

3001542661

EMKEY COMPANIES

North Seven Rivers (NAD27)
Eddy County, NM (Grid North)
Stiletto "16" State #8H
VH - Job #321114-KW-1380

Survey: Gyro

Regulatory Survey Report (Grid Nort

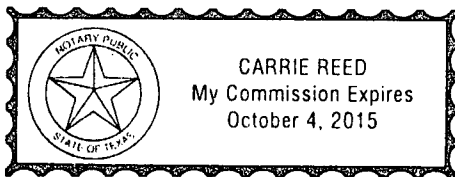
This survey is correct to the best of my knowledge and is supported by actual field data.

Jamie Northman

Notarized this date 31st of December, 2014.

Carrie Reed

Notary Signature
County of Midland
State of Texas



Regulatory Survey Report (Grid North)

Company:	EMKEY COMPANIES	Local Co-ordinate Reference:	Well Stiletto "16" State #8H
Project:	North Seven Rivers (NAD27)	TVD Reference:	Mean Sea Level (System)
Site:	Eddy County NM (Grid North)	MD Reference:	Mean Sea Level (System)
Well:	Stiletto "16" State #8H	North Reference:	Grid
Wellbore:	VH - Job #321114-KW-1380	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #321114-KW-1380	Database:	MID - Regulatory

Project:	North Seven Rivers (NAD27)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site: Eddy County, NM (Grid North)					
Site Position:		Northing:	574,701.86 usft	Latitude:	32° 34' 47.480 N
From:	Lat/Long	Easting:	449,683.60 usft	Longitude:	104° 29' 48.060 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	-0.09 °

Well:	Stiletto "16", State #8H, Horizontal					
Well Position	+N/-S	0.0 usft	Northing:	574,701.86 usft	Latitude:	32° 34' 47.480 N
	+E/-W	0.0 usft	Easting:	449,683.60 usft	Longitude:	104° 29' 48.060 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	0.0 usft

Wellbore:	VH - Job #321114-KW-1380				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2014	11/26/2014	7.79	60.26	48,353

Design: VH - Job #321114-KW-1380				
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	18.34

Survey Program	Date	12/16/2014		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	870.0	Gyro (VH - Job #321114-KW-1380)	Keeper	Keeper Gyro

MD (usft)	Inc (°)	Azi (grid north-azim)	TVD (usft)	N/S (usft)	E/W (usft)	Closure Azimuth (°)	Closure Distance (usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.0
100.0	1.65	103.49	100.0	-0.3	1.4	103.49	1.4
150.0	0.76	71.50	150.0	-0.4	2.4	99.37	2.4
200.0	0.88	350.03	200.0	0.1	2.7	88.18	2.7
250.0	0.58	346.89	250.0	0.7	2.5	74.39	2.6
300.0	0.62	359.64	300.0	1.2	2.5	63.68	2.8
350.0	0.70	350.89	350.0	1.8	2.4	53.49	3.0
400.0	0.97	4.35	400.0	2.5	2.4	43.74	3.5
450.0	0.81	354.28	449.9	3.3	2.4	36.18	4.1
500.0	0.73	2.50	499.9	4.0	2.4	31.06	4.6
550.0	0.74	1.89	549.9	4.6	2.4	27.65	5.2
600.0	0.60	15.47	599.9	5.2	2.5	25.70	5.8

Regulatory Survey Report (Grid North)

Company:	EMKEY COMPANIES	Local Co-ordinate Reference:	Well Stiletto "16" State #8H
Project:	North Seven Rivers (NAD27)	TVD Reference:	Mean Sea Level (System)
Site:	Eddy County, NM (Grid North)	MD Reference:	Mean Sea Level (System)
Well:	Stiletto "16" State #8H	North Reference:	Grid
Wellbore:	VH - Job #321114-KW-1380	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #321114-KW-1380	Database:	MID_Regulatory

Survey								
MD (usft)	Inc (°)	Azi (grid_north_azim)	TVD (usft)	N/S (usft)	E/W (usft)	Closure Azimuth (°)	Closure Distance (usft)	
650.0	0.61	6.59	649.9	5.7	2.6	24.48	6.3	
700.0	0.37	5.24	699.9	6.1	2.6	23.32	6.7	
750.0	0.34	10.53	749.9	6.4	2.7	22.64	7.0	
800.0	0.47	7.95	799.9	6.8	2.7	21.98	7.3	
850.0	0.61	322.85	849.9	7.2	2.6	19.90	7.7	
870.0	0.76	315.49	869.9	7.4	2.4	18.36	7.8	



Scientific Drilling

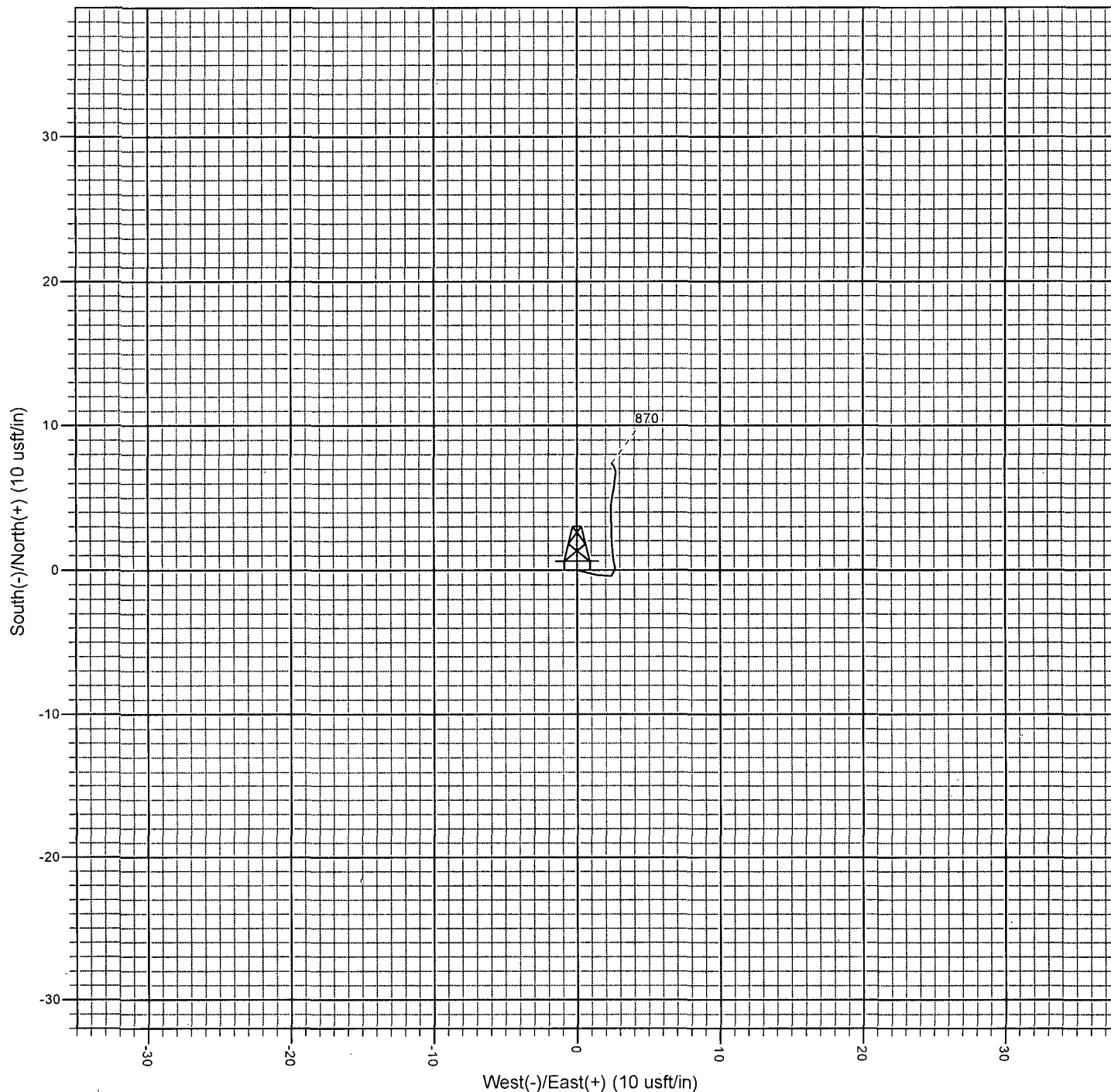
Project: North Seven Rivers (NAD27)
Eddy County, NM (Grid North)
Well: Stiletto "16" State #8H
Wellbore: VH - Job #321114-KW-1380
Design: VH - Job #321114-KW-1380

WELL DETAILS: Stiletto "16" State #8H

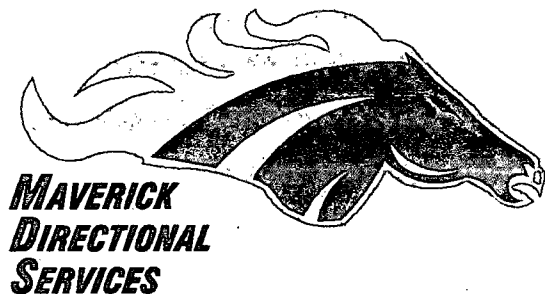
Mean Sea Level (System)

Ground Level: 0.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	574701.86	449683.60	32° 34' 47.480 N	104° 29' 48.060 W	



PROJECT DETAILS:	North Seven Rivers (NAD27)	SITE DETAILS:	Eddy County, NM (Grid North)
Geodetic System:	US State Plane 1927 (Exact solution)	Site Centre Latitude:	32° 34' 47.480 N
Datum:	NAD 1927 (NADCON CONUS)	Longitude:	104° 29' 48.060 W
Ellipsoid:	Clarke 1866	Positional Uncertainty:	0.0
Zone:	New Mexico East 3001	Convergence:	-0.09
System Datum:	Mean Sea Level	Local North:	Grid



Job Number: NML 1114- H1289

Company: Emkey Companies

Lease/Well: Stiletto 16- 8H

Location: Eddy County, NM

Rig Name: United Drilling 29

RKB: 29'

G.L. or M.S.L.: 3463'

State/Country: NM- USA

Declination: 7.66

Grid: 0.27= 7.39 East

File name: C:\WINSERVE\ST1168HB.SVY

Date/Time: 10-Dec-14 / 04:34

Curve Name: As Drilled

Maverick Directional Service's

WINSERVE SURVEY CALCULATIONS
Minimum Curvature Method
Vertical Section Plane 179.37
Vertical Section Referenced to Wellhead
Rectangular Coordinates Referenced to Wellhead

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Vertical Section FT	N-S FT	E-W FT	CLOSURE		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
100.00	1.65	103.49	99.99	.36	-.34	1.40	1.44	103.65	.00
150.00	.76	71.50	149.98	.43	-.40	2.41	2.45	99.47	2.17
200.00	.88	350.03	199.98	-.05	.08	2.66	2.66	88.26	2.15
250.00	.58	346.89	249.97	-.68	.71	2.54	2.63	74.47	.61
300.00	.62	359.64	299.97	-1.19	1.22	2.48	2.76	63.76	.28
350.00	.70	350.89	349.97	-1.77	1.79	2.43	3.02	53.55	.26
400.00	.97	4.35	399.96	-2.49	2.52	2.41	3.49	43.78	.66
450.00	.81	354.28	449.95	-3.26	3.29	2.41	4.08	36.21	.45
500.00	.73	2.50	499.95	-3.93	3.96	2.39	4.63	31.09	.27
550.00	.74	1.89	549.95	-4.58	4.60	2.41	5.20	27.67	.03
600.00	.60	15.47	599.94	-5.15	5.18	2.49	5.75	25.72	.42
650.00	.61	6.59	649.94	-5.67	5.69	2.59	6.26	24.49	.19
700.00	.37	5.24	699.94	-6.09	6.12	2.64	6.66	23.33	.48

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Vertical Section FT	N-S FT	E-W FT	CLOSURE		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
750.00	.34	10.53	749.94	-6.40	6.43	2.68	6.96	22.65	.09
800.00	.47	7.95	799.93	-6.74	6.77	2.74	7.31	22.00	.26
850.00	.61	322.85	849.93	-7.16	7.19	2.60	7.65	19.91	.87
Last Scientific Gyro Survey									
870.00	.76	315.49	869.93	-7.34	7.37	2.45	7.77	18.37	.87
Vision									
1048.00	1.00	307.60	1047.91	-9.15	9.16	.39	9.17	2.43	.15
1237.00	.90	305.90	1236.88	-11.06	11.04	-2.12	11.24	349.12	.05
1428.00	1.10	307.00	1427.86	-13.07	13.02	-4.80	13.88	339.76	.11
1618.00	1.20	306.50	1617.82	-15.39	15.30	-7.86	17.20	332.82	.05
1808.00	1.00	314.30	1807.78	-17.76	17.64	-10.64	20.60	328.90	.13
1974.00	.80	307.60	1973.76	-19.50	19.36	-12.60	23.10	326.95	.14
2132.00	1.10	320.40	2131.74	-21.36	21.20	-14.44	25.65	325.75	.23
2195.00	1.10	177.60	2194.74	-21.22	21.06	-14.80	25.74	324.91	3.31
2227.00	4.30	168.00	2226.70	-19.74	19.58	-14.53	24.39	323.42	10.06
2259.00	7.60	165.00	2258.52	-16.51	16.36	-13.74	21.37	319.99	10.35
2290.00	10.90	169.30	2289.11	-11.64	11.50	-12.66	17.11	312.25	10.87
2322.00	14.50	172.60	2320.32	-4.68	4.55	-11.58	12.45	291.46	11.47
2354.00	18.10	173.20	2351.03	4.24	-4.36	-10.48	11.35	247.42	11.26
2385.00	22.00	173.00	2380.15	14.80	-14.91	-9.20	17.52	211.69	12.58
2417.00	25.90	173.60	2409.39	27.72	-27.81	-7.69	28.85	195.46	12.21
2449.00	29.70	175.50	2437.69	42.59	-42.66	-6.29	43.12	188.39	12.19
2481.00	33.30	177.20	2464.97	59.28	-59.34	-5.24	59.57	185.04	11.59
2512.00	36.30	178.80	2490.42	76.96	-77.02	-4.63	77.16	183.44	10.12
2544.00	39.00	179.30	2515.76	96.51	-96.56	-4.31	96.66	182.55	8.49
2576.00	41.80	178.40	2540.12	117.25	-117.30	-3.89	117.36	181.90	8.94
2607.00	44.80	178.00	2562.68	138.50	-138.54	-3.22	138.58	181.33	9.72
2639.00	47.60	178.70	2584.83	161.59	-161.63	-2.56	161.65	180.91	8.89
2671.00	50.20	179.50	2605.86	185.70	-185.74	-2.18	185.75	180.67	8.34
2702.00	52.90	179.50	2625.14	209.98	-210.01	-1.97	210.02	180.54	8.71
2734.00	55.40	179.40	2643.88	235.91	-235.94	-1.72	235.95	180.42	7.82
2766.00	58.60	178.70	2661.30	262.74	-262.77	-1.27	262.78	180.28	10.17

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Vertical Section FT	N-S FT	E-W FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
2798.00	61.60	179.40	2677.25	290.48	-290.51	-.81	290.51	180.16	9.56
2829.00	64.20	180.00	2691.38	318.07	-318.10	-.67	318.10	180.12	8.56
2861.00	67.00	180.50	2704.59	347.21	-347.24	-.80	347.24	180.13	8.86
2893.00	69.60	180.10	2716.42	376.94	-376.97	-.95	376.97	180.15	8.21
2924.00	72.30	179.70	2726.54	406.23	-406.27	-.90	406.27	180.13	8.79
2956.00	75.10	179.10	2735.52	436.94	-436.98	-.58	436.98	180.08	8.93
2988.00	78.00	178.80	2742.96	468.06	-468.09	-.01	468.09	180.00	9.11
3019.00	80.80	179.10	2748.67	498.53	-498.55	.55	498.55	179.94	9.08
3051.00	83.20	179.30	2753.12	530.22	-530.24	.99	530.24	179.89	7.53
3083.00	85.60	179.70	2756.24	562.06	-562.08	1.27	562.08	179.87	7.60
3115.00	86.40	180.00	2758.47	593.98	-594.00	1.35	594.00	179.87	2.67
3146.00	86.70	179.70	2760.34	624.92	-624.95	1.43	624.95	179.87	1.37
3178.00	86.70	179.70	2762.18	656.87	-656.89	1.60	656.89	179.86	.00
3210.00	88.20	179.20	2763.61	688.84	-688.86	1.91	688.86	179.84	4.94
3242.00	88.80	179.00	2764.44	720.83	-720.84	2.41	720.85	179.81	1.98
3305.00	89.10	179.10	2765.60	783.81	-783.82	3.45	783.83	179.75	.50
3368.00	88.60	179.20	2766.86	846.80	-846.80	4.39	846.82	179.70	.81
3432.00	88.70	179.30	2768.37	910.78	-910.78	5.23	910.80	179.67	.22
3494.00	89.10	178.10	2769.56	972.77	-972.75	6.63	972.77	179.61	2.04
3589.00	90.70	179.10	2769.73	1067.75	-1067.72	8.95	1067.76	179.52	1.99
3684.00	89.50	179.30	2769.56	1162.75	-1162.71	10.28	1162.75	179.49	1.28
3779.00	87.90	179.40	2771.72	1257.72	-1257.67	11.36	1257.73	179.48	1.69
3874.00	87.60	178.90	2775.45	1352.65	-1352.59	12.77	1352.65	179.46	.61
3969.00	88.00	178.50	2779.09	1447.57	-1447.50	14.92	1447.57	179.41	.60
4065.00	89.10	178.90	2781.52	1543.53	-1543.44	17.10	1543.53	179.37	1.22
4160.00	89.70	178.70	2782.52	1638.52	-1638.41	19.09	1638.52	179.33	.67
4255.00	87.80	177.80	2784.59	1733.48	-1733.34	21.99	1733.48	179.27	2.21
4350.00	88.30	177.70	2787.82	1828.38	-1828.21	25.71	1828.39	179.19	.54
4445.00	89.10	178.20	2789.98	1923.33	-1923.13	29.11	1923.35	179.13	.99
4540.00	88.00	177.50	2792.38	2018.26	-2018.03	32.67	2018.29	179.07	1.37
4635.00	87.70	176.20	2795.94	2113.10	-2112.81	37.89	2113.15	178.97	1.40
4730.00	87.40	176.90	2800.01	2207.90	-2207.55	43.60	2207.98	178.87	.80
4826.00	87.60	177.80	2804.19	2303.75	-2303.36	48.04	2303.86	178.81	.96

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Vertical Section FT	N-S FT	E-W FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
4912.00	88.20	178.20	2807.34	2389.66	-2389.25	51.03	2389.79	178.78	.84
5007.00	89.00	178.40	2809.67	2484.62	-2484.18	53.85	2484.76	178.76	.87
5103.00	90.10	178.90	2810.42	2580.61	-2580.15	56.11	2580.76	178.75	1.26
5198.00	89.90	180.70	2810.42	2675.60	-2675.14	56.45	2675.74	178.79	1.91
5293.00	90.50	180.30	2810.09	2770.58	-2770.14	55.62	2770.69	178.85	.76
5388.00	88.20	180.10	2811.17	2865.56	-2865.12	55.28	2865.66	178.89	2.43
5483.00	89.00	180.40	2813.49	2960.52	-2960.09	54.87	2960.60	178.94	.90
5579.00	89.40	180.20	2814.83	3056.50	-3056.08	54.37	3056.57	178.98	.47
5674.00	88.90	179.00	2816.24	3151.48	-3151.07	55.03	3151.55	179.00	1.37
5769.00	89.20	178.00	2817.81	3246.46	-3246.02	57.52	3246.53	178.98	1.10
5864.00	88.70	179.20	2819.55	3341.43	-3340.97	59.84	3341.51	178.97	1.37
5959.00	88.70	180.20	2821.71	3436.40	-3435.95	60.34	3436.48	178.99	1.05
6054.00	89.60	179.70	2823.12	3531.39	-3530.94	60.42	3531.45	179.02	1.08
6149.00	87.80	179.70	2825.27	3626.36	-3625.91	60.92	3626.42	179.04	1.89
6244.00	88.60	179.60	2828.26	3721.31	-3720.86	61.50	3721.36	179.05	.85
6339.00	87.50	180.60	2831.49	3816.24	-3815.80	61.33	3816.29	179.08	1.56
6434.00	87.80	180.10	2835.38	3911.15	-3910.72	60.75	3911.19	179.11	.61
6529.00	87.70	179.90	2839.11	4006.07	-4005.64	60.75	4006.10	179.13	.24
6624.00	88.30	180.00	2842.43	4101.01	-4100.58	60.83	4101.04	179.15	.64
6719.00	88.70	180.60	2844.92	4195.96	-4195.55	60.34	4195.98	179.18	.76
6814.00	88.60	181.00	2847.15	4290.90	-4290.51	59.01	4290.92	179.21	.43
6909.00	88.60	180.90	2849.48	4385.84	-4385.47	57.44	4385.85	179.25	.11
7005.00	88.60	180.70	2851.82	4481.78	-4481.43	56.10	4481.79	179.28	.21
7082.00	89.10	180.30	2853.37	4558.75	-4558.42	55.42	4558.75	179.30	.83
PBHL TD- OTL/4' Left									
7137.00	89.10	180.30	2854.23	4613.74	-4613.41	55.14	4613.74	179.32	.00