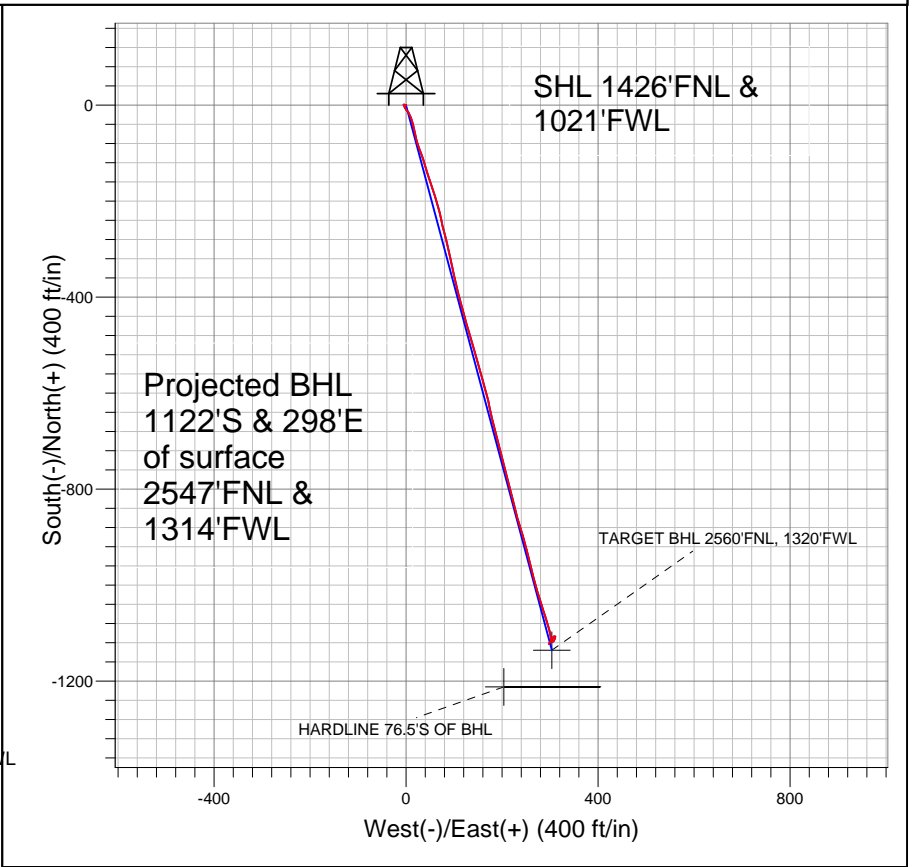


## NOBLE ENERGY INC WELD COUNTY CO



- LEGEND
- IGO Farms J28-20D, Wellbore #1, Plan #1 (07-06-09) V0
  - Wellbore #1
  - Survey #1

## Final Survey Plot

Projected Final Survey -  
 7639'MD & 7484'TVD @ 1161'VS  
 0.3 deg Inc 189.2 deg AZ

Project: SEC.28-T5N-R66W  
 Site: IGO Farms Pad Sec.28-T5N-R66W  
 Well: IGO Farms J28-20D  
 Plan: Wellbore #1



## **Directional**

# **NOBLE ENERGY INC WELD COUNTY CO**

**SEC.28-T5N-R66W**

**IGO Farms Pad Sec.28-T5N-R66W**

**IGO Farms J28-20D**

**Wellbore #1**

**Survey: Survey #1**

## **Standard Survey Report**

**05 April, 2011**



<b>Company:</b>	NOBLE ENERGY INC WELD COUNTY CO	<b>Local Co-ordinate Reference:</b>	Well IGO Farms J28-20D
<b>Project:</b>	SEC.28-T5N-R66W	<b>TVD Reference:</b>	WELL @ 4889.0ft (Original Well Elev)
<b>Site:</b>	IGO Farms Pad Sec.28-T5N-R66W	<b>MD Reference:</b>	WELL @ 4889.0ft (Original Well Elev)
<b>Well:</b>	IGO Farms J28-20D	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	Landmark

<b>Project</b>	SEC.28-T5N-R66W, 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

<b>Site</b>	IGO Farms Pad Sec.28-T5N-R66W		
<b>Site Position:</b>		<b>Northing:</b>	1,379,821.42 ft
<b>From:</b>	Lat/Long	<b>Easting:</b>	3,197,699.53 ft
<b>Position Uncertainty:</b>	0.0 ft	<b>Slot Radius:</b>	"
		<b>Latitude:</b>	40° 22' 25.824 N
		<b>Longitude:</b>	104° 47' 25.512 W
		<b>Grid Convergence:</b>	0.46 °

<b>Well</b>	IGO Farms J28-20D		
<b>Well Position</b>	<b>+N/-S</b>	0.0 ft	<b>Northing:</b> 1,379,821.61 ft
	<b>+E/-W</b>	0.0 ft	<b>Easting:</b> 3,197,724.60 ft
<b>Position Uncertainty</b>	0.0 ft	<b>Wellhead Elevation:</b>	ft
		<b>Latitude:</b>	40° 22' 25.824 N
		<b>Longitude:</b>	104° 47' 25.188 W
		<b>Ground Level:</b>	4,876.0 ft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF200510	7/6/2009	9.10	67.10	53,338

<b>Design</b>	Wellbore #1				
<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) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	165.02	

<b>Survey Program</b>	<b>Date</b>	4/5/2011			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
120.0	7,639.0	Survey #1 (Wellbore #1)	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	
120.0	0.40	256.50	120.0	-0.1	-0.4	0.0	0.33	0.33	0.00	
211.0	0.70	288.20	211.0	0.0	-1.2	-0.3	0.46	0.33	34.84	
301.0	0.70	302.70	301.0	0.5	-2.2	-1.0	0.20	0.00	16.11	
391.0	1.00	289.30	391.0	1.0	-3.4	-1.9	0.40	0.33	-14.89	
480.0	0.80	309.80	480.0	1.7	-4.6	-2.8	0.42	-0.22	23.03	
582.0	0.60	289.30	582.0	2.3	-5.7	-3.7	0.31	-0.20	-20.10	
664.0	0.40	323.00	664.0	2.7	-6.3	-4.2	0.42	-0.24	41.10	
757.0	0.40	135.50	757.0	2.7	-6.2	-4.2	0.86	0.00	185.48	
850.0	0.40	122.70	850.0	2.3	-5.7	-3.7	0.10	0.00	-13.76	
944.0	2.00	155.60	943.9	0.6	-4.8	-1.8	1.79	1.70	35.00	
1,037.0	4.00	159.30	1,036.8	-3.9	-3.0	3.0	2.16	2.15	3.98	
1,132.0	5.30	137.70	1,131.5	-10.2	1.2	10.2	2.27	1.37	-22.74	

<b>Company:</b>	NOBLE ENERGY INC WELD COUNTY CO	<b>Local Co-ordinate Reference:</b>	Well IGO Farms J28-20D
<b>Project:</b>	SEC.28-T5N-R66W	<b>TVD Reference:</b>	WELL @ 4889.0ft (Original Well Elev)
<b>Site:</b>	IGO Farms Pad Sec.28-T5N-R66W	<b>MD Reference:</b>	WELL @ 4889.0ft (Original Well Elev)
<b>Well:</b>	IGO Farms J28-20D	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	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)	
1,224.0	6.70	152.00	1,223.0	-18.1	6.5	19.2	2.22	1.52	15.54	
1,318.0	9.00	161.20	1,316.1	-29.9	11.5	31.9	2.78	2.45	9.79	
1,412.0	10.80	167.10	1,408.7	-45.5	15.8	48.0	2.20	1.91	6.28	
1,506.0	11.80	168.90	1,500.9	-63.5	19.6	66.4	1.13	1.06	1.91	
1,600.0	11.60	161.20	1,592.9	-81.9	24.5	85.4	1.67	-0.21	-8.19	
1,693.0	13.00	159.00	1,683.8	-100.5	31.3	105.1	1.59	1.51	-2.37	
1,787.0	14.00	161.60	1,775.2	-121.1	38.7	127.0	1.24	1.06	2.77	
1,871.0	14.30	164.30	1,856.7	-140.8	44.7	147.5	0.86	0.36	3.21	
1,974.0	15.40	161.50	1,956.2	-166.0	52.5	173.9	1.27	1.07	-2.72	
2,068.0	15.30	162.50	2,046.9	-189.6	60.2	198.7	0.30	-0.11	1.06	
2,161.0	15.20	164.10	2,136.6	-213.1	67.2	223.2	0.47	-0.11	1.72	
2,255.0	16.60	168.70	2,227.0	-238.1	73.2	248.9	2.00	1.49	4.89	
2,348.0	15.30	165.70	2,316.4	-263.0	78.8	274.4	1.65	-1.40	-3.23	
2,442.0	14.10	165.40	2,407.3	-286.1	84.8	298.3	1.28	-1.28	-0.32	
2,629.0	14.00	169.10	2,588.7	-330.4	94.8	343.6	0.48	-0.05	1.98	
2,753.0	17.80	166.70	2,708.0	-363.5	102.0	377.6	3.11	3.06	-1.94	
2,825.0	19.10	166.00	2,776.3	-385.7	107.4	400.3	1.83	1.81	-0.97	
2,911.0	19.00	164.80	2,857.6	-412.8	114.5	428.4	0.47	-0.12	-1.40	
3,004.0	17.70	165.40	2,945.8	-441.1	122.0	457.7	1.41	-1.40	0.65	
3,099.0	18.40	162.30	3,036.2	-469.4	130.2	487.1	1.25	0.74	-3.26	
3,192.0	18.50	165.20	3,124.4	-497.6	138.4	516.5	0.99	0.11	3.12	
3,286.0	16.60	162.60	3,214.0	-524.9	146.2	544.8	2.19	-2.02	-2.77	
3,380.0	16.50	165.70	3,304.1	-550.6	153.6	571.6	0.95	-0.11	3.30	
3,473.0	17.30	163.50	3,393.1	-576.7	160.7	598.6	1.10	0.86	-2.37	
3,570.0	15.40	165.90	3,486.2	-603.0	168.0	625.9	2.08	-1.96	2.47	
3,660.0	16.40	168.90	3,572.7	-627.1	173.3	650.6	1.44	1.11	3.33	
3,754.0	16.10	166.20	3,663.0	-652.8	179.0	676.8	0.86	-0.32	-2.87	
3,847.0	16.30	165.30	3,752.3	-677.9	185.4	702.8	0.35	0.22	-0.97	
3,941.0	16.70	166.10	3,842.4	-703.8	192.0	729.5	0.49	0.43	0.85	
4,035.0	16.80	164.90	3,932.4	-730.0	198.8	756.6	0.38	0.11	-1.28	
4,126.0	17.10	165.20	4,019.5	-755.6	205.6	783.1	0.34	0.33	0.33	
4,220.0	16.00	167.20	4,109.6	-781.6	212.0	809.9	1.32	-1.17	2.13	
4,313.0	16.00	164.60	4,199.0	-806.5	218.3	835.5	0.77	0.00	-2.80	
4,407.0	17.30	166.70	4,289.0	-832.6	224.9	862.4	1.52	1.38	2.23	
4,500.0	17.20	164.30	4,377.8	-859.3	231.8	890.0	0.77	-0.11	-2.58	
4,594.0	16.70	162.60	4,467.8	-885.5	239.6	917.4	0.75	-0.53	-1.81	
4,688.0	17.90	164.40	4,557.5	-912.3	247.5	945.3	1.40	1.28	1.91	
4,781.0	17.80	166.80	4,646.0	-939.9	254.6	973.8	0.80	-0.11	2.58	
4,875.0	15.70	165.70	4,736.0	-966.3	261.0	1,000.9	2.26	-2.23	-1.17	
4,969.0	15.30	165.70	4,826.6	-990.6	267.2	1,026.0	0.43	-0.43	0.00	
5,062.0	14.70	162.40	4,916.5	-1,013.7	273.8	1,050.1	1.12	-0.65	-3.55	
5,153.0	13.10	162.30	5,004.8	-1,034.6	280.5	1,071.9	1.76	-1.76	-0.11	
5,246.0	12.50	162.80	5,095.5	-1,054.2	286.7	1,092.5	0.66	-0.65	0.54	
5,339.0	10.00	162.00	5,186.7	-1,071.5	292.1	1,110.6	2.69	-2.69	-0.86	
5,432.0	8.40	165.70	5,278.5	-1,085.8	296.3	1,125.5	1.83	-1.72	3.98	
5,526.0	6.00	164.10	5,371.7	-1,097.2	299.3	1,137.2	2.56	-2.55	-1.70	
5,620.0	4.30	172.90	5,465.4	-1,105.4	301.1	1,145.7	1.99	-1.81	9.36	
5,714.0	3.10	176.40	5,559.2	-1,111.4	301.7	1,151.6	1.30	-1.28	3.72	
5,805.0	1.70	176.50	5,650.1	-1,115.2	302.0	1,155.4	1.54	-1.54	0.11	
5,904.0	1.30	119.10	5,749.0	-1,117.2	303.0	1,157.6	1.50	-0.40	-57.98	
5,955.1	1.06	109.17	5,800.1	-1,117.7	304.0	1,158.3	0.61	-0.46	-19.44	
TARGET BHL 2560'FNL, 1320'FWL										
5,999.0	0.90	96.80	5,844.0	-1,117.8	304.7	1,158.6	0.61	-0.37	-28.16	
6,093.0	1.10	61.30	5,938.0	-1,117.5	306.2	1,158.7	0.68	0.21	-37.77	

<b>Company:</b>	NOBLE ENERGY INC WELD COUNTY CO	<b>Local Co-ordinate Reference:</b>	Well IGO Farms J28-20D
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<b>Well:</b>	IGO Farms J28-20D	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	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)
6,186.0	1.00	41.70	6,031.0	-1,116.5	307.6	1,158.0	0.40	-0.11	-21.08
6,279.0	0.70	24.80	6,124.0	-1,115.3	308.3	1,157.1	0.42	-0.32	-18.17
6,376.0	1.10	28.70	6,221.0	-1,114.0	309.0	1,156.0	0.42	0.41	4.02
6,466.0	1.80	17.40	6,310.9	-1,111.9	309.9	1,154.2	0.84	0.78	-12.56
6,560.0	2.40	11.90	6,404.9	-1,108.5	310.7	1,151.2	0.67	0.64	-5.85
6,653.0	1.50	287.90	6,497.8	-1,106.3	310.0	1,148.8	2.90	-0.97	-90.32
6,753.0	1.10	225.50	6,597.8	-1,106.5	308.0	1,148.6	1.39	-0.40	-62.40
6,847.0	1.80	218.10	6,691.8	-1,108.3	306.5	1,149.9	0.77	0.74	-7.87
6,942.0	1.70	209.70	6,786.7	-1,110.7	304.9	1,151.8	0.29	-0.11	-8.84
7,036.0	1.80	213.90	6,880.7	-1,113.2	303.3	1,153.7	0.17	0.11	4.47
7,121.0	1.70	206.90	6,965.7	-1,115.4	302.0	1,155.6	0.28	-0.12	-8.24
7,215.0	1.50	213.90	7,059.6	-1,117.7	300.7	1,157.4	0.30	-0.21	7.45
7,308.0	1.10	211.30	7,152.6	-1,119.4	299.6	1,158.8	0.43	-0.43	-2.80
7,402.0	0.70	215.90	7,246.6	-1,120.7	298.8	1,159.8	0.43	-0.43	4.89
7,495.0	0.50	220.40	7,339.6	-1,121.4	298.2	1,160.4	0.22	-0.22	4.84
7,589.0	0.30	189.20	7,433.6	-1,122.0	297.9	1,160.9	0.31	-0.21	-33.19
7,635.0	0.30	189.20	7,479.5	-1,122.2	297.8	1,161.1	0.00	0.00	0.00
<b>HARDLINE 76.5'S OF BHL</b>									
7,639.0	0.30	189.20	7,483.6	-1,122.3	297.8	1,161.1	0.00	0.00	0.00

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