



Noble Energy Inc.

**Weld County, CO
Sec 12, T5N,R64W
SLW Ranch B12-62-1HN**

Wellbore #1

Design: Wellbore #1 FINAL

DDC Survey Report

10 May, 2013



Company:	Noble Energy Inc.	Local Co-ordinate Reference:	Well SLW Ranch B12-62-1HN
Project:	Weld County, CO	TVD Reference:	WELL @ 4626.0usft (H&P #326)
Site:	Sec 12, T5N,R64W	MD Reference:	WELL @ 4626.0usft (H&P #326)
Well:	SLW Ranch B12-62-1HN	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	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 12, T5N,R64W				
Site Position:		Northing:	1,393,120.64 usft	Latitude:	40° 24' 29.772 N
From:	Lat/Long	Easting:	3,276,451.66 usft	Longitude:	104° 30' 26.100 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.64 °

Well	SLW Ranch B12-62-1HN					
Well Position	+N-S	0.0 usft	Northing:	1,393,120.64 usft	Latitude:	40° 24' 29.772 N
	+E-W	0.0 usft	Easting:	3,276,451.66 usft	Longitude:	104° 30' 26.100 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,596.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/27/2013	8.49	67.04	52,977

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	94.74	

Survey Program	Date 5/10/2013			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
286.0	10,779.0	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)	
FIRST MWD SURVEY @ 286' MD / 286' TVD										
286.0	0.20	338.20	286.0	0.5	-0.2	-0.2	0.07	0.07	0.00	
630.0	0.30	194.20	630.0	0.1	-0.6	-0.6	0.14	0.03	-41.86	
675.0	0.10	238.60	675.0	0.0	-0.7	-0.7	0.53	-0.44	98.67	
706.0	0.30	112.20	706.0	0.0	-0.6	-0.6	1.19	0.65	-407.74	
738.0	1.30	86.80	738.0	0.0	-0.2	-0.2	3.24	3.13	-79.38	
769.0	2.50	82.00	769.0	0.1	0.8	0.8	3.90	3.87	-15.48	
801.0	2.60	82.90	800.9	0.3	2.2	2.2	0.34	0.31	2.81	
832.0	2.60	89.20	831.9	0.4	3.6	3.6	0.92	0.00	20.32	
864.0	2.90	90.30	863.9	0.4	5.2	5.1	0.95	0.94	3.44	

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	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)	
895.0	2.70	88.30	894.8	0.4	6.7	6.6	0.72	-0.65	-6.45	
927.0	3.10	89.70	926.8	0.4	8.3	8.2	1.27	1.25	4.38	
959.0	2.80	87.50	958.8	0.4	9.9	9.9	1.00	-0.94	-6.88	
990.0	3.10	91.50	989.7	0.5	11.5	11.5	1.17	0.97	12.90	
1,022.0	2.80	93.10	1,021.7	0.4	13.2	13.1	0.97	-0.94	5.00	
1,067.0	2.60	97.10	1,066.6	0.2	15.3	15.2	0.61	-0.44	8.89	
1,116.0	2.30	93.10	1,115.6	0.0	17.4	17.3	0.70	-0.61	-8.16	
1,161.0	1.90	92.20	1,160.5	-0.1	19.0	19.0	0.89	-0.89	-2.00	
1,210.0	1.80	81.10	1,209.5	0.0	20.6	20.5	0.76	-0.20	-22.65	
1,255.0	1.90	78.50	1,254.5	0.3	22.0	21.9	0.29	0.22	-5.78	
1,308.0	2.10	94.30	1,307.5	0.4	23.9	23.7	1.10	0.38	29.81	
1,353.0	2.70	98.50	1,352.4	0.2	25.7	25.6	1.39	1.33	9.33	
1,402.0	2.50	97.80	1,401.4	-0.1	27.9	27.8	0.41	-0.41	-1.43	
1,447.0	2.50	100.50	1,446.3	-0.5	29.9	29.8	0.26	0.00	6.00	
1,497.0	3.30	99.90	1,496.3	-0.9	32.4	32.3	1.60	1.60	-1.20	
1,542.0	4.00	108.40	1,541.2	-1.6	35.1	35.1	1.96	1.56	18.89	
1,591.0	5.30	119.60	1,590.0	-3.3	38.7	38.9	3.22	2.65	22.86	
1,636.0	6.70	131.40	1,634.8	-6.0	42.5	42.8	4.13	3.11	26.22	
1,683.0	7.60	141.90	1,681.4	-10.3	46.5	47.2	3.37	1.91	22.34	
1,728.0	8.50	154.60	1,726.0	-15.7	49.7	50.8	4.42	2.00	28.22	
1,776.0	8.80	171.30	1,773.4	-22.5	51.8	53.5	5.25	0.63	34.79	
1,869.0	9.90	191.90	1,865.2	-37.3	51.2	54.1	3.76	1.18	22.15	
1,961.0	11.50	192.10	1,955.6	-54.1	47.7	52.0	1.74	1.74	0.22	
2,054.0	12.90	193.60	2,046.5	-73.2	43.3	49.2	1.54	1.51	1.61	
2,146.0	12.10	192.90	2,136.3	-92.6	38.7	46.2	0.89	-0.87	-0.76	
2,238.0	12.80	190.50	2,226.2	-112.0	34.7	43.9	0.95	0.76	-2.61	
2,331.0	13.70	195.40	2,316.7	-132.8	29.9	40.8	1.55	0.97	5.27	
2,423.0	12.80	195.20	2,406.2	-153.1	24.3	36.9	0.98	-0.98	-0.22	
2,516.0	11.90	194.30	2,497.1	-172.3	19.3	33.5	0.99	-0.97	-0.97	
2,610.0	11.30	193.40	2,589.2	-190.7	14.8	30.5	0.67	-0.64	-0.96	
2,703.0	12.10	194.50	2,680.2	-209.0	10.2	27.4	0.89	0.86	1.18	
2,795.0	11.40	206.30	2,770.3	-226.5	3.8	22.5	2.72	-0.76	12.83	
2,888.0	8.30	211.40	2,861.9	-240.4	-3.8	16.1	3.46	-3.33	5.48	
2,983.0	8.10	211.60	2,956.0	-252.0	-10.9	10.0	0.21	-0.21	0.21	
3,078.0	5.10	212.40	3,050.3	-261.3	-16.7	5.0	3.16	-3.16	0.84	
3,172.0	4.20	205.20	3,144.0	-267.9	-20.4	1.8	1.14	-0.96	-7.66	
3,267.0	3.30	189.60	3,238.8	-273.8	-22.3	0.4	1.42	-0.95	-16.42	
3,362.0	3.90	199.30	3,333.6	-279.5	-23.8	-0.7	0.90	0.63	10.21	
3,456.0	3.90	200.70	3,427.4	-285.5	-26.0	-2.3	0.10	0.00	1.49	
3,551.0	4.00	201.70	3,522.2	-291.6	-28.4	-4.2	0.13	0.11	1.05	
3,646.0	4.10	202.60	3,617.0	-297.8	-30.9	-6.2	0.12	0.11	0.95	
3,741.0	4.40	203.60	3,711.7	-304.3	-33.7	-8.4	0.33	0.32	1.05	
3,835.0	2.90	193.80	3,805.5	-309.9	-35.7	-10.0	1.72	-1.60	-10.43	
3,930.0	1.60	148.30	3,900.4	-313.4	-35.6	-9.6	2.22	-1.37	-47.89	

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4,025.0	1.50	149.70	3,995.4	-315.6	-34.2	-8.0	0.11	-0.11	1.47	
4,119.0	1.60	138.10	4,089.4	-317.6	-32.7	-6.4	0.35	0.11	-12.34	
4,214.0	2.00	109.30	4,184.3	-319.1	-30.3	-3.8	1.03	0.42	-30.32	
4,309.0	2.00	114.70	4,279.3	-320.4	-27.2	-0.7	0.20	0.00	5.68	
4,404.0	2.20	118.80	4,374.2	-322.0	-24.1	2.6	0.26	0.21	4.32	
4,498.0	2.40	140.00	4,468.1	-324.3	-21.3	5.6	0.92	0.21	22.55	
4,593.0	1.10	184.50	4,563.1	-326.8	-20.1	7.0	1.88	-1.37	46.84	
4,687.0	1.10	2.90	4,657.1	-326.8	-20.1	7.0	2.34	0.00	189.79	
4,782.0	1.10	4.80	4,752.1	-324.9	-20.0	6.9	0.04	0.00	2.00	
4,877.0	1.20	355.40	4,847.0	-323.0	-20.0	6.8	0.22	0.11	-9.89	
4,971.0	1.10	337.20	4,941.0	-321.2	-20.4	6.2	0.40	-0.11	-19.36	
5,066.0	1.50	333.00	5,036.0	-319.3	-21.3	5.1	0.43	0.42	-4.42	
5,161.0	1.50	324.80	5,131.0	-317.2	-22.6	3.7	0.23	0.00	-8.63	
5,255.0	1.50	330.20	5,224.9	-315.1	-23.9	2.2	0.15	0.00	5.74	
5,350.0	0.40	71.30	5,319.9	-313.9	-24.2	1.8	1.71	-1.16	106.42	
5,445.0	0.30	65.50	5,414.9	-313.7	-23.7	2.3	0.11	-0.11	-6.11	
5,540.0	0.20	120.70	5,509.9	-313.7	-23.3	2.7	0.26	-0.11	58.11	
5,635.0	0.20	51.30	5,604.9	-313.7	-23.0	3.0	0.24	0.00	-73.05	
5,730.0	0.10	30.70	5,699.9	-313.5	-22.9	3.1	0.12	-0.11	-21.68	
5,825.0	0.20	50.70	5,794.9	-313.3	-22.7	3.3	0.12	0.11	21.05	
5,919.0	5.70	76.70	5,888.8	-312.1	-18.0	7.8	5.87	5.85	27.66	
6,014.0	15.00	77.60	5,982.1	-308.4	-1.4	24.1	9.79	9.79	0.95	
6,109.0	20.80	89.00	6,072.5	-305.5	27.5	52.7	7.11	6.11	12.00	
6,204.0	27.50	86.80	6,159.1	-303.9	66.3	91.2	7.11	7.05	-2.32	
6,299.0	35.60	84.30	6,240.0	-300.0	115.8	140.2	8.64	8.53	-2.63	
6,394.0	44.80	89.40	6,312.5	-296.9	176.9	200.9	10.28	9.68	5.37	
6,488.0	56.10	96.30	6,372.3	-300.8	249.1	273.1	13.27	12.02	7.34	
6,583.0	61.80	97.10	6,421.3	-310.3	329.9	354.4	6.04	6.00	0.84	
6,678.0	66.40	91.00	6,462.8	-316.3	415.1	439.8	7.53	4.84	-6.42	
6,773.0	76.50	87.80	6,493.0	-315.2	505.0	529.3	11.10	10.63	-3.37	
6,867.0	76.80	86.90	6,514.7	-311.0	596.4	620.0	0.98	0.32	-0.96	
6,912.0	76.90	87.10	6,525.0	-308.7	640.1	663.5	0.49	0.22	0.44	
6,941.0	80.60	88.20	6,530.6	-307.5	668.6	691.7	13.29	12.76	3.79	
7,022.0	87.70	89.60	6,538.9	-306.0	749.1	771.8	8.93	8.77	1.73	
7,116.0	89.50	91.70	6,541.2	-307.1	843.0	865.5	2.94	1.91	2.23	
7,211.0	89.60	92.00	6,541.9	-310.1	938.0	960.4	0.33	0.11	0.32	
7,306.0	89.40	91.80	6,542.7	-313.3	1,032.9	1,055.3	0.30	-0.21	-0.21	
7,401.0	88.90	91.70	6,544.1	-316.2	1,127.9	1,150.1	0.54	-0.53	-0.11	
7,496.0	88.00	91.80	6,546.7	-319.1	1,222.8	1,245.0	0.95	-0.95	0.11	
7,591.0	88.30	92.60	6,549.8	-322.7	1,317.7	1,339.8	0.90	0.32	0.84	
7,685.0	90.40	92.00	6,550.8	-326.5	1,411.6	1,433.7	2.32	2.23	-0.64	
7,780.0	90.40	92.20	6,550.2	-330.0	1,506.5	1,528.6	0.21	0.00	0.21	
7,874.0	90.00	92.20	6,549.9	-333.6	1,600.4	1,622.5	0.43	-0.43	0.00	

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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)
7,969.0	90.00	92.20	6,549.9	-337.2	1,695.4	1,717.4	0.00	0.00	0.00
8,064.0	89.40	92.00	6,550.4	-340.7	1,790.3	1,812.3	0.67	-0.63	-0.21
8,159.0	88.70	91.80	6,551.9	-343.9	1,885.2	1,907.2	0.77	-0.74	-0.21
8,254.0	87.60	91.80	6,555.0	-346.9	1,980.1	2,002.0	1.16	-1.16	0.00
8,349.0	88.90	92.20	6,557.9	-350.2	2,075.0	2,096.9	1.43	1.37	0.42
8,444.0	90.90	91.50	6,558.1	-353.2	2,170.0	2,191.7	2.23	2.11	-0.74
8,538.0	91.40	92.20	6,556.2	-356.3	2,263.9	2,285.6	0.92	0.53	0.74
8,633.0	90.80	91.80	6,554.4	-359.6	2,358.8	2,380.5	0.76	-0.63	-0.42
8,728.0	90.40	91.50	6,553.4	-362.3	2,453.8	2,475.3	0.53	-0.42	-0.32
8,823.0	89.80	91.20	6,553.2	-364.6	2,548.8	2,570.2	0.71	-0.63	-0.32
8,918.0	90.80	91.20	6,552.7	-366.6	2,643.7	2,665.0	1.05	1.05	0.00
9,013.0	90.20	91.00	6,551.9	-368.4	2,738.7	2,759.8	0.67	-0.63	-0.21
9,108.0	89.90	91.00	6,551.8	-370.0	2,833.7	2,854.6	0.32	-0.32	0.00
9,203.0	89.40	91.50	6,552.4	-372.1	2,928.7	2,949.4	0.74	-0.53	0.53
9,298.0	92.40	90.40	6,550.9	-373.7	3,023.6	3,044.2	3.36	3.16	-1.16
9,393.0	93.10	89.90	6,546.3	-373.9	3,118.5	3,138.8	0.91	0.74	-0.53
9,488.0	91.90	90.80	6,542.2	-374.5	3,213.4	3,233.4	1.58	-1.26	0.95
9,583.0	90.90	90.60	6,539.8	-375.7	3,308.4	3,328.1	1.07	-1.05	-0.21
9,678.0	89.20	91.30	6,539.8	-377.2	3,403.4	3,422.9	1.94	-1.79	0.74
9,772.0	88.70	91.30	6,541.5	-379.4	3,497.3	3,516.7	0.53	-0.53	0.00
9,867.0	88.20	90.80	6,544.1	-381.1	3,592.3	3,611.5	0.74	-0.53	-0.53
9,962.0	87.80	92.00	6,547.4	-383.4	3,687.2	3,706.3	1.33	-0.42	1.26
10,057.0	89.30	90.30	6,549.8	-385.3	3,782.1	3,801.0	2.39	1.58	-1.79
10,152.0	91.40	92.00	6,549.2	-387.2	3,877.1	3,895.9	2.84	2.21	1.79
10,247.0	89.80	91.50	6,548.2	-390.1	3,972.1	3,990.7	1.76	-1.68	-0.53
10,341.0	90.80	92.90	6,547.7	-393.8	4,066.0	4,084.6	1.83	1.06	1.49
10,436.0	88.60	90.60	6,548.2	-396.7	4,160.9	4,179.5	3.35	-2.32	-2.42
10,531.0	86.90	90.40	6,551.9	-397.5	4,255.8	4,274.1	1.80	-1.79	-0.21
10,625.0	88.70	88.90	6,555.5	-396.9	4,349.8	4,367.7	2.49	1.91	-1.60
10,720.0	88.10	89.00	6,558.2	-395.2	4,444.7	4,462.2	0.64	-0.63	0.11
TD @ 10779' MD / 6561' TVD									
10,779.0	87.50	89.00	6,560.5	-394.1	4,503.7	4,520.8	1.02	-1.02	0.00

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
286.0	286.0	0.5	-0.2	FIRST MWD SURVEY @ 286' MD / 286' TVD
10,779.0	6,560.5	-394.1	4,503.7	TD @ 10779' MD / 6561' TVD

Checked By: _____ Approved By: _____ Date: _____



Survey Certification Sheet

Noble Energy Inc
Company

RM-13362
Job Number

5/24/13
Date

Sec12,T5N,R64W
Lease

SLW Ranch B12-62-1HN
Well Name

Weld, CO
County & State

API: 05-123-36532

Surveyed from a depth of: 286 feet to 10779 feet MD

Type of Survey: MWD

Directional Supervisor/Surveyor: Bob Kubistek

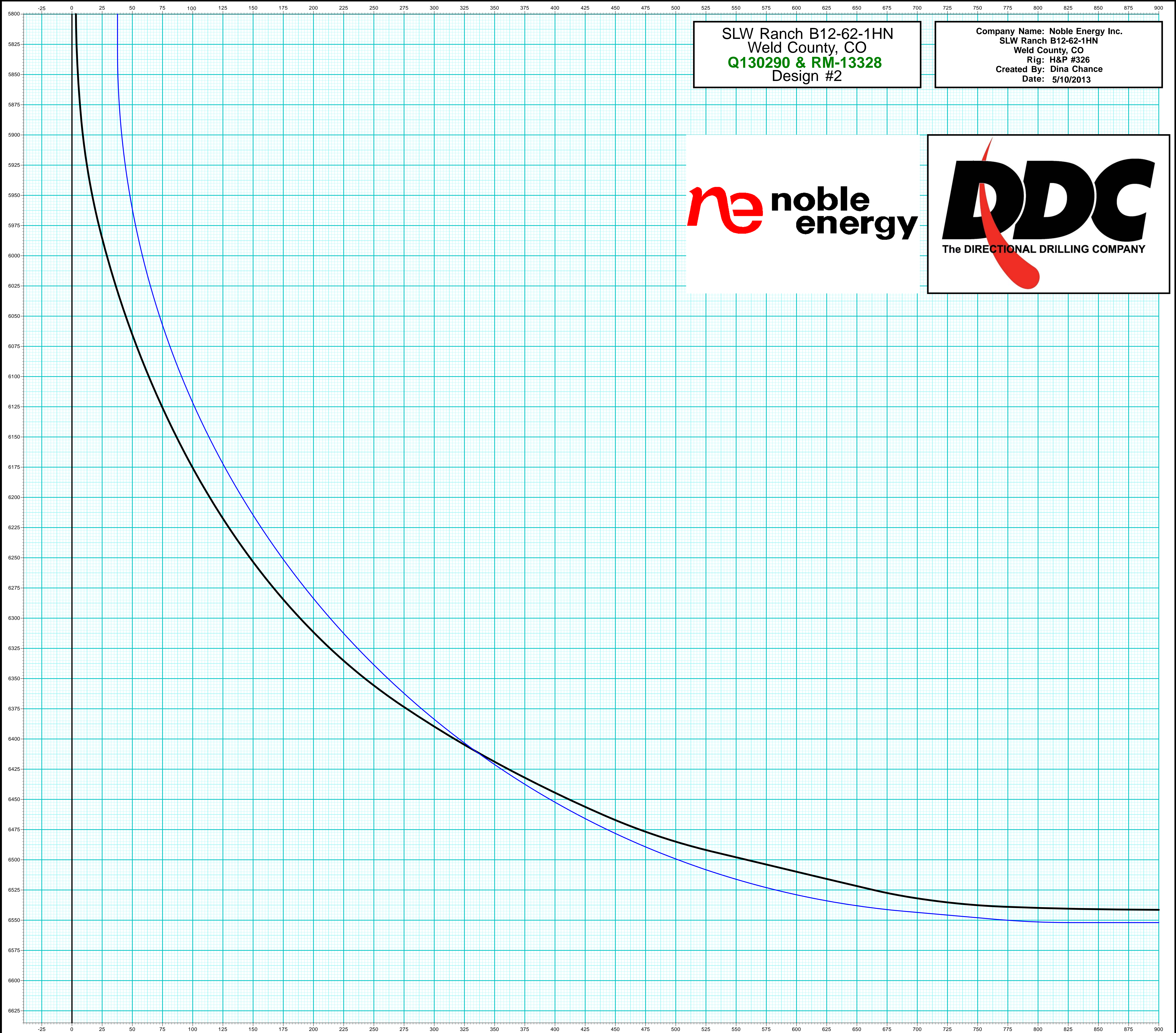
The data and calculations for this survey have been checked by me and conform to the standards and procedures set forth by **The Directional Drilling Company (DDC)**. This report represents a true and correct Directional survey of this well based on the original data obtained at the well site. Wellbore 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@directionaldriller
s.com, c=US
Date: 2013.05.28 16:53:06
-05'00'

Larry Wright
MWD General Manager

SLW Ranch B12-62-1HN
Weld County, CO
Q130290 & RM-13328
Design #2

Company Name: Noble Energy Inc.
SLW Ranch B12-62-1HN
Weld County, CO
Rig: H&P #326
Created By: Dina Chance
Date: 5/10/2013



Vertical Section at 94.74° (25 usft/in)

Company Name: Noble Energy Inc.
 SLW Ranch B12-62-1HN
 Weld County, CO
 Rig: H&P #326
 Created By: Dina Chance
 Date: 5/10/2013

SLW Ranch B12-62-1HN
 Weld County, CO
Q130290 & RM-13328
 Design #2



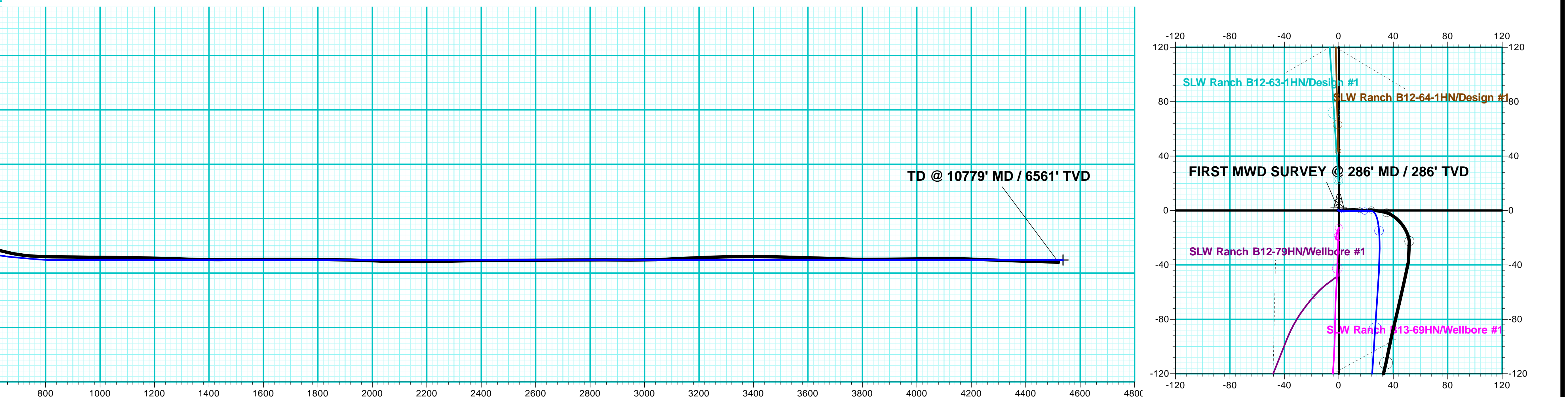
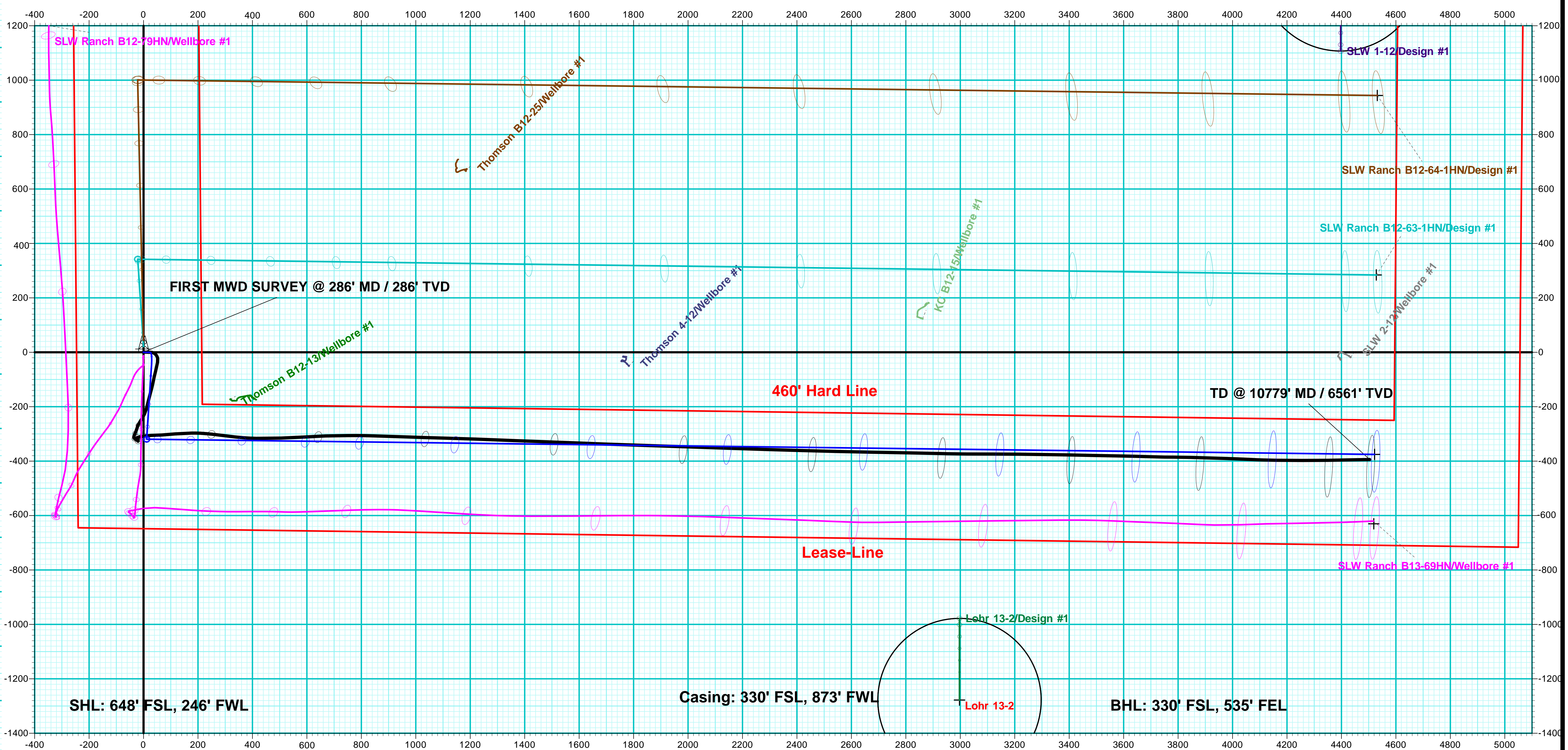
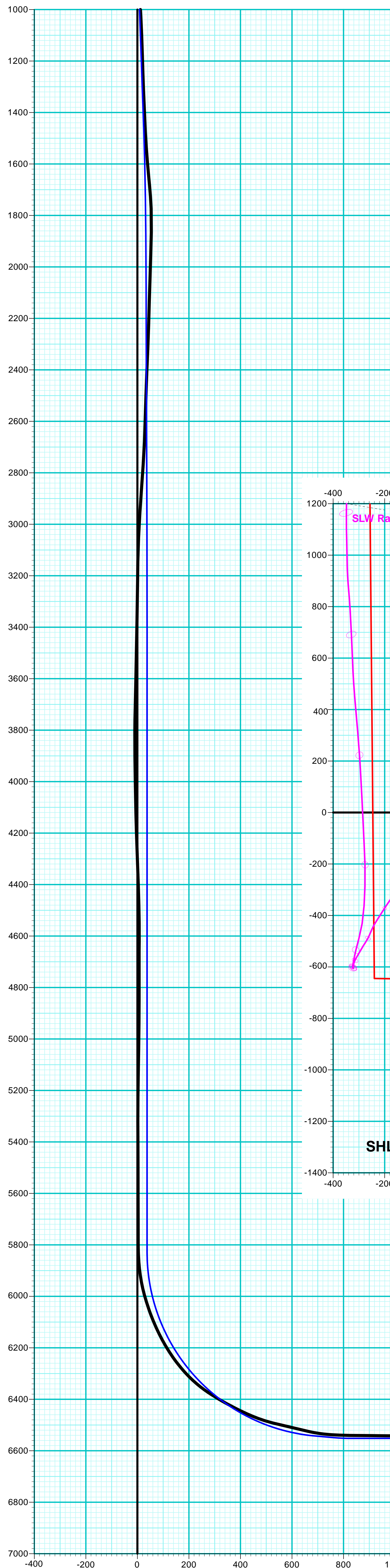
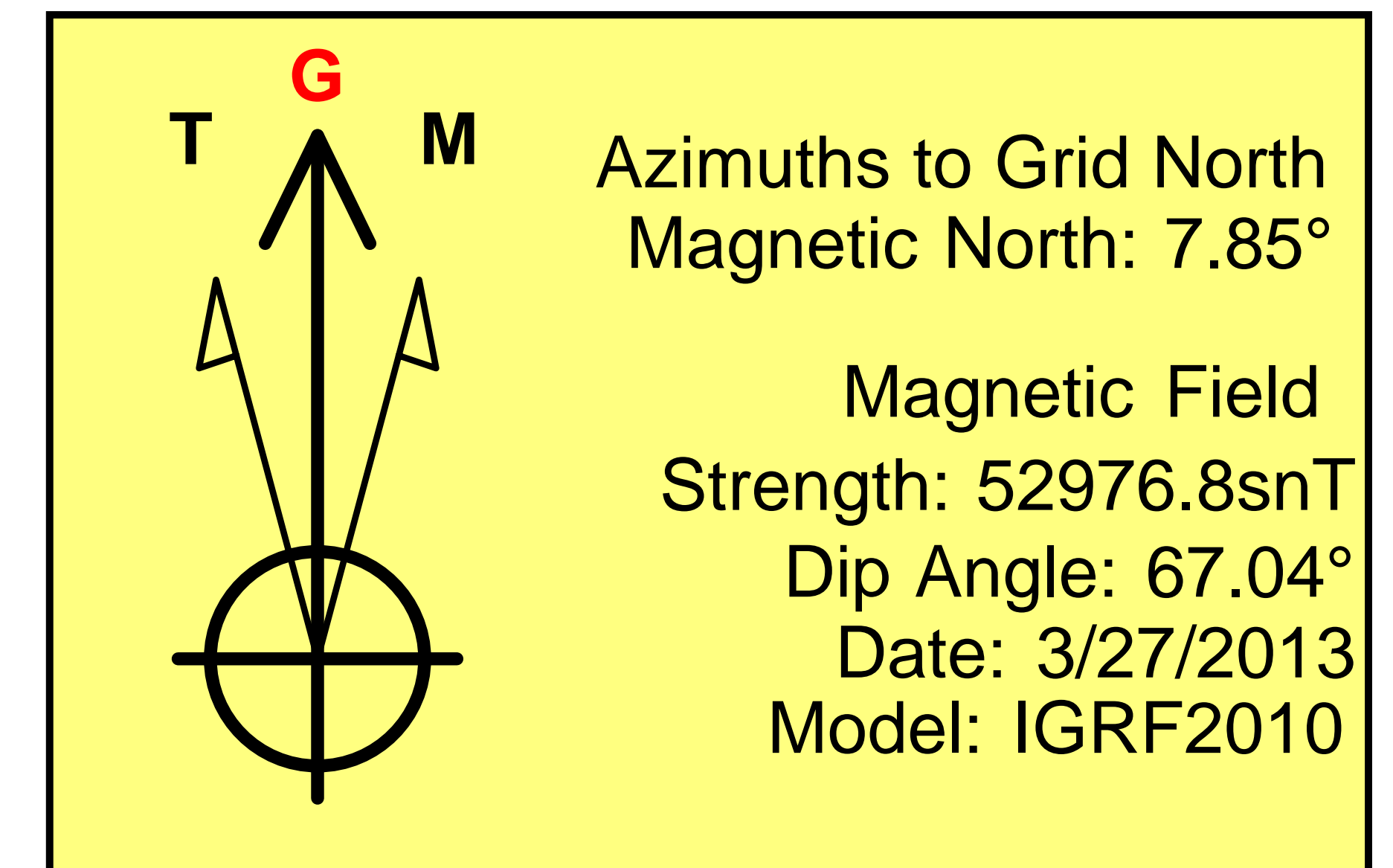
PROJECT DETAILS: Weld County, CO

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

ANNOTATIONS								
MD	Inc	Azi	TVD	+N/-S	+E/-W	V Sect	Departure	Annotation
286.0	0.20	338.20	286.0	0.5	-0.2	-0.2	0.5	FIRST MWD SURVEY @ 286' MD / 286' TVD
10779.0	87.50	89.00	6560.5	-394.1	4503.7	4520.8	4943.0	TD @ 10779' MD / 6561' TVD

DESIGN TARGET DETAILS							
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL SLW Ranch B12-62-1HN - plan hits target center	6552.0	-375.2	4521.6	1392745.43	3280973.25	40° 24' 25.560 N	104° 29' 27.706 W

WELL DETAILS: SLW Ranch B12-62-1HN								
+N/-S	+E/-W	Ground Level:	Northing		Easting		Latitude	Longitude
0.0	0.0	4596.0	1393120.63	3276451.65	40° 24' 29.772 N	104° 30' 26.100 W		



Vertical Section at 94.74° (200 usft/in)