	0.74	7,527.44	734.12	-24.55	734.12	0.57	-0.34	-0.46
9,081.00	90.37	0.05	7,527.20	829.12	-23.89	829.12	0.86	0.46	-0.73
9,175.00	90.80	0.30	7,526.24	923.11	-23.60	923.11	0.53	0.46	0.27
9,363.00	91.74	358.77	7,522.07	1,111.05	-25.13	1,111.05	0.95	0.50	-0.81
9,552.00	90.57	358.20	7,518.26	1,299.94	-30.13	1,299.94	0.69	-0.62	-0.30
9,690.00	90.23	357.42	7,517.30	1,437.84	-35.40	1,437.84	0.62	-0.25	-0.57
9,929.00	90.10	358.15	7,516.61	1,676.66	-44.64	1,676.66	0.31	-0.05	0.31
10,024.00	89.63	0.09	7,516.83	1,771.64	-46.09	1,771.64	2.10	-0.49	2.04
10,117.00	90.37	1.69	7,516.83	1,864.62	-44.65	1,864.62	1.90	0.80	1.72
10,212.00	89.80	1.82	7,516.69	1,959.58	-41.74	1,959.58	0.62	-0.60	0.14
10,400.00	88.50	2.82	7,519.48	2,147.40	-34.13	2,147.40	0.87	-0.69	0.53
10,495.00	88.42	1.72	7,522.03	2,242.29	-30.37	2,242.29	1.16	-0.08	-1.16
10,684.00	90.67	1.17	7,523.53	2,431.21	-25.60	2,431.21	1.23	1.19	-0.29
10,778.00	90.37	2.15	7,522.68	2,525.16	-22.88	2,525.16	1.09	-0.32	1.04
10,872.00	88.79	0.89	7,523.37	2,619.12	-20.39	2,619.12	2.15	-1.68	-1.34

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well NRC 2N-8HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 5063 & KB 25 @ 5088.00ft (H&P 311)
Site:	NRC 15-8HZ PAD	MD Reference:	GL 5063 & KB 25 @ 5088.00ft (H&P 311)
Well:	NRC 2N-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)	
10,967.00	90.07	0.63	7,524.31	2,714.11	-19.13	2,714.11	1.37	1.35	-0.27	
11,061.00	89.70	0.67	7,524.50	2,808.10	-18.06	2,808.10	0.40	-0.39	0.04	
11,156.00	89.56	0.82	7,525.12	2,903.09	-16.83	2,903.09	0.22	-0.15	0.16	
11,345.00	89.97	1.69	7,525.89	3,092.04	-12.69	3,092.04	0.51	0.22	0.46	
11,439.00	89.10	1.14	7,526.65	3,186.01	-10.37	3,186.01	1.09	-0.93	-0.59	
11,533.00	89.97	0.89	7,527.42	3,279.99	-8.70	3,279.99	0.96	0.93	-0.27	
11,628.00	89.30	359.90	7,528.02	3,374.99	-8.05	3,374.99	1.26	-0.71	-1.04	
11,722.00	90.03	359.23	7,528.57	3,468.98	-8.76	3,468.98	1.05	0.78	-0.71	
11,816.00	91.40	359.46	7,527.40	3,562.96	-9.83	3,562.96	1.48	1.46	0.24	
11,910.00	90.07	359.29	7,526.19	3,656.95	-10.86	3,656.95	1.43	-1.41	-0.18	
12,005.00	89.73	359.36	7,526.36	3,751.94	-11.98	3,751.94	0.37	-0.36	0.07	
12,098.00	90.97	358.18	7,525.79	3,844.92	-13.98	3,844.92	1.84	1.33	-1.27	
12,195.00	91.01	357.04	7,524.12	3,941.81	-18.02	3,941.81	1.18	0.04	-1.18	
12,289.00	91.01	357.19	7,522.46	4,035.68	-22.75	4,035.68	0.16	0.00	0.16	
12,478.00	90.20	356.66	7,520.46	4,224.40	-32.89	4,224.40	0.51	-0.43	-0.28	
LAST SDI MWD PRODUCTION SURVEY										
12,701.00	92.00	355.00	7,516.18	4,446.75	-49.10	4,446.75	1.10	0.81	-0.74	
SDI PROJECTION TO TD										

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name		Casing Diameter (in)	Hole Diameter (in)
1,243.00	1,242.89	9 5/8"		9.625	12.250
7,969.00	7,521.41	7" (67 FSL 1836 FEL)		7.000	7.500

Survey Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
1,283.00	1,282.89	-2.32	12.16	FIRST SDI MWD PRODUCTION SURVEY	
12,478.00	7,520.46	4,224.40	-32.89	LAST SDI MWD PRODUCTION SURVEY	
12,701.00	7,516.18	4,446.75	-49.10	SDI PROJECTION TO TD	

Checked By: _____	Approved By: _____	Date: _____
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