



**Directional**

**NOBLE ENERGY INC WELD  
COUNTY CO**

**SEC.18-T4N-R64W**

**FRICK PAD 18-4N-64W**

**FRICK PC C17-65HN - Final Survey**

**API #05-123-33281**

**Design: MWD Survey**

**Standard Survey Report**

**13 July, 2011**



<b>Company:</b>	NOBLE ENERGY INC WELD COUNTY CO	<b>Local Co-ordinate Reference:</b>	Well FRICK PC C17-65HN - Final Survey
<b>Project:</b>	SEC.18-T4N-R64W	<b>TVD Reference:</b>	RKB @ 4771.0ft (RKB ENSIGN RIG 132 13')
<b>Site:</b>	FRICK PAD 18-4N-64W	<b>MD Reference:</b>	RKB @ 4771.0ft (RKB ENSIGN RIG 132 13')
<b>Well:</b>	FRICK PC C17-65HN - Final Survey	<b>North Reference:</b>	True
<b>Wellbore:</b>	API #05-123-33281	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	MWD Survey	<b>Database:</b>	Landmark

<b>Project</b>	SEC.18-T4N-R64W, Weld County, Colorado		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		Using Well Reference Point
<b>Map Zone:</b>	Colorado Northern Zone		Using geodetic scale factor

Site	FRICK PAD 18-4N-64W				
Site Position:		Northing:	1,358,417.70ft	Latitude:	40.313650
From:	Lat/Long	Easting:	3,254,925.59ft	Longitude:	-104.585830
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.59 °

Well	FRICK PC C17-65HN - Final Survey					
Well Position	+N-S	0.0 ft	Northing:	1,358,417.70 ft	Latitude:	40.313650
	+E-W	0.0 ft	Easting:	3,254,925.59 ft	Longitude:	-104.585830
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,758.0 ft

<b>Wellbore</b>	API #05-123-33281				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	6/24/2011	8.76	67.01	53,103

<b>Design</b>	MWD Survey				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD)</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Direction</b>	
	(ft)	(ft)	(ft)	(°)	
	0.0	0.0	0.0	130.60	

<b>Survey Program</b>	<b>Date</b> 7/13/2011				
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
749.0	11,373.0	Survey #1 (API#05-123-33281)	MWD	MWD - Standard	

<b>Survey</b>										
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Turn Rate (°/100ft)</b>	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
1.1	0.00	54.80	1.1	0.0	0.0	0.0	0.00	0.00	0.00	
<b>HARDLINE 460'FWL</b>										
20.0	0.01	54.80	20.0	0.0	0.0	0.0	0.07	0.07	0.00	
<b>HARDLINE 460'FEL</b>										
749.0	0.50	54.80	749.0	1.9	2.7	0.8	0.07	0.07	0.00	
809.0	0.50	66.40	809.0	2.1	3.1	1.0	0.17	0.00	19.33	
900.0	1.00	147.60	900.0	1.6	3.9	1.9	1.15	0.55	89.23	
991.0	2.30	180.30	990.9	-0.9	4.3	3.9	1.71	1.43	35.93	
1,087.0	2.70	169.80	1,086.9	-5.0	4.7	6.9	0.63	0.42	-10.94	
1,182.0	4.00	177.90	1,181.7	-10.5	5.2	10.8	1.45	1.37	8.53	
1,277.0	6.00	182.80	1,276.3	-18.8	5.1	16.1	2.15	2.11	5.16	
1,372.0	7.40	179.80	1,370.7	-29.9	4.9	23.2	1.52	1.47	-3.16	



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**Wellbore:** API #05-123-33281  
**Design:** MWD Survey

**Local Co-ordinate Reference:** Well FRICK PC C17-65HN - Final Survey  
**TVD Reference:** RKB @ 4771.0ft (RKB ENSIGN RIG 132 13')  
**MD Reference:** RKB @ 4771.0ft (RKB ENSIGN RIG 132 13')  
**North Reference:** True  
**Survey Calculation Method:** Minimum Curvature  
**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)
1,466.0	8.00	172.60	1,463.8	-42.4	5.8	32.0	1.21	0.64	-7.66
1,561.0	8.40	155.50	1,557.9	-55.3	9.5	43.2	2.59	0.42	-18.00
1,656.0	8.00	143.90	1,651.9	-67.0	16.3	55.9	1.79	-0.42	-12.21
1,752.0	9.00	130.60	1,746.9	-77.2	25.9	69.9	2.29	1.04	-13.85
1,846.0	9.80	119.50	1,839.6	-86.0	38.4	85.1	2.10	0.85	-11.81
1,942.0	11.50	125.50	1,933.9	-95.5	53.3	102.7	2.11	1.77	6.25
2,037.0	10.00	129.30	2,027.3	-106.3	67.4	120.4	1.75	-1.58	4.00
2,132.0	11.70	124.10	2,120.6	-116.9	81.8	138.2	2.06	1.79	-5.47
2,227.0	11.80	118.10	2,213.6	-126.9	98.3	157.2	1.29	0.11	-6.32
2,322.0	10.70	119.90	2,306.8	-135.8	114.6	175.4	1.22	-1.16	1.89
2,417.0	11.60	123.70	2,400.0	-145.5	130.2	193.5	1.22	0.95	4.00
2,542.0	12.40	123.40	2,522.2	-159.9	151.8	219.3	0.64	0.64	-0.24
2,608.0	13.40	123.90	2,586.6	-168.1	164.1	234.0	1.52	1.52	0.76
2,702.0	13.80	121.80	2,677.9	-180.0	182.6	255.9	0.68	0.43	-2.23
2,797.0	14.20	119.20	2,770.1	-191.7	202.4	278.5	0.78	0.42	-2.74
2,892.0	14.70	115.60	2,862.1	-202.6	223.5	301.5	1.08	0.53	-3.79
2,987.0	12.30	115.50	2,954.5	-212.2	243.5	323.0	2.53	-2.53	-0.11
3,082.0	13.00	116.50	3,047.2	-221.3	262.2	343.1	0.77	0.74	1.05
3,177.0	11.30	119.50	3,140.0	-230.6	279.9	362.6	1.91	-1.79	3.16
3,272.0	9.40	133.20	3,233.5	-240.5	293.6	379.5	3.26	-2.00	14.42
3,369.0	11.10	137.30	3,329.0	-252.8	305.7	396.7	1.91	1.75	4.23
3,463.0	10.90	135.10	3,421.2	-265.8	318.1	414.5	0.49	-0.21	-2.34
3,557.0	10.80	132.90	3,513.6	-278.1	330.9	432.2	0.45	-0.11	-2.34
3,653.0	9.80	129.50	3,608.0	-289.4	343.8	449.3	1.22	-1.04	-3.54
3,748.0	8.80	129.70	3,701.8	-299.2	355.6	464.7	1.05	-1.05	0.21
3,843.0	10.60	127.90	3,795.4	-309.2	368.1	480.7	1.92	1.89	-1.89
3,938.0	10.50	123.00	3,888.8	-319.3	382.2	498.0	0.95	-0.11	-5.16
4,033.0	8.40	122.30	3,982.5	-327.7	395.4	513.4	2.21	-2.21	-0.74
4,128.0	5.50	114.20	4,076.8	-333.3	405.4	524.7	3.21	-3.05	-8.53
4,223.0	3.10	111.80	4,171.5	-336.1	411.9	531.5	2.53	-2.53	-2.53
4,318.0	0.90	60.10	4,266.5	-336.7	414.9	534.1	2.78	-2.32	-54.42
4,413.0	0.90	33.00	4,361.4	-335.7	416.0	534.3	0.44	0.00	-28.53
4,508.0	1.10	356.80	4,456.4	-334.1	416.4	533.6	0.68	0.21	-38.11
4,603.0	0.40	322.90	4,551.4	-332.9	416.1	532.6	0.84	-0.74	-35.68
4,698.0	0.00	347.30	4,646.4	-332.7	415.9	532.3	0.42	-0.42	0.00
4,793.0	1.10	209.00	4,741.4	-333.5	415.5	532.5	1.16	1.16	0.00
4,888.0	1.60	200.40	4,836.4	-335.5	414.6	533.1	0.57	0.53	-9.05
4,983.0	2.10	192.50	4,931.3	-338.5	413.7	534.4	0.59	0.53	-8.32
5,078.0	0.80	199.70	5,026.3	-340.8	413.1	535.4	1.38	-1.37	7.58
5,173.0	0.40	238.00	5,121.3	-341.6	412.6	535.6	0.57	-0.42	40.32
5,268.0	0.40	277.90	5,216.3	-341.7	412.0	535.2	0.29	0.00	42.00
5,363.0	0.80	304.80	5,311.3	-341.3	411.1	534.3	0.50	0.42	28.32
5,458.0	0.40	304.40	5,406.3	-340.7	410.3	533.3	0.42	-0.42	-0.42
5,553.0	1.50	239.60	5,501.3	-341.2	409.0	532.5	1.45	1.16	-68.21
5,648.0	1.50	249.90	5,596.2	-342.2	406.7	531.5	0.28	0.00	10.84
5,743.0	1.10	223.30	5,691.2	-343.3	404.9	530.9	0.75	-0.42	-28.00
5,838.0	0.90	200.00	5,786.2	-344.7	404.0	531.1	0.47	-0.21	-24.53
5,933.0	0.40	180.10	5,881.2	-345.7	403.8	531.6	0.57	-0.53	-20.95
5,977.0	0.60	190.70	5,925.2	-346.1	403.8	531.8	0.50	0.45	24.09
6,023.0	0.50	193.90	5,971.2	-346.5	403.7	532.0	0.23	-0.22	6.96
6,055.0	0.90	104.20	6,003.2	-346.7	403.9	532.3	3.21	1.25	-280.31
6,086.0	2.60	127.20	6,034.2	-347.2	404.7	533.2	5.83	5.48	74.19
6,117.0	4.40	104.00	6,065.1	-347.9	406.4	535.0	7.28	5.81	-74.84
6,149.0	6.50	91.90	6,097.0	-348.3	409.4	537.5	7.45	6.56	-37.81

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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)
6,181.0	9.00	89.80	6,128.7	-348.3	413.7	540.8	7.86	7.81	-6.56
6,213.0	11.40	90.30	6,160.2	-348.3	419.4	545.1	7.51	7.50	1.56
6,244.0	13.70	88.40	6,190.4	-348.2	426.1	550.2	7.54	7.42	-6.13
6,276.0	14.50	86.80	6,221.5	-347.9	433.9	555.8	2.78	2.50	-5.00
6,308.0	16.70	88.60	6,252.3	-347.6	442.5	562.2	7.04	6.88	5.63
6,339.0	19.30	90.30	6,281.8	-347.5	452.1	569.4	8.56	8.39	5.48
6,371.0	21.00	92.80	6,311.8	-347.8	463.1	577.9	5.95	5.31	7.81
6,403.0	22.40	93.30	6,341.5	-348.4	474.9	587.3	4.41	4.38	1.56
6,434.0	24.40	93.30	6,370.0	-349.1	487.2	597.1	6.45	6.45	0.00
6,466.0	26.90	93.30	6,398.8	-349.9	501.0	608.1	7.81	7.81	0.00
6,498.0	29.10	93.50	6,427.1	-350.8	516.0	620.1	6.88	6.88	0.63
6,530.0	31.30	92.80	6,454.7	-351.7	532.1	632.9	6.96	6.88	-2.19
6,561.0	34.40	94.00	6,480.8	-352.7	548.9	646.3	10.22	10.00	3.87
6,593.0	36.60	95.60	6,506.8	-354.3	567.4	661.3	7.46	6.88	5.00
6,624.0	39.00	95.90	6,531.3	-356.2	586.3	676.9	7.76	7.74	0.97
6,656.0	41.60	95.20	6,555.7	-358.2	606.9	693.9	8.25	8.13	-2.19
6,688.0	44.70	94.00	6,579.1	-359.9	628.7	711.6	10.02	9.69	-3.75
6,719.0	47.20	93.70	6,600.6	-361.4	650.9	729.4	8.09	8.06	-0.97
6,751.0	49.90	92.60	6,621.8	-362.7	674.9	748.5	8.82	8.44	-3.44
6,783.0	52.10	92.80	6,641.9	-363.9	699.7	768.1	6.89	6.88	0.63
6,814.0	55.10	93.10	6,660.3	-365.2	724.6	787.8	9.71	9.68	0.97
6,846.0	58.30	94.00	6,677.9	-366.9	751.3	809.2	10.27	10.00	2.81
6,878.0	60.80	94.40	6,694.1	-368.9	778.8	831.4	7.89	7.81	1.25
6,910.0	61.60	94.90	6,709.5	-371.2	806.8	854.1	2.85	2.50	1.56
6,940.0	63.50	94.00	6,723.4	-373.2	833.3	875.6	6.87	6.33	-3.00
6,973.0	66.00	93.80	6,737.4	-375.2	863.1	899.5	7.60	7.58	-0.61
7,005.0	68.40	93.80	6,749.8	-377.2	892.5	923.1	7.50	7.50	0.00
7,036.0	70.90	93.70	6,760.6	-379.1	921.5	946.4	8.07	8.06	-0.32
7,068.0	72.80	93.10	6,770.6	-380.9	951.9	970.6	6.20	5.94	-1.88
7,100.0	74.70	92.30	6,779.5	-382.4	982.6	994.8	6.40	5.94	-2.50
7,131.0	76.30	91.70	6,787.3	-383.4	1,012.5	1,018.3	5.49	5.16	-1.94
7,163.0	79.20	92.40	6,794.1	-384.5	1,043.8	1,042.7	9.31	9.06	2.19
7,202.0	82.70	93.00	6,800.2	-386.3	1,082.3	1,073.1	9.10	8.97	1.54
7,267.0	84.80	94.70	6,807.3	-390.7	1,146.7	1,124.9	4.15	3.23	2.62
7,299.0	85.60	93.70	6,810.0	-393.0	1,178.5	1,150.6	3.99	2.50	-3.13
7,330.0	88.20	93.70	6,811.7	-395.0	1,209.4	1,175.3	8.39	8.39	0.00
7,362.0	90.00	92.10	6,812.2	-396.6	1,241.4	1,200.6	7.53	5.63	-5.00
7,457.0	90.20	91.70	6,812.0	-399.8	1,336.3	1,274.8	0.47	0.21	-0.42
7,552.0	90.50	92.80	6,811.4	-403.5	1,431.2	1,349.3	1.20	0.32	1.16
7,647.0	90.30	93.00	6,810.7	-408.3	1,526.1	1,424.4	0.30	-0.21	0.21
7,742.0	90.30	93.50	6,810.3	-413.7	1,621.0	1,499.9	0.53	0.00	0.53
7,837.0	90.90	94.00	6,809.3	-419.9	1,715.7	1,575.9	0.82	0.63	0.53
7,932.0	91.30	94.40	6,807.4	-426.9	1,810.5	1,652.4	0.60	0.42	0.42
8,028.0	91.00	94.90	6,805.5	-434.6	1,906.1	1,730.1	0.61	-0.31	0.52
8,123.0	91.10	94.20	6,803.8	-442.2	2,000.8	1,806.9	0.74	0.11	-0.74
8,218.0	91.20	94.20	6,801.9	-449.1	2,095.5	1,883.3	0.11	0.11	0.00
8,313.0	90.70	93.10	6,800.3	-455.2	2,190.3	1,959.2	1.27	-0.53	-1.16
8,408.0	90.60	93.10	6,799.2	-460.3	2,285.2	2,034.6	0.11	-0.11	0.00
8,502.0	90.70	93.30	6,798.1	-465.6	2,379.0	2,109.3	0.24	0.11	0.21
8,598.0	91.30	93.10	6,796.5	-470.9	2,474.9	2,185.5	0.66	0.63	-0.21
8,693.0	92.00	93.50	6,793.7	-476.4	2,569.7	2,261.0	0.85	0.74	0.42
8,788.0	93.00	93.70	6,789.6	-482.4	2,664.4	2,336.8	1.07	1.05	0.21
8,883.0	91.90	96.10	6,785.5	-490.5	2,759.0	2,413.9	2.78	-1.16	2.53
8,978.0	89.70	94.00	6,784.2	-498.8	2,853.6	2,491.2	3.20	-2.32	-2.21



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9,073.0	89.40	92.80	6,784.9	-504.5	2,948.4	2,566.8	1.30	-0.32	-1.26
9,168.0	90.30	92.60	6,785.2	-508.9	3,043.3	2,641.8	0.97	0.95	-0.21
9,263.0	89.60	93.50	6,785.3	-514.0	3,138.2	2,717.1	1.20	-0.74	0.95
9,358.0	89.50	92.80	6,786.0	-519.2	3,233.0	2,792.5	0.74	-0.11	-0.74
9,453.0	90.20	93.10	6,786.3	-524.1	3,327.9	2,867.7	0.80	0.74	0.32
9,548.0	90.20	92.80	6,785.9	-529.0	3,422.8	2,943.0	0.32	0.00	-0.32
9,643.0	90.60	92.40	6,785.3	-533.3	3,517.7	3,017.8	0.60	0.42	-0.42
9,738.0	91.40	92.30	6,783.6	-537.2	3,612.6	3,092.4	0.85	0.84	-0.11
9,833.0	90.80	92.40	6,781.8	-541.1	3,707.5	3,167.0	0.64	-0.63	0.11
9,928.0	91.90	92.60	6,779.6	-545.2	3,802.3	3,241.7	1.18	1.16	0.21
10,023.0	92.10	92.60	6,776.2	-549.5	3,897.2	3,316.5	0.21	0.21	0.00
10,118.0	90.20	93.10	6,774.3	-554.3	3,992.0	3,391.6	2.07	-2.00	0.53
10,213.0	89.70	92.60	6,774.4	-559.0	4,086.9	3,466.7	0.74	-0.53	-0.53
10,308.0	90.00	93.10	6,774.7	-563.7	4,181.8	3,541.9	0.61	0.32	0.53
10,403.0	90.00	92.40	6,774.7	-568.3	4,276.7	3,616.9	0.74	0.00	-0.74
10,498.0	91.40	92.60	6,773.5	-572.4	4,371.6	3,691.6	1.49	1.47	0.21
10,593.0	90.70	93.50	6,771.8	-577.5	4,466.4	3,766.9	1.20	-0.74	0.95
10,688.0	91.90	93.00	6,769.6	-582.8	4,561.3	3,842.4	1.37	1.26	-0.53
10,784.0	91.90	93.00	6,766.4	-587.9	4,657.1	3,918.4	0.00	0.00	0.00
10,878.0	91.00	91.60	6,764.0	-591.6	4,751.0	3,992.2	1.77	-0.96	-1.49
10,973.0	91.80	91.20	6,761.7	-594.0	4,845.9	4,065.8	0.94	0.84	-0.42
11,068.0	92.50	91.70	6,758.2	-596.4	4,940.8	4,139.4	0.91	0.74	0.53
11,163.0	91.00	91.70	6,755.3	-599.2	5,035.7	4,213.3	1.58	-1.58	0.00
11,259.0	92.20	91.60	6,752.6	-601.9	5,131.6	4,287.9	1.25	1.25	-0.10
11,326.0	92.90	91.70	6,749.6	-603.9	5,198.6	4,339.9	1.06	1.04	0.15
11,373.0	93.50	91.70	6,747.0	-605.3	5,245.5	4,376.5	1.28	1.28	0.00

BHT 2465'FSL & 535'FEL

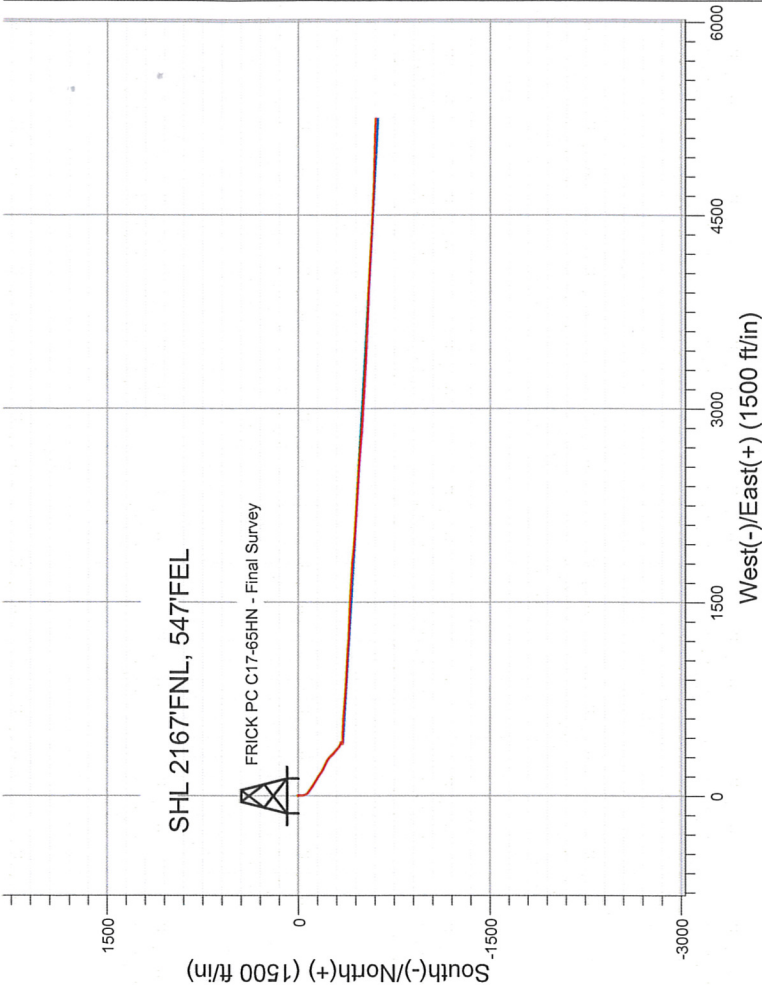
Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_

NOBLE ENERGY INC WELD COUNTY CO

Well Name: FRICK PC C17-65HN - Final Survey					
Surface Location: FRICK PAD 18-4N-64W					
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone					
Ground Elevation: 4758.0					
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1358417.70	3254925.59	40.313650	-104.585830
RKB ENSIGN RIG 132 13' RKB @ 4771.0ft (RKB ENSIGN RIG 132 13')					
Slot					

FINAL SURVEY

Projected Bottom Hole Location  
11373' MD 6746.97' TVD 605.25' N &  
5245.46' E of SHL  
93.5 degree Incl @ 91.7 degree AZM



ENSIGN  
Directional

