



**Scientific
Drilling**

Survey Certification

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

Operator	<u>OXY USA RMAT</u>
Well Name & No.	<u>Cascade Creek 697-08-31B</u>
County & State	<u>Garfield County, CO</u>
SDI Job No.	<u>42DEF10121385</u>
Rig	<u>H&P 330</u>
Survey Date	<u>28-Dec-10</u>

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 8940 feet is true and correct as determined from all available records.

Julie Cruse
Signature

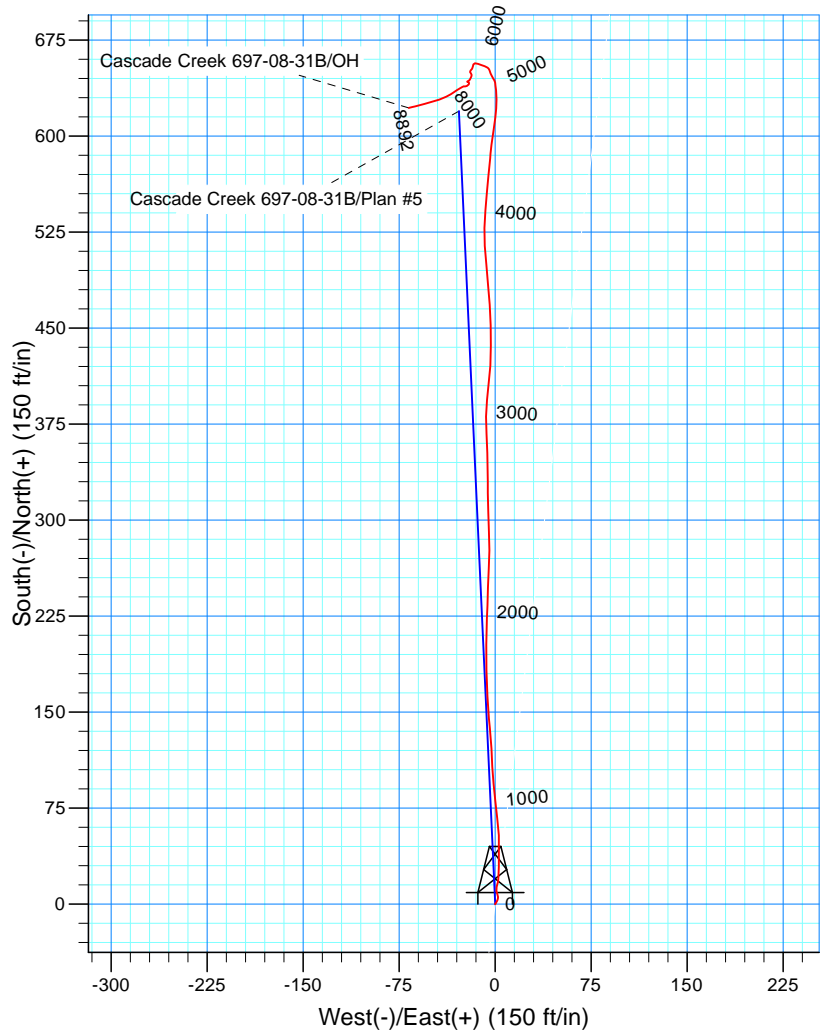
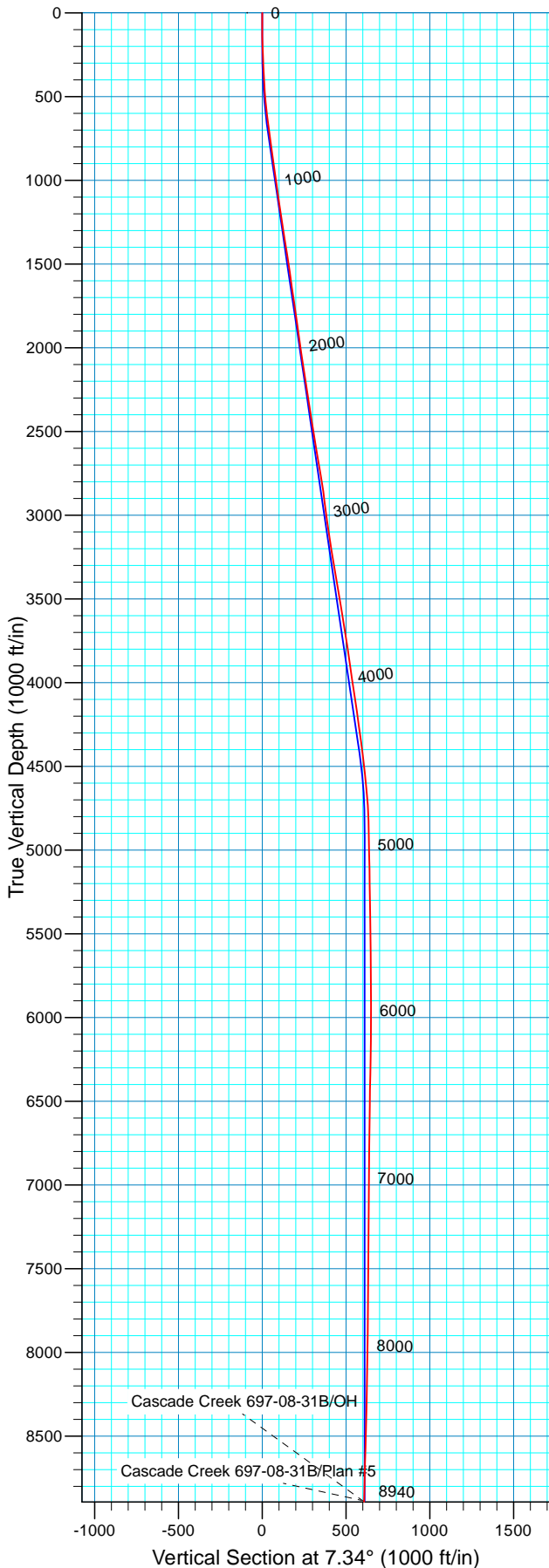
10-Feb-11
Date

Julie Cruse
Rockies Region Engineer
Scientific Drilling - Rocky Mountain District



Project: Garfield County, CO NAD27
Site: Cascade Creek 608-43-31 Pad
Well: Cascade Creek 697-08-31B
Wellbore: OH
Design: OH

OXY USA RMAT



WELL DETAILS: Cascade Creek 697-08-31B

Ground Level: GL 8479' & RKB 30' @ 8509.00ft (H&P)						
0.00	0.00	North	East	Lat	Long	H
		631797.68	1228166.38	39° 32' 10.254 N	108° 14' 13.054 W	

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Cascade Creek 697-08-31B - Slot H, True North
Vertical (TVD) Reference: GL 8479' & RKB 30' @ 8509.00ft (H&P)
Section (VS) Reference: Slot - H(0.00N, 0.00E)
Measured Depth Reference: GL 8479' & RKB 30' @ 8509.00ft (H&P)
Calculation Method: Minimum Curvature
Local North: True
Location: Sec 8 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 (Cascade Creek 697-08-31B/OH)

Created By: Julie Cruse Date: 2011-02-10



OXY USA RMAT

Garfield County, CO NAD27

Cascade Creek 608-43-31 Pad

Cascade Creek 697-08-31B - Slot H

OH

Design: OH

Standard Survey Report

10 February, 2011



Company:	OXY USA RMAT	Local Co-ordinate Reference:	Well Cascade Creek 697-08-31B - Slot H
Project:	Garfield County, CO NAD27	TVD Reference:	GL 8479' & RKB 30' @ 8509.00ft (H&P)
Site:	Cascade Creek 608-43-31 Pad	MD Reference:	GL 8479' & RKB 30' @ 8509.00ft (H&P)
Well:	Cascade Creek 697-08-31B	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 608-43-31 Pad, Sec 8 T6S R97W		
Site Position:		Northing:	39.54 usft
From:	Map	Easting:	-108.24 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in
		Latitude:	37° 37' 28.115 N
		Longitude:	112° 24' 37.715 W
		Grid Convergence:	-4.36 °

Well	Cascade Creek 697-08-31B - Slot H,		
Well Position	+N/-S	0.00 ft	Northing: 631,797.68 usft
	+E/-W	0.00 ft	Easting: 1,228,166.38 usft
Position Uncertainty	0.00 ft	Wellhead Elevation:	ft
		Latitude:	39° 32' 10.254 N
		Longitude:	108° 14' 13.054 W
		Ground Level:	8,479.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2005-10	2008-11-19	10.77	65.81	52,503

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	7.34	

Survey Program	Date	2011-02-10			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
73.00	534.00	Survey #1 - Surface Gyro (OH)	Standard Keeper 103	Standard Wireline Keeper ver 1.0.3	
618.00	2,657.00	Survey #2 - Surface MWD (OH)	MWD-SDI	MWD - Standard ISCWSA	
2,789.00	8,940.00	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	
73.00	0.19	151.04	73.00	-0.11	0.06	-0.10	0.26	0.26	0.00	
First SDI Gyro Survey										
104.00	0.41	9.93	104.00	-0.04	0.10	-0.03	1.84	0.71	-455.19	
135.00	1.08	28.36	135.00	0.32	0.26	0.36	2.27	2.16	59.45	
165.00	1.79	29.45	164.99	0.98	0.63	1.05	2.37	2.37	3.63	
196.00	2.24	32.00	195.97	1.92	1.18	2.05	1.48	1.45	8.23	
227.00	2.39	21.71	226.94	3.03	1.74	3.23	1.42	0.48	-33.19	
258.00	2.50	11.18	257.91	4.29	2.11	4.53	1.49	0.35	-33.97	

Company:	OXY USA RMAT	Local Co-ordinate Reference:	Well Cascade Creek 697-08-31B - Slot H
Project:	Garfield County, CO NAD27	TVD Reference:	GL 8479' & RKB 30' @ 8509.00ft (H&P)
Site:	Cascade Creek 608-43-31 Pad	MD Reference:	GL 8479' & RKB 30' @ 8509.00ft (H&P)
Well:	Cascade Creek 697-08-31B	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)
288.00	2.76	355.98	287.88	5.66	2.19	5.89	2.47	0.87	-50.67
319.00	2.86	346.41	318.85	7.15	1.96	7.34	1.55	0.32	-30.87
350.00	2.80	340.03	349.81	8.62	1.52	8.74	1.03	-0.19	-20.58
381.00	2.81	347.32	380.77	10.07	1.09	10.13	1.15	0.03	23.52
442.00	3.45	13.32	441.68	13.32	1.19	13.36	2.52	1.05	42.62
473.00	4.15	15.21	472.62	15.31	1.69	15.40	2.29	2.26	6.10
534.00	5.06	6.72	533.42	20.11	2.59	20.27	1.86	1.49	-13.92
Last SDI Gyro Survey									
618.00	7.59	357.47	616.90	29.33	2.78	29.44	3.24	3.01	-11.01
First SDI MWD Survey									
711.00	7.63	2.93	709.08	41.63	2.82	41.65	0.78	0.04	5.87
803.00	7.61	357.50	800.27	53.82	2.87	53.74	0.78	-0.02	-5.90
897.00	8.50	352.46	893.35	66.92	1.69	66.59	1.21	0.95	-5.36
989.00	8.63	354.99	984.32	80.54	0.19	79.90	0.43	0.14	2.75
1,084.00	7.91	352.86	1,078.33	94.13	-1.24	93.20	0.82	-0.76	-2.24
1,179.00	7.91	357.87	1,172.43	107.14	-2.30	105.97	0.73	0.00	5.27
1,273.00	9.67	357.78	1,265.32	121.50	-2.85	120.14	1.87	1.87	-0.10
1,368.00	9.58	353.91	1,358.99	137.33	-3.99	135.70	0.69	-0.09	-4.07
1,463.00	8.62	355.76	1,452.79	152.29	-5.36	150.36	1.06	-1.01	1.95
1,558.00	7.83	358.13	1,546.81	165.86	-6.10	163.72	0.90	-0.83	2.49
1,653.00	9.15	356.38	1,640.77	179.87	-6.78	177.53	1.42	1.39	-1.84
1,747.00	7.56	1.91	1,733.77	193.51	-7.05	191.02	1.89	-1.69	5.88
1,842.00	7.91	1.12	1,827.90	206.29	-6.71	203.74	0.39	0.37	-0.83
1,937.00	8.27	1.30	1,921.96	219.65	-6.43	217.04	0.38	0.38	0.19
2,031.00	8.44	1.91	2,014.96	233.31	-6.05	230.63	0.20	0.18	0.65
2,126.00	8.79	2.09	2,108.89	247.53	-5.55	244.79	0.37	0.37	0.19
2,221.00	8.62	2.88	2,202.79	261.89	-4.93	259.12	0.22	-0.18	0.83
2,316.00	8.88	0.68	2,296.69	276.34	-4.48	273.50	0.45	0.27	-2.32
2,410.00	9.23	357.34	2,389.52	291.12	-4.75	288.13	0.67	0.37	-3.55
2,505.00	9.23	357.96	2,483.29	306.35	-5.37	303.15	0.10	0.00	0.65
2,600.00	8.97	359.80	2,577.09	321.37	-5.67	318.01	0.41	-0.27	1.94
2,657.00	9.23	359.80	2,633.38	330.38	-5.70	326.95	0.46	0.46	0.00
Last Survey in 14 3/4" Hole									
2,789.00	9.99	357.94	2,763.52	352.41	-6.15	348.74	0.62	0.58	-1.41
First Survey in 8 3/4" Hole									
2,884.00	8.44	357.51	2,857.29	367.61	-6.75	363.74	1.63	-1.63	-0.45
2,979.00	7.74	0.59	2,951.35	380.97	-6.99	376.96	0.87	-0.74	3.24
3,073.00	7.74	5.95	3,044.49	393.60	-6.26	389.58	0.77	0.00	5.70
3,168.00	7.83	4.89	3,138.62	406.41	-5.05	402.44	0.18	0.09	-1.12
3,263.00	9.41	5.16	3,232.54	420.59	-3.80	416.66	1.66	1.66	0.28
3,358.00	9.67	358.83	3,326.23	436.30	-3.26	432.32	1.14	0.27	-6.66
3,452.00	9.67	359.71	3,418.89	452.09	-3.47	447.95	0.16	0.00	0.94
3,547.00	10.11	355.23	3,512.48	468.38	-4.20	464.01	0.93	0.46	-4.72
3,642.00	9.50	355.05	3,606.10	484.50	-5.57	479.82	0.64	-0.64	-0.19

Company:	OXY USA RMAT	Local Co-ordinate Reference:	Well Cascade Creek 697-08-31B - Slot H
Project:	Garfield County, CO NAD27	TVD Reference:	GL 8479' & RKB 30' @ 8509.00ft (H&P)
Site:	Cascade Creek 608-43-31 Pad	MD Reference:	GL 8479' & RKB 30' @ 8509.00ft (H&P)
Well:	Cascade Creek 697-08-31B	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)
3,736.00	9.15	355.23	3,698.85	499.68	-6.86	494.71	0.37	-0.37	0.19
3,831.00	8.53	355.23	3,792.72	514.23	-8.07	508.98	0.65	-0.65	0.00
3,926.00	8.35	1.99	3,886.70	528.14	-8.42	522.74	1.06	-0.19	7.12
4,021.00	8.27	4.98	3,980.70	541.84	-7.59	536.44	0.46	-0.08	3.15
4,115.00	8.44	4.63	4,073.70	555.45	-6.44	550.08	0.19	0.18	-0.37
4,210.00	8.27	5.16	4,167.69	569.21	-5.27	563.87	0.20	-0.18	0.56
4,305.00	8.09	6.56	4,261.73	582.65	-3.89	577.38	0.28	-0.19	1.47
4,399.00	7.47	6.48	4,354.86	595.29	-2.44	590.11	0.66	-0.66	-0.09
4,494.00	6.77	7.09	4,449.13	606.99	-1.06	601.88	0.74	-0.74	0.64
4,589.00	6.42	8.76	4,543.50	617.79	0.44	612.79	0.42	-0.37	1.76
4,684.00	5.45	359.45	4,637.99	627.55	1.21	622.57	1.44	-1.02	-9.80
4,779.00	3.69	352.06	4,732.69	635.09	0.74	629.99	1.95	-1.85	-7.78
4,873.00	1.49	357.07	4,826.59	639.31	0.26	634.11	2.35	-2.34	5.33
4,968.00	1.41	350.22	4,921.56	641.69	0.00	636.44	0.20	-0.08	-7.21
5,062.00	1.06	330.18	5,015.53	643.59	-0.63	638.24	0.59	-0.37	-21.32
5,157.00	1.23	327.89	5,110.52	645.21	-1.60	639.73	0.19	0.18	-2.41
5,251.00	1.32	333.34	5,204.49	647.04	-2.63	641.40	0.16	0.10	5.80
5,346.00	1.06	339.06	5,299.47	648.84	-3.43	643.08	0.30	-0.27	6.02
5,441.00	0.97	337.56	5,394.46	650.40	-4.05	644.56	0.10	-0.09	-1.58
5,535.00	0.88	344.15	5,488.44	651.83	-4.55	645.91	0.15	-0.10	7.01
5,630.00	1.23	307.59	5,583.43	653.15	-5.56	647.10	0.78	0.37	-38.48
5,725.00	1.14	297.48	5,678.41	654.21	-7.21	647.93	0.24	-0.09	-10.64
5,819.00	1.06	287.02	5,772.39	654.90	-8.87	648.40	0.23	-0.09	-11.13
5,914.00	1.32	289.84	5,867.37	655.53	-10.74	648.79	0.28	0.27	2.97
6,009.00	1.85	291.07	5,962.33	656.45	-13.20	649.39	0.56	0.56	1.29
6,104.00	1.32	266.02	6,057.30	656.92	-15.72	649.54	0.91	-0.56	-26.37
6,199.00	0.97	194.74	6,152.28	656.07	-17.02	648.53	1.44	-0.37	-75.03
6,293.00	1.06	190.17	6,246.27	654.44	-17.37	646.87	0.13	0.10	-4.86
6,388.00	1.23	212.67	6,341.25	652.72	-18.08	645.07	0.50	0.18	23.68
6,483.00	1.14	222.51	6,436.23	651.17	-19.27	643.37	0.23	-0.09	10.36
6,577.00	0.62	151.06	6,530.22	650.03	-19.65	642.20	1.18	-0.55	-76.01
6,672.00	0.88	140.69	6,625.21	649.02	-18.94	641.29	0.31	0.27	-10.92
6,766.00	0.79	169.43	6,719.20	647.82	-18.37	640.17	0.45	-0.10	30.57
6,861.00	0.88	206.16	6,814.19	646.52	-18.57	638.86	0.56	0.09	38.66
6,956.00	0.88	200.01	6,909.18	645.18	-19.14	637.46	0.10	0.00	-6.47
7,051.00	0.97	225.06	7,004.17	643.93	-19.96	636.11	0.43	0.09	26.37
7,145.00	0.88	245.72	7,098.16	643.07	-21.18	635.10	0.37	-0.10	21.98
7,240.00	0.26	196.41	7,193.15	642.56	-21.90	634.51	0.78	-0.65	-51.91
7,334.00	0.70	92.17	7,287.15	642.34	-21.39	634.35	0.86	0.47	-110.89
7,429.00	0.26	146.66	7,382.15	642.14	-20.69	634.24	0.62	-0.46	57.36
7,524.00	0.70	165.91	7,477.15	641.39	-20.43	633.53	0.49	0.46	20.26
7,619.00	0.70	214.25	7,572.14	640.35	-20.62	632.47	0.60	0.00	50.88
7,713.00	1.49	240.00	7,666.12	639.26	-22.00	631.22	0.97	0.84	27.39

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Site:	Cascade Creek 608-43-31 Pad	MD Reference:	GL 8479' & RKB 30' @ 8509.00ft (H&P)
Well:	Cascade Creek 697-08-31B	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)
7,808.00	0.62	275.07	7,761.11	638.69	-23.58	630.45	1.10	-0.92	36.92
7,902.00	0.53	285.88	7,855.10	638.86	-24.51	630.50	0.15	-0.10	11.50
7,997.00	1.06	235.70	7,950.09	638.48	-25.66	629.98	0.87	0.56	-52.82
8,092.00	1.32	235.34	8,045.07	637.36	-27.28	628.66	0.27	0.27	-0.38
8,187.00	2.20	243.69	8,140.03	635.93	-29.82	626.92	0.96	0.93	8.79
8,281.00	2.55	231.65	8,233.95	633.84	-33.07	624.42	0.65	0.37	-12.81
8,376.00	2.55	243.87	8,328.85	631.59	-36.63	621.75	0.57	0.00	12.86
8,471.00	2.64	249.06	8,423.75	629.88	-40.57	619.54	0.26	0.09	5.46
8,566.00	3.08	247.47	8,518.64	628.12	-44.97	617.24	0.47	0.46	-1.67
8,660.00	3.96	257.49	8,612.46	626.45	-50.47	614.88	1.14	0.94	10.66
8,755.00	3.96	252.57	8,707.23	624.76	-56.80	612.39	0.36	0.00	-5.18
8,850.00	3.43	258.90	8,802.03	623.23	-62.72	610.12	0.70	-0.56	6.66
8,882.00	3.08	257.14	8,833.98	622.85	-64.50	609.52	1.14	-1.09	-5.50
Last Survey in 8 3/4" Hole									
8,940.00	3.08	257.14	8,891.90	622.16	-67.54	608.44	0.00	0.00	0.00
Projection to TD - BHL = 632421.59 ft N, 1228117.62 ft E									

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
73.00	73.00	-0.11	0.06	First SDI Gyro Survey
534.00	533.42	20.11	2.59	Last SDI Gyro Survey
618.00	616.90	29.33	2.78	First SDI MWD Survey
2,657.00	2,633.38	330.38	-5.70	Last Survey in 14 3/4" Hole
2,789.00	2,763.52	352.41	-6.15	First Survey in 8 3/4" Hole
8,882.00	8,833.98	622.85	-64.50	Last Survey in 8 3/4" Hole
8,940.00	8,891.90	622.16	-67.54	Projection to TD
8,940.00	8,891.90	622.16	-67.54	BHL = 632421.59 ft N, 1228117.62 ft E

Checked By: _____	Approved By: _____	Date: _____
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