



**Scientific Drilling**

## **OXY USA RMAT**

**Garfield County, CO NAD27**

**Cascade Creek 609-14 Pad**

**CC 697-09-50B - Slot H**

**OH**

**Design: OH**

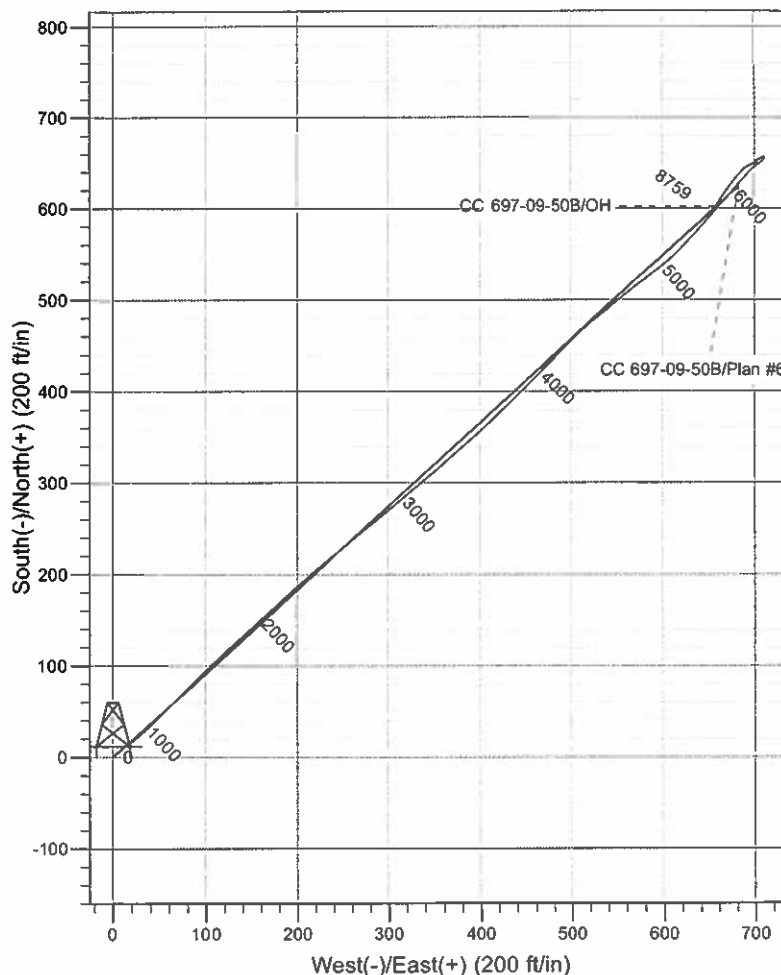
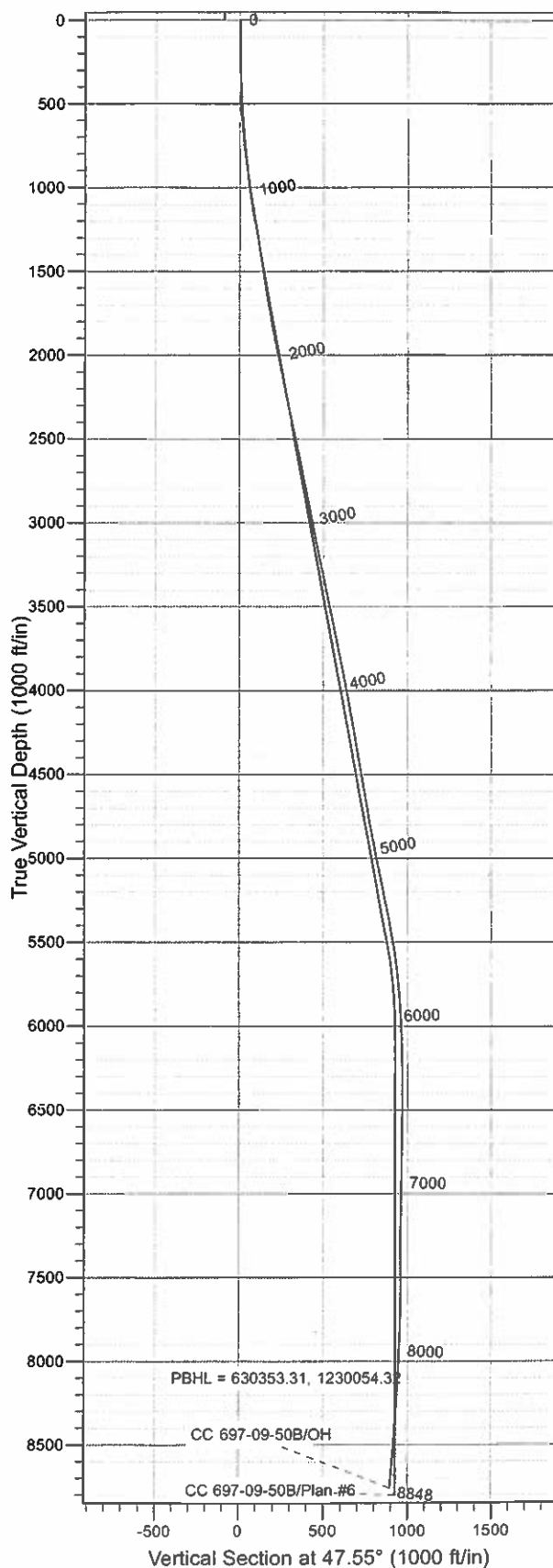
## **Standard Survey Report**

**25 October, 2010**





Project: Garfield County, CO NAD27  
 Site: Cascade Creek 609-14 Pad  
 Well: CC 697-09-50B  
 Wellbore: OH  
 Design: OH



#### WELL DETAILS: CC 697-09-50B

Ground Level: GL 8393' & RKB 30' @ 8423.00ft (H&P 330)		Latitude		Longitude	
North	East	Lat	Long	Lat	Long
0.00	0.00	629750.21	1229353.76	39° 31' 50.380 N	108° 13' 57.120 W

#### REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC 697-09-50B - Slot H, True North  
 Vertical (TVD) Reference: GL 8393' & RKB 30' @ 8423.00ft (H&P 330)  
 Section (VS) Reference: Slot - H(0.00N, 0.00E)  
 Measured Depth Reference: GL 8393' & RKB 30' @ 8423.00ft (H&P 330)  
 Calculation Method: Minimum Curvature  
 Local North: True  
 Location: Sec 9 T6S R97W

#### 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

#### Design: OH (CC 697-09-50B/OH)

Created By: Julie Cruse Date: 2010-09-30

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-09-50B - Slot H
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8393' & RKB 30' @ 8423.00ft (H&P 330)
<b>Site:</b>	Cascade Creek 609-14 Pad	<b>MD Reference:</b>	GL 8393' & RKB 30' @ 8423.00ft (H&P 330)
<b>Well:</b>	CC 697-09-50B	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Rockies-R5000.1

<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 609-14 Pad, Sec 9 T6S R97W				
Site Position:		Northing:	629,789.23 usft	Latitude:	39° 31' 50.765 N
From:	Map	Easting:	1,229,350.88 usft	Longitude:	108° 13' 57.172 W
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.72 °

Well	CC 697-09-50B - Slot H, 192' FSL 272' FWL					
Well Position	+N/-S	0.00 ft	Northing:	629,750.21 usft	Latitude:	39° 31' 50.380 N
	+E/-W	0.00 ft	Easting:	1,229,353.76 usft	Longitude:	108° 13' 57.120 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	8,393.00 ft

<b>Wellbore</b>	OH				
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	2008-06-24	10.83	65.81	52,541

<b>Design</b>	OH				
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<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	47.55

Survey Program		Date	2010-10-25		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
89.00	643.00	Survey #1 - Surface Gyro (OH)	Standard Keeper 103	Standard Wireline Keeper ver 1.0.3	
708.00	2,660.00	Survey #2 - Surface MWD (OH)	MWD-SDI	MWD - Standard ISCWSA	
2,787.00	8,848.00	Survey #3 - Production (OH)	MWD-SDI	MWD - Standard ISCWSA	

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)
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	89.00	0.35	285.05	89.00	0.07	-0.26	-0.15	0.39	0.39	0.00
<b>First SDI Gyro Survey</b>										
	120.00	0.31	333.31	120.00	0.17	-0.39	-0.17	0.88	-0.13	155.68
	151.00	0.49	16.95	151.00	0.37	-0.39	-0.04	1.10	0.58	140.77
	182.00	0.69	50.97	182.00	0.62	-0.21	0.26	1.27	0.65	109.74
	212.00	0.89	55.80	211.99	0.86	0.13	0.67	0.70	0.67	16.10
	243.00	1.06	60.63	242.99	1.14	0.58	1.19	0.61	0.55	15.58
	274.00	1.10	56.37	273.98	1.44	1.07	1.76	0.29	0.13	-13.74

**Company:** OXY USA RMAT  
**Project:** Garfield County, CO NAD27  
**Site:** Cascade Creek 609-14 Pad  
**Well:** CC 697-09-50B  
**Wellbore:** OH  
**Design:** OH

**Local Co-ordinate Reference:** Well CC 697-09-50B - Slot H  
**TVD Reference:** GL 8393' & RKB 30' @ 8423.00ft (H&P 330)  
**MD Reference:** GL 8393' & RKB 30' @ 8423.00ft (H&P 330)  
**North Reference:** True  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Rockies-R5000.1

**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)
304.00	1.24	50.26	303.98	1.81	1.56	2.37	0.62	0.47	-20.37
335.00	1.64	45.37	334.97	2.34	2.14	3.15	1.35	1.29	-15.77
366.00	2.11	46.59	365.95	3.04	2.87	4.17	1.52	1.52	3.94
397.00	2.26	47.04	396.93	3.85	3.73	5.35	0.49	0.48	1.45
427.00	2.78	47.07	426.90	4.75	4.69	6.67	1.73	1.73	0.10
458.00	2.99	46.48	457.86	5.82	5.83	8.23	0.68	0.68	-1.90
489.00	3.58	45.50	488.81	7.05	7.11	10.00	1.91	1.90	-3.16
520.00	3.62	51.78	519.75	8.33	8.57	11.95	1.28	0.13	20.26
550.00	3.85	53.51	549.68	9.52	10.12	13.89	0.85	0.77	5.77
581.00	3.97	57.94	580.61	10.71	11.87	15.98	1.05	0.39	14.29
643.00	4.07	55.38	642.46	13.10	15.50	20.27	0.33	0.16	-4.13
<b>Last SDI Gyro Survey</b>									
708.00	4.42	53.11	707.28	15.91	19.40	25.05	0.60	0.54	-3.49
<b>First SDI MWD Survey</b>									
800.00	5.70	49.44	798.92	21.01	25.70	33.15	1.43	1.39	-3.99
894.00	7.11	47.63	892.33	27.97	33.55	43.63	1.52	1.50	-1.93
987.00	8.37	45.58	984.48	36.58	42.64	56.15	1.39	1.35	-2.20
1,081.00	9.07	43.84	1,077.40	46.72	52.65	70.38	0.80	0.74	-1.85
1,176.00	9.41	44.92	1,171.16	57.62	63.32	85.61	0.40	0.36	1.14
1,270.00	9.23	45.72	1,263.92	68.32	74.15	100.82	0.24	-0.19	0.85
1,365.00	8.88	42.99	1,357.74	79.00	84.60	115.75	0.58	-0.37	-2.87
1,460.00	9.15	45.19	1,451.57	89.69	94.96	130.60	0.46	0.28	2.32
1,554.00	8.71	47.39	1,544.43	99.78	105.50	145.19	0.59	-0.47	2.34
1,649.00	9.41	46.95	1,638.24	109.95	116.47	160.15	0.74	0.74	-0.46
1,744.00	10.02	47.21	1,731.88	120.86	128.21	176.18	0.64	0.64	0.27
1,838.00	10.73	48.26	1,824.34	132.24	140.74	193.11	0.78	0.76	1.12
1,933.00	10.82	47.03	1,917.67	144.21	153.87	210.87	0.26	0.09	-1.29
2,028.00	12.22	48.18	2,010.75	156.99	167.88	229.84	1.49	1.47	1.21
2,123.00	11.08	47.12	2,103.79	169.91	182.07	249.02	1.22	-1.20	-1.12
2,217.00	10.90	47.82	2,196.07	182.02	195.27	266.94	0.24	-0.19	0.74
2,312.00	11.87	50.20	2,289.20	194.31	209.43	285.68	1.13	1.02	2.51
2,407.00	12.57	48.18	2,382.04	207.45	224.64	305.78	0.86	0.74	-2.13
2,501.00	12.66	52.04	2,473.78	220.61	240.39	326.28	0.90	0.10	4.11
2,596.00	11.43	49.14	2,566.68	233.17	255.72	346.06	1.44	-1.29	-3.05
2,660.00	11.34	50.55	2,629.43	241.32	265.37	358.69	0.46	-0.14	2.20
<b>Last Survey in 14 3/4" Hole</b>									
2,787.00	11.52	51.34	2,753.91	257.18	284.92	383.81	0.19	0.14	0.62
<b>First Survey in 8 3/4" Hole</b>									
2,882.00	10.46	49.41	2,847.16	268.71	298.87	401.90	1.18	-1.12	-2.03
2,977.00	11.34	50.37	2,940.45	280.28	312.61	419.84	0.95	0.93	1.01
3,072.00	10.55	50.11	3,033.72	291.82	326.48	437.86	0.83	-0.83	-0.27
3,166.00	11.96	48.97	3,125.91	303.73	340.43	456.20	1.52	1.50	-1.21
3,261.00	12.22	49.49	3,218.80	316.72	355.50	476.08	0.30	0.27	0.55
3,356.00	11.96	47.39	3,311.70	329.92	370.39	495.98	0.54	-0.27	-2.21

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-09-50B - Slot H
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8393' & RKB 30' @ 8423.00ft (H&P 330)
<b>Site:</b>	Cascade Creek 609-14 Pad	<b>MD Reference:</b>	GL 8393' & RKB 30' @ 8423.00ft (H&P 330)
<b>Well:</b>	CC 697-09-50B	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Rockies-R5000.1

**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)
3,450.00	11.70	48.79	3,403.70	342.79	384.73	515.24	0.41	-0.28	1.49
3,545.00	10.73	47.82	3,496.88	355.08	398.53	533.72	1.04	-1.02	-1.02
3,640.00	11.96	46.59	3,590.03	367.78	412.23	552.40	1.32	1.29	-1.29
3,734.00	11.87	45.80	3,682.00	381.21	426.24	571.81	0.20	-0.10	-0.84
3,829.00	11.26	45.63	3,775.07	394.51	439.87	590.84	0.64	-0.64	-0.18
3,924.00	10.99	45.10	3,868.29	407.39	452.92	609.16	0.30	-0.28	-0.56
4,019.00	10.55	43.96	3,961.61	420.04	465.37	626.89	0.51	-0.46	-1.20
4,113.00	10.55	44.57	4,054.02	432.36	477.38	644.07	0.12	0.00	0.65
4,208.00	10.20	45.28	4,147.47	444.48	489.46	661.16	0.39	-0.37	0.75
4,303.00	10.02	43.69	4,241.00	456.37	501.15	677.81	0.35	-0.19	-1.67
4,397.00	10.29	49.93	4,333.53	467.69	513.22	694.36	1.20	0.29	6.64
4,492.00	9.76	51.96	4,427.08	478.12	526.06	710.86	0.67	-0.56	2.14
4,587.00	10.20	50.11	4,520.64	488.47	538.85	727.29	0.57	0.46	-1.95
4,682.00	9.32	49.76	4,614.26	498.84	551.18	743.38	0.93	-0.93	-0.37
4,776.00	9.32	51.25	4,707.02	508.52	562.93	758.59	0.26	0.00	1.59
4,871.00	9.50	51.34	4,800.74	518.23	575.05	774.09	0.19	0.19	0.09
4,966.00	10.90	53.27	4,894.24	528.50	588.37	790.85	1.52	1.47	2.03
5,060.00	11.70	50.81	4,986.42	539.84	602.88	809.21	0.99	0.85	-2.62
5,155.00	12.13	43.25	5,079.38	553.19	617.18	828.78	1.70	0.45	-7.96
5,250.00	11.78	41.23	5,172.32	567.76	630.41	848.37	0.57	-0.37	-2.13
5,345.00	11.26	41.50	5,265.40	582.00	642.95	867.23	0.55	-0.55	0.28
5,439.00	10.64	41.94	5,357.69	595.33	654.83	884.99	0.67	-0.66	0.47
5,534.00	10.46	41.23	5,451.08	608.34	666.38	902.29	0.23	-0.19	-0.75
5,628.00	8.88	40.79	5,543.75	620.25	676.74	917.98	1.68	-1.68	-0.47
5,723.00	7.21	41.06	5,637.81	630.29	685.45	931.18	1.76	-1.76	0.28
5,818.00	5.45	43.61	5,732.22	638.06	692.48	941.61	1.88	-1.85	2.68
5,913.00	3.69	49.93	5,826.92	643.29	697.93	949.17	1.92	-1.85	6.65
6,007.00	3.17	51.43	5,920.75	646.86	702.28	954.78	0.56	-0.55	1.60
6,102.00	2.81	52.66	6,015.62	649.91	706.18	959.72	0.38	-0.38	1.29
6,197.00	2.37	47.65	6,110.52	652.64	709.48	964.00	0.52	-0.46	-5.27
6,292.00	0.62	19.44	6,205.49	654.45	711.11	966.42	1.94	-1.84	-29.69
6,386.00	0.44	342.70	6,299.49	655.28	711.17	967.02	0.40	-0.19	-39.09
6,481.00	0.53	319.58	6,394.48	655.96	710.78	967.19	0.22	0.09	-24.34
6,576.00	0.62	254.89	6,489.48	656.16	709.99	966.75	0.65	0.09	-68.09
6,670.00	0.62	235.12	6,583.47	655.74	709.09	965.80	0.23	0.00	-21.03
6,765.00	1.14	246.02	6,678.46	655.06	707.80	964.39	0.57	0.55	11.47
6,860.00	0.88	235.82	6,773.45	654.26	706.33	962.77	0.33	-0.27	-10.74
6,955.00	1.06	242.94	6,868.43	653.45	704.95	961.20	0.23	0.19	7.49
7,050.00	1.06	241.54	6,963.42	652.64	703.39	959.50	0.03	0.00	-1.47
7,144.00	1.32	219.12	7,057.40	651.38	701.95	957.59	0.56	0.28	-23.85
7,239.00	1.14	201.02	7,152.38	649.65	700.92	955.66	0.45	-0.19	-19.05
7,334.00	1.06	176.06	7,247.36	647.89	700.64	954.27	0.51	-0.08	-26.27
7,429.00	1.14	55.03	7,342.35	647.56	701.47	954.66	2.02	0.08	-127.40

**Company:** OXY USA RMAT  
**Project:** Garfield County, CO NAD27  
**Site:** Cascade Creek 609-14 Pad  
**Well:** CC 697-09-50B  
**Wellbore:** OH  
**Design:** OH

**Local Co-ordinate Reference:** Well CC 697-09-50B - Slot H  
**TVD Reference:** GL 8393' & RKB 30' @ 8423.00ft (H&P 330)  
**MD Reference:** GL 8393' & RKB 30' @ 8423.00ft (H&P 330)  
**North Reference:** True  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Rockies-R5000.1

**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)
7,523.00	0.88	41.76	7,436.33	648.63	702.72	956.30	0.37	-0.28	-14.12
7,618.00	0.53	357.64	7,531.33	649.61	703.19	957.31	0.65	-0.37	-46.44
7,713.00	1.14	262.89	7,626.32	649.94	702.23	956.83	1.36	0.64	-99.74
7,807.00	1.93	248.39	7,720.29	649.24	699.83	954.58	0.93	0.84	-15.43
7,902.00	2.11	248.39	7,815.23	648.00	696.72	951.45	0.19	0.19	0.00
7,997.00	2.55	241.98	7,910.15	646.37	693.23	947.77	0.54	0.46	-6.75
8,091.00	2.64	232.83	8,004.05	644.08	689.66	943.59	0.45	0.10	-9.73
8,186.00	3.34	222.46	8,098.92	640.71	686.04	938.66	0.93	0.74	-10.92
8,281.00	3.61	222.20	8,193.75	636.46	682.17	932.92	0.28	0.28	-0.27
8,376.00	3.69	220.79	8,288.56	631.93	678.16	926.91	0.13	0.08	-1.48
8,470.00	4.04	214.82	8,382.34	626.92	674.29	920.67	0.57	0.37	-6.35
8,565.00	4.31	215.26	8,477.09	621.26	670.32	913.92	0.29	0.28	0.46
8,660.00	4.75	212.36	8,571.79	615.02	666.16	906.64	0.52	0.46	-3.05
8,755.00	4.92	215.78	8,666.46	608.39	661.67	898.85	0.35	0.18	3.60
8,792.00	5.10	214.99	8,703.31	605.76	659.80	895.70	0.52	0.49	-2.14
<b>Last SDI MWD Survey</b>									
8,848.00	5.10	214.99	8,759.09	601.68	656.94	890.84	0.00	0.00	0.00
<b>BHL = 630331.79 ft N, 1230028.45 ft E - Projection to TD</b>									

**Design Annotations**

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
89.00	89.00	0.07	-0.26	First SDI Gyro Survey
643.00	642.46	13.10	15.50	Last SDI Gyro Survey
708.00	707.28	15.91	19.40	First SDI MWD Survey
2,660.00	2,629.43	241.32	265.37	Last Survey in 14 3/4" Hole
2,787.00	2,753.91	257.18	284.92	First Survey in 8 3/4" Hole
8,792.00	8,703.31	605.76	659.80	Last SDI MWD Survey
8,848.00	8,759.09	601.68	656.94	BHL = 630331.79 ft N, 1230028.45 ft E
8,848.00	8,759.09	601.68	656.94	Projection to TD

Checked By: \_\_\_\_\_

Approved By: \_\_\_\_\_

Date: \_\_\_\_\_