

# **OXY USA RMAT**

**Garfield County, CO NAD27**

**Cascade Creek 697-08-53 Pad**

**CC 697-08-41B - Slot L**

**OH**

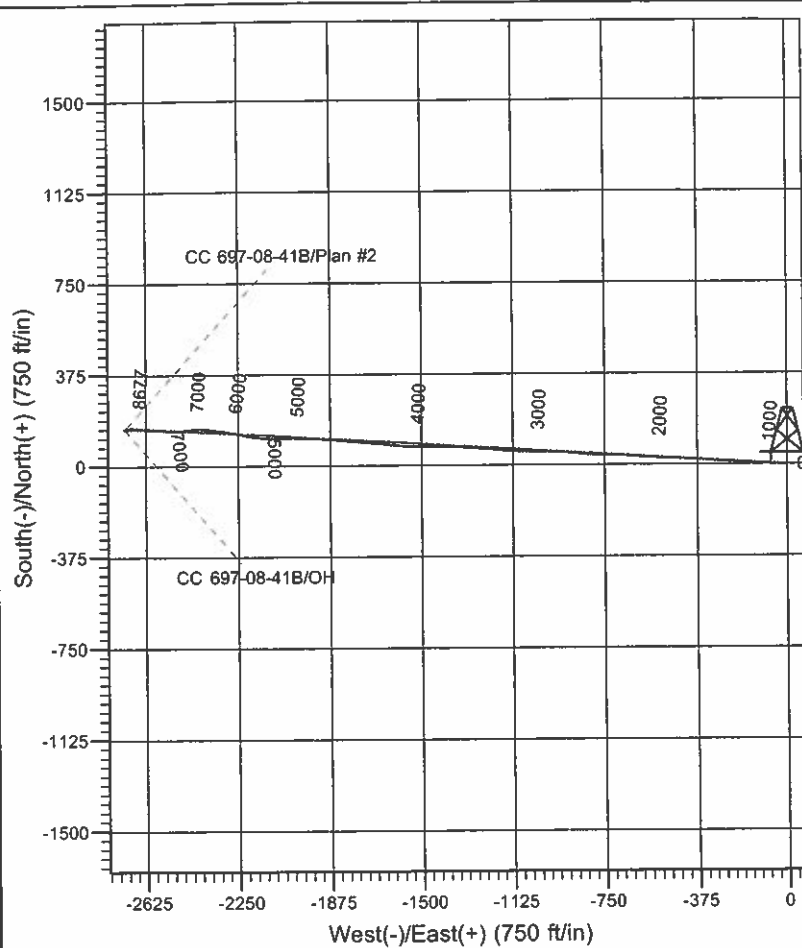
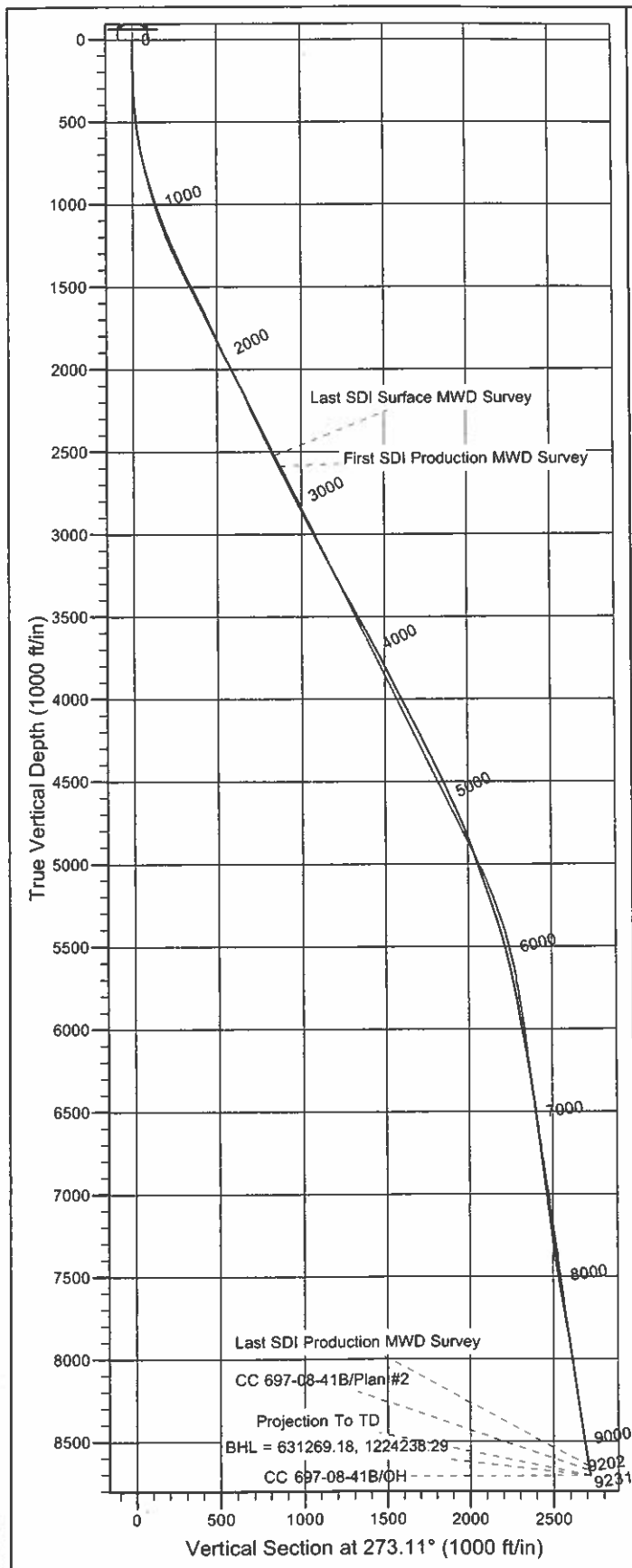
**Design: OH**

## **Standard Survey Report**

**01 December, 2011**



Company: OXY USA RMAT  
 Project: Garfield County, CO NAD27  
 Site: Cascade Creek 697-08-53 Pad  
 Well: CC 697-08-41B  
 Wellbore: OH  
 Design: OH



#### Well Details: CC 697-08-41B

TVD Reference: GL 8379' & RKB 30' @ 8409.00ft (H&P 330) Level: 8379.00		Slot				
+N/-S	+E/-W	North	East	Latitude	Longitude	Slot
0.00	0.00	631033.77	1226946.19	39° 32' 2.344 N	108° 14' 28.328 W	L

#### REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC 697-08-41B - Slot L, True North  
 Vertical (TVD) Reference: GL 8379' & RKB 30' @ 8409.00ft (H&P 330)  
 Section (VS) Reference: Slot - L(0.00N, 0.00E)  
 Measured Depth Reference: GL 8379' & RKB 30' @ 8409.00ft (H&P 330)  
 Calculation Method: Minimum Curvature

#### 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

System Datum: Mean Sea Level

Plan: OH

10:47, December 01 2011  
 Created By: Rex Hall

# Scientific Drilling International

## Survey Report

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 Site: Cascade Creek 697-08-53 Pad  
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 Wellbore: OH  
 Design: OH

Local Co-ordinate Reference: Well CC 697-08-41B - Slot L  
 TVD Reference: GL 8379' & RKB 30' @ 8409.00ft (H&P 330)  
 MD Reference: GL 8379' & RKB 30' @ 8409.00ft (H&P 330)  
 North Reference: True  
 Survey Calculation Method: Minimum Curvature  
 Database: Rockies Compass Server

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 697-08-53 Pad, Sec. 8 T6S R97W				
Site Position:		Northing:	630,837.78 usft	Latitude:	39° 32' 0.393 N
From:	Map	Easting:	1,226,897.42 usft	Longitude:	108° 14' 28.874 W
Position Uncertainty:	0.00 ft	Slot Radius:	0.000 in	Grid Convergence:	-1.73 °

Well	CC 697-08-41B - Slot L					
Well Position	+N/-S	0.00 ft	Northing:	631,033.77 usft	Latitude:	39° 32' 2.344 N
	+E/-W	0.00 ft	Easting:	1,226,946.19 usft	Longitude:	108° 14' 28.328 W
Position Uncertainty	0.00 ft	Wellhead Elevation:	ft	Ground Level:	8,379.00 ft	

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2005-10	2010/09/01	10.54	65.76	52,329

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	273.11	

Survey Program	Date	2011/12/01			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
154.00	2,694.00	Survey #1 - Surface MWD (OH)	MWD-SDI	MWD - Standard ISCWSA	
2,766.00	9,231.00	Survey #2 - Production MWD (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
154.00	0.90	283.69	153.99	0.29	-1.18	1.19	0.58	0.58	0.00
First SDI Surface MWD Survey									
243.00	1.22	263.48	242.98	0.34	-2.80	2.81	0.55	0.36	-22.71
332.00	2.66	273.67	331.93	0.37	-5.80	5.81	1.66	1.62	11.45
422.00	4.75	270.86	421.73	0.56	-11.61	11.62	2.33	2.32	-3.12
511.00	6.51	275.43	510.30	1.09	-20.32	20.35	2.04	1.98	5.13
602.00	9.32	269.01	600.43	1.45	-32.82	32.85	3.23	3.09	-7.05
694.00	12.31	271.21	690.78	1.53	-50.08	50.09	3.28	3.25	2.39
785.00	14.16	271.48	779.36	2.02	-70.91	70.91	2.03	2.03	0.30

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Wellbore: OH  
Design: OH

Local Co-ordinate Reference: Well CC 697-08-41B - Slot L  
TVD Reference: GL 8379' & RKB 30' @ 8409.00ft (H&P 330)  
MD Reference: GL 8379' & RKB 30' @ 8409.00ft (H&P 330)  
North Reference: True  
Survey Calculation Method: Minimum Curvature  
Database: Rockies Compass Server

### 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)
875.00	16.18	274.11	866.22	3.21	-94.42	94.46	2.37	2.24	2.92
965.00	17.76	273.15	952.30	4.86	-120.64	120.72	1.78	1.76	-1.07
1,060.00	19.17	272.44	1,042.41	6.32	-150.69	150.81	1.50	1.48	-0.75
1,155.00	21.28	274.90	1,131.55	8.46	-183.45	183.64	2.39	2.22	2.59
1,249.00	22.51	274.11	1,218.76	11.20	-218.40	218.68	1.35	1.31	-0.84
1,344.00	23.30	274.02	1,306.27	13.82	-255.28	255.65	0.83	0.83	-0.09
1,439.00	24.97	272.09	1,392.97	15.87	-294.06	294.49	1.94	1.76	-2.03
1,533.00	25.85	272.44	1,477.87	17.47	-334.36	334.82	0.95	0.94	0.37
1,628.00	26.64	273.58	1,563.08	19.68	-376.31	376.83	0.99	0.83	1.20
1,723.00	25.15	274.02	1,648.54	22.43	-417.71	418.31	1.58	-1.57	0.46
1,818.00	24.62	272.88	1,734.72	24.83	-457.61	458.28	0.75	-0.56	-1.20
1,912.00	24.97	272.09	1,820.05	26.54	-496.99	497.70	0.51	0.37	-0.84
2,007.00	25.15	273.32	1,906.11	28.44	-537.19	537.94	0.58	0.19	1.29
2,101.00	25.50	274.90	1,991.08	31.33	-577.29	578.14	0.81	0.37	1.68
2,196.00	27.35	274.82	2,076.15	34.91	-619.41	620.39	1.95	1.95	-0.08
2,291.00	23.65	272.27	2,161.88	37.50	-660.21	661.27	4.06	-3.89	-2.68
2,385.00	24.36	271.30	2,247.75	38.68	-698.43	699.50	0.86	0.76	-1.03
2,480.00	25.85	270.86	2,333.77	39.44	-738.73	739.78	1.58	1.57	-0.46
2,575.00	26.64	273.67	2,418.98	41.11	-780.70	781.78	1.55	0.83	2.96
2,694.00	26.29	275.34	2,525.51	45.27	-833.56	834.79	0.69	-0.29	1.40
Last SDI Surface MWD Survey									
2,766.00	24.89	275.50	2,590.45	48.21	-864.52	865.86	1.95	-1.94	0.22
First SDI Production MWD Survey									
2,861.00	26.56	274.44	2,676.03	51.77	-905.60	907.07	1.82	1.76	-1.12
2,956.00	27.52	272.95	2,760.65	54.54	-948.69	950.26	1.24	1.01	-1.57
3,051.00	26.82	270.31	2,845.17	55.79	-992.05	993.61	1.47	-0.74	-2.78
3,145.00	27.44	269.96	2,928.82	55.89	-1,034.91	1,036.42	0.68	0.66	-0.37
3,240.00	27.00	271.19	3,013.30	56.32	-1,078.36	1,079.83	0.75	-0.46	1.29
3,335.00	26.91	272.77	3,097.99	57.81	-1,121.39	1,122.88	0.76	-0.09	1.66
3,430.00	27.79	275.85	3,182.37	61.11	-1,164.90	1,166.50	1.75	0.93	3.24
3,524.00	27.70	275.76	3,265.56	65.53	-1,208.44	1,210.21	0.11	-0.10	-0.10
3,619.00	28.93	275.06	3,349.19	69.77	-1,253.29	1,255.23	1.34	1.29	-0.74
3,713.00	29.55	273.30	3,431.22	73.11	-1,299.08	1,301.14	1.13	0.66	-1.87
3,808.00	28.84	272.86	3,514.15	75.61	-1,345.36	1,347.48	0.78	-0.75	-0.46
3,903.00	28.23	271.19	3,597.61	77.22	-1,390.70	1,392.84	1.06	-0.64	-1.76
3,997.00	27.79	270.58	3,680.60	77.90	-1,434.84	1,436.96	0.56	-0.47	-0.65
4,092.00	27.35	269.96	3,764.81	78.11	-1,478.81	1,480.87	0.55	-0.46	-0.65
4,187.00	27.35	270.49	3,849.19	78.28	-1,522.45	1,524.46	0.26	0.00	0.56
4,281.00	27.08	272.95	3,932.79	79.57	-1,565.42	1,567.43	1.23	-0.29	2.62
4,376.00	27.00	275.94	4,017.41	82.91	-1,608.46	1,610.59	1.43	-0.08	3.15
4,471.00	27.35	276.29	4,101.92	87.53	-1,651.60	1,653.92	0.41	0.37	0.37
4,566.00	27.17	275.67	4,186.37	92.07	-1,694.88	1,697.38	0.35	-0.19	-0.65
4,661.00	26.29	275.32	4,271.22	96.16	-1,737.41	1,740.07	0.94	-0.93	-0.37

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4,755.00	26.29	275.59	4,355.49	100.12	-1,778.86	1,781.67	0.13	0.00	0.29
4,850.00	26.38	274.62	4,440.64	103.87	-1,820.83	1,823.78	0.46	0.09	-1.02
4,945.00	25.59	273.83	4,526.03	106.94	-1,862.34	1,865.40	0.91	-0.83	-0.83
5,039.00	24.45	273.30	4,611.21	109.41	-1,902.02	1,905.15	1.24	-1.21	-0.56
5,134.00	23.30	273.92	4,698.08	111.83	-1,940.39	1,943.60	1.24	-1.21	0.65
5,229.00	21.46	272.07	4,785.92	113.74	-1,976.50	1,979.76	2.07	-1.94	-1.95
5,323.00	19.79	271.19	4,873.89	114.69	-2,009.60	2,012.86	1.81	-1.78	-0.94
5,418.00	19.08	269.26	4,963.48	114.83	-2,041.21	2,044.43	1.01	-0.75	-2.03
5,513.00	18.91	269.35	5,053.31	114.45	-2,072.12	2,075.28	0.18	-0.18	0.09
5,608.00	19.35	267.94	5,143.06	113.71	-2,103.25	2,106.32	0.67	0.46	-1.48
5,702.00	19.08	272.07	5,231.83	113.71	-2,134.16	2,137.19	1.47	-0.29	4.39
5,797.00	18.11	277.70	5,321.88	116.25	-2,164.32	2,167.44	2.15	-1.02	5.93
5,892.00	16.36	281.56	5,412.61	120.91	-2,192.06	2,195.39	2.20	-1.84	4.06
5,987.00	14.68	279.72	5,504.14	125.62	-2,217.03	2,220.58	1.84	-1.77	-1.94
6,081.00	13.37	281.91	5,595.34	129.87	-2,239.41	2,243.16	1.50	-1.39	2.33
6,176.00	11.87	281.83	5,688.04	134.14	-2,259.72	2,263.67	1.58	-1.58	-0.08
6,270.00	10.90	279.01	5,780.19	137.52	-2,277.96	2,282.07	1.19	-1.03	-3.00
6,365.00	9.85	279.28	5,873.64	140.24	-2,294.85	2,299.08	1.11	-1.11	0.28
6,460.00	10.11	278.93	5,967.20	142.84	-2,311.11	2,315.45	0.28	0.27	-0.37
6,555.00	10.29	278.22	6,060.70	145.35	-2,327.74	2,332.20	0.23	0.19	-0.75
6,649.00	9.85	277.17	6,153.25	147.55	-2,344.03	2,348.58	0.51	-0.47	-1.12
6,744.00	8.97	276.90	6,246.97	149.46	-2,359.45	2,364.08	0.93	-0.93	-0.28
6,839.00	8.53	276.29	6,340.86	151.12	-2,373.80	2,378.50	0.47	-0.46	-0.64
6,933.00	7.65	275.94	6,433.93	152.53	-2,386.95	2,391.71	0.94	-0.94	-0.37
7,028.00	7.30	272.16	6,528.12	153.41	-2,399.27	2,404.06	0.64	-0.37	-3.98
7,123.00	7.30	270.05	6,622.35	153.64	-2,411.34	2,416.13	0.28	0.00	-2.22
7,217.00	7.30	265.39	6,715.59	153.17	-2,423.27	2,428.01	0.63	0.00	-4.96
7,312.00	7.30	264.42	6,809.82	152.10	-2,435.29	2,439.95	0.13	0.00	-1.02
7,407.00	7.56	262.93	6,904.02	150.74	-2,447.50	2,452.07	0.34	0.27	-1.57
7,502.00	7.56	261.35	6,998.20	149.03	-2,459.88	2,464.34	0.22	0.00	-1.66
7,596.00	7.83	259.33	7,091.35	146.92	-2,472.28	2,476.61	0.41	0.29	-2.15
7,691.00	7.03	258.80	7,185.55	144.59	-2,484.35	2,488.53	0.85	-0.84	-0.56
7,786.00	6.95	265.65	7,279.85	143.02	-2,495.78	2,499.86	0.88	-0.08	7.21
7,880.00	8.35	273.92	7,373.01	143.06	-2,508.26	2,512.33	1.89	1.49	8.80
7,975.00	9.23	278.13	7,466.90	144.61	-2,522.69	2,526.82	1.15	0.93	4.43
8,070.00	9.58	277.78	7,560.62	146.76	-2,538.06	2,542.28	0.37	0.37	-0.37
8,164.00	9.58	275.23	7,653.31	148.53	-2,553.60	2,557.90	0.45	0.00	-2.71
8,259.00	9.76	274.27	7,746.96	149.85	-2,569.50	2,573.85	0.25	0.19	-1.01
8,354.00	9.50	273.30	7,840.62	150.90	-2,585.36	2,589.74	0.32	-0.27	-1.02
8,448.00	8.27	272.86	7,933.49	151.68	-2,599.86	2,604.26	1.31	-1.31	-0.47
8,543.00	7.74	270.75	8,027.56	152.11	-2,613.08	2,617.48	0.64	-0.56	-2.22
8,638.00	8.00	270.75	8,121.67	152.28	-2,626.08	2,630.48	0.27	0.27	0.00
8,732.00	8.09	270.05	8,214.74	152.37	-2,639.24	2,643.62	0.14	0.10	-0.74
8,827.00	8.44	269.79	8,308.76	152.35	-2,652.89	2,657.25	0.37	0.37	-0.27

# Scientific Drilling International

## Survey Report

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**Project:** Garfield County, CO NAD27  
**Site:** Cascade Creek 697-08-53 Pad  
**Well:** CC 697-08-41B  
**Wellbore:** OH  
**Design:** OH

**Local Co-ordinate Reference:** Well CC 697-08-41B - Slot L  
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**MD Reference:** GL 8379' & RKB 30' @ 8409.00ft (H&P 330)  
**North Reference:** True  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Rockies Compass Server

### 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)
8,921.00	8.44	272.33	8,401.74	152.60	-2,666.69	2,671.04	0.40	0.00	2.70
9,016.00	9.06	269.70	8,495.63	152.85	-2,681.13	2,685.47	0.78	0.65	-2.77
9,111.00	9.06	271.37	8,589.45	152.99	-2,696.09	2,700.42	0.28	0.00	1.76
9,175.00	8.27	272.25	8,652.72	153.29	-2,705.73	2,710.06	1.25	-1.23	1.38
<b>Last SDI Production MWD Survey</b>									
9,231.00	8.27	272.25	8,708.14	153.61	-2,713.77	2,718.11	0.00	0.00	0.00
<b>BHL = 631269.18, 1224238.29 - Projection To TD</b>									

### Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
2,694.00	2,525.51	45.27	-833.56	Last SDI Surface MWD Survey
2,766.00	2,590.45	48.21	-864.52	First SDI Production MWD Survey
9,175.00	8,652.72	153.29	-2,705.73	Last SDI Production MWD Survey
9,231.00	8,708.14	153.61	-2,713.77	BHL = 631269.18, 1224238.29
9,231.00	8,708.14	153.61	-2,713.77	Projection To TD

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