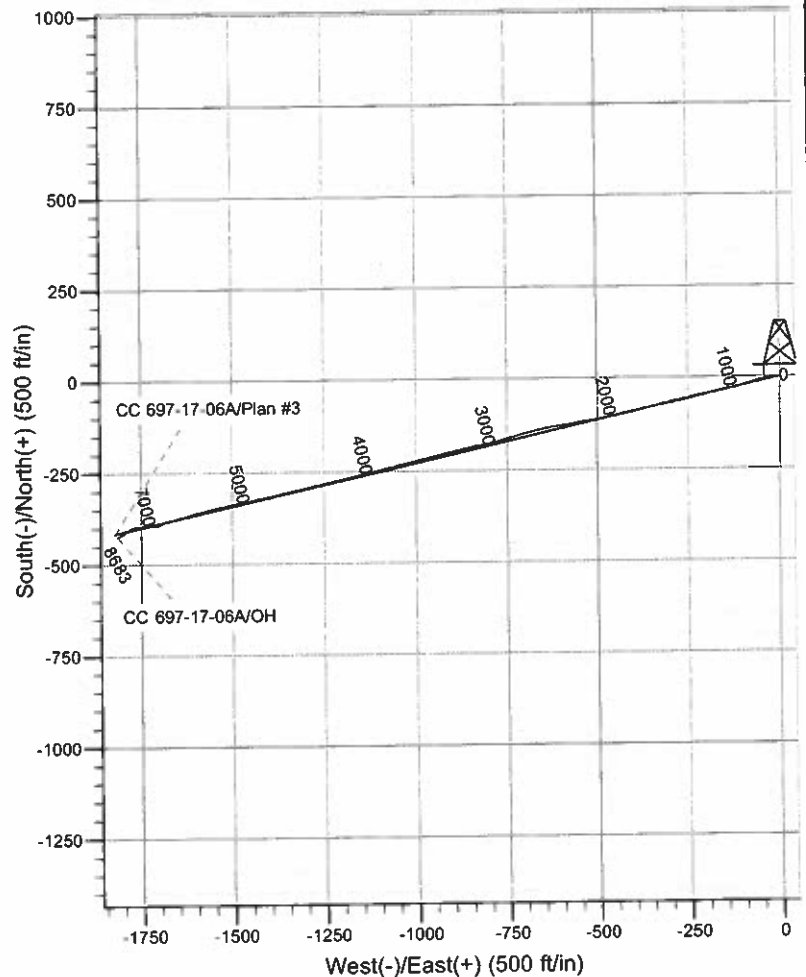
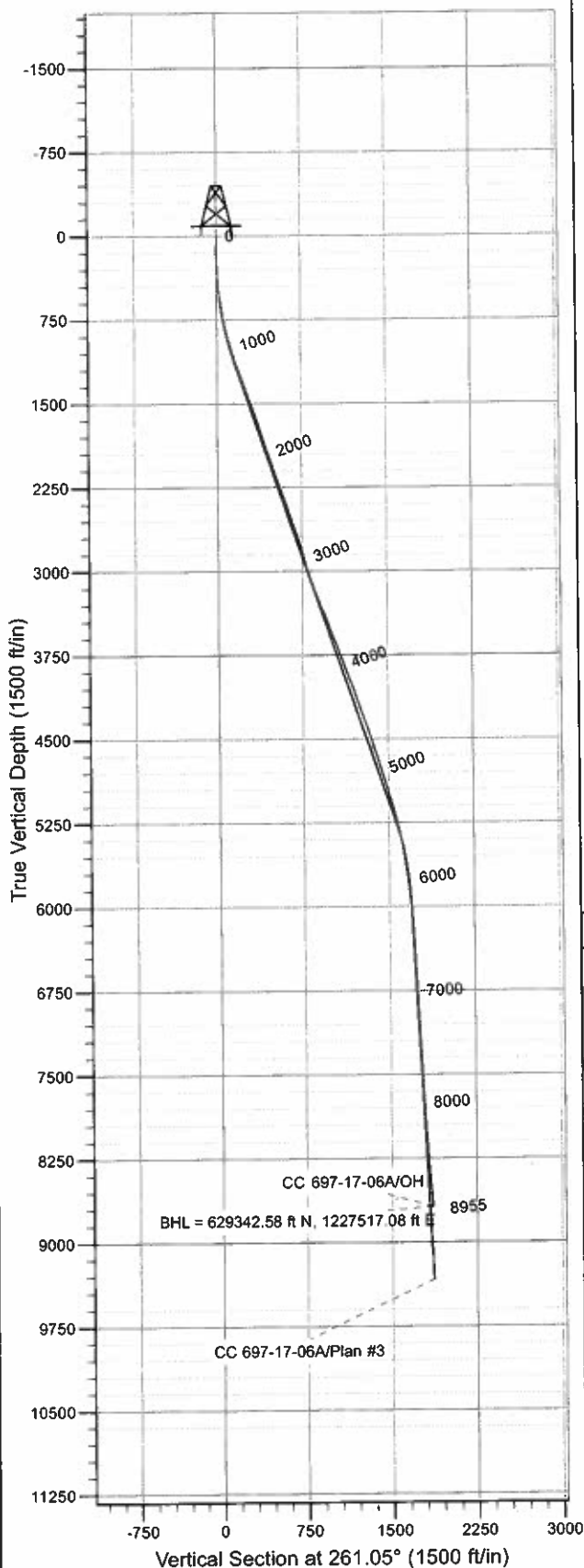




Scientific Drilling

Project: Garfield County, CO NAD27  
Site: Cascade Creek 609-14 Pad  
Well: CC 697-17-06A  
Wellbore: OH  
Design: OH

OXY USA RMAT



WELL DETAILS: CC 697-17-06A

Ground Level: GL 8393' & RKB 30' @ 8423.00ft (H&P 330)						
North	East	Lat	Long			
0.00	0.00	629712.68	1229343.91	39° 31' 50.006 N	108° 13' 57.231 W	Q

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC 697-17-06A - Slot Q, True North  
Vertical (TVD) Reference: GL 8393' & RKB 30' @ 8423.00ft (H&P 330)  
Section (VS) Reference: Slot - Q(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 697-17-06A/OH)

Created By: Julie Cruse Date: 2010-08-03



SDI  
Survey Report



Company: OXY USA RMAT  
Project: Garfield County, CO NAD27  
Site: Cascade Creek 609-14 Pad  
Well: CC 697-17-06A  
Wellbore: OH  
Design: OH

Local Co-ordinate Reference: Well CC 697-17-06A - Slot Q  
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

Project	Garfield County, CO NAD27		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	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 697-17-06A - Slot Q

Well Position	+N/-S	0.00 ft	Northing:	629,712.68 usft	Latitude:	39° 31' 50.006 N
	+E/-W	0.00 ft	Easting:	1,229,343.91 usft	Longitude:	108° 13' 57.231 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	8,393.00 ft

Wellbore OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2009-12-08	10.66	65.76	52,371

Design OH

Audit Notes:

Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
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Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	261.05

Survey Program Date 2010-08-03

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
92.00	553.00	Survey #1 - Surface Gyro (OH)	Standard Keeper 103	Standard Wireline Keeper ver 1.0.3
619.00	2,883.00	Survey #2 - Surface (OH)	MWD-SDI	MWD - Standard ISCWSA
2,978.00	8,955.00	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
92.00	0.86	74.87	92.00	0.18	0.67	-0.69	0.93	0.93	0.00
122.00	0.16	86.01	122.00	0.24	0.93	-0.95	2.35	-2.33	37.13
153.00	0.43	271.17	152.99	0.25	0.85	-0.88	1.90	0.87	-564.00
184.00	0.85	269.19	183.99	0.25	0.51	-0.54	1.36	1.35	-6.39
215.00	0.94	260.85	214.99	0.20	0.03	-0.06	0.51	0.29	-26.90
245.00	1.20	270.38	244.98	0.17	-0.53	0.50	1.05	0.87	31.77
276.00	1.61	263.63	275.97	0.12	-1.29	1.25	1.42	1.32	-21.77
307.00	2.81	251.93	306.95	-0.16	-2.44	2.44	4.12	3.87	-37.74

**Company:** OXY USA RMAT  
**Project:** Garfield County, CO NAD27  
**Site:** Cascade Creek 609-14 Pad  
**Well:** CC 697-17-06A  
**Wellbore:** OH  
**Design:** OH

**Local Co-ordinate Reference:** Well CC 697-17-06A - Slot Q  
**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)
338.00	3.42	250.74	337.91	-0.71	-4.04	4.10	1.98	1.97	-3.84
368.00	4.03	250.27	367.84	-1.36	-5.88	6.02	2.04	2.03	-1.57
399.00	4.71	258.59	398.75	-1.98	-8.15	8.36	2.99	2.19	26.84
430.00	5.06	260.86	429.64	-2.44	-10.75	11.00	1.29	1.13	7.32
461.00	5.70	264.08	460.50	-2.82	-13.63	13.90	2.28	2.06	10.39
522.00	7.64	266.80	521.09	-3.36	-20.69	20.96	3.22	3.18	4.46
553.00	7.96	265.73	551.80	-3.63	-24.89	25.15	1.13	1.03	-3.45
<b>Last Gyro Survey</b>									
619.00	8.86	262.85	617.09	-4.61	-34.49	34.79	1.51	1.36	-4.36
<b>First SDI MWD Survey</b>									
712.00	10.40	255.95	708.78	-7.54	-49.74	50.31	2.07	1.66	-7.42
804.00	12.30	251.02	798.98	-12.74	-67.06	68.23	2.32	2.07	-5.36
897.00	14.28	252.18	889.48	-19.47	-87.35	89.32	2.15	2.13	1.25
990.00	16.00	256.70	979.26	-25.93	-110.75	113.43	2.24	1.85	4.86
1,084.00	19.43	258.10	1,068.79	-32.14	-138.66	141.97	3.68	3.65	1.49
1,179.00	20.75	256.87	1,158.00	-39.22	-170.51	174.54	1.46	1.39	-1.29
1,274.00	19.87	255.47	1,247.10	-47.09	-202.53	207.39	1.06	-0.93	-1.47
1,368.00	19.35	255.64	1,335.64	-54.96	-233.08	238.80	0.56	-0.55	0.18
1,463.00	18.99	257.93	1,425.38	-62.10	-263.45	269.90	0.88	-0.38	2.41
1,557.00	19.87	258.19	1,514.02	-68.57	-294.04	301.12	0.94	0.94	0.28
1,652.00	20.31	257.93	1,603.24	-75.32	-325.96	333.71	0.47	0.46	-0.27
1,747.00	19.87	258.37	1,692.46	-82.02	-357.90	366.30	0.49	-0.46	0.46
1,841.00	19.08	256.08	1,781.08	-88.94	-388.46	397.57	1.17	-0.84	-2.44
1,936.00	17.06	255.64	1,871.39	-96.13	-417.03	426.91	2.13	-2.13	-0.46
2,031.00	17.66	258.43	1,962.07	-102.48	-444.65	455.18	1.08	0.63	2.94
2,126.00	20.14	259.72	2,051.94	-108.29	-474.87	485.93	2.65	2.61	1.36
2,220.00	19.15	259.51	2,140.47	-113.98	-505.95	517.52	1.06	-1.05	-0.22
2,315.00	19.08	260.80	2,230.23	-119.30	-536.60	548.62	0.45	-0.07	1.36
2,410.00	19.30	261.06	2,319.95	-124.22	-567.44	579.85	0.25	0.23	0.27
2,504.00	18.92	261.07	2,408.77	-129.00	-597.84	610.63	0.40	-0.40	0.01
2,599.00	20.01	260.12	2,498.34	-134.18	-629.07	642.28	1.19	1.15	-1.00
2,694.00	19.16	258.19	2,587.84	-140.16	-660.34	674.10	1.12	-0.89	-2.03
2,788.00	18.38	255.02	2,676.85	-147.15	-689.76	704.25	1.37	-0.83	-3.37
2,883.00	17.49	254.87	2,767.23	-154.75	-718.01	733.34	0.94	-0.94	-0.16
<b>Last Survey in 14 3/4" Hole</b>									
2,978.00	14.51	253.07	2,858.54	-161.94	-743.18	759.32	3.18	-3.14	-1.89
<b>First Survey in 8 3/4" Hole</b>									
3,072.00	16.80	256.15	2,949.05	-168.62	-767.64	784.52	2.59	2.44	3.28
3,167.00	17.85	255.27	3,039.74	-175.61	-795.05	812.69	1.14	1.11	-0.93
3,262.00	20.40	260.01	3,129.49	-182.19	-825.44	843.73	3.14	2.68	4.99
3,356.00	20.93	256.94	3,217.45	-188.82	-857.93	876.86	1.28	0.56	-3.27
3,451.00	21.37	257.47	3,306.05	-196.41	-891.36	911.06	0.51	0.46	0.56
3,546.00	21.81	255.88	3,394.38	-204.47	-925.37	945.91	0.77	0.46	-1.67
3,640.00	20.40	256.15	3,482.07	-212.66	-958.21	979.63	1.50	-1.50	0.29

**Company:** OXY USA RMAT  
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**Local Co-ordinate Reference:** Well CC 697-17-06A - Slot Q  
**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)
3,735.00	20.22	256.24	3,571.17	-220.52	-990.24	1,012.48	0.19	-0.19	0.09
3,830.00	21.54	256.24	3,659.93	-228.58	-1,023.12	1,046.22	1.39	1.39	0.00
3,924.00	20.58	256.76	3,747.65	-236.47	-1,055.97	1,079.89	1.04	-1.02	0.55
4,019.00	19.87	256.67	3,836.79	-244.01	-1,087.93	1,112.64	0.75	-0.75	-0.09
4,114.00	21.02	255.88	3,925.80	-251.89	-1,120.16	1,145.71	1.24	1.21	-0.83
4,209.00	20.49	257.03	4,014.64	-259.78	-1,152.89	1,179.26	0.70	-0.56	1.21
4,303.00	19.26	256.50	4,103.04	-267.09	-1,184.00	1,211.13	1.32	-1.31	-0.56
4,398.00	19.70	255.97	4,192.60	-274.63	-1,214.77	1,242.70	0.50	0.46	-0.56
4,493.00	19.35	255.80	4,282.14	-282.37	-1,245.56	1,274.32	0.37	-0.37	-0.18
4,588.00	17.76	257.20	4,372.20	-289.45	-1,274.95	1,304.45	1.74	-1.67	1.47
4,682.00	18.47	256.94	4,461.54	-295.99	-1,303.43	1,333.61	0.76	0.76	-0.28
4,777.00	18.64	257.55	4,551.60	-302.66	-1,332.92	1,363.77	0.27	0.18	0.64
4,872.00	17.41	256.15	4,641.93	-309.34	-1,361.54	1,393.09	1.37	-1.29	-1.47
4,966.00	18.03	258.78	4,731.48	-315.53	-1,389.47	1,421.63	1.08	0.66	2.80
5,061.00	16.80	257.29	4,822.12	-321.41	-1,417.28	1,450.02	1.38	-1.29	-1.57
5,156.00	17.23	258.34	4,912.96	-327.28	-1,444.45	1,477.78	0.56	0.45	1.11
5,251.00	16.44	258.87	5,003.89	-332.72	-1,471.42	1,505.27	0.85	-0.83	0.56
5,345.00	15.74	259.14	5,094.21	-337.69	-1,497.00	1,531.30	0.75	-0.74	0.29
5,440.00	14.77	256.59	5,185.86	-342.92	-1,521.43	1,556.25	1.24	-1.02	-2.68
5,535.00	12.93	255.00	5,278.09	-348.48	-1,543.48	1,578.90	1.98	-1.94	-1.67
5,629.00	12.66	257.20	5,369.76	-353.49	-1,563.68	1,599.63	0.59	-0.29	2.34
5,724.00	10.99	256.24	5,462.74	-357.95	-1,582.63	1,619.04	1.77	-1.76	-1.01
5,819.00	8.79	255.27	5,556.32	-361.95	-1,598.45	1,635.29	2.32	-2.32	-1.02
5,913.00	8.09	255.36	5,649.30	-365.45	-1,611.80	1,649.02	0.74	-0.74	0.10
6,008.00	7.74	253.95	5,743.40	-368.90	-1,624.41	1,662.02	0.42	-0.37	-1.48
6,103.00	6.68	254.65	5,837.65	-372.14	-1,635.89	1,673.86	1.12	-1.12	0.74
6,198.00	6.33	252.81	5,932.04	-375.15	-1,646.22	1,684.53	0.43	-0.37	-1.94
6,292.00	5.54	259.58	6,025.53	-377.50	-1,655.63	1,694.20	1.12	-0.84	7.20
6,387.00	3.78	258.17	6,120.21	-378.97	-1,663.21	1,701.91	1.86	-1.85	-1.48
6,482.00	3.43	253.51	6,215.03	-380.42	-1,669.00	1,707.85	0.48	-0.37	-4.91
6,576.00	3.61	258.17	6,308.85	-381.82	-1,674.59	1,713.60	0.36	0.19	4.96
6,671.00	3.43	256.41	6,403.67	-383.10	-1,680.28	1,719.42	0.22	-0.19	-1.85
6,766.00	3.25	252.28	6,498.51	-384.59	-1,685.61	1,724.91	0.32	-0.19	-4.35
6,860.00	3.43	244.28	6,592.35	-386.62	-1,690.68	1,730.24	0.53	0.19	-8.51
6,955.00	2.81	236.55	6,687.21	-389.14	-1,695.18	1,735.08	0.79	-0.65	-8.14
7,050.00	1.93	242.26	6,782.13	-391.17	-1,698.54	1,738.71	0.96	-0.93	6.01
7,145.00	2.55	239.27	6,877.05	-392.99	-1,701.77	1,742.19	0.66	0.65	-3.15
7,240.00	3.17	256.24	6,971.94	-394.70	-1,706.14	1,746.77	1.10	0.65	17.86
7,334.00	3.34	281.37	7,065.79	-394.78	-1,711.35	1,751.93	1.52	0.18	26.73
7,429.00	3.34	275.57	7,160.63	-393.96	-1,716.82	1,757.20	0.36	0.00	-6.11
7,524.00	3.25	274.52	7,255.47	-393.48	-1,722.26	1,762.50	0.11	-0.09	-1.11
7,619.00	2.90	269.07	7,350.33	-393.31	-1,727.34	1,767.50	0.48	-0.37	-5.74
7,713.00	2.73	266.08	7,444.22	-393.50	-1,731.96	1,772.08	0.24	-0.18	-3.18

**Company:** OXY USA RMAT  
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**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)
7,808.00	3.34	261.77	7,539.09	-394.05	-1,736.95	1,777.10	0.69	0.64	-4.54
7,903.00	3.08	253.95	7,633.94	-395.15	-1,742.14	1,782.40	0.54	-0.27	-8.23
7,997.00	3.34	265.29	7,727.79	-396.07	-1,747.30	1,787.64	0.73	0.28	12.06
8,092.00	3.78	260.89	7,822.61	-396.80	-1,753.15	1,793.53	0.54	0.46	-4.63
8,187.00	3.78	260.01	7,917.40	-397.84	-1,759.33	1,799.79	0.06	0.00	-0.93
8,282.00	3.96	267.92	8,012.19	-398.50	-1,765.69	1,806.18	0.59	0.19	8.33
8,376.00	3.78	256.67	8,105.97	-399.33	-1,771.95	1,812.49	0.83	-0.19	-11.97
8,471.00	4.40	243.05	8,200.73	-401.70	-1,778.24	1,819.08	1.21	0.65	-14.34
8,566.00	4.75	230.92	8,295.43	-405.84	-1,784.54	1,825.95	1.08	0.37	-12.77
8,661.00	5.19	235.67	8,390.08	-410.74	-1,791.15	1,833.23	0.63	0.46	5.00
8,755.00	5.19	241.12	8,483.69	-415.19	-1,798.38	1,841.07	0.52	0.00	5.80
8,850.00	5.54	237.16	8,578.27	-419.75	-1,805.99	1,849.30	0.54	0.37	-4.17
8,898.00	5.63	240.85	8,626.05	-422.16	-1,810.00	1,853.63	0.77	0.19	7.69

**Last SDI MWD Survey**

8,955.00 5.63 240.85 8,682.77 -424.88 -1,814.88 1,858.88 0.00 0.00 0.00

Projection to TD - BHL = 629342.58 ft N, 1227517.08 ft E

**Design Targets**
**Target Name**

- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- Shape									
CC 697-17-06A 8°	-3.00	257.14	7,880.00	-399.26	-1,748.52	629,366.19	1,227,584.17	39° 31' 46.060 N	108° 14' 19.547 W
- actual wellpath misses target center by 8.55ft at 8148.99ft MD (7879.48 TVD, -397.41 N, -1756.86 E)									
- Circle (radius 50.00)									

**Design Annotations**

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
553.00	551.80	-3.63	-24.89	Last Gyro Survey
619.00	617.09	-4.61	-34.49	First SDI MWD Survey
2,883.00	2,767.23	-154.75	-718.01	Last Survey in 14 3/4" Hole
2,978.00	2,858.54	-161.94	-743.18	First Survey in 8 3/4" Hole
8,898.00	8,626.05	-422.16	-1,810.00	Last SDI MWD Survey
8,955.00	8,682.77	-424.88	-1,814.88	Projection to TD
8,955.00	8,682.77	-424.88	-1,814.88	BHL = 629342.58 ft N, 1227517.08 ft E

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