



Directional Survey Certification

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

Operator	TEP Rocky Mountain, LLC
Well Name & No.	RU 421-7
County & State	Garfield, CO
SDI Job No.	420916DEFK385732
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 115 feet to a measured depth of 9,564 feet is true and correct as determined from all available records.

A handwritten signature in blue ink, appearing to read 'Janie Collins', written over a horizontal line.

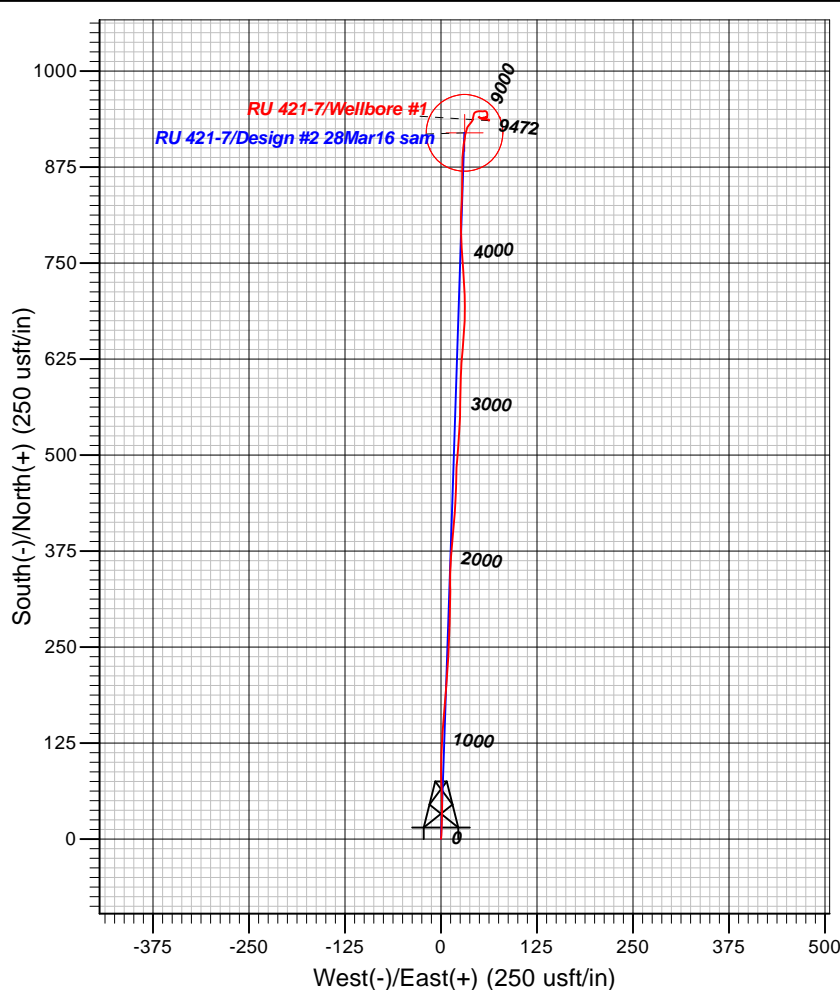
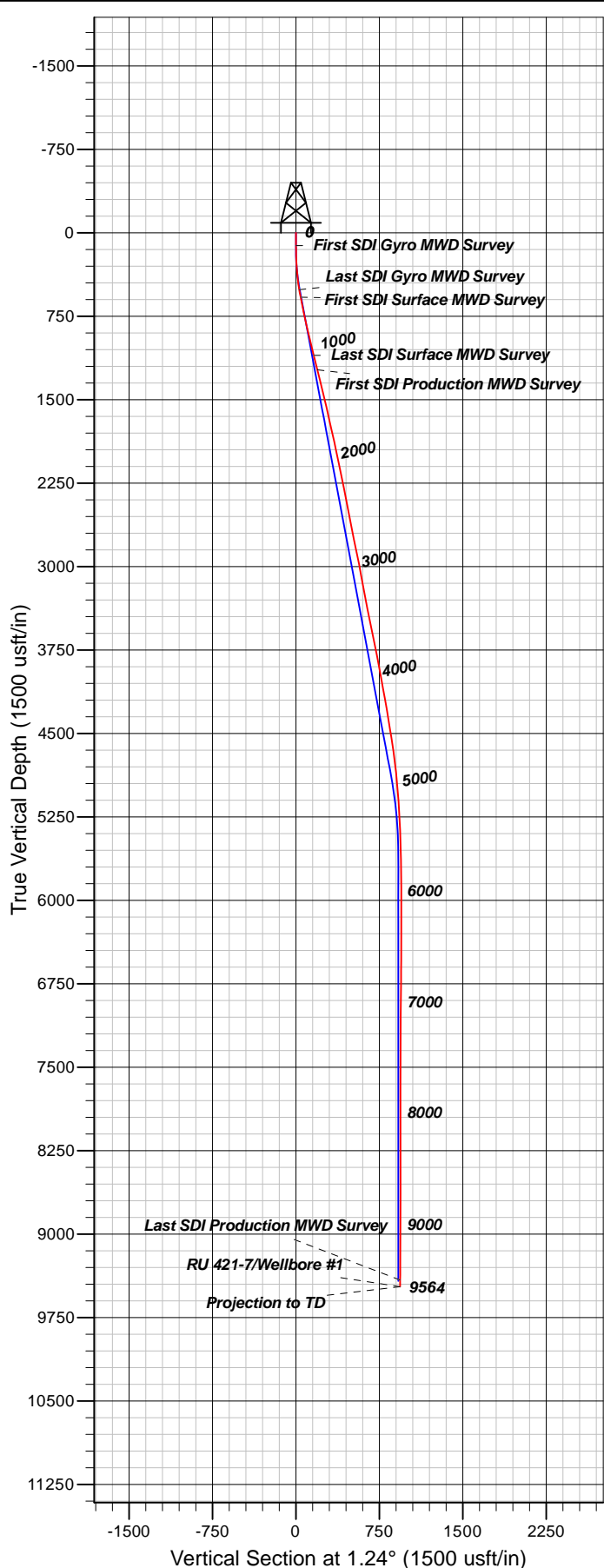
Signature

3-Oct-16

Date

Janie Collins

Colorado District Well Planner
Scientific Drilling International



Well Details: RU 421-7

TVD Reference: GL 7339' & RKB 24' @ 7363.00usft (H&P 318) Level: 7339.00
 +N/-S +E/-W Northing Easting Latitude Longitude Slot
 0.00 0.00 1599701.97 2345095.76 39.4569966 -107.8196725 RU 421-7 (A6)

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well RU 421-7 - Slot RU 421-7 (A6), True North
 Vertical (TVD) Reference: GL 7339' & RKB 24' @ 7363.00usft (H&P 318)
 Section (VS) Reference: Slot - RU 421-7 (A6)(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

12:32, October 03 2016
 Created By: Janie Collins

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well RU 421-7 - Slot RU 421-7 (A6)
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 421-7	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 421-7 - Slot RU 421-7 (A6)					
Well Position	+N/-S	0.00 usft	Northing:	1,599,701.96 usft	Latitude:	39.4569966
	+E/-W	0.00 usft	Easting:	2,345,095.76 usft	Longitude:	-107.8196725
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	9/22/2016	9.33	65.68	51,779

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	1.24	

Survey Program	Date	10/3/2016			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
115.00	512.00	Survey #1 - Gyro Survey (Wellbore #1)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	
581.00	1,116.00	Survey #2 - Surface MWD Survey (Wellbo	SDI MWD	SDI MWD - Standard ver 1.0.1	
1,251.00	9,564.00	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	
115.00	0.70	0.79	115.00	0.70	0.01	0.70	0.61	0.61	0.00	
First SDI Gyro MWD Survey										
149.00	1.14	11.34	148.99	1.24	0.08	1.24	1.38	1.29	31.03	
239.00	2.29	7.56	238.95	3.90	0.49	3.91	1.28	1.28	-4.20	
330.00	3.61	358.33	329.83	8.57	0.65	8.58	1.54	1.45	-10.14	
421.00	6.60	1.05	420.46	16.66	0.66	16.67	3.30	3.29	2.99	
512.00	9.68	3.25	510.53	29.53	1.19	29.55	3.40	3.38	2.42	

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well RU 421-7 - Slot RU 421-7 (A6)
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Site:	RU 22-7 Pad	MD Reference:	GL 7339' & RKB 24' @ 7363.00usft (H&P 318)
Well:	RU 421-7	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									
581.00	11.04	359.03	578.40	41.93	1.41	41.95	2.26	1.97	-6.12
First SDI Surface MWD Survey									
672.00	11.68	357.65	667.62	59.85	0.88	59.85	0.76	0.70	-1.52
763.00	12.74	358.72	756.56	79.08	0.28	79.07	1.19	1.16	1.18
854.00	13.14	0.14	845.25	99.46	0.08	99.44	0.56	0.44	1.56
946.00	12.88	3.89	934.89	120.14	0.80	120.13	0.96	-0.28	4.08
1,036.00	13.21	3.98	1,022.57	140.41	2.20	140.43	0.37	0.37	0.10
1,116.00	13.81	3.70	1,100.35	159.06	3.45	159.10	0.75	0.75	-0.35
Last SDI Surface MWD Survey									
1,251.00	14.62	5.40	1,231.22	192.10	6.09	192.19	0.67	0.60	1.26
First SDI Production MWD Survey									
1,345.00	14.32	3.82	1,322.24	215.51	7.98	215.63	0.53	-0.32	-1.68
1,440.00	13.55	3.26	1,414.44	238.34	9.40	238.49	0.82	-0.81	-0.59
1,534.00	13.24	2.52	1,505.88	260.09	10.50	260.26	0.38	-0.33	-0.79
1,629.00	12.61	1.20	1,598.48	281.33	11.19	281.50	0.73	-0.66	-1.39
1,723.00	12.73	1.23	1,690.19	301.94	11.63	302.12	0.13	0.13	0.03
1,818.00	12.81	0.63	1,782.84	322.94	11.97	323.12	0.16	0.08	-0.63
1,912.00	12.58	359.72	1,874.54	343.59	12.03	343.77	0.32	-0.24	-0.97
2,006.00	11.95	3.96	1,966.40	363.54	12.66	363.73	1.17	-0.67	4.51
2,101.00	11.75	5.61	2,059.37	382.98	14.28	383.20	0.41	-0.21	1.74
2,195.00	11.52	4.77	2,151.44	401.86	16.00	402.11	0.30	-0.24	-0.89
2,290.00	11.63	5.13	2,244.51	420.85	17.64	421.13	0.14	0.12	0.38
2,384.00	11.03	1.84	2,336.68	439.27	18.78	439.58	0.94	-0.64	-3.50
2,478.00	11.09	2.59	2,428.93	457.29	19.47	457.61	0.17	0.06	0.80
2,573.00	10.51	0.62	2,522.25	475.08	19.98	475.40	0.72	-0.61	-2.07
2,667.00	11.57	5.69	2,614.51	493.04	21.01	493.37	1.53	1.13	5.39
2,762.00	11.80	3.54	2,707.54	512.21	22.55	512.58	0.52	0.24	-2.26
2,856.00	11.52	4.00	2,799.60	531.17	23.80	531.56	0.31	-0.30	0.49
2,950.00	11.28	1.03	2,891.75	549.72	24.62	550.13	0.67	-0.26	-3.16
3,045.00	10.71	1.61	2,985.00	567.84	25.04	568.25	0.61	-0.60	0.61
3,139.00	10.84	0.63	3,077.35	585.41	25.38	585.82	0.24	0.14	-1.04
3,233.00	9.88	2.06	3,169.81	602.30	25.77	602.72	1.06	-1.02	1.52
3,328.00	11.83	3.63	3,263.11	620.17	26.68	620.60	2.08	2.05	1.65
3,422.00	11.00	5.39	3,355.25	638.71	28.13	639.17	0.96	-0.88	1.87
3,517.00	11.19	3.22	3,448.47	656.94	29.50	657.43	0.48	0.20	-2.28
3,611.00	10.71	4.56	3,540.76	674.75	30.70	675.26	0.58	-0.51	1.43
3,705.00	11.90	357.99	3,632.94	693.15	31.06	693.66	1.86	1.27	-6.99
3,800.00	11.90	357.17	3,725.90	712.72	30.23	713.21	0.18	0.00	-0.86
3,894.00	11.17	358.03	3,818.00	731.50	29.44	731.97	0.80	-0.78	0.91
3,988.00	10.90	356.37	3,910.26	749.47	28.56	749.91	0.44	-0.29	-1.77
4,083.00	10.29	354.57	4,003.64	766.88	27.19	767.29	0.73	-0.64	-1.89
4,177.00	9.69	356.03	4,096.22	783.13	25.85	783.51	0.69	-0.64	1.55
4,271.00	10.39	2.06	4,188.78	799.49	25.61	799.86	1.34	0.74	6.41

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well RU 421-7 - Slot RU 421-7 (A6)
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 421-7	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	9.47	2.57	4,281.37	815.69	26.26	816.07	0.98	-0.98	0.54
4,460.00	9.58	1.81	4,375.06	831.40	26.86	831.79	0.18	0.12	-0.80
4,554.00	8.98	2.17	4,467.83	846.55	27.38	846.94	0.64	-0.64	0.38
4,649.00	8.53	359.66	4,561.72	861.00	27.62	861.40	0.62	-0.47	-2.64
4,743.00	8.72	359.81	4,654.66	875.10	27.56	875.49	0.20	0.20	0.16
4,837.00	7.47	3.52	4,747.72	888.32	27.91	888.72	1.44	-1.33	3.95
4,931.00	5.66	8.55	4,841.10	899.01	28.97	899.42	2.02	-1.93	5.35
5,026.00	5.80	6.89	4,935.63	908.41	30.25	908.85	0.23	0.15	-1.75
5,120.00	4.40	11.30	5,029.25	916.66	31.52	917.12	1.55	-1.49	4.69
5,214.00	4.14	16.03	5,122.99	923.45	33.17	923.96	0.47	-0.28	5.03
5,308.00	3.36	38.58	5,216.80	928.87	35.82	929.43	1.76	-0.83	23.99
5,403.00	2.29	38.58	5,311.68	932.53	38.74	933.15	1.13	-1.13	0.00
5,497.00	2.05	26.17	5,405.61	935.51	40.65	936.17	0.56	-0.26	-13.20
5,591.00	2.15	11.93	5,499.55	938.74	41.76	939.42	0.56	0.11	-15.15
5,685.00	1.40	2.61	5,593.50	941.61	42.18	942.31	0.85	-0.80	-9.91
5,780.00	1.35	19.28	5,688.48	943.83	42.60	944.53	0.42	-0.05	17.55
5,874.00	1.17	41.03	5,782.46	945.60	43.59	946.32	0.54	-0.19	23.14
5,969.00	2.12	69.90	5,877.42	946.93	45.88	947.70	1.30	1.00	30.39
6,063.00	2.07	86.66	5,971.36	947.63	49.21	948.47	0.65	-0.05	17.83
6,158.00	1.60	95.99	6,066.31	947.59	52.24	948.50	0.58	-0.49	9.82
6,252.00	1.15	86.74	6,160.28	947.51	54.49	948.47	0.53	-0.48	-9.84
6,347.00	1.42	72.99	6,255.26	947.91	56.56	948.91	0.43	0.28	-14.47
6,441.00	1.01	131.33	6,349.24	947.70	58.30	948.74	1.32	-0.44	62.06
6,536.00	0.77	138.96	6,444.23	946.67	59.35	947.73	0.28	-0.25	8.03
6,630.00	0.93	160.21	6,538.22	945.47	60.02	946.55	0.37	0.17	22.61
6,724.00	0.57	179.41	6,632.21	944.29	60.28	945.37	0.46	-0.38	20.43
6,818.00	0.35	127.38	6,726.20	943.64	60.52	944.73	0.48	-0.23	-55.35
6,913.00	0.57	213.56	6,821.20	943.07	60.49	944.16	0.68	0.23	90.72
7,007.00	0.93	186.04	6,915.19	941.93	60.15	943.01	0.53	0.38	-29.28
7,102.00	1.08	185.50	7,010.18	940.27	59.98	941.35	0.16	0.16	-0.57
7,197.00	0.71	314.89	7,105.17	939.79	59.48	940.86	1.71	-0.39	136.20
7,292.00	0.54	269.53	7,200.17	940.20	58.61	941.25	0.53	-0.18	-47.75
7,386.00	0.30	210.93	7,294.17	939.99	58.04	941.03	0.49	-0.26	-62.34
7,480.00	0.18	83.95	7,388.17	939.79	58.06	940.83	0.46	-0.13	-135.09
7,575.00	0.45	136.54	7,483.17	939.54	58.47	940.58	0.39	0.28	55.36
7,669.00	0.36	110.41	7,577.16	939.17	59.00	940.23	0.22	-0.10	-27.80
7,763.00	0.39	337.60	7,671.16	939.36	59.16	940.42	0.73	0.03	-141.29
7,858.00	0.28	242.73	7,766.16	939.55	58.83	940.61	0.53	-0.12	-99.86
7,952.00	0.50	245.41	7,860.16	939.28	58.25	940.32	0.23	0.23	2.85
8,047.00	0.93	286.23	7,955.15	939.32	57.13	940.34	0.67	0.45	42.97
8,141.00	0.96	257.69	8,049.14	939.37	55.63	940.35	0.50	0.03	-30.36
8,235.00	0.97	261.07	8,143.13	939.07	54.07	940.03	0.06	0.01	3.60
8,330.00	1.02	263.54	8,238.11	938.85	52.44	939.77	0.07	0.05	2.60

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Well:	RU 421-7	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)	
8,424.00	1.18	291.68	8,332.10	939.12	50.71	940.00	0.59	0.17	29.94	
8,519.00	0.72	310.46	8,427.08	939.87	49.35	940.71	0.58	-0.48	19.77	
8,613.00	0.32	170.75	8,521.08	939.99	48.94	940.83	1.05	-0.43	-148.63	
8,707.00	0.33	85.24	8,615.08	939.75	49.25	940.60	0.47	0.01	-90.97	
8,802.00	0.20	156.19	8,710.08	939.62	49.59	940.48	0.34	-0.14	74.68	
8,896.00	0.44	61.84	8,804.08	939.65	49.97	940.51	0.53	0.26	-100.37	
8,991.00	1.24	144.23	8,899.07	938.98	50.90	939.87	1.33	0.84	86.73	
9,085.00	1.59	113.62	8,993.04	937.64	52.69	938.56	0.87	0.37	-32.56	
9,179.00	2.58	91.16	9,086.98	937.07	56.00	938.06	1.35	1.05	-23.89	
9,273.00	2.23	94.31	9,180.90	936.89	59.94	937.97	0.40	-0.37	3.35	
9,368.00	0.60	81.20	9,275.86	936.83	62.27	937.96	1.74	-1.72	-13.80	
9,462.00	0.54	187.70	9,369.86	936.46	62.70	937.60	0.97	-0.06	113.30	
9,504.00	0.62	186.25	9,411.86	936.04	62.65	937.18	0.19	0.19	-3.45	
Last SDI Production MWD Survey										
9,564.00	0.62	186.25	9,471.86	935.40	62.58	936.53	0.00	0.00	0.00	
Projection to TD										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
115.00	115.00	0.70	0.01	First SDI Gyro MWD Survey	
512.00	510.53	29.53	1.19	Last SDI Gyro MWD Survey	
581.00	578.40	41.93	1.41	First SDI Surface MWD Survey	
1,116.00	1,100.35	159.06	3.45	Last SDI Surface MWD Survey	
1,251.00	1,231.22	192.10	6.09	First SDI Production MWD Survey	
9,504.00	9,411.86	936.04	62.65	Last SDI Production MWD Survey	
9,564.00	9,471.86	935.40	62.58	Projection to TD	

Checked By: _____	Approved By: _____	Date: _____
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