



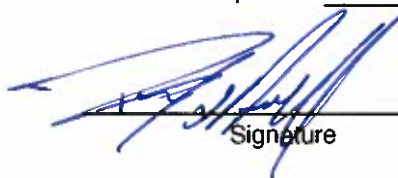
**Scientific  
Drilling**

## **Directional Survey Certification**

7327 West Barton Road  
Casper, WY 82604  
(307)-472-6621 Fax (307) 472-5439

<b>Operator</b>	<u>OXY USA RMAT</u>
<b>Well Name &amp; No.</b>	<u>Cascade Creek 697-16-01</u>
<b>County &amp; State</b>	<u>Garfield County, CO</u>
<b>SDI Job No.</b>	<u>42DEF1006590</u>
<b>Rig</b>	<u>H&amp;P 330</u>

I, Rex Hall, having personal knowledge of all the facts, hereby  
certify that the attached directional survey run from a measured depth of 0 feet to a  
measured depth of 8812 feet is true and correct as determined from all available records.

  
\_\_\_\_\_  
Signature

08-Jul-10  
\_\_\_\_\_  
Date

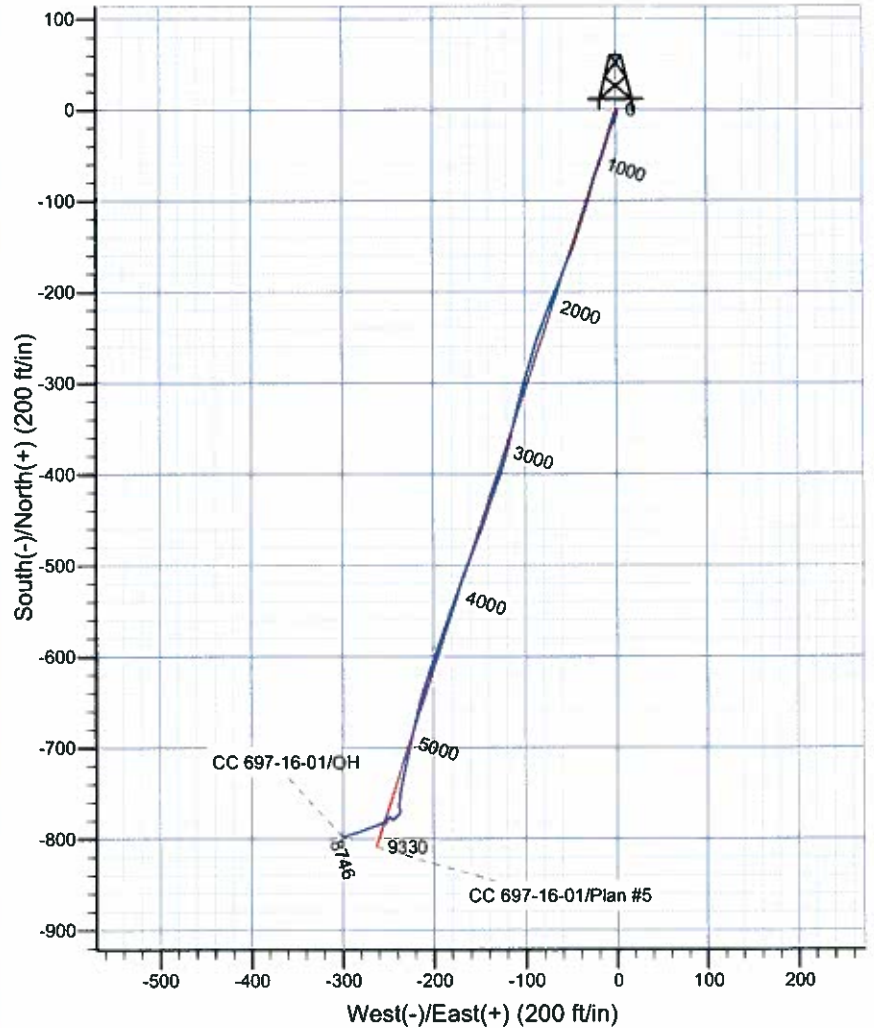
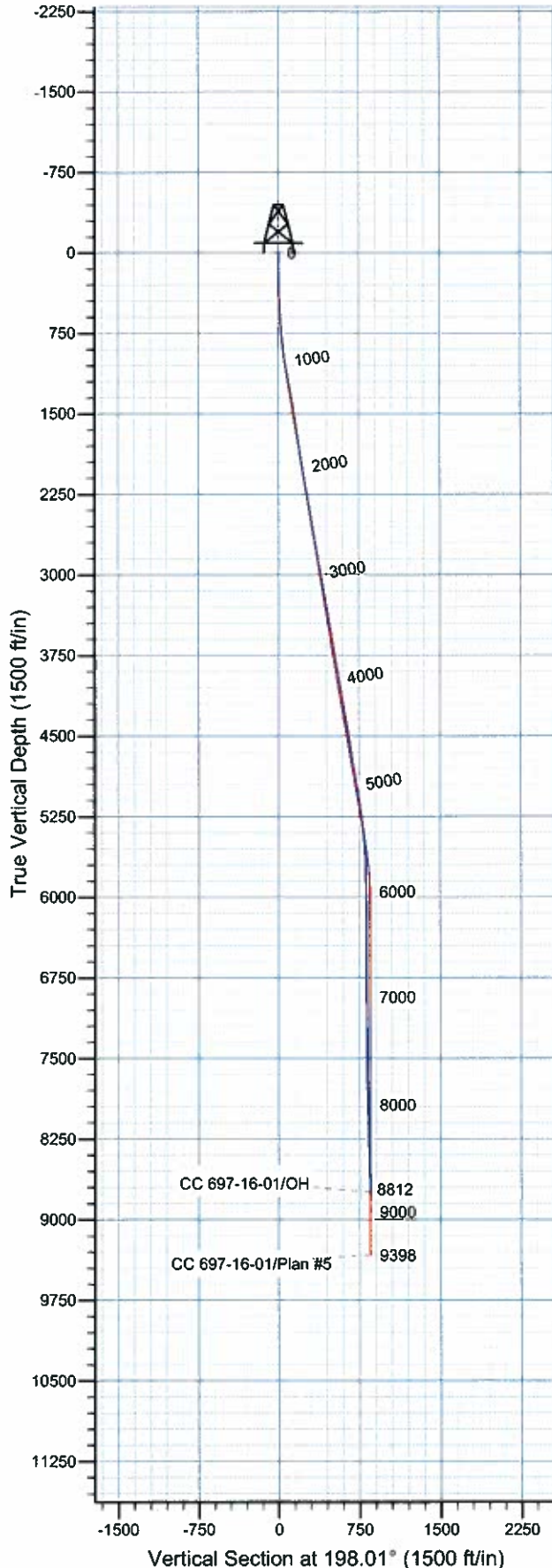
**Rex Hall**  
Grand Junction Drilling Engineer  
Scientific Drilling - Rocky Mountain District



**Scientific Drilling**  
Rocky Mountain Operations

Project: Garfield County, CO NAD27  
Site: Cascade Creek 609-14 Pad  
Well: CC 697-16-01  
Wellbore: OH  
Design: OH

# OXY USA RMAT



## WELL DETAILS: CC 697-16-01

Ground Level: 8393' & RKB 30' @ 8423.00ft (H&P 330)  
+N/-S +E/-W Northing Easting Latitude Longitude  
0.00 0.00 629705.38 1229353.53 39° 31' 49.937 N 108° 13' 57.106 W T

## REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC 697-16-01 - Slot T, True North  
Vertical (TVD) Reference: GL 8393' & RKB 30' @ 8423.00ft (H&P 330)  
Section (VS) Reference: Slot - T(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 697-16-01/OH)

Created By: Rex Hall Date: 2010-07-08



**Scientific Drilling**  
Rocky Mountain Operations

## **OXY USA RMAT**

Garfield County, CO NAD27  
Cascade Creek 609-14 Pad  
CC 697-16-01 - Slot T  
OH

**Design: OH**

## **Standard Survey Report**

**08 July, 2010**



<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-16-01 - Slot T
<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 697-16-01	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 2003.16 Multi-User Db

<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 ft	Latitude:	39° 31' 50.765 N
From:	Map	Easting:	1,229,350.88 ft	Longitude:	108° 13' 57.172 W
Position Uncertainty:	0.00 ft	Slot Radius:	in	Grid Convergence:	-1.72 °

Well	CC 697-16-01 - Slot T, 139' FSL 264' FWL					
Well Position	+N/-S	0.00 ft	Northing:	629,705.38 ft	Latitude:	39° 31' 49.937 N
	+E/-W	0.00 ft	Easting:	1,229,353.53 ft	Longitude:	108° 13' 57.106 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	8,393.00 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>
	IGRF200510	2008/06/24	10.82	65.81	52,539

Design	OH			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	198.01

<b>Survey Program</b>	<b>Date</b>	2010/07/08			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
92.00	831.00	Survey #1 - Surface Wireline Gyro (OH)	Standard Keeper 103	Standard Wireline Keeper ver 1.0.3	
895.00	2,881.00	Survey #2 - Surface MWD (OH)	MWD-SDI	MWD - Standard ISCWSA	
2,984.00	8,812.00	Survey #3 - 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
92.00	0.78	25.94	92.00	0.56	0.27	-0.62	0.85	0.85	0.00
<b>First SDI Surface Wireline Gyro Survey</b>									
184.00	0.77	148.25	183.99	0.60	0.87	-0.84	1.48	-0.01	132.95
276.00	1.80	174.66	275.97	-1.36	1.33	0.88	1.26	1.12	28.71
368.00	2.92	186.76	367.89	-5.13	1.19	4.51	1.33	1.22	13.15
461.00	2.67	208.24	460.78	-9.39	-0.11	8.96	1.15	-0.27	23.10
553.00	3.52	206.71	552.65	-13.80	-2.40	13.87	0.93	0.92	-1.66
645.00	3.86	200.00	644.46	-19.23	-4.72	19.75	0.60	0.37	-7.29
737.00	4.95	197.98	736.18	-25.92	-7.01	26.82	1.20	1.18	-2.20
831.00	6.13	196.76	829.74	-34.58	-9.71	35.89	1.26	1.26	-1.30



<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-16-01 - Slot T
<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 697-16-01	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 2003.16 Multi-User Db

**Survey**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Bulld Rate (°/100ft)	Turn Rate (°/100ft)
<b>Last SDI Surface Wireline Gyro Survey</b>									
895.00	7.03	198.24	893.32	-41.57	-11.92	43.22	1.43	1.41	2.31
<b>First SDI Surface MWD Survey</b>									
987.00	8.97	201.22	984.42	-53.61	-16.28	56.01	2.16	2.11	3.24
1,082.00	9.85	197.27	1,078.14	-68.27	-21.37	71.53	1.15	0.93	-4.16
1,177.00	9.67	196.83	1,171.77	-83.67	-26.09	87.64	0.21	-0.19	-0.46
1,271.00	9.50	197.27	1,264.46	-98.63	-30.68	103.29	0.20	-0.18	0.47
1,366.00	10.73	196.57	1,357.98	-114.60	-35.53	119.97	1.30	1.29	-0.74
1,461.00	10.90	196.65	1,451.29	-131.68	-40.63	137.79	0.18	0.18	0.08
1,555.00	9.32	200.52	1,543.83	-147.32	-45.84	154.28	1.83	-1.68	4.12
1,650.00	8.00	203.95	1,637.74	-160.57	-51.22	168.54	1.49	-1.39	3.61
1,744.00	8.00	201.14	1,730.83	-172.65	-56.24	181.58	0.42	0.00	-2.99
1,839.00	8.71	200.35	1,824.82	-185.56	-61.12	195.36	0.76	0.75	-0.83
1,934.00	9.50	201.84	1,918.62	-199.58	-66.54	210.37	0.87	0.83	1.57
2,029.00	9.06	202.72	2,012.38	-213.76	-72.35	225.65	0.49	-0.46	0.93
2,123.00	9.94	201.31	2,105.09	-228.14	-78.15	241.13	0.97	0.94	-1.50
2,218.00	10.38	199.99	2,198.60	-243.82	-84.06	257.87	0.52	0.46	-1.39
2,313.00	9.50	196.57	2,292.17	-259.38	-89.22	274.26	1.12	-0.93	-3.60
2,407.00	9.85	196.13	2,384.84	-274.54	-93.67	290.05	0.38	0.37	-0.47
2,502.00	9.67	196.30	2,478.46	-290.00	-98.16	306.14	0.19	-0.19	0.18
2,597.00	9.32	196.30	2,572.16	-305.04	-102.56	321.81	0.37	-0.37	0.00
2,691.00	9.76	194.98	2,664.86	-320.05	-106.76	337.37	0.52	0.47	-1.40
2,786.00	10.11	192.44	2,758.44	-335.97	-110.63	353.71	0.59	0.37	-2.67
2,881.00	9.76	192.88	2,852.01	-351.96	-114.23	370.03	0.38	-0.37	0.46
<b>Last SDI Surface MWD Survey</b>									
2,984.00	9.33	192.59	2,953.58	-368.62	-117.99	387.04	0.42	-0.42	-0.28
<b>First SDI Production MWD Survey</b>									
3,078.00	9.83	196.04	3,046.27	-383.77	-121.87	402.64	0.81	0.53	3.67
3,173.00	10.90	199.04	3,139.72	-400.05	-127.04	419.73	1.26	1.13	3.16
3,268.00	10.73	198.34	3,233.04	-416.94	-132.75	437.55	0.23	-0.18	-0.74
3,362.00	10.38	197.99	3,325.45	-433.30	-138.12	454.77	0.38	-0.37	-0.37
3,457.00	9.58	199.92	3,419.01	-448.87	-143.46	471.23	0.91	-0.84	2.03
3,552.00	10.11	200.71	3,512.61	-464.10	-149.10	487.46	0.58	0.56	0.83
3,646.00	9.76	200.97	3,605.20	-479.26	-154.87	503.66	0.38	-0.37	0.28
3,741.00	9.32	201.68	3,698.88	-493.93	-160.59	519.38	0.48	-0.46	0.75
3,836.00	10.02	200.10	3,792.53	-508.84	-166.28	535.32	0.79	0.74	-1.66
3,930.00	10.38	199.13	3,885.05	-524.52	-171.86	551.95	0.42	0.38	-1.03
4,025.00	9.85	199.92	3,978.57	-540.24	-177.44	568.63	0.58	-0.56	0.83
4,120.00	9.41	199.48	4,072.23	-555.20	-182.79	584.52	0.47	-0.46	-0.46
4,215.00	8.79	197.37	4,166.04	-569.45	-187.55	599.54	0.74	-0.65	-2.22
4,309.00	9.15	201.24	4,258.89	-583.27	-192.40	614.18	0.75	0.38	4.12
4,404.00	10.11	199.13	4,352.55	-598.19	-197.87	630.06	1.08	1.01	-2.22
4,499.00	9.32	198.25	4,446.19	-613.38	-203.01	646.09	0.85	-0.83	-0.93
4,594.00	8.97	197.81	4,539.98	-627.73	-207.69	661.19	0.38	-0.37	-0.46
4,688.00	8.97	197.55	4,632.83	-641.70	-212.14	675.85	0.04	0.00	-0.28
4,783.00	8.97	192.54	4,726.67	-655.99	-215.98	690.62	0.82	0.00	-5.27
4,878.00	9.23	192.98	4,820.47	-670.64	-219.30	705.59	0.28	0.27	0.46
4,972.00	8.53	193.77	4,913.34	-684.76	-222.65	720.05	0.76	-0.74	0.84
5,067.00	9.23	191.57	5,007.21	-699.07	-225.86	734.64	0.82	0.74	-2.32
5,162.00	8.71	191.83	5,101.04	-713.57	-228.86	749.37	0.55	-0.55	0.27
5,256.00	8.88	192.98	5,193.94	-727.61	-231.95	763.67	0.26	0.18	1.22
5,351.00	7.83	191.57	5,287.93	-741.09	-234.89	777.40	1.13	-1.11	-1.48
5,446.00	6.24	188.76	5,382.21	-752.53	-236.98	788.93	1.71	-1.67	-2.96
5,541.00	4.92	181.46	5,476.76	-761.71	-237.87	797.93	1.57	-1.39	-7.68

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<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 697-16-01	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 2003.16 Multi-User Db

**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)
5,635.00	2.73	161.86	5,570.55	-767.87	-237.27	803.60	2.68	-2.33	-20.85
5,730.00	2.73	205.28	5,665.45	-772.06	-237.53	807.68	2.13	0.00	45.71
5,825.00	1.93	229.80	5,760.37	-775.14	-239.72	811.28	1.33	-0.84	25.81
5,919.00	1.93	233.58	5,854.32	-777.10	-242.21	813.91	0.14	0.00	4.02
6,014.00	0.62	221.98	5,949.29	-778.44	-243.84	815.68	1.40	-1.38	-12.21
6,109.00	0.97	235.69	6,044.29	-779.27	-244.84	816.79	0.42	0.37	14.43
6,204.00	0.53	339.49	6,139.28	-779.31	-245.66	817.08	1.27	-0.46	109.26
6,298.00	0.62	329.65	6,233.28	-778.47	-246.07	816.41	0.14	0.10	-10.47
6,393.00	0.70	316.64	6,328.27	-777.60	-246.73	815.79	0.18	0.08	-13.69
6,488.00	0.79	304.69	6,423.26	-776.81	-247.67	815.32	0.19	0.09	-12.58
6,582.00	0.26	63.78	6,517.26	-776.34	-248.01	814.99	1.00	-0.56	126.69
6,677.00	0.09	131.10	6,612.26	-776.30	-247.76	814.86	0.25	-0.18	70.86
6,772.00	0.53	231.21	6,707.26	-776.62	-248.05	815.26	0.58	0.46	105.38
6,866.00	0.62	241.58	6,801.25	-777.14	-248.83	815.99	0.15	0.10	11.03
6,961.00	1.23	237.45	6,896.24	-777.93	-250.14	817.15	0.65	0.64	-4.35
7,056.00	0.70	196.93	6,991.23	-779.03	-251.17	818.52	0.88	-0.56	-42.65
7,151.00	0.88	197.37	7,086.22	-780.29	-251.56	819.83	0.19	0.19	0.46
7,246.00	1.49	204.14	7,181.20	-782.11	-252.28	821.79	0.66	0.64	7.13
7,340.00	0.26	10.43	7,275.19	-783.01	-252.74	822.79	1.85	-1.31	176.90
7,435.00	0.18	16.23	7,370.19	-782.66	-252.66	822.43	0.09	-0.08	6.11
7,530.00	0.26	304.42	7,465.19	-782.39	-252.80	822.22	0.28	0.08	-75.59
7,625.00	0.70	265.84	7,560.18	-782.31	-253.55	822.38	0.55	0.46	-40.61
7,719.00	1.32	254.50	7,654.17	-782.65	-255.17	823.19	0.69	0.66	-12.06
7,814.00	1.85	250.63	7,749.13	-783.45	-257.67	824.73	0.57	0.56	-4.07
7,909.00	2.29	248.26	7,844.07	-784.66	-260.88	826.87	0.47	0.46	-2.49
8,003.00	2.29	250.02	7,937.99	-785.99	-264.39	829.23	0.07	0.00	1.87
8,098.00	2.37	252.48	8,032.92	-787.23	-268.05	831.54	0.13	0.08	2.59
8,193.00	2.64	247.20	8,127.82	-788.67	-271.94	834.11	0.37	0.28	-5.56
8,288.00	2.37	245.36	8,222.73	-790.34	-275.74	836.87	0.30	-0.28	-1.94
8,382.00	2.11	248.00	8,316.66	-791.80	-279.11	839.30	0.30	-0.28	2.81
8,477.00	2.55	255.03	8,411.58	-793.00	-282.77	841.58	0.55	0.46	7.40
8,572.00	2.81	254.76	8,506.48	-794.16	-287.06	844.00	0.27	0.27	-0.28
8,667.00	3.25	251.07	8,601.35	-795.64	-291.86	846.90	0.51	0.46	-3.88
8,761.00	3.34	251.16	8,695.19	-797.39	-296.97	850.14	0.10	0.10	0.10
<b>Last SDI Production MWD Survey</b>									
8,812.00	3.34	251.16	8,746.10	-798.35	-299.78	851.93	0.00	0.00	0.00
<b>Projection To TD - BHL = 628916.41, 1229029.88</b>									

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-16-01 - Slot T
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<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 697-16-01	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 2003.16 Multi-User Db

**Targets**

Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
- Shape									
CC 697-16-01 8"	0.00	0.00	7,895.00	-809.00	-263.09	628,904.66	1,229,066.23	39° 31' 41.941 N	108° 14' 0.463 W
- actual wellpath misses target center by 23.60ft at 7960.32ft MD (7895.35 TVD, -785.40 N, -262.79 E)									
- Circle (radius 50.00)									
CC 697-16-01 Target 2	0.00	0.00	7,914.00	-809.00	-263.09	628,904.66	1,229,066.23	39° 31' 41.941 N	108° 14' 0.463 W
- actual wellpath misses target center by 23.34ft at 7979.30ft MD (7914.32 TVD, -785.67 N, -263.50 E)									
- Circle (radius 50.00)									
CC 697-16-01 Target	0.00	0.00	7,843.00	-809.00	-263.09	628,904.66	1,229,066.23	39° 31' 41.941 N	108° 14' 0.463 W
- actual wellpath misses target center by 24.46ft at 7908.32ft MD (7843.39 TVD, -784.65 N, -260.86 E)									
- Circle (radius 50.00)									

**Design Annotations**

Measured Depth	Vertical Depth	Local Coordinates		Comment
(ft)	(ft)	+N/-S (ft)	+E/-W (ft)	
92.00	92.00	0.56	0.27	First SDI Surface Wireline Gyro Survey
831.00	829.74	-34.58	-9.71	Last SDI Surface Wireline Gyro Survey
895.00	893.32	-41.57	-11.92	First SDI Surface MWD Survey
2,881.00	2,852.01	-351.96	-114.23	Last SDI Surface MWD Survey
2,984.00	2,953.58	-368.62	-117.99	First SDI Production MWD Survey
8,761.00	8,695.19	-797.39	-296.97	Last SDI Production MWD Survey
8,812.00	8,746.10	-798.35	-299.78	Projection To TD
8,812.00	8,746.10	-798.35	-299.78	BHL = 628916.41, 1229029.88

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