

Noble Energy Inc.- Weld County, CO (Grid North)

Well Name: **Tahoma E22-69HC**

Surface Location: Eagle E14-62-1HN Pad Sec.14-T6N-R65W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

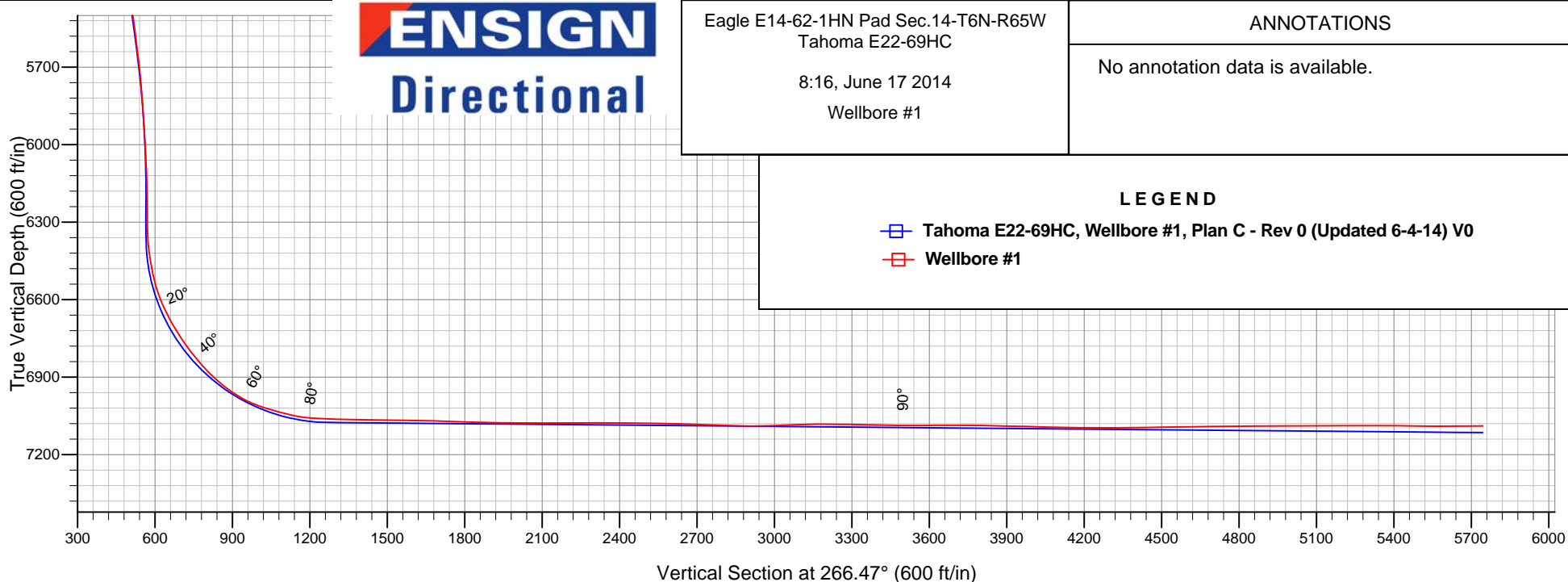
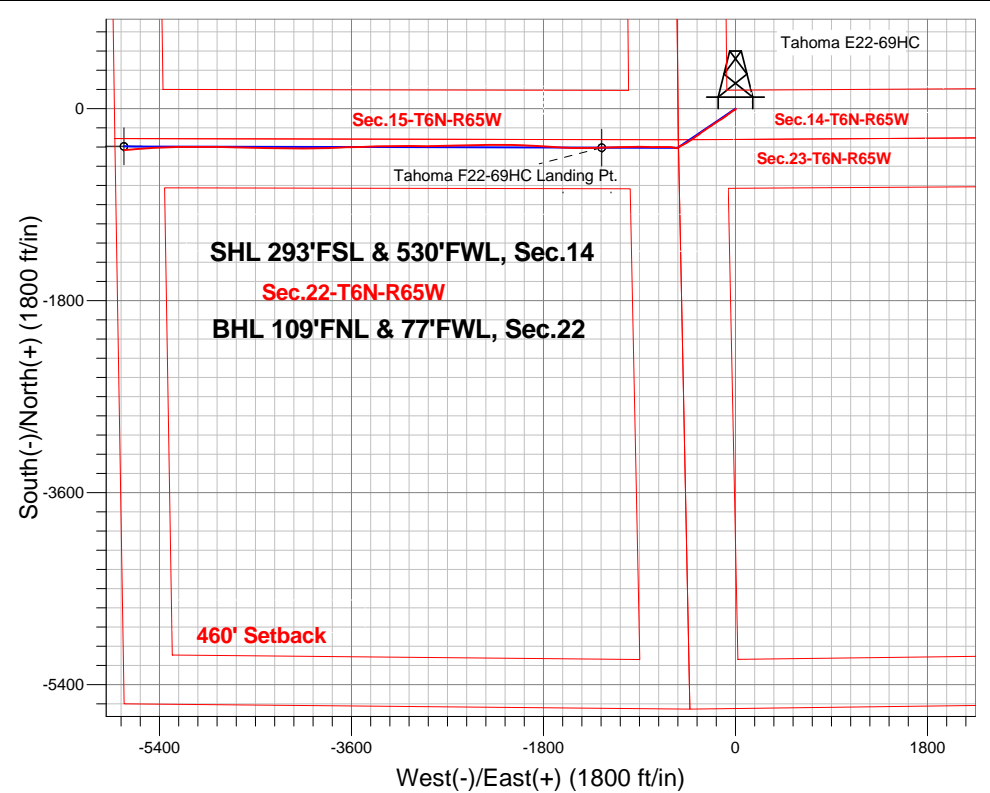
Ground Elevation: 4739.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1418723.74	3239745.75	40.479600	-104.638160	

Precision 829 RKB - 16' WELL @ 4755.0ft (Precision 829 RKB - 16')

FINAL SURVEY

Projected Bottom Hole Location
11989'MD 7089'TVD 388'S & 5731'W of SHL
90.2 degree Incl @ 265.3 degree AZM



ENSIGN
Directional

Eagle E14-62-1HN Pad Sec.14-T6N-R65W
Tahoma E22-69HC

8:16, June 17 2014

Wellbore #1

ANNOTATIONS

No annotation data is available.

LEGEND

- Tahoma E22-69HC, Wellbore #1, Plan C - Rev 0 (Updated 6-4-14) V0
- Wellbore #1



Noble Energy Inc.- Weld County, CO (Grid North)

Sec.14-T6N-R65W

Eagle E14-62-1HN Pad Sec.14-T6N-R65W

Tahoma E22-69HC

Wellbore #1

Design: Wellbore #1

Standard Survey Report

17 June, 2014

Company:	Noble Energy Inc.- Weld County, CO (Grid North)	Local Co-ordinate Reference:	Well Tahoma E22-69HC
Project:	Sec.14-T6N-R65W	TVD Reference:	WELL @ 4755.0ft (Precision 829 RKB - 16')
Site:	Eagle E14-62-1HN Pad Sec.14-T6N-R65W	MD Reference:	WELL @ 4755.0ft (Precision 829 RKB - 16')
Well:	Tahoma E22-69HC	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Project	Sec.14-T6N-R65W, Weld County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site	Eagle E14-62-1HN Pad Sec.14-T6N-R65W				
Site Position:		Northing:	1,418,814.82 ft	Latitude:	40.479850
From:	Lat/Long	Easting:	3,239,744.87 ft	Longitude:	-104.638160
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.56 °

Well	Tahoma E22-69HC					
Well Position	+N-S	0.0 ft	Northing:	1,418,723.74 ft	Latitude:	40.479600
	+E-W	0.0 ft	Easting:	3,239,745.75 ft	Longitude:	-104.638160
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,739.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	6/4/2014	8.40	67.03	52,874

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.0	0.0	0.0	266.47	

Survey Program	Date 6/17/2014				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
321.0	661.0	Surface (Wellbore #1)	Flexi-Shot	VES Flexi-Shot Tool	
707.0	7,510.0	Intermediate (Wellbore #1)	MWD	MWD - Standard	
7,621.0	11,989.0	Lateral (Wellbore #1)	MWD	MWD - Standard	

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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
321.0	0.20	101.36	321.0	-0.1	0.5	-0.5	0.06	0.06	0.00
661.0	0.00	123.16	661.0	-0.2	1.1	-1.1	0.06	-0.06	0.00
707.0	1.20	158.80	707.0	-0.7	1.3	-1.3	2.61	2.61	0.00
797.0	1.40	161.60	797.0	-2.6	2.0	-1.8	0.23	0.22	3.11
887.0	1.30	146.50	886.9	-4.5	2.9	-2.6	0.41	-0.11	-16.78
976.0	0.10	276.40	975.9	-5.3	3.4	-3.0	1.54	-1.35	145.96
1,066.0	0.50	173.70	1,065.9	-5.7	3.3	-3.0	0.59	0.44	-114.11
1,143.0	0.30	190.90	1,142.9	-6.2	3.3	-3.0	0.30	-0.26	22.34
1,238.0	1.50	228.00	1,237.9	-7.3	2.4	-1.9	1.34	1.26	39.05

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Site:	Eagle E14-62-1HN Pad Sec.14-T6N-R65W	MD Reference:	WELL @ 4755.0ft (Precision 829 RKB - 16')
Well:	Tahoma E22-69HC	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

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)
1,336.0	1.80	229.30	1,335.9	-9.2	0.3	0.3	0.31	0.31	1.33
1,430.0	2.60	247.80	1,429.8	-10.9	-2.8	3.5	1.13	0.85	19.68
1,523.0	3.60	249.80	1,522.7	-12.8	-7.5	8.3	1.08	1.08	2.15
1,616.0	4.50	243.50	1,615.4	-15.4	-13.5	14.5	1.08	0.97	-6.77
1,710.0	5.90	237.70	1,709.1	-19.6	-20.9	22.1	1.59	1.49	-6.17
1,804.0	7.40	236.60	1,802.4	-25.5	-30.1	31.6	1.60	1.60	-1.17
1,898.0	8.00	236.20	1,895.6	-32.5	-40.5	42.5	0.64	0.64	-0.43
1,991.0	8.40	234.00	1,987.6	-40.1	-51.4	53.8	0.55	0.43	-2.37
2,085.0	7.90	232.10	2,080.7	-48.1	-62.1	64.9	0.60	-0.53	-2.02
2,178.0	9.40	232.80	2,172.6	-56.6	-73.2	76.5	1.62	1.61	0.75
2,272.0	9.80	232.30	2,265.3	-66.1	-85.6	89.5	0.43	0.43	-0.53
2,365.0	10.50	233.20	2,356.8	-76.1	-98.7	103.2	0.77	0.75	0.97
2,459.0	10.10	233.60	2,449.3	-86.1	-112.2	117.2	0.43	-0.43	0.43
2,551.0	9.90	240.80	2,539.9	-94.7	-125.5	131.1	1.38	-0.22	7.83
2,641.0	9.70	239.40	2,628.6	-102.4	-138.8	144.9	0.35	-0.22	-1.56
2,730.0	9.30	236.80	2,716.4	-110.1	-151.3	157.8	0.66	-0.45	-2.92
2,820.0	9.20	235.80	2,805.2	-118.1	-163.3	170.3	0.21	-0.11	-1.11
2,910.0	9.00	234.80	2,894.1	-126.2	-175.0	182.5	0.28	-0.22	-1.11
2,999.0	8.30	233.70	2,982.1	-134.1	-185.9	193.8	0.81	-0.79	-1.24
3,089.0	8.80	242.30	3,071.1	-141.1	-197.2	205.6	1.52	0.56	9.56
3,178.0	9.10	235.60	3,159.0	-148.3	-209.1	217.8	1.22	0.34	-7.53
3,268.0	7.70	231.70	3,248.0	-156.0	-219.7	228.9	1.68	-1.56	-4.33
3,358.0	8.00	235.50	3,337.2	-163.3	-229.6	239.2	0.67	0.33	4.22
3,447.0	8.20	240.40	3,425.3	-169.9	-240.2	250.2	0.81	0.22	5.51
3,537.0	6.90	236.00	3,514.5	-176.1	-250.3	260.6	1.58	-1.44	-4.89
3,627.0	5.70	239.70	3,604.0	-181.4	-258.6	269.3	1.41	-1.33	4.11
3,716.0	6.50	234.00	3,692.5	-186.6	-266.5	277.5	1.13	0.90	-6.40
3,806.0	9.00	236.10	3,781.6	-193.5	-276.5	287.8	2.80	2.78	2.33
3,895.0	9.70	235.60	3,869.5	-201.6	-288.4	300.3	0.79	0.79	-0.56
3,985.0	9.70	235.60	3,958.2	-210.2	-300.9	313.3	0.00	0.00	0.00
4,074.0	8.90	234.80	4,046.0	-218.4	-312.7	325.6	0.91	-0.90	-0.90
4,164.0	7.80	229.50	4,135.1	-226.4	-323.1	336.4	1.49	-1.22	-5.89
4,254.0	8.70	232.90	4,224.1	-234.5	-333.1	347.0	1.14	1.00	3.78
4,343.0	7.90	229.90	4,312.2	-242.5	-343.2	357.5	1.02	-0.90	-3.37
4,433.0	8.40	237.00	4,401.3	-250.0	-353.4	368.2	1.25	0.56	7.89
4,523.0	9.30	236.80	4,490.2	-257.6	-365.0	380.2	1.00	1.00	-0.22
4,612.0	7.90	234.70	4,578.2	-265.1	-376.0	391.7	1.61	-1.57	-2.36
4,702.0	7.30	227.90	4,667.4	-272.5	-385.3	401.4	1.20	-0.67	-7.56
4,792.0	5.50	230.70	4,756.9	-279.0	-392.9	409.4	2.03	-2.00	3.11
4,881.0	8.50	242.60	4,845.2	-284.8	-402.1	418.8	3.73	3.37	13.37
4,971.0	9.50	236.80	4,934.1	-291.9	-414.2	431.4	1.50	1.11	-6.44
5,060.0	10.60	233.90	5,021.7	-300.7	-426.9	444.7	1.36	1.24	-3.26
5,150.0	10.20	237.60	5,110.2	-309.9	-440.4	458.6	0.86	-0.44	4.11
5,240.0	8.40	237.90	5,199.0	-317.7	-452.7	471.4	2.00	-2.00	0.33
5,330.0	9.00	242.50	5,288.0	-324.4	-464.5	483.6	1.02	0.67	5.11
5,419.0	9.20	242.00	5,375.9	-331.0	-476.9	496.4	0.24	0.22	-0.56
5,509.0	9.30	240.80	5,464.7	-337.9	-489.6	509.5	0.24	0.11	-1.33
5,599.0	7.60	241.40	5,553.7	-344.3	-501.2	521.5	1.89	-1.89	0.67
5,688.0	8.00	241.60	5,641.9	-350.0	-511.8	532.4	0.45	0.45	0.22
5,778.0	6.50	236.10	5,731.2	-355.9	-521.6	542.5	1.83	-1.67	-6.11
5,868.0	5.40	232.00	5,820.7	-361.3	-529.1	550.4	1.31	-1.22	-4.56
5,957.0	4.20	241.40	5,909.4	-365.4	-535.3	556.8	1.61	-1.35	10.56
6,047.0	3.60	230.20	5,999.2	-368.8	-540.3	562.0	1.07	-0.67	-12.44
6,137.0	2.90	272.20	6,089.1	-370.6	-544.8	566.6	2.69	-0.78	46.67

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

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)
6,226.0	0.60	290.60	6,178.0	-370.3	-547.5	569.2	2.63	-2.58	20.67
6,316.0	0.70	276.40	6,268.0	-370.1	-548.5	570.2	0.21	0.11	-15.78
6,361.0	0.70	271.90	6,313.0	-370.0	-549.0	570.8	0.12	0.00	-10.00
6,405.0	2.80	257.50	6,357.0	-370.3	-550.3	572.1	4.84	4.77	-32.73
6,450.0	6.40	270.00	6,401.8	-370.5	-553.9	575.7	8.26	8.00	27.78
6,495.0	9.80	281.00	6,446.4	-369.8	-560.2	581.9	8.27	7.56	24.44
6,540.0	11.80	287.30	6,490.6	-367.7	-568.3	589.9	5.15	4.44	14.00
6,585.0	15.20	280.90	6,534.3	-365.2	-578.5	599.9	8.24	7.56	-14.22
6,629.0	19.70	277.70	6,576.3	-363.1	-591.5	612.8	10.45	10.23	-7.27
6,674.0	24.20	274.20	6,618.0	-361.4	-608.3	629.4	10.41	10.00	-7.78
6,719.0	27.30	271.80	6,658.6	-360.4	-627.8	648.8	7.27	6.89	-5.33
6,764.0	29.60	271.00	6,698.1	-359.9	-649.2	670.2	5.18	5.11	-1.78
6,809.0	32.50	270.00	6,736.7	-359.7	-672.4	693.3	6.55	6.44	-2.22
6,853.0	35.00	269.00	6,773.2	-359.9	-696.9	717.7	5.82	5.68	-2.27
6,898.0	39.10	268.60	6,809.2	-360.5	-724.0	744.8	9.13	9.11	-0.89
6,943.0	40.50	269.20	6,843.7	-361.0	-752.8	773.6	3.23	3.11	1.33
6,988.0	44.10	270.10	6,877.0	-361.2	-783.0	803.8	8.11	8.00	2.00
7,032.0	47.70	271.30	6,907.6	-360.8	-814.6	835.3	8.41	8.18	2.73
7,077.0	52.10	271.00	6,936.6	-360.1	-849.0	869.6	9.79	9.78	-0.67
7,122.0	56.60	271.50	6,962.8	-359.3	-885.6	906.0	10.04	10.00	1.11
7,166.0	61.80	271.30	6,985.3	-358.4	-923.4	943.7	11.82	11.82	-0.45
7,211.0	68.10	270.10	7,004.4	-357.9	-964.1	984.3	14.21	14.00	-2.67
7,256.0	73.00	269.20	7,019.4	-358.2	-1,006.5	1,026.7	11.05	10.89	-2.00
7,301.0	74.30	269.00	7,032.0	-358.9	-1,049.7	1,069.8	2.92	2.89	-0.44
7,346.0	75.70	267.90	7,043.7	-360.0	-1,093.1	1,113.2	3.91	3.11	-2.44
7,391.0	80.30	267.80	7,053.0	-361.7	-1,137.1	1,157.2	10.22	10.22	-0.22
7,435.0	86.10	267.50	7,058.2	-363.5	-1,180.8	1,200.9	13.20	13.18	-0.68
7,480.0	87.60	267.70	7,060.7	-365.4	-1,225.6	1,245.8	3.36	3.33	0.44
7,508.9	87.60	267.51	7,061.9	-366.6	-1,254.5	1,274.7	0.67	0.00	-0.67
Tahoma F22-69HC Landing Pt.									
7,510.0	87.60	267.50	7,062.0	-366.6	-1,255.6	1,275.8	0.67	0.00	-0.67
7,621.0	89.10	269.40	7,065.2	-369.6	-1,366.5	1,386.7	2.18	1.35	1.71
7,710.0	89.20	271.60	7,066.5	-368.8	-1,455.5	1,475.4	2.47	0.11	2.47
7,800.0	89.50	271.60	7,067.5	-366.3	-1,545.4	1,565.1	0.33	0.33	0.00
7,890.0	88.20	272.50	7,069.3	-363.1	-1,635.4	1,654.6	1.76	-1.44	1.00
7,980.0	88.50	273.30	7,071.9	-358.6	-1,725.2	1,744.0	0.95	0.33	0.89
8,069.0	88.10	273.50	7,074.5	-353.3	-1,814.0	1,832.3	0.50	-0.45	0.22
8,158.0	89.10	273.40	7,076.7	-347.9	-1,902.8	1,920.6	1.13	1.12	-0.11
8,248.0	89.50	272.00	7,077.8	-343.7	-1,992.7	2,010.1	1.62	0.44	-1.56
8,338.0	89.80	271.60	7,078.4	-340.9	-2,082.7	2,099.7	0.56	0.33	-0.44
8,427.0	90.70	270.20	7,078.0	-339.5	-2,171.6	2,188.4	1.87	1.01	-1.57
8,517.0	90.00	269.40	7,077.4	-339.8	-2,261.6	2,278.3	1.18	-0.78	-0.89
8,607.0	90.10	269.30	7,077.4	-340.8	-2,351.6	2,368.2	0.16	0.11	-0.11
8,696.0	88.70	269.40	7,078.3	-341.8	-2,440.6	2,457.0	1.58	-1.57	0.11
8,786.0	89.50	268.50	7,079.7	-343.5	-2,530.6	2,546.9	1.34	0.89	-1.00
8,875.0	88.60	269.20	7,081.2	-345.2	-2,619.6	2,635.9	1.28	-1.01	0.79
8,965.0	87.70	267.50	7,084.1	-347.8	-2,709.5	2,725.8	2.14	-1.00	-1.89
9,054.0	87.80	268.50	7,087.6	-350.9	-2,798.4	2,814.7	1.13	0.11	1.12
9,144.0	89.80	269.70	7,089.5	-352.3	-2,888.3	2,904.5	2.59	2.22	1.33
9,234.0	92.10	270.60	7,088.0	-352.1	-2,978.3	2,994.3	2.74	2.56	1.00
9,324.0	92.30	270.50	7,084.5	-351.2	-3,068.2	3,084.0	0.25	0.22	-0.11
9,413.0	90.00	270.50	7,082.7	-350.5	-3,157.2	3,172.8	2.58	-2.58	0.00
9,503.0	89.90	269.50	7,082.8	-350.5	-3,247.2	3,262.6	1.12	-0.11	-1.11

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9,593.0	88.00	266.90	7,084.5	-353.3	-3,337.1	3,352.6	3.58	-2.11	-2.89
9,682.0	89.00	268.00	7,086.8	-357.3	-3,426.0	3,441.5	1.67	1.12	1.24
9,772.0	90.40	269.10	7,087.3	-359.5	-3,516.0	3,531.4	1.98	1.56	1.22
9,862.0	90.40	268.70	7,086.6	-361.3	-3,606.0	3,621.4	0.44	0.00	-0.44
9,952.0	89.60	267.20	7,086.6	-364.5	-3,695.9	3,711.3	1.89	-0.89	-1.67
10,041.0	89.20	266.80	7,087.6	-369.1	-3,784.8	3,800.3	0.64	-0.45	-0.45
10,131.0	88.40	269.30	7,089.4	-372.2	-3,874.7	3,890.3	2.92	-0.89	2.78
10,220.0	88.70	270.50	7,091.7	-372.4	-3,963.7	3,979.1	1.39	0.34	1.35
10,310.0	88.80	269.80	7,093.7	-372.1	-4,053.6	4,068.9	0.79	0.11	-0.78
10,400.0	88.80	269.20	7,095.5	-372.9	-4,143.6	4,158.7	0.67	0.00	-0.67
10,489.0	90.20	270.90	7,096.3	-372.8	-4,232.6	4,247.5	2.47	1.57	1.91
10,579.0	90.20	271.80	7,096.0	-370.7	-4,322.6	4,337.2	1.00	0.00	1.00
10,669.0	90.70	271.30	7,095.3	-368.3	-4,412.5	4,426.8	0.79	0.56	-0.56
10,759.0	90.80	271.00	7,094.1	-366.5	-4,502.5	4,516.5	0.35	0.11	-0.33
10,848.0	90.70	272.00	7,093.0	-364.1	-4,591.5	4,605.2	1.13	-0.11	1.12
10,938.0	90.90	271.50	7,091.7	-361.4	-4,681.4	4,694.8	0.60	0.22	-0.56
11,028.0	90.60	270.60	7,090.5	-359.7	-4,771.4	4,784.5	1.05	-0.33	-1.00
11,117.0	90.50	270.00	7,089.7	-359.3	-4,860.4	4,873.3	0.68	-0.11	-0.67
11,207.0	90.10	269.60	7,089.2	-359.6	-4,950.4	4,963.1	0.63	-0.44	-0.44
11,296.0	90.30	270.60	7,088.9	-359.4	-5,039.4	5,052.0	1.15	0.22	1.12
11,386.0	90.40	270.00	7,088.3	-359.0	-5,129.4	5,141.8	0.68	0.11	-0.67
11,476.0	89.70	268.40	7,088.3	-360.2	-5,219.4	5,231.7	1.94	-0.78	-1.78
11,565.0	90.20	268.60	7,088.3	-362.5	-5,308.3	5,320.6	0.61	0.56	0.22
11,655.0	89.40	267.60	7,088.6	-365.5	-5,398.3	5,410.6	1.42	-0.89	-1.11
11,745.0	88.90	266.00	7,090.0	-370.6	-5,488.1	5,500.5	1.86	-0.56	-1.78
11,834.0	90.80	266.40	7,090.2	-376.5	-5,576.9	5,589.5	2.18	2.13	0.45
11,927.0	90.20	265.30	7,089.4	-383.2	-5,669.7	5,682.5	1.35	-0.65	-1.18
11,987.9	90.20	265.30	7,089.2	-388.2	-5,730.3	5,743.4	0.00	0.00	0.00
Tahoma E22-69HC BHL 75'FNL & 75'FWL									
11,989.0	90.20	265.30	7,089.2	-388.3	-5,731.5	5,744.5	0.00	0.00	0.00

Checked By: _____ Approved By: _____ Date: _____