

US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

WELD_HOWARD 17-32 PAD

Howard 26-32

Howard 26-32

Plan: Howard 26-32 (wp03)

Standard Planning Report

12 May, 2011



Project: COLORADO NORTHERN ZONE - 83
 Site: WELD_HOWARD 17-32 PAD
 Well: Howard 26-32
 Wellbore: Howard 26-32
 Section:
 SHL:
 Design: Howard 26-32 (wp03)
 Latitude: 40.010453
 Longitude: -104.910552
 GL: 5047.00
 KB: 15' RKB + 5047' GL @ 5062.00ft

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
3912.00	4137.96	PK Depth
4879.00	5181.49	SX Depth
7387.00	7797.46	NIO Depth
7820.00	8230.46	CD Depth
7898.00	8308.46	GH Depth
8250.00	8660.46	J Depth



Azimuths to True North
 Magnetic North: 8.92°

Magnetic Field
 Strength: 52918.9snT
 Dip Angle: 66.71°
 Date: 5/9/2011
 Model: IGRF2010

WELL DETAILS: Howard 26-32

+N/-S	+E/-W	Northing	Ground Level: Easting	5047.00 Latitude	Longitude	Slot
0.00	0.00	1247203.34	3165109.45	40.010453	-104.910552	

CASING DETAILS

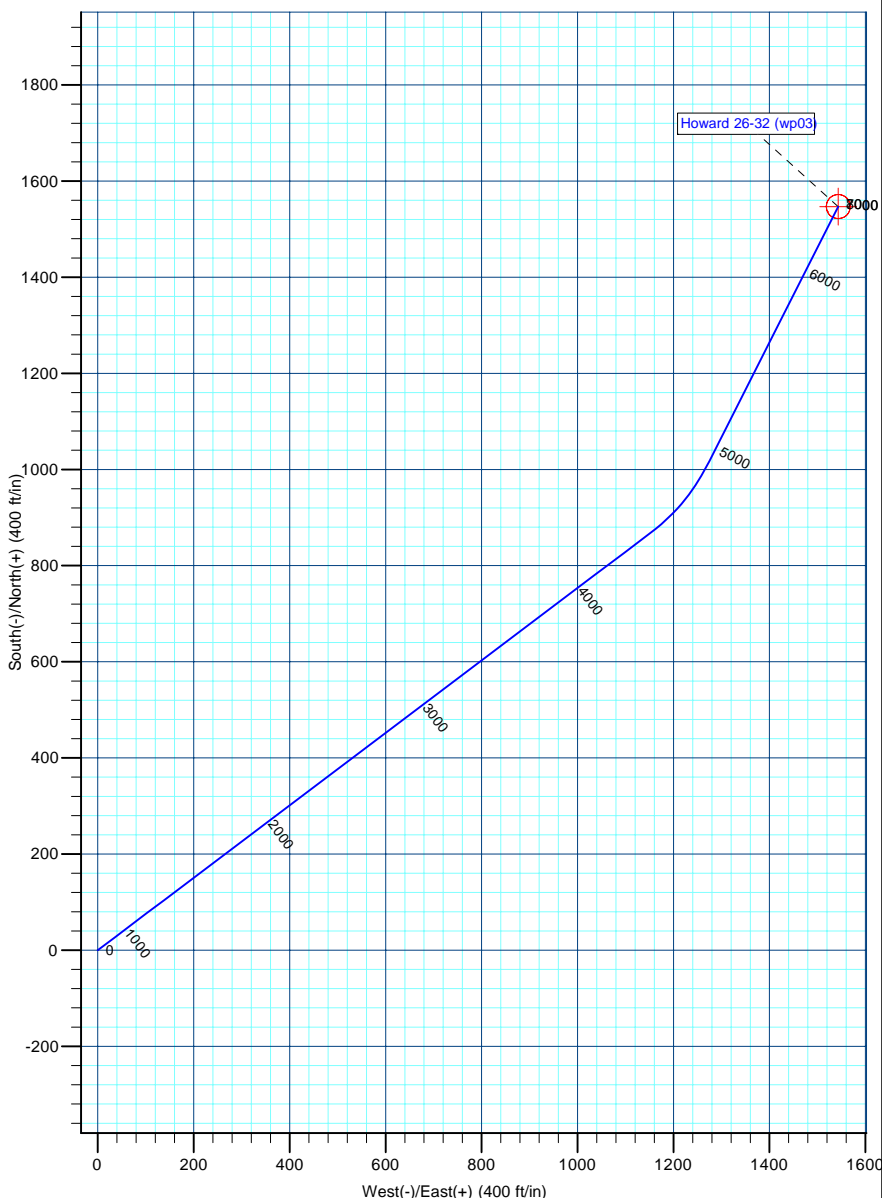
TVD	MD	Name	Size
1150.00	1162.87	8 5/8"	8-5/8

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Howard 26-32 BHL	8385.00	1547.13	1543.59	1248760.70	3166642.72	40.014700	-104.905041	Circle (Radius: 25.00)

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00
1405.00	22.00	53.00	1378.05	126.11	167.35	1.99	53.00	207.48
4700.00	22.00	53.00	4433.12	868.95	1153.13	0.00	0.00	1429.60
5199.60	23.11	26.91	4895.66	1013.05	1272.54	2.00	-95.88	1615.94
6140.11	23.11	26.91	5760.72	1342.19	1439.58	0.00	0.00	1966.93
7295.46	0.00	0.38	6885.00	1547.13	1543.59	2.00	180.00	2185.48
8795.46	0.00	0.38	8385.00	1547.13	1543.59	0.00	0.00	2185.48



Database:	edm5000p	Local Co-ordinate Reference:	Well Howard 26-32
Company:	US ROCKIES REGION PLANNING	TVD Reference:	15' RKB + 5047' GL @ 5062.00ft
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	15' RKB + 5047' GL @ 5062.00ft
Site:	WELD_HOWARD 17-32 PAD	North Reference:	True
Well:	Howard 26-32	Survey Calculation Method:	Minimum Curvature
Wellbore:	Howard 26-32		
Design:	Howard 26-32 (wp03)		

Project	COLORADO NORTHERN ZONE - 83		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site		WELD_HOWARD 17-32 PAD			
Site Position:		Northing:	1,247,203.06 ft	Latitude:	40.010452
From:	Lat/Long	Easting:	3,165,119.53 ft	Longitude:	-104.910516
Position Uncertainty:	0.00 ft	Slot Radius:	0 "	Grid Convergence:	0.38

Well	Howard 26-32					
Well Position	+N-S	0.35 ft	Northing:	1,247,203.34 ft	Latitude:	40.010453
	+E-W	-10.08 ft	Easting:	3,165,109.45 ft	Longitude:	-104.910552
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	5,047.00 ft

Wellbore	Howard 26-32				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	5/9/2011	8.92	66.71	52,919

Design	Howard 26-32 (wp03)			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	44.93

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,405.00	22.00	53.00	1,378.05	126.11	167.35	1.99	1.99	0.00	53.00	
4,700.00	22.00	53.00	4,433.12	868.95	1,153.13	0.00	0.00	0.00	0.00	
5,199.60	23.11	26.91	4,895.66	1,013.05	1,272.54	2.00	0.22	-5.22	-95.88	
6,140.11	23.11	26.91	5,760.72	1,342.19	1,439.58	0.00	0.00	0.00	0.00	
7,295.46	0.00	0.38	6,885.00	1,547.13	1,543.59	2.00	-2.00	0.00	180.00	
8,795.46	0.00	0.38	8,385.00	1,547.13	1,543.59	0.00	0.00	0.00	0.00	Howard 26-32 BHL

Database:	edm5000p	Local Co-ordinate Reference:	Well Howard 26-32
Company:	US ROCKIES REGION PLANNING	TVD Reference:	15' RKB + 5047' GL @ 5062.00ft
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	15' RKB + 5047' GL @ 5062.00ft
Site:	WELD_HOWARD 17-32 PAD	North Reference:	True
Well:	Howard 26-32	Survey Calculation Method:	Minimum Curvature
Wellbore:	Howard 26-32		
Design:	Howard 26-32 (wp03)		

Planned 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
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 1.99									
400.00	1.99	53.00	399.98	1.05	1.39	1.72	1.99	1.99	0.00
500.00	3.98	53.00	499.84	4.18	5.55	6.88	1.99	1.99	0.00
600.00	5.97	53.00	599.46	9.40	12.48	15.47	1.99	1.99	0.00
700.00	7.96	53.00	698.71	16.70	22.17	27.48	1.99	1.99	0.00
800.00	9.95	53.00	797.49	26.07	34.60	42.90	1.99	1.99	0.00
900.00	11.95	53.00	895.66	37.51	49.77	61.70	1.99	1.99	0.00
1,000.00	13.94	53.00	993.12	50.98	67.66	83.88	1.99	1.99	0.00
1,100.00	15.93	53.00	1,089.74	66.49	88.23	109.39	1.99	1.99	0.00
1,162.87	17.18	53.00	1,150.00	77.27	102.54	127.12	1.99	1.99	0.00
8 5/8"									
1,200.00	17.92	53.00	1,185.40	84.01	111.48	138.21	1.99	1.99	0.00
1,300.00	19.91	53.00	1,280.00	103.51	137.37	170.30	1.99	1.99	0.00
1,400.00	21.90	53.00	1,373.41	124.99	165.86	205.63	1.99	1.99	0.00
1,405.00	22.00	53.00	1,378.05	126.11	167.35	207.48	1.99	1.99	0.00
Start 3295.00 hold at 1405.00 MD									
1,500.00	22.00	53.00	1,466.13	147.53	195.78	242.71	0.00	0.00	0.00
1,600.00	22.00	53.00	1,558.85	170.07	225.69	279.80	0.00	0.00	0.00
1,700.00	22.00	53.00	1,651.57	192.62	255.61	316.89	0.00	0.00	0.00
1,800.00	22.00	53.00	1,744.28	215.16	285.53	353.98	0.00	0.00	0.00
1,900.00	22.00	53.00	1,837.00	237.71	315.45	391.07	0.00	0.00	0.00
2,000.00	22.00	53.00	1,929.72	260.25	345.36	428.16	0.00	0.00	0.00
2,100.00	22.00	53.00	2,022.44	282.79	375.28	465.25	0.00	0.00	0.00
2,200.00	22.00	53.00	2,115.16	305.34	405.20	502.34	0.00	0.00	0.00
2,300.00	22.00	53.00	2,207.88	327.88	435.12	539.43	0.00	0.00	0.00
2,400.00	22.00	53.00	2,300.59	350.43	465.03	576.52	0.00	0.00	0.00
2,500.00	22.00	53.00	2,393.31	372.97	494.95	613.61	0.00	0.00	0.00
2,600.00	22.00	53.00	2,486.03	395.52	524.87	650.70	0.00	0.00	0.00
2,700.00	22.00	53.00	2,578.75	418.06	554.79	687.80	0.00	0.00	0.00
2,800.00	22.00	53.00	2,671.47	440.61	584.70	724.89	0.00	0.00	0.00
2,900.00	22.00	53.00	2,764.19	463.15	614.62	761.98	0.00	0.00	0.00
3,000.00	22.00	53.00	2,856.91	485.69	644.54	799.07	0.00	0.00	0.00
3,100.00	22.00	53.00	2,949.62	508.24	674.46	836.16	0.00	0.00	0.00
3,200.00	22.00	53.00	3,042.34	530.78	704.37	873.25	0.00	0.00	0.00
3,300.00	22.00	53.00	3,135.06	553.33	734.29	910.34	0.00	0.00	0.00
3,400.00	22.00	53.00	3,227.78	575.87	764.21	947.43	0.00	0.00	0.00
3,500.00	22.00	53.00	3,320.50	598.42	794.12	984.52	0.00	0.00	0.00
3,600.00	22.00	53.00	3,413.22	620.96	824.04	1,021.61	0.00	0.00	0.00
3,700.00	22.00	53.00	3,505.93	643.50	853.96	1,058.70	0.00	0.00	0.00
3,800.00	22.00	53.00	3,598.65	666.05	883.88	1,095.79	0.00	0.00	0.00
3,900.00	22.00	53.00	3,691.37	688.59	913.79	1,132.88	0.00	0.00	0.00
4,000.00	22.00	53.00	3,784.09	711.14	943.71	1,169.97	0.00	0.00	0.00
4,100.00	22.00	53.00	3,876.81	733.68	973.63	1,207.06	0.00	0.00	0.00
4,137.96	22.00	53.00	3,912.00	742.24	984.98	1,221.13	0.00	0.00	0.00
PK Depth									
4,200.00	22.00	53.00	3,969.53	756.23	1,003.55	1,244.15	0.00	0.00	0.00
4,300.00	22.00	53.00	4,062.24	778.77	1,033.46	1,281.24	0.00	0.00	0.00
4,400.00	22.00	53.00	4,154.96	801.32	1,063.38	1,318.33	0.00	0.00	0.00
4,500.00	22.00	53.00	4,247.68	823.86	1,093.30	1,355.42	0.00	0.00	0.00
4,600.00	22.00	53.00	4,340.40	846.40	1,123.22	1,392.51	0.00	0.00	0.00

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Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	15' RKB + 5047' GL @ 5062.00ft
Site:	WELD_HOWARD 17-32 PAD	North Reference:	True
Well:	Howard 26-32	Survey Calculation Method:	Minimum Curvature
Wellbore:	Howard 26-32		
Design:	Howard 26-32 (wp03)		

Planned 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)
4,700.00	22.00	53.00	4,433.12	868.95	1,153.13	1,429.60	0.00	0.00	0.00
Start DLS 2.00 TFO -95.88									
4,800.00	21.88	47.66	4,525.88	892.78	1,181.87	1,466.76	2.00	-0.12	-5.34
4,900.00	21.94	42.30	4,618.67	919.15	1,208.21	1,504.04	2.00	0.05	-5.36
5,000.00	22.16	37.00	4,711.37	948.03	1,232.14	1,541.38	2.00	0.23	-5.29
5,100.00	22.56	31.84	4,803.86	979.39	1,253.61	1,578.75	2.00	0.39	-5.16
5,181.49	23.00	27.79	4,879.00	1,006.75	1,269.28	1,609.18	2.00	0.54	-4.98
SX Depth									
5,199.60	23.11	26.91	4,895.66	1,013.05	1,272.54	1,615.94	2.00	0.61	-4.86
Start 940.51 hold at 5199.60 MD									
5,200.00	23.11	26.91	4,896.03	1,013.19	1,272.61	1,616.09	0.00	0.00	0.00
5,300.00	23.11	26.91	4,988.01	1,048.18	1,290.37	1,653.41	0.00	0.00	0.00
5,400.00	23.11	26.91	5,079.98	1,083.18	1,308.13	1,690.73	0.00	0.00	0.00
5,500.00	23.11	26.91	5,171.96	1,118.18	1,325.89	1,728.05	0.00	0.00	0.00
5,600.00	23.11	26.91	5,263.94	1,153.17	1,343.65	1,765.37	0.00	0.00	0.00
5,700.00	23.11	26.91	5,355.92	1,188.17	1,361.41	1,802.68	0.00	0.00	0.00
5,800.00	23.11	26.91	5,447.89	1,223.16	1,379.17	1,840.00	0.00	0.00	0.00
5,900.00	23.11	26.91	5,539.87	1,258.16	1,396.93	1,877.32	0.00	0.00	0.00
6,000.00	23.11	26.91	5,631.85	1,293.15	1,414.70	1,914.64	0.00	0.00	0.00
6,100.00	23.11	26.91	5,723.83	1,328.15	1,432.46	1,951.96	0.00	0.00	0.00
6,140.11	23.11	26.91	5,760.72	1,342.19	1,439.58	1,966.93	0.00	0.00	0.00
Start Drop -2.00									
6,200.00	21.91	26.91	5,816.05	1,362.63	1,449.96	1,988.73	2.00	-2.00	0.00
6,300.00	19.91	26.91	5,909.46	1,394.45	1,466.11	2,022.66	2.00	-2.00	0.00
6,400.00	17.91	26.91	6,004.05	1,423.35	1,480.77	2,053.48	2.00	-2.00	0.00
6,500.00	15.91	26.91	6,099.73	1,449.29	1,493.93	2,081.13	2.00	-2.00	0.00
6,600.00	13.91	26.91	6,196.35	1,472.23	1,505.58	2,105.60	2.00	-2.00	0.00
6,700.00	11.91	26.91	6,293.82	1,492.15	1,515.69	2,126.84	2.00	-2.00	0.00
6,800.00	9.91	26.91	6,392.01	1,509.02	1,524.25	2,144.84	2.00	-2.00	0.00
6,900.00	7.91	26.91	6,490.80	1,522.83	1,531.26	2,159.56	2.00	-2.00	0.00
7,000.00	5.91	26.91	6,590.07	1,533.56	1,536.70	2,171.00	2.00	-2.00	0.00
7,100.00	3.91	26.91	6,689.69	1,541.19	1,540.58	2,179.14	2.00	-2.00	0.00
7,200.00	1.91	26.91	6,789.56	1,545.72	1,542.87	2,183.96	2.00	-2.00	0.00
7,295.46	0.00	0.38	6,885.00	1,547.13	1,543.59	2,185.48	2.00	-2.00	0.00
Start 1500.00 hold at 7295.46 MD									
7,300.00	0.00	0.38	6,889.54	1,547.13	1,543.59	2,185.48	0.00	0.00	0.00
7,400.00	0.00	0.38	6,989.54	1,547.13	1,543.59	2,185.48	0.00	0.00	0.00
7,500.00	0.00	0.38	7,089.54	1,547.13	1,543.59	2,185.48	0.00	0.00	0.00
7,600.00	0.00	0.38	7,189.54	1,547.13	1,543.59	2,185.48	0.00	0.00	0.00
7,700.00	0.00	0.38	7,289.54	1,547.13	1,543.59	2,185.48	0.00	0.00	0.00
7,797.46	0.00	0.38	7,387.00	1,547.13	1,543.59	2,185.48	0.00	0.00	0.00
NIO Depth									
7,800.00	0.00	0.38	7,389.54	1,547.13	1,543.59	2,185.48	0.00	0.00	0.00
7,900.00	0.00	0.38	7,489.54	1,547.13	1,543.59	2,185.48	0.00	0.00	0.00
8,000.00	0.00	0.38	7,589.54	1,547.13	1,543.59	2,185.48	0.00	0.00	0.00
8,100.00	0.00	0.38	7,689.54	1,547.13	1,543.59	2,185.48	0.00	0.00	0.00
8,200.00	0.00	0.38	7,789.54	1,547.13	1,543.59	2,185.48	0.00	0.00	0.00
8,230.46	0.00	0.38	7,820.00	1,547.13	1,543.59	2,185.48	0.00	0.00	0.00
CD Depth									
8,300.00	0.00	0.38	7,889.54	1,547.13	1,543.59	2,185.48	0.00	0.00	0.00
8,308.46	0.00	0.38	7,898.00	1,547.13	1,543.59	2,185.48	0.00	0.00	0.00
GH Depth									
8,400.00	0.00	0.38	7,989.54	1,547.13	1,543.59	2,185.48	0.00	0.00	0.00

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Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	15' RKB + 5047' GL @ 5062.00ft
Site:	WELD_HOWARD 17-32 PAD	North Reference:	True
Well:	Howard 26-32	Survey Calculation Method:	Minimum Curvature
Wellbore:	Howard 26-32		
Design:	Howard 26-32 (wp03)		

Planned 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)
8,500.00	0.00	0.38	8,089.54	1,547.13	1,543.59	2,185.48	0.00	0.00	0.00
8,600.00	0.00	0.38	8,189.54	1,547.13	1,543.59	2,185.48	0.00	0.00	0.00
8,660.46	0.00	0.38	8,250.00	1,547.13	1,543.59	2,185.48	0.00	0.00	0.00
J Depth									
8,700.00	0.00	0.38	8,289.54	1,547.13	1,543.59	2,185.48	0.00	0.00	0.00
8,795.46	0.00	0.38	8,385.00	1,547.13	1,543.59	2,185.48	0.00	0.00	0.00
TD at 8795.46 - Howard 26-32 BHL									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Howard 26-32 BHL	0.00	0.38	8,385.00	1,547.13	1,543.59	1,248,760.70	3,166,642.72	40.014700	-104.905041
- hit/miss target									
- Shape									
- plan hits target center									
- Circle (radius 25.00)									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
1,162.87	1,150.00	8 5/8"	8-5/8	11	

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,137.96	3,912.00	PK Depth			
5,181.49	4,879.00	SX Depth			
7,797.46	7,387.00	NIO Depth			
8,230.46	7,820.00	CD Depth			
8,308.46	7,898.00	GH Depth			
8,660.46	8,250.00	J Depth			

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Comment
300.00	300.00	0.00	0.00	Start Build 1.99
1,405.00	1,378.05	126.11	167.35	Start 3295.00 hold at 1405.00 MD
4,700.00	4,433.12	868.95	1,153.13	Start DLS 2.00 TFO -95.88
5,199.60	4,895.66	1,013.05	1,272.54	Start 940.51 hold at 5199.60 MD
6,140.11	5,760.72	1,342.19	1,439.58	Start Drop -2.00
7,295.46	6,885.00	1,547.13	1,543.59	Start 1500.00 hold at 7295.46 MD
8,795.46	8,385.00	1,547.13	1,543.59	TD at 8795.46