



## **Noble Energy Inc.**

**Weld County, CO**

**Sec 1, T5N, R64W, 6th PM**

**SLW Ranch B01-63-1HN**

**Wellbore #1**

**Design: Wellbore #1** FINAL

## **DDC Survey Report**

**27 March, 2013**



<b>Company:</b>	Noble Energy Inc.	<b>Local Co-ordinate Reference:</b>	Well SLW Ranch B01-63-1HN
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 4634.0usft (H&P #326)
<b>Site:</b>	Sec 1, T5N, R64W, 6th PM	<b>MD Reference:</b>	WELL @ 4634.0usft (H&P #326)
<b>Well:</b>	SLW Ranch B01-63-1HN	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db

Project	Weld County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site		Sec 1, T5N, R64W, 6th PM			
Site Position:		Northing:	1,398,889.40 usft	Latitude:	40° 25' 26.328 N
From:	Lat/Long	Easting:	3,280,466.06 usft	Longitude:	104° 29' 33.360 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.65 °

Well	SLW Ranch B01-63-1HN					
Well Position	+N-S	0.0 usft	Northing:	1,398,907.74 usft	Latitude:	40° 25' 26.508 N
	+E-W	0.0 usft	Easting:	3,280,476.99 usft	Longitude:	104° 29' 33.216 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,604.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/14/2013	8.48	67.05	52,990

Design	Wellbore #1				
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	268.58	

Survey Program		Date	3/27/2013		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
633.0	11,250.0	MWD (Wellbore #1)	MWD default	MWD - Standard	

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
TIE IN @ 633' MD / 633' TVD									
633.0	0.00	0.00	633.0	0.0	0.0	0.0	0.00	0.00	0.00
644.0	0.30	127.40	644.0	0.0	0.0	0.0	2.73	2.73	0.00
738.0	0.30	173.40	738.0	-0.4	0.2	-0.2	0.25	0.00	48.94
833.0	0.30	149.70	833.0	-0.9	0.4	-0.4	0.13	0.00	-24.95
927.0	0.20	189.90	927.0	-1.2	0.5	-0.5	0.21	-0.11	42.77
1,211.0	0.40	205.90	1,211.0	-2.6	0.0	0.1	0.08	0.07	5.63
1,496.0	0.40	159.20	1,496.0	-4.5	-0.1	0.2	0.11	0.00	-16.39
1,777.0	0.90	111.40	1,777.0	-6.2	2.3	-2.1	0.25	0.18	-17.01
1,869.0	4.00	88.90	1,868.9	-6.4	6.2	-6.0	3.46	3.37	-24.46

<b>Company:</b>	Noble Energy Inc.	<b>Local Co-ordinate Reference:</b>	Well SLW Ranch B01-63-1HN
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 4634.0usft (H&P #326)
<b>Site:</b>	Sec 1, T5N, R64W, 6th PM	<b>MD Reference:</b>	WELL @ 4634.0usft (H&P #326)
<b>Well:</b>	SLW Ranch B01-63-1HN	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,963.0	5.50	79.20	1,962.6	-5.5	13.9	-13.7	1.80	1.60	-10.32
2,056.0	8.40	93.60	2,054.9	-5.1	25.0	-24.9	3.61	3.12	15.48
2,148.0	10.10	95.20	2,145.7	-6.2	39.8	-39.6	1.87	1.85	1.74
2,242.0	12.20	86.20	2,237.9	-6.3	57.9	-57.7	2.90	2.23	-9.57
2,335.0	14.20	93.30	2,328.4	-6.3	79.1	-78.9	2.76	2.15	7.63
2,426.0	16.40	88.50	2,416.2	-6.6	103.1	-102.9	2.79	2.42	-5.27
2,519.0	18.10	87.60	2,505.0	-5.7	130.7	-130.5	1.85	1.83	-0.97
2,613.0	18.20	87.50	2,594.3	-4.4	159.9	-159.8	0.11	0.11	-0.11
2,705.0	19.50	89.20	2,681.4	-3.6	189.6	-189.5	1.53	1.41	1.85
2,797.0	20.00	89.70	2,768.0	-3.3	220.7	-220.6	0.57	0.54	0.54
2,891.0	18.90	88.90	2,856.6	-2.9	252.0	-251.9	1.20	-1.17	-0.85
2,986.0	19.90	86.40	2,946.2	-1.6	283.5	-283.4	1.37	1.05	-2.63
3,080.0	19.20	88.30	3,034.8	-0.1	314.9	-314.8	1.01	-0.74	2.02
3,175.0	16.60	88.30	3,125.2	0.7	344.1	-344.0	2.74	-2.74	0.00
3,270.0	16.10	88.70	3,216.4	1.4	370.9	-370.8	0.54	-0.53	0.42
3,364.0	15.10	90.10	3,306.9	1.7	396.1	-396.1	1.14	-1.06	1.49
3,459.0	15.60	89.20	3,398.5	1.9	421.3	-421.2	0.58	0.53	-0.95
3,554.0	16.80	88.30	3,489.7	2.5	447.8	-447.7	1.29	1.26	-0.95
3,649.0	19.10	89.60	3,580.1	3.0	477.0	-477.0	2.46	2.42	1.37
3,743.0	19.80	93.10	3,668.8	2.2	508.3	-508.2	1.45	0.74	3.72
3,838.0	20.90	94.70	3,757.8	0.0	541.3	-541.1	1.30	1.16	1.68
3,933.0	19.90	93.60	3,846.9	-2.4	574.3	-574.1	1.13	-1.05	-1.16
4,027.0	17.90	92.40	3,935.8	-4.1	604.7	-604.4	2.17	-2.13	-1.28
4,122.0	17.60	89.90	4,026.3	-4.6	633.7	-633.3	0.86	-0.32	-2.63
4,217.0	17.00	90.40	4,117.0	-4.7	661.9	-661.6	0.65	-0.63	0.53
4,311.0	16.50	89.40	4,207.0	-4.7	689.0	-688.7	0.61	-0.53	-1.06
4,406.0	18.00	90.10	4,297.7	-4.5	717.2	-716.8	1.59	1.58	0.74
4,501.0	17.90	88.00	4,388.1	-4.1	746.4	-746.1	0.69	-0.11	-2.21
4,595.0	15.80	88.00	4,478.0	-3.1	773.7	-773.3	2.23	-2.23	0.00
4,690.0	14.50	90.30	4,569.7	-2.7	798.5	-798.2	1.51	-1.37	2.42
4,785.0	14.50	92.40	4,661.7	-3.3	822.3	-821.9	0.55	0.00	2.21
4,880.0	14.10	89.70	4,753.8	-3.7	845.7	-845.4	0.82	-0.42	-2.84
4,974.0	14.90	89.70	4,844.8	-3.6	869.2	-868.9	0.85	0.85	0.00
5,069.0	16.10	92.40	4,936.3	-4.1	894.6	-894.2	1.47	1.26	2.84
5,164.0	13.90	92.00	5,028.1	-5.0	919.2	-918.8	2.32	-2.32	-0.42
5,258.0	12.10	101.00	5,119.7	-7.3	940.2	-939.7	2.88	-1.91	9.57
5,353.0	11.40	91.00	5,212.7	-9.4	959.3	-958.8	2.26	-0.74	-10.53
5,448.0	9.90	87.60	5,306.1	-9.2	976.9	-976.3	1.71	-1.58	-3.58
5,543.0	8.00	85.70	5,399.9	-8.4	991.6	-991.1	2.02	-2.00	-2.00
5,638.0	6.20	93.40	5,494.2	-8.2	1,003.3	-1,002.8	2.14	-1.89	8.11
5,732.0	5.20	91.20	5,587.7	-8.6	1,012.7	-1,012.1	1.09	-1.06	-2.34
5,827.0	4.60	113.30	5,682.4	-10.2	1,020.5	-1,019.9	2.07	-0.63	23.26
5,923.0	4.30	193.10	5,778.2	-15.2	1,023.2	-1,022.5	5.95	-0.31	83.13
6,017.0	13.10	244.10	5,871.1	-23.3	1,012.8	-1,011.9	11.61	9.36	54.26

<b>Company:</b>	Noble Energy Inc.	<b>Local Co-ordinate Reference:</b>	Well SLW Ranch B01-63-1HN
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 4634.0usft (H&P #326)
<b>Site:</b>	Sec 1, T5N, R64W, 6th PM	<b>MD Reference:</b>	WELL @ 4634.0usft (H&P #326)
<b>Well:</b>	SLW Ranch B01-63-1HN	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
6,112.0	17.80	255.30	5,962.6	-31.7	989.0	-987.9	5.84	4.95	11.79
6,208.0	17.50	263.10	6,054.1	-37.2	960.5	-959.3	2.48	-0.31	8.13
6,302.0	20.30	270.80	6,143.1	-38.6	930.1	-928.9	3.98	2.98	8.19
6,396.0	23.60	277.60	6,230.3	-35.9	895.2	-894.0	4.43	3.51	7.23
6,444.0	26.20	274.80	6,273.8	-33.7	875.1	-874.0	5.95	5.42	-5.83
6,491.0	29.20	272.40	6,315.4	-32.4	853.3	-852.2	6.81	6.38	-5.11
6,585.0	36.40	262.50	6,394.4	-35.1	802.6	-801.5	9.53	7.66	-10.53
6,680.0	42.80	258.30	6,467.6	-45.3	743.0	-741.7	7.30	6.74	-4.42
6,725.0	48.30	257.30	6,499.1	-52.1	711.6	-710.1	12.32	12.22	-2.22
6,774.0	54.20	258.30	6,529.8	-60.2	674.3	-672.6	12.15	12.04	2.04
<b>CROSSED HARD LINE @ 6854' MD / 6571' TVD</b>									
6,854.2	63.91	260.10	6,571.0	-73.0	606.8	-604.8	12.25	12.10	2.25
6,869.0	65.70	260.40	6,577.3	-75.3	593.6	-591.5	12.25	12.12	2.01
6,963.0	79.30	262.20	6,605.5	-88.7	505.2	-502.8	14.58	14.47	1.91
6,991.0	84.70	263.20	6,609.3	-92.3	477.7	-475.3	19.61	19.29	3.57
7,054.0	91.10	263.90	6,611.7	-99.3	415.2	-412.6	10.22	10.16	1.11
7,118.0	92.30	264.60	6,609.8	-105.7	351.5	-348.8	2.17	1.88	1.09
7,212.0	91.40	268.30	6,606.7	-111.5	257.8	-254.9	4.05	-0.96	3.94
7,307.0	89.60	270.30	6,605.9	-112.7	162.8	-159.9	2.83	-1.89	2.11
7,401.0	89.90	270.30	6,606.3	-112.2	68.8	-66.0	0.32	0.32	0.00
7,496.0	88.80	269.60	6,607.4	-112.3	-26.2	29.0	1.37	-1.16	-0.74
7,591.0	92.40	270.80	6,606.4	-112.0	-121.2	123.9	3.99	3.79	1.26
7,686.0	92.10	270.30	6,602.7	-111.1	-216.1	218.8	0.61	-0.32	-0.53
7,781.0	91.50	272.40	6,599.7	-108.8	-311.0	313.6	2.30	-0.63	2.21
7,876.0	90.50	273.60	6,598.0	-103.8	-405.9	408.3	1.64	-1.05	1.26
7,970.0	90.80	278.40	6,596.9	-94.0	-499.3	501.5	5.12	0.32	5.11
8,065.0	85.30	276.30	6,600.2	-81.9	-593.5	595.3	6.20	-5.79	-2.21
8,160.0	86.70	276.80	6,606.8	-71.1	-687.6	689.2	1.56	1.47	0.53
8,255.0	89.00	277.60	6,610.4	-59.2	-781.8	783.0	2.56	2.42	0.84
8,350.0	87.60	271.90	6,613.2	-51.3	-876.4	877.4	6.18	-1.47	-6.00
8,445.0	89.80	274.30	6,615.3	-46.2	-971.2	972.0	3.43	2.32	2.53
8,540.0	87.60	273.30	6,617.5	-39.9	-1,066.0	1,066.6	2.54	-2.32	-1.05
8,634.0	89.00	273.10	6,620.3	-34.6	-1,159.8	1,160.3	1.50	1.49	-0.21
8,729.0	92.90	273.30	6,618.7	-29.3	-1,254.6	1,254.9	4.11	4.11	0.21
8,824.0	92.70	272.40	6,614.1	-24.6	-1,349.4	1,349.5	0.97	-0.21	-0.95
8,919.0	93.10	271.70	6,609.3	-21.2	-1,444.2	1,444.3	0.85	0.42	-0.74
9,014.0	92.50	271.20	6,604.6	-18.8	-1,539.0	1,539.0	0.82	-0.63	-0.53
9,109.0	90.80	269.90	6,601.9	-17.9	-1,634.0	1,633.9	2.25	-1.79	-1.37
9,204.0	89.90	269.40	6,601.3	-18.5	-1,729.0	1,728.9	1.08	-0.95	-0.53
9,299.0	90.50	269.90	6,601.0	-19.1	-1,824.0	1,823.9	0.82	0.63	0.53
9,394.0	88.70	267.60	6,601.6	-21.1	-1,918.9	1,918.9	3.07	-1.89	-2.42
9,488.0	89.50	266.40	6,603.1	-26.1	-2,012.8	2,012.8	1.53	0.85	-1.28
9,583.0	91.00	265.70	6,602.7	-32.6	-2,107.6	2,107.7	1.74	1.58	-0.74

<b>Company:</b>	Noble Energy Inc.	<b>Local Co-ordinate Reference:</b>	Well SLW Ranch B01-63-1HN
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 4634.0usft (H&P #326)
<b>Site:</b>	Sec 1, T5N, R64W, 6th PM	<b>MD Reference:</b>	WELL @ 4634.0usft (H&P #326)
<b>Well:</b>	SLW Ranch B01-63-1HN	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db

#### Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,678.0	90.50	265.20	6,601.5	-40.1	-2,202.3	2,202.6	0.74	-0.53	-0.53
9,773.0	91.90	264.30	6,599.5	-48.8	-2,296.8	2,297.3	1.75	1.47	-0.95
9,868.0	91.70	263.60	6,596.5	-58.8	-2,391.3	2,392.0	0.77	-0.21	-0.74
9,963.0	92.20	265.40	6,593.3	-67.9	-2,485.8	2,486.7	1.97	0.53	1.89
10,057.0	92.30	267.10	6,589.6	-74.1	-2,579.5	2,580.5	1.81	0.11	1.81
10,152.0	90.00	270.80	6,587.7	-75.8	-2,674.4	2,675.5	4.59	-2.42	3.89
10,246.0	90.00	272.20	6,587.7	-73.4	-2,768.4	2,769.4	1.49	0.00	1.49
10,341.0	89.80	272.70	6,587.8	-69.3	-2,863.3	2,864.1	0.57	-0.21	0.53
10,436.0	89.90	273.40	6,588.1	-64.2	-2,958.2	2,958.8	0.74	0.11	0.74
10,530.0	87.90	270.10	6,589.9	-61.4	-3,052.1	3,052.7	4.10	-2.13	-3.51
10,625.0	88.70	268.20	6,592.7	-62.8	-3,147.0	3,147.6	2.17	0.84	-2.00
10,719.0	87.80	266.90	6,595.6	-66.8	-3,240.9	3,241.6	1.68	-0.96	-1.38
10,814.0	89.90	266.90	6,597.5	-71.9	-3,335.7	3,336.5	2.21	2.21	0.00
10,909.0	91.20	267.10	6,596.6	-76.9	-3,430.6	3,431.4	1.38	1.37	0.21
11,004.0	91.20	266.80	6,594.6	-82.0	-3,525.4	3,526.4	0.32	0.00	-0.32
11,099.0	90.90	266.00	6,592.8	-87.9	-3,620.2	3,621.3	0.90	-0.32	-0.84
11,193.0	92.00	266.00	6,590.5	-94.5	-3,714.0	3,715.2	1.17	1.17	0.00
<b>TD @ 11250' MD / 6589' TVD</b>									
11,250.0	92.00	266.00	6,588.5	-98.5	-3,770.8	3,772.1	0.00	0.00	0.00

#### Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
633.0	633.0	0.0	0.0	TIE IN @ 633' MD / 633' TVD
6,854.2	6,571.0	-73.0	606.8	CROSSED HARD LINE @ 6854' MD / 6571' TVD
11,250.0	6,588.5	-98.5	-3,770.8	TD @ 11250' MD / 6589' TVD

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



---

---

## Survey Certification Sheet

Noble Energy  
Company

RM-13219  
Job Number

4/12/13  
Date

Sec1,T5N,R64W,6<sup>th</sup>PM  
Lease

SLW Ranch B01-63-1HN  
Well Name

Weld,CO  
County & State

API: 05-123-36259

Surveyed from a depth of: 633 feet to 11250 feet MD

Type of Survey: MWD

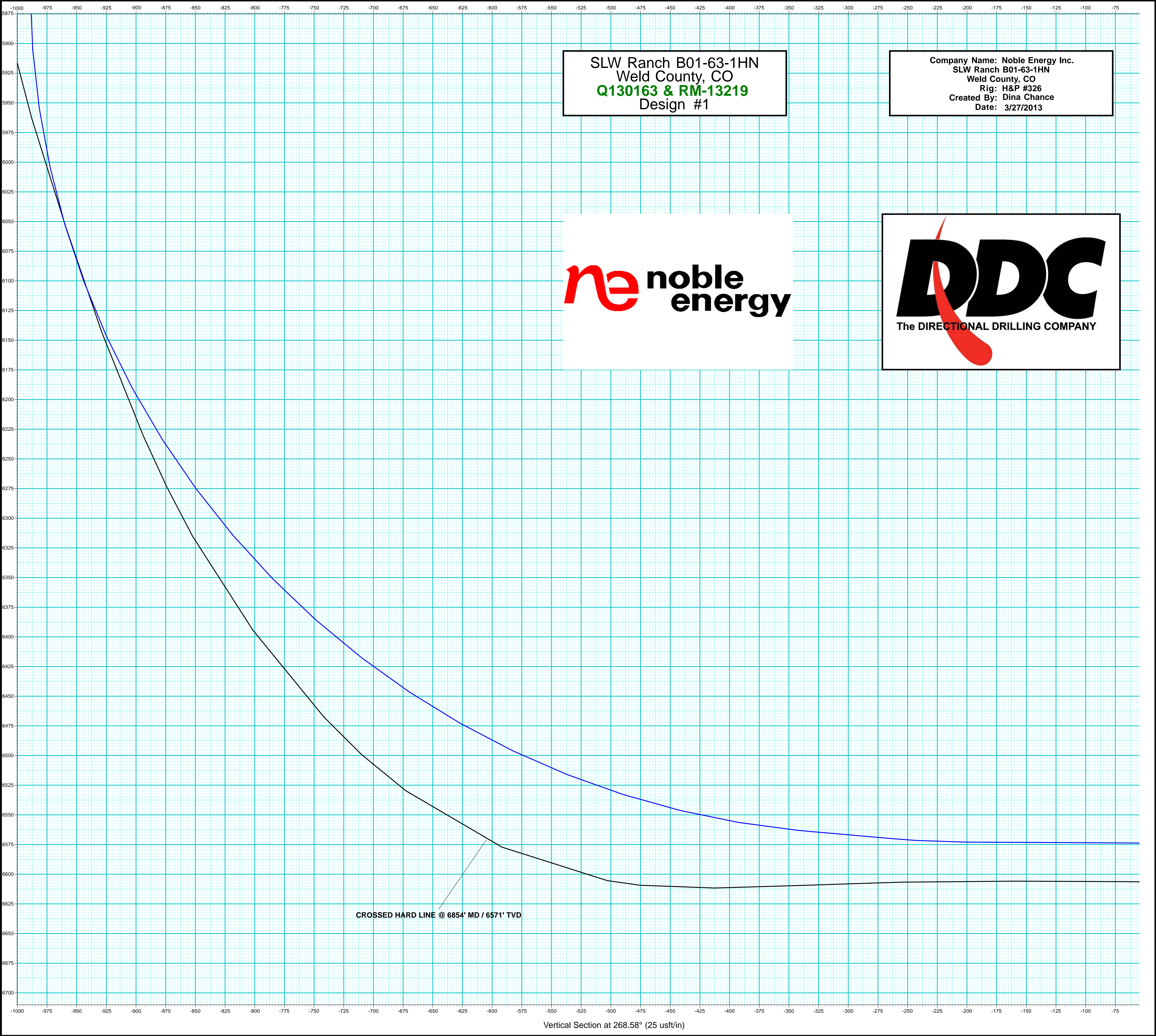
Directional Supervisor/Surveyor: Bob Kubistek

The data and calculations for this survey have been checked by me and conform to the standards and procedures set forth by **The Directional Drilling Company (DDC)**. This report represents a true and correct Directional survey of this well based on the original data obtained at the well site. Wellbore Coordinates are calculated using minimum curvature.

Digitally signed by Larry Wright  
DN: cn=Larry Wright, o=The  
Directional Drilling Company,  
ou=GM of Guidance Services,  
email=larryw@directionaldrillers.c  
om, c=US  
Date: 2013.04.12 10:10:45 -05'00'

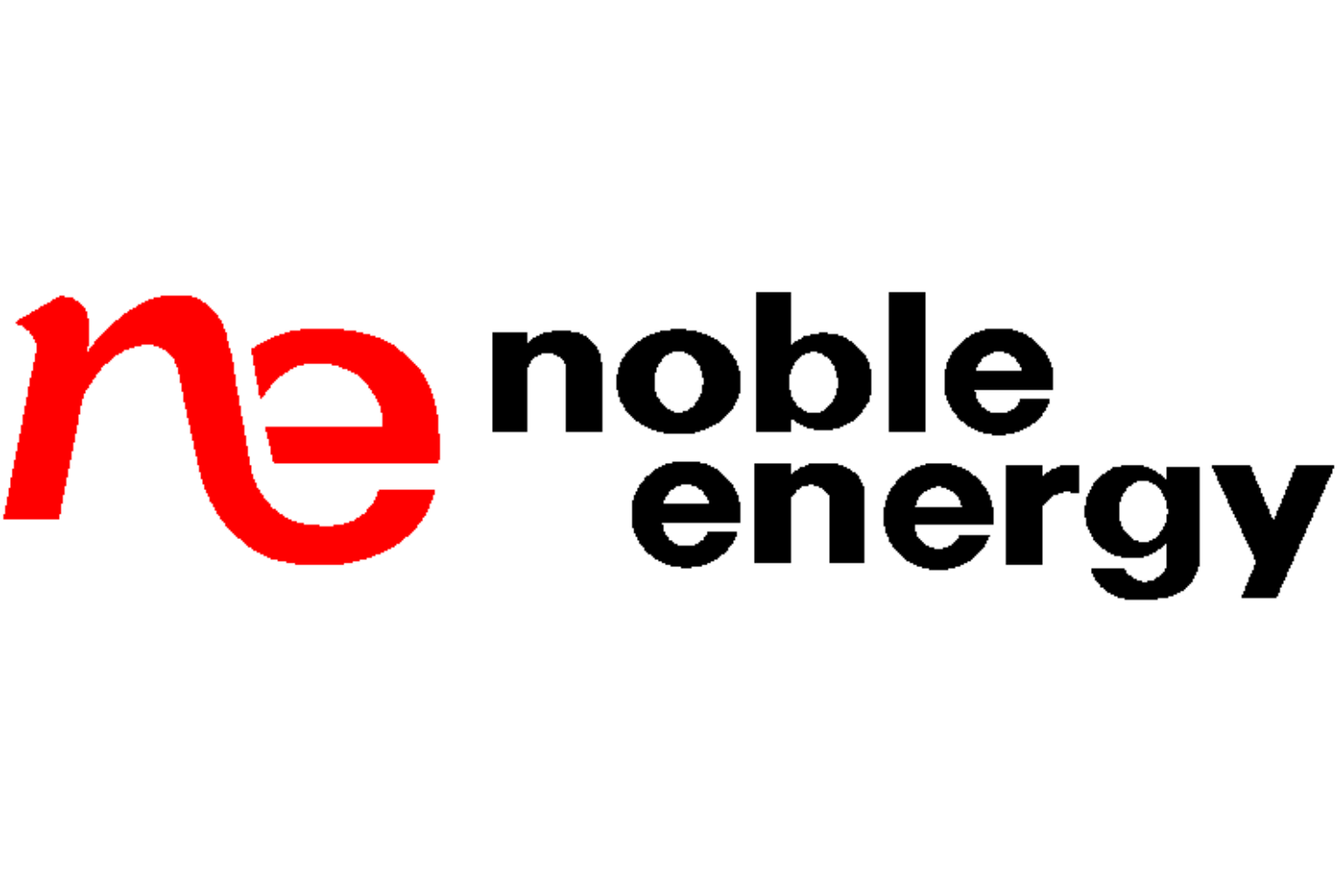
Larry Wright  
MWD General Manager





SLW Ranch B01-63-1HN  
Weld County, CO  
**Q130163 & RM-13219**  
Design #1

Company Name: Noble Energy Inc.  
SLW Ranch B01-63-1HN  
Weld County, CO  
Rig: H&P #326  
Created By: Dina Chance  
Date: 3/27/2013

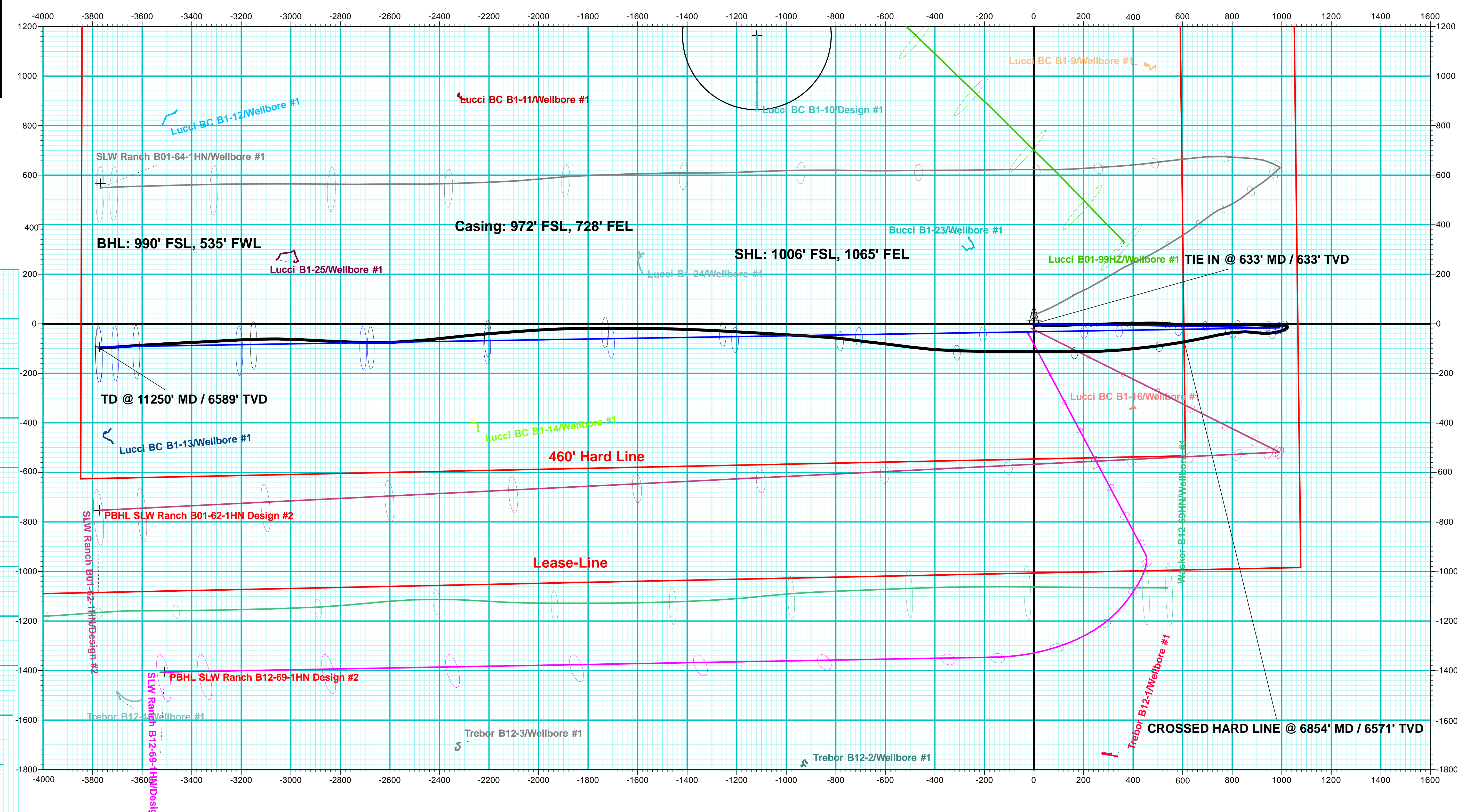
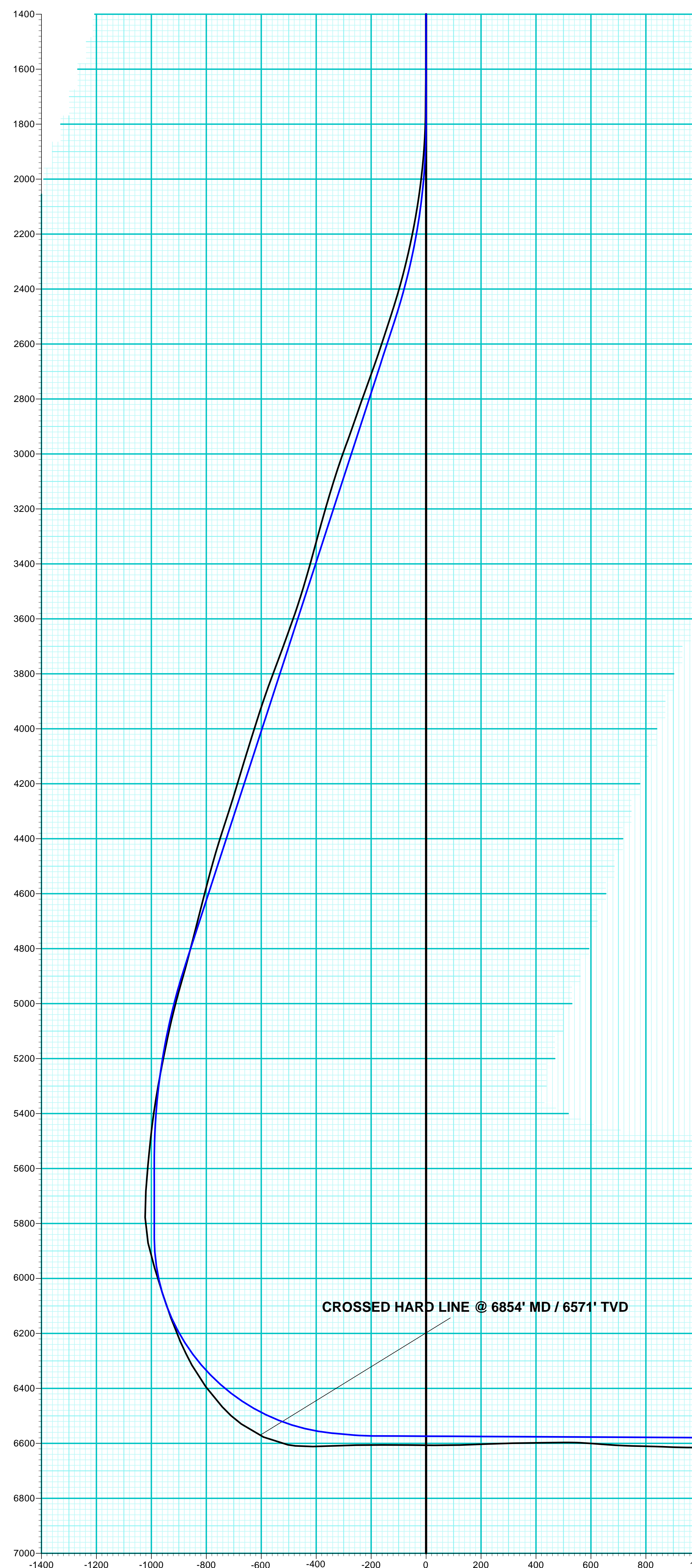


CROSSED HARD LINE @ 6854' MD / 6571' TVD



SLW Ranch B01-63-1HN  
Weld County, CO  
**Q130163 & RM-13219**  
Design #1

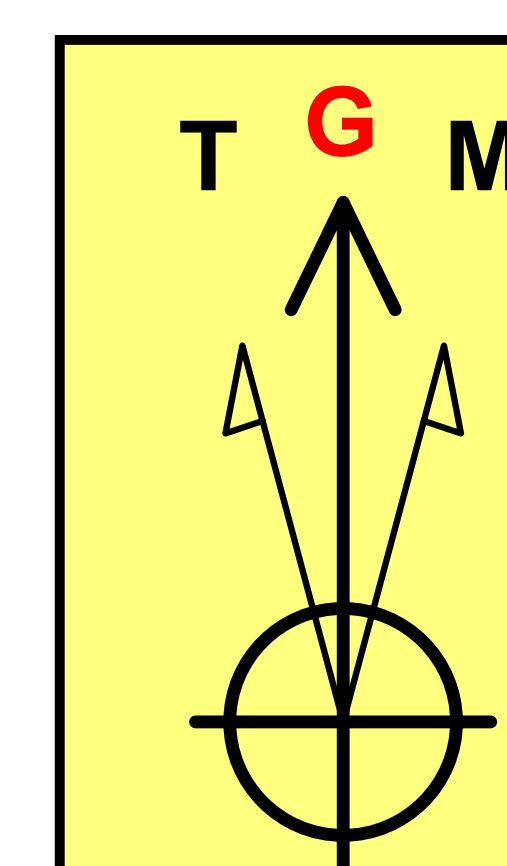
<b>Geodetic System:</b>	US State Plane 1983
<b>Datum:</b>	North American Datum 1983
<b>Ellipsoid:</b>	GRS 1980
<b>Zone:</b>	Colorado Northern Zone
<b>System Datum:</b>	Mean Sea Level



		WELL DETAILS:		SLW Ranch B01-63-1HN	
+N/-S	+E/-W	Ground Level: Northing	4604.0 Easting	Latitude	Longitude
0.0	0.0	1398907.74	3280476.98	40° 25' 26.508 N	104° 29' 33.216 W

ANNOTATIONS							
MD	Inc	Azi	TVD	+N/-S	+E/-W	Vsect	Departure Annotation
633.0	0.00	0.00	633.0	0.0	0.0	0.0	TIE IN @ 633' MD / 633' TVD
6854.2	63.91	260.10	6571.0	-73.0	606.8	-604.8	CROSSED HARD LINE @ 6854' MD / 6571' TVD
11250.0	92.00	266.00	6588.5	-98.5	-3770.8	3772.1	TD @ 11250' MD / 6589' TVD

DESIGN TARGET DETAILS							
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL SLW Ranch B01-63-1HN - plan hits target center	6594.0	-93.6	-3771.7	1398814.17	3276705.32	40° 25' 26.004 N	104° 30' 21.996 W



Azimuths to Grid North  
Magnetic North: 7.83°  
Magnetic Field  
Strength: 52990.3snT  
Dip Angle: 67.05°  
Date: 3/14/2013  
Model: IGRF2010

Vertical Section at 268.58° (200 usft/in)