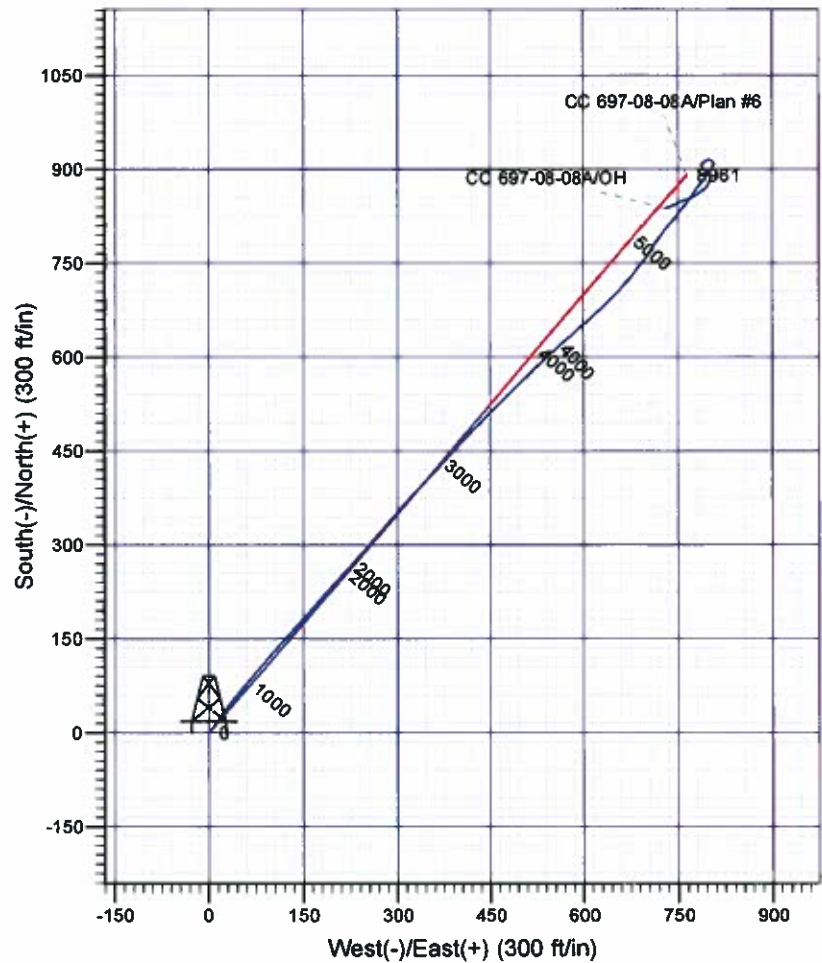
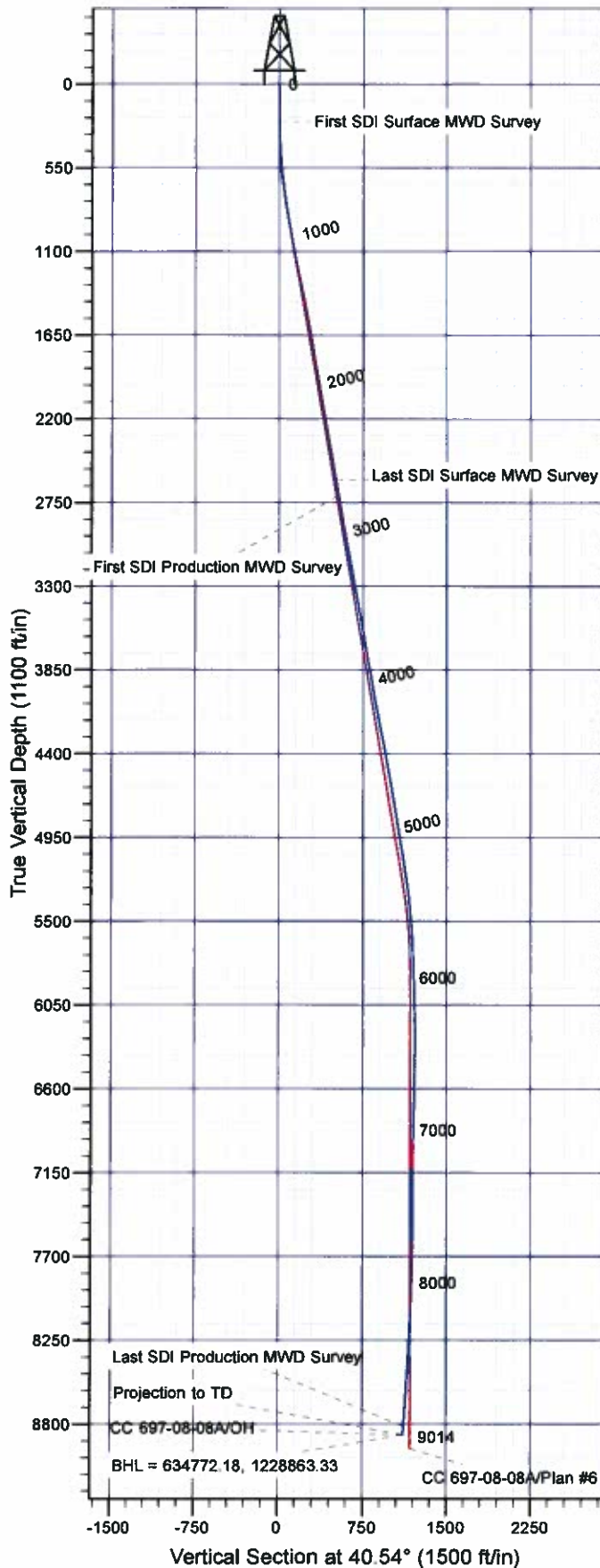




# Scientific Drilling

Rocky Mountain Operations

Company: OXY USA RMAT  
Project: Garfield County, CO NAD27  
Site: Cascade Creek 608-41 Pad  
Well: CC 697-08-08A  
Wellbore: OH  
Design: OH



## Well Details: CC 697-08-08A

+N/-S	+E/-W	North	East	Latitude	Longitude	Slot
0.00	0.00	633957.17	1228106.09	39° 32' 31.570 N	108° 14' 14.654 W	F

## REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC 697-08-08A - Slot F, True North  
Vertical (TVD) Reference: GL 8407' & RKB 30' @ 8437.00ft (H&P)  
Section (VS) Reference: Slot - F(0.00N, 0.00E)  
Measured Depth Reference: GL 8407' & RKB 30' @ 8437.00ft (H&P)  
Calculation Method: Minimum Curvature

## PROJECT DETAILS: Garfield County, CO NAD27

Geodetic System: US State Plane 1927 (Exact solution)  
Datum: NAD 1927 (NADCON CONUS)  
Ellipsoid: Clarke 1866  
Zone: Colorado Central 502

System Datum: Mean Sea Level

Plan: OH

11:19, August 09 2011  
Created By: Janie Cooke

# **OXY USA RMAT**

**Garfield County, CO NAD27  
Cascade Creek 608-41 Pad  
CC 697-08-08A - Slot F**

**OH**

**Design: OH**

## **Standard Survey Report**

**09 August, 2011**





<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-08-08A - Slot F
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8407' & RKB 30' @ 8437.00ft (H&P)
<b>Site:</b>	Cascade Creek 608-41 Pad	<b>MD Reference:</b>	GL 8407' & RKB 30' @ 8437.00ft (H&P)
<b>Well:</b>	CC 697-08-08A	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Rockies Compass Server

<b>Project</b>	Garfield County, CO NAD27		
<b>Map System:</b>	US State Plane 1927 (Exact solution)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD 1927 (NADCON CONUS)		
<b>Map Zone:</b>	Colorado Central 502		

Site	Cascade Creek 608-41 Pad, SECTION 8 T6S R97W				
Site Position:		Northing:	633,966.95 usft	Latitude:	39° 32' 31.685 N
From:	Map	Easting:	1,228,168.67 usft	Longitude:	108° 14' 13.859 W
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.73 °

Well	CC 697-08-08A - Slot F					
Well Position	+N/-S	0.00 ft	Northing:	633,957.17 usft	Latitude:	39° 32' 31.570 N
	+E/-W	0.00 ft	Easting:	1,228,106.09 usft	Longitude:	108° 14' 14.654 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	8,407.00 ft

<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>
	IGRF2005-10	10/15/08	10.79	65.81	52,516

<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) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	40.54	

<b>Survey Program</b>	<b>Date</b>	08/09/11			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
248.00	2,664.00	Survey #1 - Surface MWD (OH)	MWD-SDI	MWD - Standard ISCWSA	
2,763.00	9,014.00	Survey #2 - Production MWD (OH)	MWD-SDI	MWD - Standard ISCWSA	

<b>Survey</b>										
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Turn Rate (°/100ft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
248.00	0.65	30.77	247.99	1.21	0.72	1.39	0.26	0.26	0.00	
<b>First SDI Surface MWD Survey</b>										
340.00	1.41	52.23	339.98	2.35	1.88	3.01	0.91	0.83	23.33	
431.00	3.44	48.28	430.89	4.85	4.80	6.81	2.24	2.23	-4.34	
523.00	6.60	32.39	522.53	11.16	9.70	14.78	3.72	3.43	-17.27	
615.00	8.64	31.21	613.72	21.53	16.11	26.84	2.22	2.22	-1.28	
707.00	10.98	37.47	704.37	34.40	25.02	42.41	2.79	2.54	6.80	
799.00	13.23	36.36	794.32	49.83	36.60	61.66	2.46	2.45	-1.21	
891.00	13.37	40.93	883.85	66.35	49.81	82.79	1.15	0.15	4.97	



<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-08-08A - Slot F
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8407' & RKB 30' @ 8437.00ft (H&P)
<b>Site:</b>	Cascade Creek 608-41 Pad	<b>MD Reference:</b>	GL 8407' & RKB 30' @ 8437.00ft (H&P)
<b>Well:</b>	CC 697-08-08A	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Rockies Compass Server

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
983.00	13.19	40.72	973.39	82.34	63.62	103.93	0.20	-0.20	-0.23
1,078.00	13.37	39.57	1,065.85	99.02	77.69	125.75	0.34	0.19	-1.21
1,172.00	15.26	41.16	1,156.93	116.71	92.76	148.99	2.05	2.01	1.69
1,267.00	16.09	39.75	1,248.39	136.25	109.40	174.65	0.96	0.87	-1.48
1,361.00	15.21	42.03	1,338.91	155.42	125.99	200.00	1.14	-0.94	2.43
1,456.00	15.83	41.24	1,430.44	174.42	142.88	225.42	0.69	0.65	-0.83
1,551.00	14.25	42.91	1,522.19	192.73	159.38	250.06	1.72	-1.66	1.76
1,645.00	13.19	40.36	1,613.51	209.38	174.20	272.34	1.30	-1.13	-2.71
1,740.00	12.57	41.42	1,706.11	225.39	188.06	293.52	0.70	-0.65	1.12
1,834.00	12.84	40.98	1,797.81	240.94	201.68	314.19	0.31	0.29	-0.47
1,929.00	13.63	42.39	1,890.29	257.18	216.14	335.93	0.90	0.83	1.48
2,023.00	12.57	42.30	1,981.84	272.93	230.50	357.23	1.13	-1.13	-0.10
2,118.00	13.80	42.03	2,074.34	288.99	245.04	378.89	1.30	1.29	-0.28
2,213.00	13.81	41.33	2,166.59	305.92	260.11	401.55	0.18	0.01	-0.74
2,307.00	13.72	40.63	2,257.89	322.80	274.78	423.92	0.20	-0.10	-0.74
2,402.00	13.01	39.40	2,350.32	339.62	288.91	445.87	0.81	-0.75	-1.29
2,496.00	14.05	40.85	2,441.71	356.42	303.08	467.86	1.16	1.11	1.54
2,591.00	12.84	43.62	2,534.10	372.79	317.91	489.94	1.44	-1.27	2.92
2,684.00	13.28	42.65	2,605.22	384.83	329.19	506.42	0.67	0.60	-1.33
Last SDI Surface MWD Survey									
2,763.00	13.31	44.51	2,701.56	401.32	344.88	529.15	0.43	0.03	1.88
First SDI Production MWD Survey									
2,857.00	13.71	44.29	2,792.96	417.01	360.24	551.06	0.43	0.43	-0.23
2,952.00	13.12	41.12	2,885.37	433.19	375.20	573.07	0.99	-0.62	-3.34
3,046.00	13.98	43.00	2,976.75	449.53	389.96	595.09	1.03	0.91	2.00
3,141.00	14.61	43.46	3,068.81	466.62	406.02	618.52	0.67	0.66	0.48
3,236.00	13.89	43.00	3,160.89	483.66	422.04	641.87	0.77	-0.76	-0.48
3,330.00	14.86	45.90	3,251.95	500.30	438.39	665.15	1.28	1.03	3.09
3,425.00	14.07	45.19	3,343.93	516.91	455.33	688.79	0.85	-0.83	-0.75
3,519.00	13.54	45.46	3,435.22	532.68	471.28	711.14	0.57	-0.56	0.29
3,614.00	13.89	46.25	3,527.51	548.37	487.45	733.57	0.42	0.37	0.83
3,708.00	12.49	45.02	3,619.03	563.36	502.79	754.93	1.52	-1.49	-1.31
3,803.00	12.84	47.57	3,711.72	577.74	517.85	775.65	0.69	0.37	2.68
3,897.00	14.86	47.13	3,802.98	592.99	534.39	797.99	2.15	2.15	-0.47
3,992.00	13.81	47.92	3,895.02	608.88	551.73	821.33	1.12	-1.11	0.83
4,086.00	12.84	49.06	3,986.49	623.24	567.95	842.79	1.07	-1.03	1.21
4,181.00	14.68	48.62	4,078.76	638.12	584.96	865.15	1.94	1.94	-0.46
4,275.00	16.36	47.65	4,169.33	654.91	603.68	890.08	1.81	1.79	-1.03
4,370.00	15.21	46.86	4,260.74	672.44	622.66	915.75	1.23	-1.21	-0.83
4,464.00	13.45	47.13	4,351.82	688.31	639.67	938.86	1.87	-1.87	0.29
4,559.00	14.16	42.38	4,444.07	704.41	655.61	961.45	1.41	0.75	-5.00
4,653.00	14.16	40.18	4,535.22	721.69	670.77	984.44	0.57	0.00	-2.34
4,748.00	13.19	38.95	4,627.52	739.00	685.08	1,006.90	1.07	-1.02	-1.29





<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-08-08A - Slot F
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8407' & RKB 30' @ 8437.00ft (H&P)
<b>Site:</b>	Cascade Creek 608-41 Pad	<b>MD Reference:</b>	GL 8407' & RKB 30' @ 8437.00ft (H&P)
<b>Well:</b>	CC 697-08-08A	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Rockies Compass Server

## Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,843.00	13.37	34.91	4,719.99	756.44	698.18	1,028.66	0.99	0.19	-4.25
4,937.00	12.66	32.10	4,811.57	774.08	709.88	1,049.67	1.01	-0.76	-2.99
5,032.00	12.13	34.56	4,904.36	791.11	721.07	1,069.89	0.79	-0.56	2.59
5,126.00	12.49	38.95	4,996.20	807.15	733.07	1,089.88	1.07	0.38	4.67
5,220.00	12.84	39.04	5,087.91	823.17	746.03	1,110.48	0.37	0.37	0.10
5,315.00	11.26	37.19	5,180.81	838.76	758.29	1,130.29	1.71	-1.66	-1.95
5,410.00	10.11	33.85	5,274.17	853.07	768.54	1,147.83	1.37	-1.21	-3.52
5,504.00	8.79	36.67	5,366.89	865.69	777.43	1,163.19	1.49	-1.40	3.00
5,598.00	6.33	38.60	5,460.07	875.50	784.95	1,175.54	2.63	-2.62	2.05
5,693.00	5.54	37.99	5,554.56	883.21	791.04	1,185.36	0.83	-0.83	-0.64
5,787.00	4.48	30.78	5,648.20	889.94	795.71	1,193.51	1.31	-1.13	-7.67
5,882.00	3.25	38.95	5,742.98	895.22	799.30	1,199.86	1.42	-1.29	8.60
5,977.00	2.20	36.76	5,837.87	898.77	802.09	1,204.37	1.11	-1.11	-2.31
6,071.00	2.11	30.34	5,931.80	901.71	804.04	1,207.87	0.27	-0.10	-6.83
6,166.00	2.46	29.37	6,026.73	905.00	805.92	1,211.59	0.37	0.37	-1.02
6,260.00	2.02	7.75	6,120.66	908.40	807.14	1,214.96	1.00	-0.47	-23.00
6,355.00	1.76	325.04	6,215.61	911.25	806.53	1,216.74	1.47	-0.27	-44.96
6,449.00	1.93	307.99	6,309.56	913.41	804.45	1,217.03	0.61	0.18	-18.14
6,544.00	1.85	288.12	6,404.51	914.87	801.73	1,216.37	0.69	-0.08	-20.92
6,638.00	1.58	266.94	6,498.47	915.28	799.00	1,214.90	0.73	-0.29	-22.53
6,733.00	2.20	244.79	6,593.42	914.43	796.04	1,212.33	1.00	0.65	-23.32
6,827.00	2.55	238.11	6,687.34	912.56	792.63	1,208.69	0.47	0.37	-7.11
6,922.00	2.29	227.65	6,782.25	910.16	789.44	1,204.80	0.54	-0.27	-11.01
7,016.00	2.02	186.78	6,876.19	907.25	787.85	1,201.55	1.62	-0.29	-43.48
7,111.00	1.93	159.98	6,971.14	904.08	788.20	1,199.38	0.97	-0.09	-28.21
7,205.00	1.41	140.91	7,065.10	901.70	789.47	1,198.39	0.80	-0.55	-20.29
7,300.00	1.49	145.04	7,160.07	899.78	790.92	1,197.87	0.14	0.08	4.35
7,394.00	1.67	135.28	7,254.03	897.80	792.58	1,197.45	0.34	0.19	-10.38
7,489.00	1.85	127.46	7,348.99	895.89	794.77	1,197.42	0.32	0.19	-8.23
7,583.00	2.20	133.17	7,442.93	893.73	797.29	1,197.42	0.43	0.37	6.07
7,678.00	2.02	148.20	7,537.87	891.06	799.51	1,196.83	0.61	-0.19	15.82
7,772.00	2.02	162.97	7,631.81	888.07	800.86	1,195.44	0.55	0.00	15.71
7,867.00	2.46	183.18	7,726.74	884.43	801.24	1,192.92	0.94	0.46	21.27
7,962.00	2.90	198.03	7,821.63	880.11	800.38	1,189.08	0.86	0.46	15.63
8,056.00	2.46	214.91	7,915.53	876.20	798.49	1,184.87	0.96	-0.47	17.96
8,150.00	2.81	223.61	8,009.43	872.87	795.75	1,180.57	0.56	0.37	9.26
8,245.00	3.61	224.49	8,104.28	869.05	792.05	1,175.26	0.84	0.84	0.93
8,339.00	4.66	225.63	8,198.04	864.27	787.24	1,168.50	1.12	1.12	1.21
8,433.00	4.31	239.43	8,291.75	859.81	781.47	1,161.35	1.20	-0.37	14.68
8,528.00	4.66	244.44	8,386.46	856.32	774.92	1,154.45	0.55	0.37	5.27
8,622.00	5.01	248.22	8,480.13	853.15	767.66	1,147.32	0.50	0.37	4.02
8,717.00	5.54	249.89	8,574.72	850.04	759.50	1,139.65	0.58	0.56	1.76
8,811.00	5.36	244.79	8,668.30	846.61	751.27	1,131.69	0.55	-0.19	-5.43
8,905.00	5.89	243.30	8,761.85	842.57	742.99	1,123.24	0.58	0.56	-1.59



<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-08-08A - Slot F
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8407' & RKB 30' @ 8437.00ft (H&P)
<b>Site:</b>	Cascade Creek 608-41 Pad	<b>MD Reference:</b>	GL 8407' & RKB 30' @ 8437.00ft (H&P)
<b>Well:</b>	CC 697-08-08A	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Rockies Compass Server

## Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
8,959.00	6.33	244.62	8,815.54	840.05	737.82	1,117.97	0.86	0.81	2.44
Last SDI Production MWD Survey									
9,014.00	6.33	244.62	8,870.21	837.45	732.35	1,112.43	0.00	0.00	0.00
Projection to TD - BHL = 634772.18, 1228863.33									

## Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
248.00	247.99	1.21	0.72	First SDI Surface MWD Survey
2,664.00	2,605.22	384.83	329.19	Last SDI Surface MWD Survey
2,763.00	2,701.56	401.32	344.88	First SDI Production MWD Survey
8,959.00	8,815.54	840.05	737.82	Last SDI Production MWD Survey
9,014.00	8,870.21	837.45	732.35	Projection to TD
9,014.00	8,870.21	837.45	732.35	BHL = 634772.18, 1228863.33

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_