



Directional Survey Certification

2948 I-70 Business Loop
Grand Junction, CO 81504
(970)-245-9447 Fax (970)-245-9454

Operator	Terra Energy Partners
Well Name & No.	RU 411-7
County & State	Garfield, CO
SDI Job No.	420916DEFK384396
Rig	H&P 318

I, Janie Collins, having personal knowledge of all the facts, hereby certify that the attached directional survey run from a measured depth of 80 feet to a measured depth of 9,782 feet is true and correct as determined from all available records.

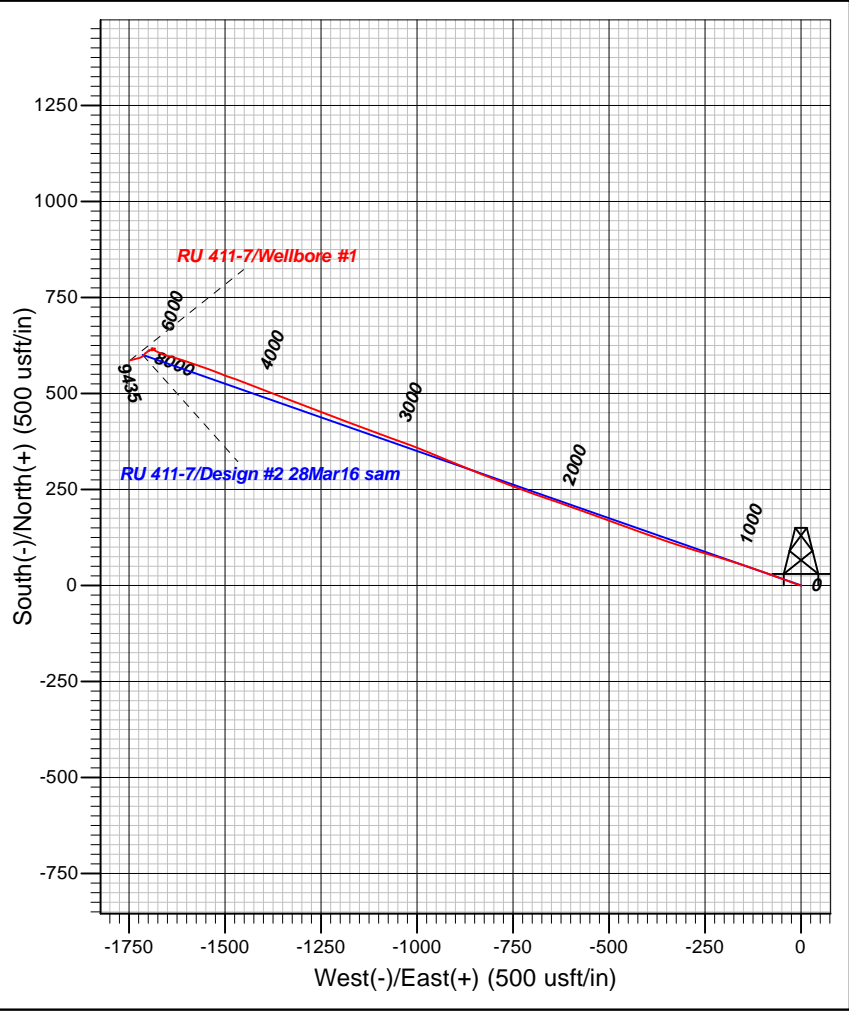
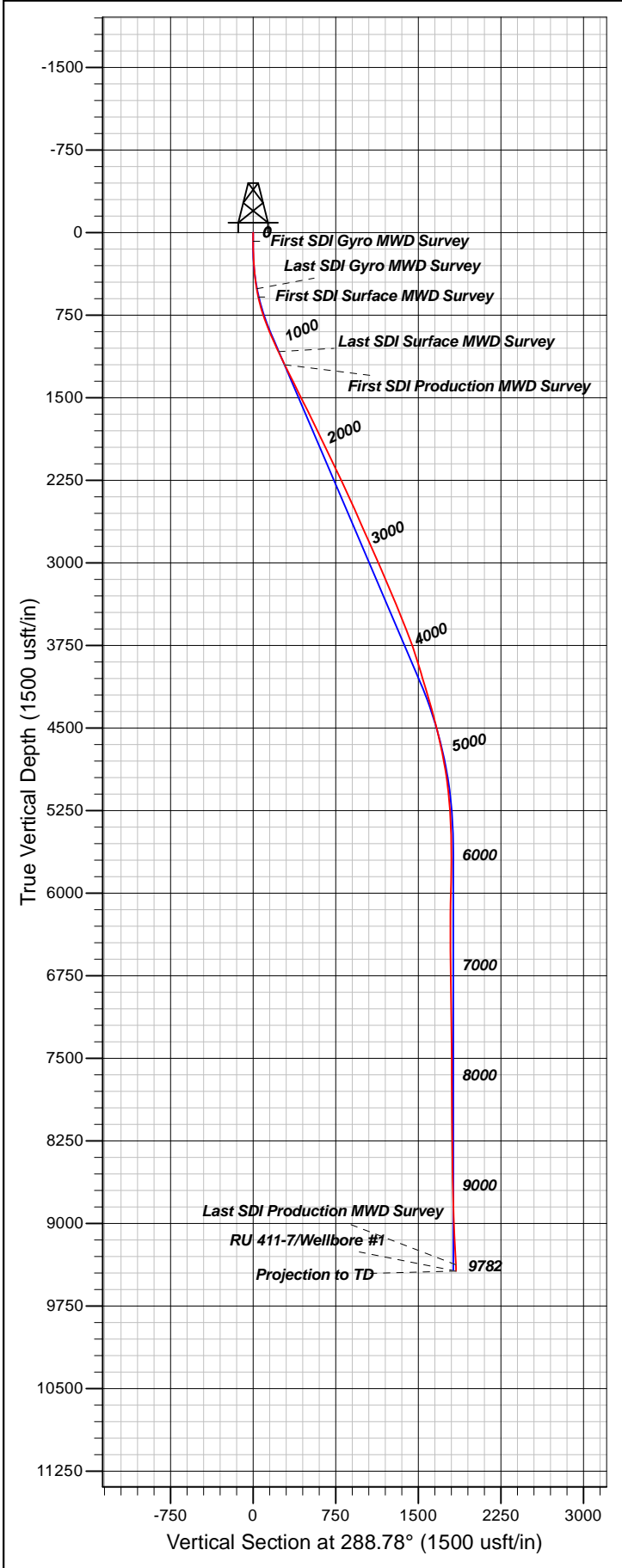
Signature

3-Oct-16

Date

Janie Collins

Colorado District Well Planner
Scientific Drilling International



Well Details: RU 411-7						
TVD Reference: GL 7339' & RKB 24' @ 7363.00usft (H&P 318) Slot Level: 7339.00						
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	1599705.24	2345086.31	39.4570049	-107.8197062	RU 411-7 (B6)
REFERENCE INFORMATION						
Co-ordinate (N/E) Reference: Well RU 411-7 - Slot RU 411-7 (B6), True North						
Vertical (TVD) Reference: GL 7339' & RKB 24' @ 7363.00usft (H&P 318)						
Section (VS) Reference: Slot - RU 411-7 (B6)(0.00N, 0.00E)						
Measured Depth Reference: GL 7339' & RKB 24' @ 7363.00usft (H&P 318)						
Calculation Method: Minimum Curvature						
PROJECT DETAILS: Garfield County, CO NAD83						
Geodetic System: US State Plane 1983						
Datum: North American Datum 1983						
Ellipsoid: GRS 1980						
Zone: Colorado Central Zone						
System Datum: Mean Sea Level						
Plan: Wellbore #1						
11:57, October 03 2016 Created By: Janie Collins						

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well RU 411-7 - Slot RU 411-7 (B6)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 7339' & RKB 24' @ 7363.00usft (H&P 318)
Site:	RU 22-7 Pad	MD Reference:	GL 7339' & RKB 24' @ 7363.00usft (H&P 318)
Well:	RU 411-7	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Grand Junction District

Project	Garfield County, CO NAD83		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site	RU 22-7 Pad				
Site Position:		Northing:	1,599,673.59 usft	Latitude:	39.4569181
From:	Map	Easting:	2,345,086.00 usft	Longitude:	-107.8197045
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.46 °

Well	RU 411-7 - Slot RU 411-7 (B6)					
Well Position	+N/-S	0.00 usft	Northing:	1,599,705.23 usft	Latitude:	39.4570050
	+E/-W	0.00 usft	Easting:	2,345,086.31 usft	Longitude:	-107.8197063
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,339.00 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	9/15/2016	9.35	65.68	51,781

Design	Wellbore #1				
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	288.78	

Survey Program	Date	10/3/2016			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
80.00	512.00	Survey #1 - Gyro MWD Survey (Wellbore)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	
588.00	1,120.00	Survey #2 - Surface MWD Survey (Wellbo	SDI MWD	SDI MWD - Standard ver 1.0.1	
1,250.00	9,782.00	Survey #3 - Production MWD Survey (Wel	SDI MWD	SDI MWD - Standard ver 1.0.1	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	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	0.00
80.00	0.18	248.20	80.00	-0.05	-0.12	0.10	0.23	0.23	0.00	
First SDI Gyro MWD Survey										
149.00	1.14	270.88	148.99	-0.08	-0.90	0.83	1.42	1.39	32.87	
239.00	3.08	277.82	238.93	0.27	-4.19	4.06	2.17	2.16	7.71	
330.00	4.49	292.68	329.73	1.97	-9.90	10.01	1.88	1.55	16.33	
421.00	6.60	288.81	420.30	5.03	-18.14	18.80	2.35	2.32	-4.25	
512.00	9.59	292.24	510.38	9.59	-30.11	31.59	3.33	3.29	3.77	

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well RU 411-7 - Slot RU 411-7 (B6)
Project:	Garfield County, CO NAD83	TVD Reference:	GL 7339' & RKB 24' @ 7363.00usft (H&P 318)
Site:	RU 22-7 Pad	MD Reference:	GL 7339' & RKB 24' @ 7363.00usft (H&P 318)
Well:	RU 411-7	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Grand Junction District

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
Last SDI Gyro MWD Survey									
588.00	12.18	292.45	585.01	15.05	-43.38	45.92	3.41	3.41	0.28
First SDI Surface MWD Survey									
679.00	15.83	289.47	673.29	22.85	-63.96	67.92	4.09	4.01	-3.27
770.00	18.51	288.61	760.23	31.60	-89.36	94.78	2.96	2.95	-0.95
861.00	21.30	289.20	845.78	41.65	-118.66	125.75	3.07	3.07	0.65
953.00	23.92	288.58	930.70	53.09	-152.13	161.12	2.86	2.85	-0.67
1,043.00	24.42	287.52	1,012.82	64.50	-187.17	197.97	0.74	0.56	-1.18
1,120.00	24.97	287.17	1,082.77	74.09	-217.87	230.13	0.74	0.71	-0.45
Last SDI Surface MWD Survey									
1,250.00	26.03	285.59	1,200.11	89.86	-271.57	286.04	0.97	0.82	-1.22
First SDI Production MWD Survey									
1,345.00	26.44	288.67	1,285.33	102.23	-311.68	328.00	1.50	0.43	3.24
1,439.00	26.60	289.06	1,369.44	115.80	-351.40	369.97	0.25	0.17	0.41
1,534.00	26.49	288.13	1,454.42	129.34	-391.64	412.43	0.45	-0.12	-0.98
1,628.00	26.47	290.64	1,538.56	143.25	-431.17	454.33	1.19	-0.02	2.67
1,723.00	26.58	289.93	1,623.56	157.96	-470.96	496.74	0.35	0.12	-0.75
1,817.00	25.77	290.10	1,707.92	172.15	-509.92	538.20	0.87	-0.86	0.18
1,912.00	26.01	289.67	1,793.39	186.26	-548.93	579.67	0.32	0.25	-0.45
2,006.00	25.77	289.98	1,877.95	200.18	-587.54	620.71	0.29	-0.26	0.33
2,100.00	25.74	289.68	1,962.62	214.03	-625.96	661.54	0.14	-0.03	-0.32
2,195.00	25.45	287.91	2,048.29	227.26	-664.81	702.58	0.86	-0.31	-1.86
2,289.00	26.06	290.46	2,132.96	240.69	-703.38	743.42	1.35	0.65	2.71
2,383.00	25.92	290.42	2,217.45	255.07	-741.98	784.59	0.15	-0.15	-0.04
2,478.00	24.45	289.50	2,303.42	268.88	-779.97	825.01	1.60	-1.55	-0.97
2,572.00	24.61	293.27	2,388.94	283.11	-816.29	863.97	1.67	0.17	4.01
2,667.00	24.27	292.53	2,475.43	298.40	-852.49	903.18	0.48	-0.36	-0.78
2,761.00	23.39	290.68	2,561.42	312.40	-887.80	941.10	1.23	-0.94	-1.97
2,855.00	24.59	293.42	2,647.30	326.76	-923.20	979.25	1.74	1.28	2.91
2,950.00	24.25	292.03	2,733.80	341.93	-959.42	1,018.43	0.70	-0.36	-1.46
3,044.00	24.22	291.89	2,819.51	356.36	-995.21	1,056.95	0.07	-0.03	-0.15
3,138.00	23.61	289.90	2,905.44	369.96	-1,030.80	1,095.03	1.08	-0.65	-2.12
3,233.00	23.22	288.91	2,992.62	382.50	-1,066.41	1,132.77	0.58	-0.41	-1.04
3,327.00	24.00	290.86	3,078.75	395.32	-1,101.80	1,170.41	1.17	0.83	2.07
3,422.00	24.03	291.87	3,165.53	409.40	-1,137.81	1,209.03	0.43	0.03	1.06
3,516.00	22.81	290.24	3,251.79	422.83	-1,172.67	1,246.36	1.47	-1.30	-1.73
3,610.00	21.40	289.51	3,338.87	434.87	-1,205.93	1,281.73	1.53	-1.50	-0.78
3,705.00	22.52	291.21	3,426.98	447.24	-1,239.23	1,317.23	1.36	1.18	1.79
3,799.00	22.00	290.00	3,513.98	459.77	-1,272.55	1,352.82	0.74	-0.55	-1.29
3,893.00	21.82	291.32	3,601.19	472.14	-1,305.37	1,387.88	0.56	-0.19	1.40
3,988.00	20.80	291.93	3,689.69	484.86	-1,337.47	1,422.36	1.10	-1.07	0.64
4,082.00	18.17	290.04	3,778.30	496.12	-1,366.72	1,453.68	2.88	-2.80	-2.01
4,176.00	17.72	291.52	3,867.73	506.39	-1,393.80	1,482.62	0.68	-0.48	1.57
4,270.00	17.17	291.41	3,957.40	516.70	-1,420.03	1,510.77	0.59	-0.59	-0.12

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well RU 411-7 - Slot RU 411-7 (B6)
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Site:	RU 22-7 Pad	MD Reference:	GL 7339' & RKB 24' @ 7363.00usft (H&P 318)
Well:	RU 411-7	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Grand Junction District

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
4,365.00	15.91	290.80	4,048.47	526.45	-1,445.25	1,537.79	1.34	-1.33	-0.64	
4,459.00	17.16	290.16	4,138.58	535.80	-1,470.32	1,564.53	1.34	1.33	-0.68	
4,554.00	17.43	289.63	4,229.29	545.41	-1,496.87	1,592.77	0.33	0.28	-0.56	
4,648.00	15.30	291.83	4,319.47	554.75	-1,521.65	1,619.24	2.36	-2.27	2.34	
4,742.00	14.81	289.58	4,410.25	563.39	-1,544.48	1,643.63	0.81	-0.52	-2.39	
4,836.00	13.89	289.91	4,501.31	571.26	-1,566.41	1,666.93	0.98	-0.98	0.35	
4,931.00	12.15	287.73	4,593.87	578.19	-1,586.66	1,688.33	1.90	-1.83	-2.29	
5,025.00	12.12	287.95	4,685.77	584.24	-1,605.47	1,708.08	0.06	-0.03	0.23	
5,120.00	10.65	288.81	4,778.90	590.15	-1,623.26	1,726.83	1.56	-1.55	0.91	
5,214.00	9.61	284.67	4,871.43	594.93	-1,639.08	1,743.35	1.35	-1.11	-4.40	
5,308.00	7.82	284.95	4,964.34	598.57	-1,652.85	1,757.55	1.90	-1.90	0.30	
5,402.00	6.30	295.15	5,057.63	602.41	-1,663.70	1,769.06	2.09	-1.62	10.85	
5,497.00	6.05	293.11	5,152.08	606.59	-1,673.02	1,779.23	0.35	-0.26	-2.15	
5,591.00	4.06	301.41	5,245.71	610.27	-1,680.41	1,787.42	2.25	-2.12	8.83	
5,685.00	2.96	293.14	5,339.53	612.96	-1,685.49	1,793.09	1.29	-1.17	-8.80	
5,779.00	1.38	303.16	5,433.46	614.53	-1,688.67	1,796.61	1.72	-1.68	10.66	
5,873.00	1.23	308.54	5,527.44	615.78	-1,690.40	1,798.65	0.21	-0.16	5.72	
5,968.00	0.24	331.82	5,622.43	616.59	-1,691.29	1,799.76	1.07	-1.04	24.51	
6,063.00	0.70	349.28	5,717.43	617.34	-1,691.50	1,800.19	0.50	0.48	18.38	
6,158.00	1.61	94.41	5,812.41	617.81	-1,690.27	1,799.18	2.02	0.96	110.66	
6,252.00	1.07	108.17	5,906.39	617.43	-1,688.12	1,797.02	0.66	-0.57	14.64	
6,346.00	1.16	105.50	6,000.37	616.90	-1,686.37	1,795.20	0.11	0.10	-2.84	
6,440.00	0.93	80.31	6,094.35	616.78	-1,684.70	1,793.58	0.54	-0.24	-26.80	
6,535.00	0.66	111.94	6,189.35	616.70	-1,683.44	1,792.35	0.53	-0.28	33.29	
6,629.00	0.62	101.11	6,283.34	616.40	-1,682.43	1,791.31	0.14	-0.04	-11.52	
6,723.00	0.98	236.48	6,377.34	615.86	-1,682.61	1,791.30	1.58	0.38	144.01	
6,818.00	1.04	240.99	6,472.32	614.99	-1,684.04	1,792.37	0.10	0.06	4.75	
6,912.00	0.44	233.88	6,566.31	614.37	-1,685.07	1,793.15	0.64	-0.64	-7.56	
7,007.00	0.51	208.75	6,661.31	613.78	-1,685.57	1,793.43	0.23	0.07	-26.45	
7,102.00	0.74	252.51	6,756.30	613.23	-1,686.36	1,794.00	0.54	0.24	46.06	
7,196.00	1.11	247.82	6,850.29	612.70	-1,687.78	1,795.18	0.40	0.39	-4.99	
7,291.00	0.68	291.56	6,945.28	612.56	-1,689.16	1,796.44	0.82	-0.45	46.04	
7,385.00	1.19	268.23	7,039.27	612.73	-1,690.65	1,797.91	0.67	0.54	-24.82	
7,480.00	1.09	259.90	7,134.25	612.55	-1,692.53	1,799.62	0.20	-0.11	-8.77	
7,574.00	1.22	286.69	7,228.23	612.68	-1,694.37	1,801.41	0.58	0.14	28.50	
7,669.00	0.39	285.44	7,323.22	613.05	-1,695.65	1,802.74	0.87	-0.87	-1.32	
7,763.00	0.99	267.81	7,417.21	613.11	-1,696.77	1,803.82	0.67	0.64	-18.76	
7,858.00	0.65	158.60	7,512.21	612.57	-1,697.39	1,804.24	1.42	-0.36	-114.96	
7,952.00	0.28	168.04	7,606.21	611.85	-1,697.15	1,803.77	0.40	-0.39	10.04	
8,046.00	0.64	224.90	7,700.20	611.26	-1,697.47	1,803.89	0.57	0.38	60.49	
8,141.00	0.65	292.60	7,795.20	611.09	-1,698.35	1,804.66	0.76	0.01	71.26	
8,235.00	0.17	315.98	7,889.19	611.39	-1,698.93	1,805.32	0.53	-0.51	24.87	
8,329.00	0.36	197.34	7,983.19	611.21	-1,699.12	1,805.43	0.50	0.20	-126.21	

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Grand Junction District

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
8,424.00	0.50	215.35	8,078.19	610.59	-1,699.45	1,805.54	0.20	0.15	18.96	
8,518.00	1.45	238.58	8,172.18	609.63	-1,700.70	1,806.42	1.07	1.01	24.71	
8,613.00	1.38	225.04	8,267.15	608.20	-1,702.54	1,807.70	0.36	-0.07	-14.25	
8,707.00	1.96	238.12	8,361.11	606.55	-1,704.70	1,809.22	0.73	0.62	13.91	
8,802.00	2.22	239.15	8,456.05	604.75	-1,707.66	1,811.44	0.28	0.27	1.08	
8,896.00	1.76	207.91	8,549.99	602.54	-1,709.90	1,812.85	1.23	-0.49	-33.23	
8,990.00	2.35	212.79	8,643.93	599.64	-1,711.62	1,813.54	0.65	0.63	5.19	
9,085.00	2.33	225.68	8,738.85	596.66	-1,714.06	1,814.89	0.55	-0.02	13.57	
9,179.00	2.12	249.15	8,832.78	594.70	-1,717.05	1,817.09	0.99	-0.22	24.97	
9,273.00	2.58	246.13	8,926.70	593.23	-1,720.61	1,819.99	0.51	0.49	-3.21	
9,368.00	3.24	255.65	9,021.58	591.70	-1,725.16	1,823.81	0.86	0.69	10.02	
9,462.00	3.02	256.11	9,115.44	590.44	-1,730.14	1,828.12	0.24	-0.23	0.49	
9,556.00	3.70	260.98	9,209.28	589.37	-1,735.54	1,832.88	0.78	0.72	5.18	
9,651.00	3.24	252.50	9,304.10	588.09	-1,741.13	1,837.76	0.72	-0.48	-8.93	
9,723.00	3.08	251.14	9,376.00	586.85	-1,744.90	1,840.93	0.25	-0.22	-1.89	
Last SDI Production MWD Survey										
9,782.00	3.08	251.14	9,434.91	585.82	-1,747.90	1,843.44	0.00	0.00	0.00	
Projection to TD										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
80.00	80.00	-0.05	-0.12	First SDI Gyro MWD Survey	
512.00	510.38	9.59	-30.11	Last SDI Gyro MWD Survey	
588.00	585.01	15.05	-43.38	First SDI Surface MWD Survey	
1,120.00	1,082.77	74.09	-217.87	Last SDI Surface MWD Survey	
1,250.00	1,200.11	89.86	-271.57	First SDI Production MWD Survey	
9,723.00	9,376.00	586.85	-1,744.90	Last SDI Production MWD Survey	
9,782.00	9,434.91	585.82	-1,747.90	Projection to TD	

Checked By: _____ Approved By: _____ Date: _____