



# **TEP Rocky Mountain LLC**

**Garfield County, CO NAD83**

**SG 11-22 Pad**

**SG 31-21 - Slot SG 31-21 (A8)**

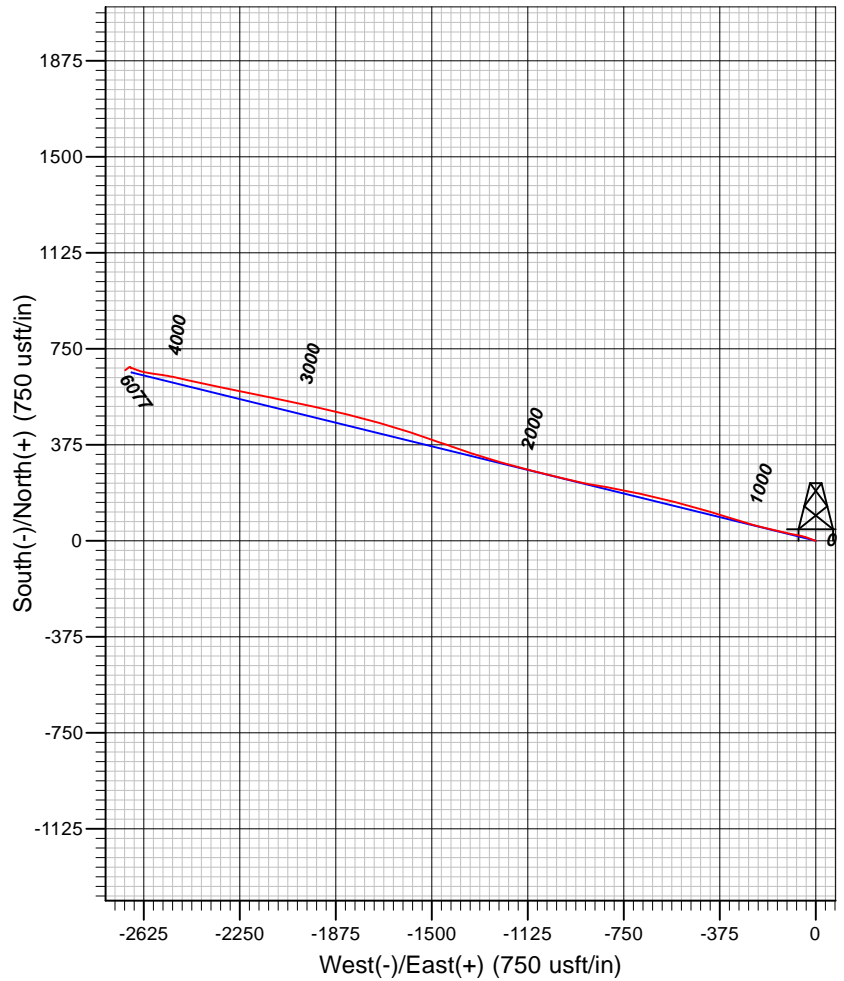
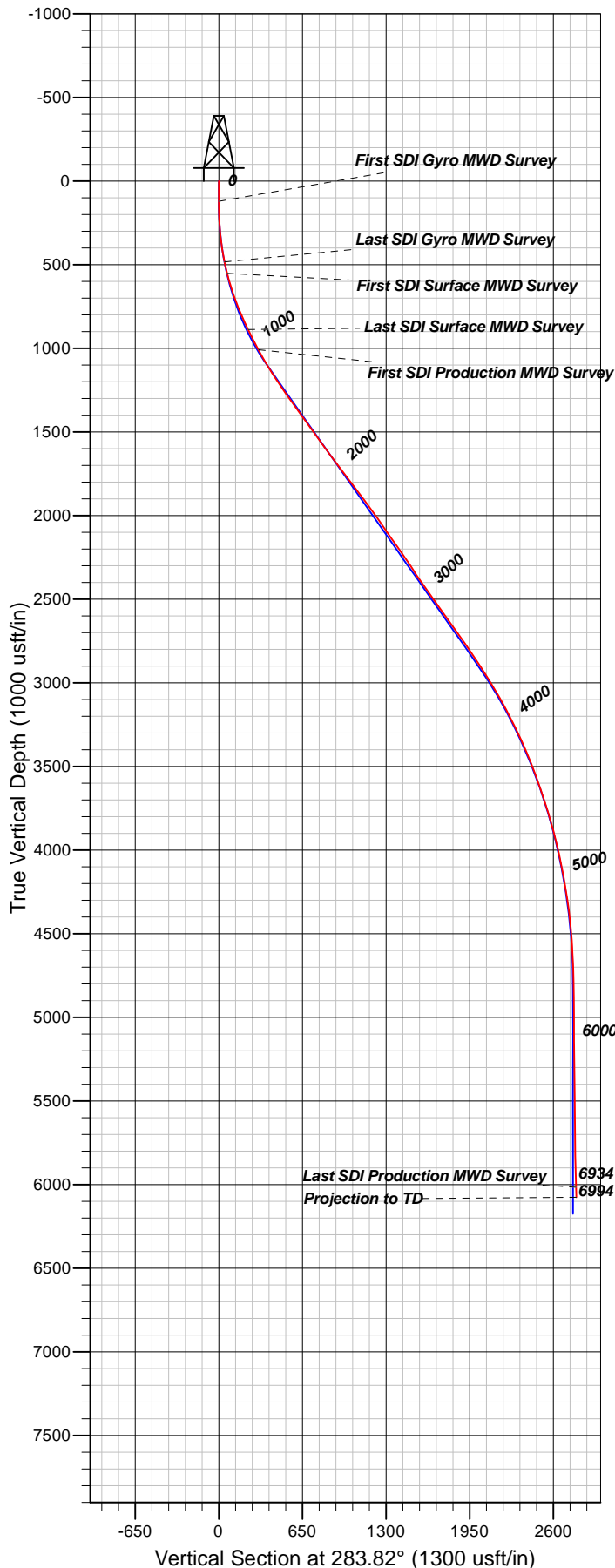
**OH**

**Design: OH**

## **Standard Survey Report**

**19 March, 2019**





#### Well Details: SG 31-21

TVD Reference: GL 6092.4' & RKB 24' @ 6116.40usft  
 +N/-S +E/-W Northing Easting Latitude Longitude Slot  
 0.00 0.00 1591222.90 2264523.40 39.4277321 -108.1040515 SG 31-21 (A8)

#### REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well SG 31-21 - Slot SG 31-21 (A8), True North  
 Vertical (TVD) Reference: GL 6092.4' & RKB 24' @ 6116.40usft  
 Section (VS) Reference: Slot - SG 31-21 (A8)(0.00N, 0.00E)  
 Measured Depth Reference: GL 6092.4' & RKB 24' @ 6116.40usft  
 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: OH

17:16, March 19 2019  
 Created By: Mel Mireles Jr.



## Directional Survey Certification

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

<b>Operator</b>	TEP Rocky Mountain, LLC.
<b>Well Name &amp; No.</b>	SG 31-21
<b>County &amp; State</b>	Garfield County, CO
<b>SDI Job No.</b>	OP.017079
<b>Rig</b>	H&P 318

I, Mel Mireles Jr., having personal knowledge of all the facts, hereby certify that the attached directional survey run from a measured depth of 122 feet to a measured depth of 6,994 feet is true and correct as determined from all available records.

A handwritten signature in black ink, appearing to read 'Mel Mireles Jr.', written over a horizontal line.

Signature

21-Mar-19

Date

### **Mel Mireles Jr.**

Grand Junction Assistant Well Planner  
Scientific Drilling - Colorado District

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well SG 31-21 - Slot SG 31-21 (A8)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 6092.4' & RKB 24' @ 6116.40usft
<b>Site:</b>	SG 11-22 Pad	<b>MD Reference:</b>	GL 6092.4' & RKB 24' @ 6116.40usft
<b>Well:</b>	SG 31-21	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Grand Junction District

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

Site		SG 11-22 Pad			
Site Position:		Northing:	1,591,239.00 usft	Latitude:	39.4277783
From:	Map	Easting:	2,264,548.70 usft	Longitude:	-108.1039637
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.64 °

Well	SG 31-21 - Slot SG 31-21 (A8)					
Well Position	+N/-S	0.00 usft	Northing:	1,591,222.90 usft	Latitude:	39.4277321
	+E/-W	0.00 usft	Easting:	2,264,523.40 usft	Longitude:	-108.1040516
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	6,092.40 usft

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	3/7/2019	9.38	65.58	51,618

<b>Design</b>	OH				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	283.82	

<b>Survey Program</b>	<b>Date</b>	3/12/2019			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
122.00	488.00	Survey #1 - Gyro MWD Survey (OH)	Gyro MWD 105	Gyro MWD Error Model Ver 1.0.5	
559.00	934.00	Survey #2 - Surface MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM	
1,079.00	6,994.00	Survey #3 - Production MWD Survey (OH)	MWD+HDGM	OWSG MWD + HDGM	

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
122.00	0.35	293.99	122.00	0.15	-0.34	0.37	0.29	0.29	0.00	
<b>First SDI Gyro MWD Survey</b>										
213.00	2.99	284.50	212.95	0.86	-2.89	3.01	2.91	2.90	-10.43	
305.00	6.25	289.78	304.64	3.15	-9.93	10.40	3.57	3.54	5.74	
396.00	10.65	291.71	394.63	7.94	-22.41	23.66	4.84	4.84	2.12	
488.00	14.69	287.49	484.37	14.60	-41.44	43.73	4.50	4.39	-4.59	
<b>Last SDI Gyro MWD Survey</b>										

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well SG 31-21 - Slot SG 31-21 (A8)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 6092.4' & RKB 24' @ 6116.40usft
<b>Site:</b>	SG 11-22 Pad	<b>MD Reference:</b>	GL 6092.4' & RKB 24' @ 6116.40usft
<b>Well:</b>	SG 31-21	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	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)	
559.00	18.18	282.75	552.47	19.75	-60.84	63.79	5.26	4.92	-6.68	
First SDI Surface MWD Survey										
650.00	22.65	279.63	637.73	25.82	-91.98	95.48	5.05	4.91	-3.43	
745.00	26.38	283.25	724.16	33.72	-130.57	134.84	4.23	3.93	3.81	
839.00	29.41	283.99	807.23	44.09	-173.30	178.82	3.24	3.22	0.79	
934.00	32.38	284.21	888.74	55.97	-220.61	227.59	3.13	3.13	0.23	
Last SDI Surface MWD Survey										
1,079.00	35.22	287.39	1,009.23	78.01	-298.17	308.17	2.31	1.96	2.19	
First SDI Production MWD Survey										
1,173.00	37.31	286.79	1,085.01	94.34	-351.31	363.68	2.26	2.22	-0.64	
1,268.00	39.59	286.06	1,159.41	111.03	-407.97	422.69	2.45	2.40	-0.77	
1,362.00	41.86	285.97	1,230.64	127.95	-466.92	483.97	2.42	2.41	-0.10	
1,456.00	43.53	285.44	1,299.73	145.20	-528.28	547.67	1.82	1.78	-0.56	
1,550.00	42.45	283.80	1,368.49	161.38	-590.29	611.75	1.65	-1.15	-1.74	
1,645.00	43.64	282.76	1,437.91	176.27	-653.40	676.59	1.46	1.25	-1.09	
1,739.00	43.03	280.90	1,506.29	189.50	-716.53	741.06	1.50	-0.65	-1.98	
1,834.00	43.70	281.38	1,575.35	202.11	-780.53	806.21	0.79	0.71	0.51	
1,928.00	43.04	279.36	1,643.69	213.73	-844.02	870.64	1.63	-0.70	-2.15	
2,022.00	45.04	281.65	1,711.26	225.67	-908.25	935.87	2.72	2.13	2.44	
2,117.00	44.85	284.48	1,778.51	240.83	-973.62	1,002.96	2.11	-0.20	2.98	
2,211.00	44.23	282.82	1,845.51	256.39	-1,037.68	1,068.88	1.40	-0.66	-1.77	
2,305.00	44.14	283.61	1,912.92	271.37	-1,101.46	1,134.40	0.59	-0.10	0.84	
2,400.00	42.95	286.10	1,981.78	288.13	-1,164.71	1,199.82	2.20	-1.25	2.62	
2,494.00	42.12	285.38	2,051.04	305.37	-1,225.87	1,263.33	1.02	-0.88	-0.77	
2,588.00	43.16	287.70	2,120.20	323.51	-1,286.90	1,326.92	2.00	1.11	2.47	
2,683.00	41.66	287.48	2,190.34	342.87	-1,347.97	1,390.85	1.59	-1.58	-0.23	
2,777.00	42.66	289.65	2,260.02	362.97	-1,407.77	1,453.72	1.88	1.06	2.31	
2,872.00	39.66	288.61	2,331.53	383.47	-1,466.83	1,515.97	3.24	-3.16	-1.09	
2,966.00	41.77	288.26	2,402.78	402.86	-1,525.00	1,577.08	2.26	2.24	-0.37	
3,061.00	43.65	288.40	2,472.58	423.12	-1,586.16	1,641.32	1.98	1.98	0.15	
3,155.00	42.52	287.38	2,541.23	442.85	-1,647.26	1,705.36	1.41	-1.20	-1.09	
3,250.00	43.24	286.28	2,610.85	461.56	-1,709.14	1,769.91	1.09	0.76	-1.16	
3,344.00	42.90	283.39	2,679.52	478.00	-1,771.17	1,834.08	2.13	-0.36	-3.07	
3,439.00	42.42	283.34	2,749.39	492.88	-1,833.81	1,898.46	0.51	-0.51	-0.05	
3,533.00	41.44	283.36	2,819.32	507.38	-1,894.92	1,961.27	1.04	-1.04	0.02	
3,627.00	40.26	283.74	2,890.42	521.79	-1,954.69	2,022.75	1.28	-1.26	0.40	
3,722.00	39.19	283.26	2,963.49	535.96	-2,013.73	2,083.46	1.17	-1.13	-0.51	
3,816.00	37.91	281.05	3,037.00	548.31	-2,070.98	2,142.01	2.00	-1.36	-2.35	
3,911.00	35.79	281.48	3,113.02	559.43	-2,126.86	2,198.92	2.25	-2.23	0.45	
4,005.00	33.91	280.50	3,190.16	569.68	-2,179.58	2,252.57	2.09	-2.00	-1.04	
4,100.00	32.40	281.59	3,269.69	579.63	-2,230.57	2,304.46	1.71	-1.59	1.15	
4,194.00	30.93	282.29	3,349.69	589.83	-2,278.85	2,353.77	1.61	-1.56	0.74	
4,289.00	28.46	281.24	3,432.21	599.44	-2,324.91	2,400.80	2.66	-2.60	-1.11	
4,383.00	26.03	283.07	3,515.78	608.47	-2,366.98	2,443.81	2.73	-2.59	1.95	

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well SG 31-21 - Slot SG 31-21 (A8)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 6092.4' & RKB 24' @ 6116.40usft
<b>Site:</b>	SG 11-22 Pad	<b>MD Reference:</b>	GL 6092.4' & RKB 24' @ 6116.40usft
<b>Well:</b>	SG 31-21	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	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)	
4,477.00	24.31	282.12	3,600.85	617.20	-2,405.99	2,483.77	1.88	-1.83	-1.01	
4,572.00	23.95	281.66	3,687.55	625.20	-2,444.00	2,522.59	0.43	-0.38	-0.48	
4,666.00	21.39	283.13	3,774.28	632.95	-2,479.38	2,558.80	2.79	-2.72	1.56	
4,760.00	19.98	281.56	3,862.22	640.07	-2,511.81	2,591.99	1.61	-1.50	-1.67	
4,855.00	17.53	279.64	3,952.17	645.72	-2,541.82	2,622.48	2.66	-2.58	-2.02	
4,949.00	15.47	276.59	4,042.29	649.53	-2,568.23	2,649.04	2.38	-2.19	-3.24	
5,044.00	13.46	280.60	4,134.28	653.01	-2,591.69	2,672.65	2.36	-2.12	4.22	
5,138.00	12.77	279.00	4,225.83	656.65	-2,612.71	2,693.93	0.83	-0.73	-1.70	
5,233.00	10.78	284.83	4,318.83	660.57	-2,631.67	2,713.27	2.44	-2.09	6.14	
5,239.40	10.57	285.06	4,325.11	660.87	-2,632.81	2,714.46	3.30	-3.23	3.62	
SG 31-21 BTV										
5,327.00	7.77	289.45	4,411.59	664.94	-2,646.16	2,728.39	3.30	-3.20	5.01	
5,422.00	6.12	291.24	4,505.89	668.91	-2,656.94	2,739.80	1.75	-1.74	1.88	
5,516.00	4.48	290.98	4,599.48	672.04	-2,665.04	2,748.42	1.74	-1.74	-0.28	
5,611.00	2.63	281.68	4,694.30	673.81	-2,670.63	2,754.28	2.03	-1.95	-9.79	
5,705.00	1.82	252.08	4,788.23	673.79	-2,674.17	2,757.70	1.47	-0.86	-31.49	
5,800.00	0.88	352.86	4,883.21	674.05	-2,675.69	2,759.25	2.28	-0.99	106.08	
5,894.00	1.17	344.84	4,977.19	675.69	-2,676.03	2,759.97	0.34	0.31	-8.53	
5,989.00	1.02	345.20	5,072.18	677.44	-2,676.50	2,760.84	0.16	-0.16	0.38	
6,083.00	0.78	323.14	5,166.17	678.76	-2,677.10	2,761.74	0.44	-0.26	-23.47	
6,178.00	0.70	275.24	5,261.16	679.33	-2,678.07	2,762.81	0.64	-0.08	-50.42	
6,272.00	0.74	258.06	5,355.15	679.26	-2,679.23	2,763.93	0.23	0.04	-18.28	
6,367.00	1.04	229.46	5,450.14	678.57	-2,680.49	2,764.98	0.55	0.32	-30.11	
6,461.00	1.09	247.75	5,544.12	677.68	-2,681.96	2,766.20	0.36	0.05	19.46	
6,556.00	1.48	238.47	5,639.10	676.70	-2,683.85	2,767.79	0.46	0.41	-9.77	
6,650.00	1.49	225.77	5,733.07	675.21	-2,685.76	2,769.29	0.35	0.01	-13.51	
6,745.00	2.29	233.68	5,828.02	673.22	-2,688.17	2,771.16	0.88	0.84	8.33	
6,839.00	2.90	232.21	5,921.92	670.65	-2,691.56	2,773.85	0.65	0.65	-1.56	
6,934.00	2.73	233.50	6,016.81	667.83	-2,695.28	2,776.78	0.19	-0.18	1.36	
Last SDI Production MWD Survey										
6,994.00	2.73	233.00	6,076.74	666.12	-2,697.57	2,778.60	0.04	0.00	-0.83	
Projection to TD - SG 31-21 PBHL										



Scientific Drilling, Intl  
Survey Report

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well SG 31-21 - Slot SG 31-21 (A8)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 6092.4' & RKB 24' @ 6116.40usft
<b>Site:</b>	SG 11-22 Pad	<b>MD Reference:</b>	GL 6092.4' & RKB 24' @ 6116.40usft
<b>Well:</b>	SG 31-21	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Grand Junction District

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
122.00	122.00	0.15	-0.34	First SDI Gyro MWD Survey
488.00	484.37	14.60	-41.44	Last SDI Gyro MWD Survey
559.00	552.47	19.75	-60.84	First SDI Surface MWD Survey
934.00	888.74	55.97	-220.61	Last SDI Surface MWD Survey
1,079.00	1,009.23	78.01	-298.17	First SDI Production MWD Survey
6,934.00	6,016.81	667.83	-2,695.28	Last SDI Production MWD Survey
6,994.00	6,076.74	666.12	-2,697.57	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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