



**Scientific
Drilling**

Survey Certification

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

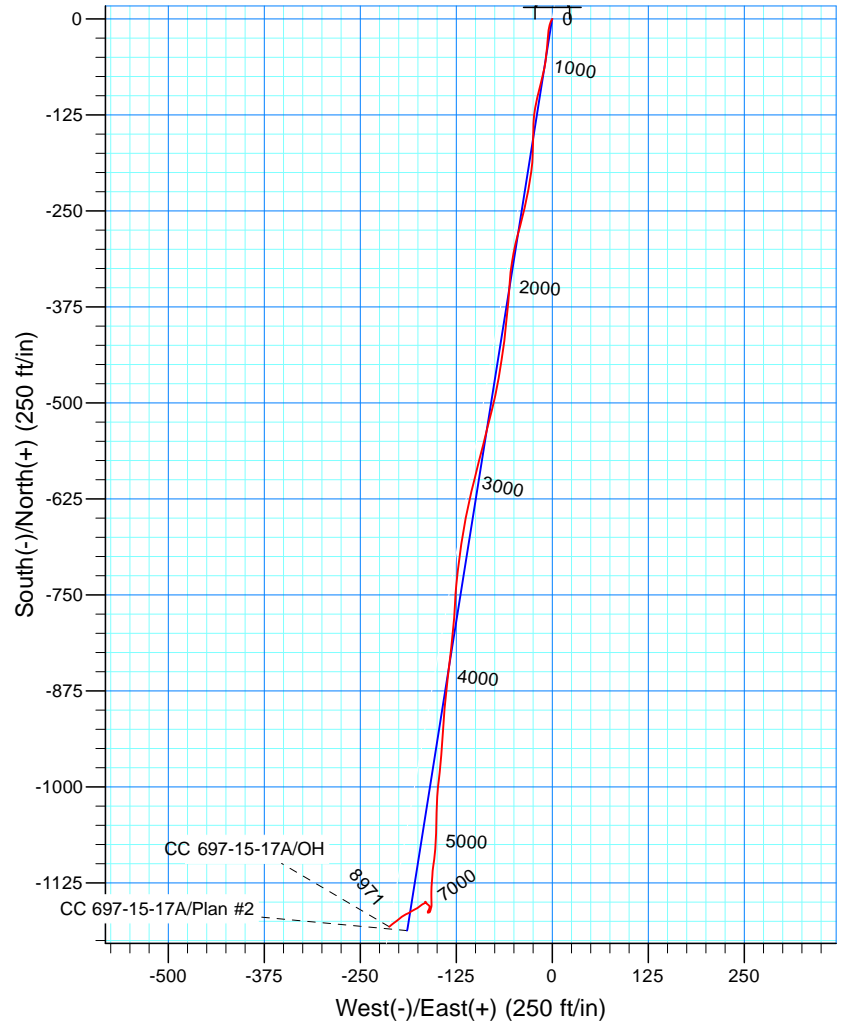
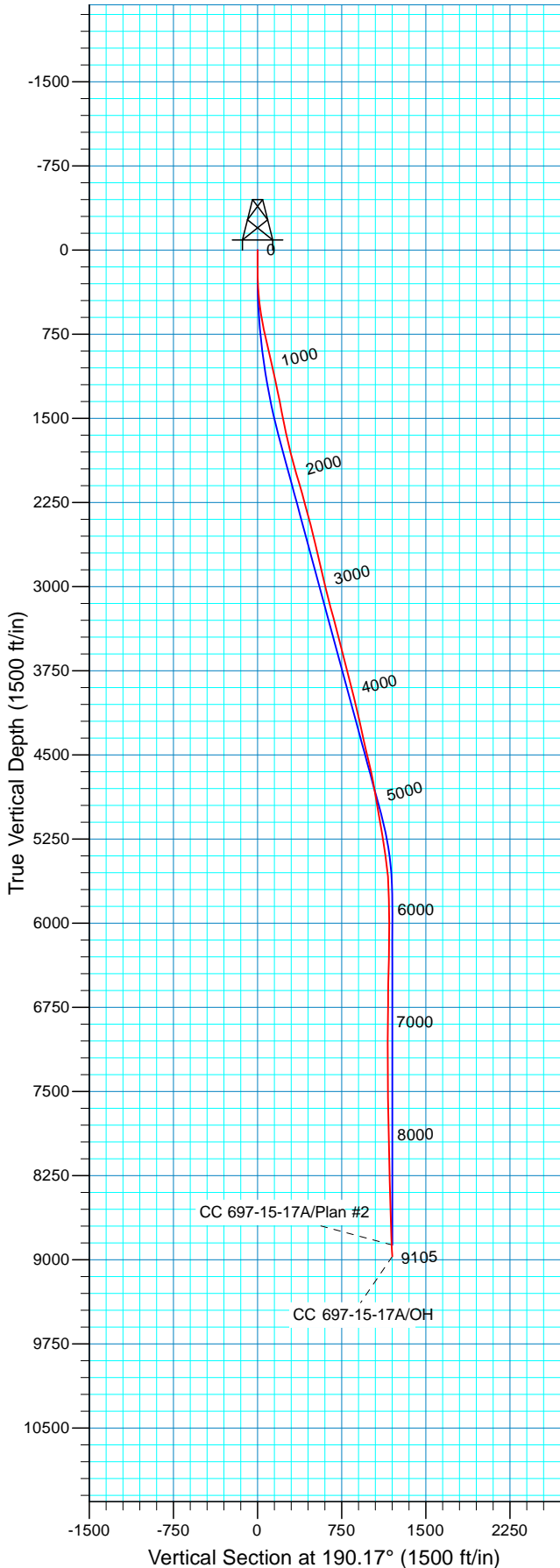
Operator	OXY USA RMAT
Well Name & No.	Cascade Creek 697-15-17A
County & State	Garfield County, CO
SDI Job No.	42DEF10121348
Rig	H&P 353
Survey Date	19-Dec-10

I, Julie Cruse, 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 9105 feet is true and correct as determined from all available records.

Signature

03-Feb-11
Date

Julie Cruse
Rockies Region Engineer
Scientific Drilling - Rocky Mountain District



WELL DETAILS: CC 697-15-17A

Ground Level: GL 8348' & RKB 30' @ 8378.00ft					
0.00	0.00	Northing	Easting	Latitude	Longitude
		629167.16	1234983.28	39° 31' 46.287 N	108° 12' 45.081 W
					O

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC 697-15-17A - Slot O, True North
 Vertical (TVD) Reference: GL 8348' & RKB 30' @ 8378.00ft
 Section (VS) Reference: Slot - O(0.00N, 0.00E)
 Measured Depth Reference: GL 8348' & RKB 30' @ 8378.00ft
 Calculation Method: Minimum Curvature
 Local North: True
 Location: Sec 15 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 697-15-17A/OH)

Created By: Julie Cruse Date: 2011-02-03



Scientific Drilling

OXY USA RMAT

Garfield County, CO NAD27
Cascade Creek 697-15-01 Pad
CC 697-15-17A - Slot O

OH

Design: OH

Standard Survey Report

03 February, 2011



Company:	OXY USA RMAT	Local Co-ordinate Reference:	Well CC 697-15-17A - Slot O
Project:	Garfield County, CO NAD27	TVD Reference:	GL 8348' & RKB 30' @ 8378.00ft
Site:	Cascade Creek 697-15-01 Pad	MD Reference:	GL 8348' & RKB 30' @ 8378.00ft
Well:	CC 697-15-17A	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	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 697-15-01 Pad, Sec 15 T6S R97W		
Site Position:		Northing:	629,156.97 usft
From:	Map	Easting:	1,234,961.93 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in
		Latitude:	39° 31' 46.180 N
		Longitude:	108° 12' 45.350 W
		Grid Convergence:	-1.71 °

Well	CC 697-15-17A - Slot O		
Well Position	+N/-S	0.00 ft	Northing: 629,167.16 usft
	+E/-W	0.00 ft	Easting: 1,234,983.28 usft
Position Uncertainty	0.00 ft	Wellhead Elevation:	ft
		Latitude:	39° 31' 46.287 N
		Longitude:	108° 12' 45.081 W
		Ground Level:	8,348.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2010-11-24	10.52	65.74	52,277

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	190.17	

Survey Program	Date	2011-02-03			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
155.00	2,672.00	Survey #1 - Surface MWD (OH)	MWD-SDI	MWD - Standard ISCWSA	
2,788.00	9,105.00	Survey #2 - 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	
155.00	0.17	214.86	155.00	-0.19	-0.13	0.21	0.11	0.11	0.00	
First SDI MWD Survey										
248.00	2.35	210.89	247.97	-1.94	-1.19	2.12	2.34	2.34	-4.27	
340.00	3.44	193.74	339.85	-6.24	-2.81	6.64	1.50	1.18	-18.64	
432.00	5.98	191.56	431.54	-13.62	-4.43	14.18	2.77	2.76	-2.37	
524.00	7.03	183.65	522.94	-23.93	-5.75	24.57	1.50	1.14	-8.60	
616.00	10.02	184.44	613.92	-37.53	-6.73	38.13	3.25	3.25	0.86	
710.00	11.34	189.01	706.29	-54.81	-8.81	55.51	1.67	1.40	4.86	
802.00	12.57	192.35	796.29	-73.53	-12.36	74.55	1.53	1.34	3.63	

Company:	OXY USA RMAT	Local Co-ordinate Reference:	Well CC 697-15-17A - Slot O
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Site:	Cascade Creek 697-15-01 Pad	MD Reference:	GL 8348' & RKB 30' @ 8378.00ft
Well:	CC 697-15-17A	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	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)
896.00	13.89	195.25	887.80	-94.41	-17.52	96.02	1.57	1.40	3.09
991.00	13.54	189.18	980.09	-116.39	-22.29	118.49	1.56	-0.37	-6.39
1,086.00	11.96	182.15	1,072.75	-137.20	-24.44	139.36	2.33	-1.66	-7.40
1,180.00	12.66	180.39	1,164.59	-157.24	-24.87	159.16	0.84	0.74	-1.87
1,275.00	11.78	182.59	1,257.44	-177.34	-25.38	179.03	1.05	-0.93	2.32
1,369.00	11.08	188.92	1,349.58	-195.85	-27.22	197.57	1.53	-0.74	6.73
1,464.00	11.34	187.87	1,442.77	-214.12	-29.91	216.03	0.35	0.27	-1.11
1,558.00	11.17	189.80	1,534.96	-232.24	-32.73	234.37	0.44	-0.18	2.05
1,653.00	11.87	196.39	1,628.05	-250.68	-37.05	253.29	1.57	0.74	6.94
1,747.00	13.10	194.19	1,719.82	-270.29	-42.39	273.52	1.40	1.31	-2.34
1,842.00	14.77	192.26	1,812.03	-292.56	-47.60	296.37	1.82	1.76	-2.03
1,936.00	15.83	189.97	1,902.69	-316.90	-52.36	321.16	1.30	1.13	-2.44
2,031.00	16.18	182.86	1,994.02	-342.88	-55.27	347.25	2.09	0.37	-7.48
2,125.00	16.00	185.58	2,084.34	-368.85	-57.18	373.16	0.82	-0.19	2.89
2,220.00	15.56	186.11	2,175.76	-394.56	-59.81	398.92	0.49	-0.46	0.56
2,314.00	15.12	186.46	2,266.41	-419.27	-62.53	423.73	0.48	-0.47	0.37
2,409.00	15.12	189.18	2,358.12	-443.82	-65.90	448.48	0.75	0.00	2.86
2,503.00	14.33	189.45	2,449.03	-467.39	-69.77	472.37	0.84	-0.84	0.29
2,598.00	13.63	191.56	2,541.22	-489.96	-73.94	495.31	0.91	-0.74	2.22
2,672.00	13.98	194.72	2,613.08	-507.15	-77.96	512.94	1.12	0.47	4.27
Last Survey in 14 3/4" Hole									
2,788.00	13.01	194.03	2,725.88	-533.37	-84.69	539.94	0.85	-0.84	-0.59
First Survey in 8 3/4" Hole									
2,883.00	13.45	193.94	2,818.36	-554.46	-89.94	561.63	0.46	0.46	-0.09
2,977.00	14.07	194.64	2,909.66	-576.13	-95.46	583.93	0.68	0.66	0.74
3,072.00	12.80	193.05	3,002.06	-597.55	-100.76	605.96	1.39	-1.34	-1.67
3,167.00	13.71	192.86	3,094.53	-618.78	-105.64	627.71	0.96	0.96	-0.20
3,261.00	15.13	193.26	3,185.56	-641.58	-110.93	651.09	1.51	1.51	0.43
3,355.00	15.55	188.42	3,276.22	-665.99	-115.59	675.93	1.43	0.45	-5.15
3,450.00	14.81	187.86	3,367.90	-690.61	-119.12	700.79	0.79	-0.78	-0.59
3,544.00	13.76	187.75	3,458.99	-713.59	-122.27	723.97	1.12	-1.12	-0.12
3,639.00	14.66	185.50	3,551.09	-736.75	-124.94	747.24	1.11	0.95	-2.37
3,733.00	15.24	182.06	3,641.91	-760.94	-126.53	771.33	1.13	0.62	-3.66
3,828.00	14.46	185.19	3,733.73	-785.23	-128.05	795.50	1.18	-0.82	3.29
3,922.00	14.09	185.33	3,824.83	-808.31	-130.17	818.60	0.40	-0.39	0.15
4,017.00	13.28	188.48	3,917.14	-830.62	-132.86	841.03	1.16	-0.85	3.32
4,111.00	13.78	185.99	4,008.53	-852.43	-135.62	862.98	0.82	0.53	-2.65
4,206.00	13.94	184.82	4,100.76	-875.09	-137.76	885.66	0.34	0.17	-1.23
4,301.00	12.88	185.35	4,193.17	-897.03	-139.71	907.60	1.12	-1.12	0.56
4,395.00	12.38	184.52	4,284.90	-917.51	-141.48	928.07	0.57	-0.53	-0.88
4,490.00	12.22	184.23	4,377.71	-937.69	-143.02	948.21	0.18	-0.17	-0.31
4,584.00	13.63	183.57	4,469.33	-958.66	-144.45	969.10	1.51	1.50	-0.70
4,679.00	14.03	186.46	4,561.58	-981.28	-146.44	991.72	0.84	0.42	3.04

Company:	OXY USA RMAT	Local Co-ordinate Reference:	Well CC 697-15-17A - Slot O
Project:	Garfield County, CO NAD27	TVD Reference:	GL 8348' & RKB 30' @ 8378.00ft
Site:	Cascade Creek 697-15-01 Pad	MD Reference:	GL 8348' & RKB 30' @ 8378.00ft
Well:	CC 697-15-17A	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	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)
4,773.00	12.47	185.13	4,653.07	-1,002.71	-148.63	1,013.20	1.69	-1.66	-1.41
4,868.00	10.87	184.46	4,746.11	-1,021.86	-150.24	1,032.33	1.69	-1.68	-0.71
4,962.00	9.01	178.81	4,838.69	-1,038.05	-150.78	1,048.36	2.23	-1.98	-6.01
5,057.00	9.88	180.88	4,932.40	-1,053.64	-150.75	1,063.70	0.98	0.92	2.18
5,151.00	9.74	184.20	5,025.03	-1,069.63	-151.46	1,079.57	0.62	-0.15	3.53
5,246.00	9.69	186.33	5,118.67	-1,085.59	-152.93	1,095.54	0.38	-0.05	2.24
5,340.00	9.67	186.89	5,211.33	-1,101.29	-154.75	1,111.31	0.10	-0.02	0.60
5,435.00	8.46	183.50	5,305.14	-1,116.19	-156.13	1,126.22	1.39	-1.27	-3.57
5,530.00	8.47	184.17	5,399.11	-1,130.14	-157.06	1,140.12	0.10	0.01	0.71
5,624.00	7.12	179.84	5,492.24	-1,142.88	-157.55	1,152.74	1.57	-1.44	-4.61
5,718.00	4.51	176.05	5,585.75	-1,152.39	-157.28	1,162.05	2.80	-2.78	-4.03
5,813.00	2.06	204.49	5,680.59	-1,157.67	-157.73	1,167.33	3.02	-2.58	29.94
5,907.00	1.82	187.41	5,774.54	-1,160.69	-158.62	1,170.46	0.66	-0.26	-18.17
6,002.00	0.59	209.44	5,869.51	-1,162.61	-159.06	1,172.43	1.36	-1.29	23.19
6,097.00	0.47	248.95	5,964.51	-1,163.18	-159.66	1,173.09	0.40	-0.13	41.59
6,191.00	0.96	243.23	6,058.50	-1,163.67	-160.73	1,173.76	0.53	0.52	-6.09
6,286.00	0.67	294.85	6,153.49	-1,163.79	-161.94	1,174.10	0.80	-0.31	54.34
6,380.00	1.72	24.78	6,247.48	-1,162.28	-161.85	1,172.60	1.96	1.12	95.67
6,475.00	1.46	29.75	6,342.44	-1,159.94	-160.65	1,170.08	0.31	-0.27	5.23
6,569.00	1.39	10.83	6,436.41	-1,157.78	-159.84	1,167.81	0.50	-0.07	-20.13
6,664.00	1.02	358.15	6,531.39	-1,155.80	-159.65	1,165.83	0.48	-0.39	-13.35
6,758.00	0.92	313.82	6,625.38	-1,154.44	-160.22	1,164.59	0.78	-0.11	-47.16
6,853.00	0.89	308.71	6,720.37	-1,153.45	-161.35	1,163.82	0.09	-0.03	-5.38
6,947.00	1.10	291.30	6,814.35	-1,152.67	-162.76	1,163.29	0.39	0.22	-18.52
7,042.00	0.85	350.14	6,909.34	-1,151.64	-163.73	1,162.46	1.03	-0.26	61.94
7,137.00	0.65	324.10	7,004.33	-1,150.51	-164.17	1,161.42	0.41	-0.21	-27.41
7,231.00	0.87	306.47	7,098.32	-1,149.66	-165.05	1,160.73	0.34	0.23	-18.76
7,326.00	0.45	144.98	7,193.32	-1,149.53	-165.42	1,160.68	1.37	-0.44	-169.99
7,420.00	0.64	198.37	7,287.32	-1,150.33	-165.37	1,161.46	0.55	0.20	56.80
7,515.00	0.54	218.44	7,382.31	-1,151.19	-165.82	1,162.38	0.24	-0.11	21.13
7,609.00	0.61	256.55	7,476.31	-1,151.65	-166.58	1,162.97	0.41	0.07	40.54
7,704.00	0.21	234.30	7,571.31	-1,151.87	-167.21	1,163.30	0.45	-0.42	-23.42
7,798.00	0.47	244.00	7,665.30	-1,152.14	-167.70	1,163.65	0.28	0.28	10.32
7,893.00	1.58	237.69	7,760.29	-1,153.01	-169.16	1,164.76	1.17	1.17	-6.64
7,988.00	2.01	231.28	7,855.24	-1,154.75	-171.56	1,166.90	0.50	0.45	-6.75
8,082.00	2.77	236.87	7,949.16	-1,157.03	-174.75	1,169.70	0.84	0.81	5.95
8,177.00	3.06	242.47	8,044.04	-1,159.45	-178.92	1,172.83	0.43	0.31	5.89
8,271.00	2.79	238.66	8,137.91	-1,161.80	-183.10	1,175.88	0.35	-0.29	-4.05
8,366.00	2.36	236.85	8,232.82	-1,164.07	-186.72	1,178.75	0.46	-0.45	-1.91
8,460.00	2.08	242.03	8,326.75	-1,165.93	-189.84	1,181.13	0.37	-0.30	5.51
8,555.00	1.67	252.09	8,421.70	-1,167.17	-192.68	1,182.85	0.55	-0.43	10.59
8,649.00	1.45	234.26	8,515.66	-1,168.28	-194.95	1,184.35	0.56	-0.23	-18.97
8,744.00	1.75	230.35	8,610.62	-1,169.91	-197.04	1,186.32	0.34	0.32	-4.12
8,839.00	2.50	228.93	8,705.56	-1,172.20	-199.72	1,189.04	0.79	0.79	-1.49

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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	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)	
8,933.00	3.00	233.96	8,799.45	-1,174.99	-203.26	1,192.42	0.59	0.53	5.35	
9,027.00	4.03	231.62	8,893.27	-1,178.49	-207.84	1,196.67	1.11	1.10	-2.49	
9,051.00	4.16	229.17	8,917.21	-1,179.58	-209.15	1,197.98	0.91	0.54	-10.21	
Last SDI MWD Survey										
9,105.00	4.16	229.17	8,971.07	-1,182.14	-212.12	1,201.02	0.00	0.00	0.00	
Projection to TD - BHL = 627991.88 ft N, 1234735.96 ft E										

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
155.00	155.00	-0.19	-0.13	First SDI MWD Survey	
2,672.00	2,613.08	-507.15	-77.96	Last Survey in 14 3/4" Hole	
2,788.00	2,725.88	-533.37	-84.69	First Survey in 8 3/4" Hole	
9,051.00	8,917.21	-1,179.58	-209.15	Last SDI MWD Survey	
9,105.00	8,971.07	-1,182.14	-212.12	Projection to TD	
9,105.00	8,971.07	-1,182.14	-212.12	BHL = 627991.88 ft N, 1234735.96 ft E	

Checked By: _____ Approved By: _____ Date: _____