



Noble Energy, Inc

Weld County, CO (NAD 83)

Sec 29, T6N-R62W (Wells Ranch AE30 Pad)

Wells Ranch AE30-64-1HNC

Wellbore #1

Design: OH

Standard Survey Report

25 June, 2014





IDS Survey Report



Company:	Noble Energy, Inc	Local Co-ordinate Reference:	Well Wells Ranch AE30-64-1HNC
Project:	Weld County, CO (NAD 83)	TVD Reference:	Well @ 4777.0usft (H&P277)
Site:	Sec 29, T6N-R62W (Wells Ranch AE30 Pad)	MD Reference:	Well @ 4777.0usft (H&P277)
Well:	Wells Ranch AE30-64-1HNC	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Project	Weld County, CO (NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site	Sec 29, T6N-R62W (Wells Ranch AE30 Pad)				
Site Position:		Northing:	1,410,139.62 usft	Latitude:	40° 27' 12.960 N
From:	Lat/Long	Easting:	3,318,293.89 usft	Longitude:	104° 21' 22.392 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.74 °

Well	Wells Ranch AE30-64-1HNC					
Well Position	+N/-S	0.0 usft	Northing:	1,410,103.19 usft	Latitude:	40° 27' 12.600 N
	+E/-W	0.0 usft	Easting:	3,318,294.36 usft	Longitude:	104° 21' 22.392 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	4,753.0 usft

Wellbore	Wellbore #1				
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	4/9/2014	8.27	67.06	52,905

Design	OH				
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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	273.32

Survey Program		Date	6/25/2014		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
280.0	636.0	Survey #1 (Wellbore #1)	Flexi-Shot	VES Flexi-Shot Tool	
734.0	6,924.0	Survey #2 (Wellbore #1)	MWD	MWD - Standard	
7,018.0	12,063.0	Survey #3 (Wellbore #1)	Sperry - MWD+IFR1+MS_	Fixed:v2:Rockies, crustal dec + 3-axis correction	

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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
280.0	0.60	295.03	280.0	0.6	-1.3	1.4	0.21	0.21	0.00
636.0	0.50	234.93	636.0	0.5	-4.3	4.3	0.16	-0.03	-16.88
734.0	0.70	237.28	734.0	-0.1	-5.1	5.1	0.21	0.20	2.40
First MWD									
828.0	0.79	239.03	828.0	-0.7	-6.2	6.1	0.10	0.10	1.86
921.0	0.70	233.32	921.0	-1.4	-7.2	7.1	0.13	-0.10	-6.14
1,015.0	0.70	243.25	1,015.0	-2.0	-8.2	8.0	0.13	0.00	10.56
1,109.0	0.70	218.64	1,108.9	-2.7	-9.0	8.9	0.32	0.00	-26.18



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Wellbore: Wellbore #1
Design: OH

Local Co-ordinate Reference: Well Wells Ranch AE30-64-1HNC
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MD Reference: Well @ 4777.0usft (H&P277)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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)
1,204.0	1.85	335.01	1,203.9	-1.7	-10.0	9.9	2.37	1.21	122.49
1,297.0	2.99	2.52	1,296.8	2.0	-10.6	10.7	1.72	1.23	29.58
1,392.0	4.75	5.95	1,391.6	8.4	-10.1	10.5	1.87	1.85	3.61
1,487.0	5.98	5.68	1,486.2	17.3	-9.2	10.1	1.30	1.29	-0.28
1,581.0	7.39	356.10	1,579.6	28.2	-9.1	10.7	1.91	1.50	-10.19
1,676.0	8.79	352.85	1,673.6	41.5	-10.4	12.8	1.55	1.47	-3.42
1,770.0	9.58	353.91	1,766.4	56.4	-12.1	15.4	0.86	0.84	1.13
1,865.0	9.15	352.41	1,860.2	71.7	-14.0	18.1	0.52	-0.45	-1.58
1,959.0	9.85	357.60	1,952.9	87.2	-15.3	20.3	1.18	0.74	5.52
2,054.0	9.06	351.18	2,046.6	102.7	-16.8	22.7	1.39	-0.83	-6.76
2,149.0	10.02	358.83	2,140.3	118.3	-18.1	24.9	1.67	1.01	8.05
2,243.0	9.58	358.04	2,232.9	134.3	-18.5	26.3	0.49	-0.47	-0.84
2,337.0	8.44	0.94	2,325.7	149.0	-18.7	27.3	1.31	-1.21	3.09
2,431.0	10.20	357.69	2,418.5	164.3	-18.9	28.4	1.95	1.87	-3.46
2,526.0	9.76	357.60	2,512.1	180.7	-19.6	30.0	0.46	-0.46	-0.09
2,620.0	8.79	359.18	2,604.8	195.9	-20.0	31.3	1.07	-1.03	1.68
2,715.0	10.64	353.56	2,698.5	211.8	-21.1	33.3	2.19	1.95	-5.92
2,809.0	10.02	353.29	2,790.9	228.6	-23.0	36.2	0.66	-0.66	-0.29
2,904.0	9.85	354.17	2,884.5	244.9	-24.8	39.0	0.24	-0.18	0.93
2,998.0	10.46	350.48	2,977.0	261.3	-27.0	42.1	0.95	0.65	-3.93
3,093.0	9.15	351.36	3,070.6	277.2	-29.6	45.6	1.39	-1.38	0.93
3,188.0	10.46	353.12	3,164.3	293.3	-31.8	48.7	1.41	1.38	1.85
3,283.0	9.58	350.22	3,257.8	309.6	-34.2	52.0	1.07	-0.93	-3.05
3,379.0	9.41	349.78	3,352.5	325.2	-36.9	55.7	0.19	-0.18	-0.46
3,473.0	10.64	347.40	3,445.1	341.3	-40.2	59.9	1.38	1.31	-2.53
3,568.0	10.46	346.52	3,538.4	358.2	-44.1	64.8	0.25	-0.19	-0.93
3,663.0	11.17	346.17	3,631.8	375.5	-48.3	70.0	0.75	0.75	-0.37
3,757.0	12.05	346.79	3,723.8	393.9	-52.7	75.4	0.95	0.94	0.66
3,851.0	13.01	347.05	3,815.6	413.8	-57.3	81.2	1.02	1.02	0.28
3,946.0	13.01	347.67	3,908.2	434.7	-62.0	87.1	0.15	0.00	0.65
4,040.0	10.02	350.30	4,000.3	453.1	-65.6	91.8	3.23	-3.18	2.80
4,135.0	8.53	350.92	4,094.0	468.2	-68.1	95.2	1.57	-1.57	0.65
4,229.0	7.83	347.75	4,187.1	481.3	-70.6	98.4	0.89	-0.74	-3.37
4,324.0	7.12	343.89	4,281.2	493.3	-73.6	102.1	0.92	-0.75	-4.06
4,418.0	6.33	349.95	4,374.6	504.0	-76.1	105.2	1.13	-0.84	6.45
4,513.0	4.40	355.23	4,469.2	512.8	-77.3	106.9	2.09	-2.03	5.56
4,607.0	2.64	4.01	4,563.0	518.5	-77.5	107.4	1.95	-1.87	9.34
4,702.0	1.85	321.74	4,657.9	521.9	-78.3	108.4	1.87	-0.83	-44.49
4,797.0	1.41	311.98	4,752.9	523.9	-80.1	110.3	0.55	-0.46	-10.27
4,891.0	1.49	301.26	4,846.9	525.3	-82.0	112.3	0.30	0.09	-11.40
4,986.0	1.67	292.12	4,941.8	526.5	-84.4	114.7	0.33	0.19	-9.62
5,080.0	1.58	270.59	5,035.8	527.0	-86.9	117.3	0.65	-0.10	-22.90
5,175.0	1.58	250.90	5,130.8	526.6	-89.5	119.8	0.57	0.00	-20.73



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Survey

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5,269.0	1.23	237.89	5,224.7	525.6	-91.5	121.9	0.50	-0.37	-13.84
5,363.0	0.97	224.09	5,318.7	524.5	-93.0	123.2	0.39	-0.28	-14.68
5,458.0	1.23	233.41	5,413.7	523.3	-94.3	124.5	0.33	0.27	9.81
5,552.0	1.23	87.95	5,507.7	522.8	-94.1	124.3	2.50	0.00	-154.74
5,647.0	0.97	100.43	5,602.7	522.7	-92.3	122.5	0.37	-0.27	13.14
5,741.0	0.79	71.25	5,696.7	522.7	-90.9	121.1	0.51	-0.19	-31.04
5,835.0	0.35	92.61	5,790.7	522.9	-90.0	120.2	0.51	-0.47	22.72
5,930.0	0.70	117.13	5,885.6	522.6	-89.2	119.4	0.43	0.37	25.81
6,025.0	3.78	276.91	5,980.6	522.7	-91.8	122.0	4.68	3.24	168.19
6,072.0	8.09	275.60	6,027.3	523.3	-96.6	126.8	9.17	9.17	-2.79
6,120.0	13.10	279.29	6,074.5	524.5	-105.4	135.6	10.53	10.44	7.69
6,167.0	15.83	275.60	6,120.0	525.9	-117.0	147.3	6.13	5.81	-7.85
6,214.0	19.96	267.95	6,164.7	526.3	-131.4	161.7	10.09	8.79	-16.28
6,261.0	24.01	267.16	6,208.3	525.5	-149.0	179.2	8.64	8.62	-1.68
6,309.0	29.11	267.77	6,251.2	524.6	-170.4	200.5	10.64	10.63	1.27
6,356.0	33.50	269.71	6,291.4	524.1	-194.8	224.9	9.58	9.34	4.13
6,404.0	38.87	270.32	6,330.1	524.1	-223.2	253.2	11.21	11.19	1.27
6,451.0	43.79	270.15	6,365.4	524.2	-254.2	284.2	10.47	10.47	-0.36
6,499.0	49.33	269.88	6,398.4	524.2	-289.0	318.9	11.55	11.54	-0.56
6,546.0	52.94	269.27	6,427.9	523.9	-325.6	355.4	7.75	7.68	-1.30
6,594.0	56.72	269.53	6,455.5	523.5	-364.9	394.6	7.89	7.88	0.54
6,641.0	61.20	269.00	6,479.7	523.0	-405.1	434.7	9.58	9.53	-1.13
6,688.0	64.81	268.21	6,501.1	522.0	-447.0	476.5	7.83	7.68	-1.68
6,735.0	68.06	268.83	6,519.8	520.9	-490.0	519.4	7.02	6.91	1.32
6,783.0	72.81	269.36	6,535.9	520.2	-535.2	564.5	9.95	9.90	1.10
6,830.0	77.91	270.50	6,547.8	520.1	-580.7	609.9	11.10	10.85	2.43
6,864.0	82.66	271.03	6,553.5	520.6	-614.2	643.3	14.05	13.97	1.56
6,917.0	87.26	274.22	6,558.2	523.0	-666.9	696.1	10.55	8.68	6.02
7"									
6,924.0	87.87	274.64	6,558.5	523.5	-673.9	703.1	10.55	8.70	5.98
7,018.0	88.93	265.73	6,561.1	523.8	-767.8	796.8	9.54	1.13	-9.48
7,113.0	91.11	264.32	6,561.1	515.6	-862.4	890.8	2.73	2.29	-1.48
7,208.0	90.02	265.70	6,560.1	507.3	-957.0	984.8	1.85	-1.15	1.45
7,302.0	89.78	267.72	6,560.3	501.9	-1,050.9	1,078.2	2.16	-0.26	2.15
7,397.0	88.91	269.37	6,561.4	499.5	-1,145.8	1,172.8	1.96	-0.92	1.74
7,491.0	88.55	268.11	6,563.5	497.5	-1,239.8	1,266.5	1.39	-0.38	-1.34
7,586.0	91.58	269.43	6,563.4	495.4	-1,334.7	1,361.2	3.48	3.19	1.39
7,680.0	91.22	267.74	6,561.1	493.1	-1,428.7	1,454.9	1.84	-0.38	-1.80
7,774.0	89.59	266.59	6,560.4	488.5	-1,522.6	1,548.3	2.12	-1.73	-1.22
7,869.0	88.23	265.63	6,562.2	482.0	-1,617.3	1,642.5	1.75	-1.43	-1.01
7,964.0	86.49	266.39	6,566.6	475.4	-1,712.0	1,736.7	2.00	-1.83	0.80
8,058.0	87.64	267.07	6,571.4	470.1	-1,805.7	1,829.9	1.42	1.22	0.72
8,153.0	88.92	266.49	6,574.3	464.7	-1,900.5	1,924.2	1.48	1.35	-0.61
8,247.0	89.20	268.93	6,575.8	461.0	-1,994.4	2,017.8	2.61	0.30	2.60



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8,342.0	89.57	269.29	6,576.8	459.5	-2,089.4	2,112.5	0.54	0.39	0.38
8,437.0	88.35	268.56	6,578.5	457.7	-2,184.4	2,207.2	1.50	-1.28	-0.77
8,531.0	88.88	268.71	6,580.8	455.5	-2,278.3	2,300.9	0.59	0.56	0.16
8,626.0	89.57	267.21	6,582.1	452.1	-2,373.2	2,395.4	1.74	0.73	-1.58
8,721.0	86.89	266.97	6,585.0	447.3	-2,468.1	2,489.8	2.83	-2.82	-0.25
8,815.0	86.67	267.46	6,590.3	442.7	-2,561.8	2,583.1	0.57	-0.23	0.52
8,910.0	88.02	267.39	6,594.7	438.4	-2,656.6	2,677.5	1.42	1.42	-0.07
9,005.0	90.18	267.14	6,596.2	433.9	-2,751.5	2,772.0	2.29	2.27	-0.26
9,099.0	93.30	266.55	6,593.3	428.7	-2,845.3	2,865.3	3.38	3.32	-0.63
9,194.0	94.03	267.74	6,587.3	424.0	-2,940.0	2,959.6	1.47	0.77	1.25
9,289.0	92.41	269.47	6,581.9	421.7	-3,034.8	3,054.1	2.49	-1.71	1.82
9,383.0	91.03	269.36	6,579.1	420.8	-3,128.7	3,147.8	1.47	-1.47	-0.12
9,478.0	90.92	271.15	6,577.5	421.2	-3,223.7	3,242.7	1.89	-0.12	1.88
9,573.0	87.88	268.10	6,578.5	420.6	-3,318.7	3,337.5	4.53	-3.20	-3.21
9,667.0	87.51	267.20	6,582.3	416.7	-3,412.5	3,430.9	1.03	-0.39	-0.96
9,762.0	88.29	266.63	6,585.8	411.6	-3,507.3	3,525.3	1.02	0.82	-0.60
9,856.0	90.38	267.28	6,586.8	406.6	-3,601.2	3,618.7	2.33	2.22	0.69
9,951.0	87.55	264.92	6,588.6	400.1	-3,695.9	3,712.9	3.88	-2.98	-2.48
10,046.0	88.10	263.41	6,592.2	390.5	-3,790.4	3,806.6	1.69	0.58	-1.59
10,140.0	87.73	266.56	6,595.6	382.3	-3,883.9	3,899.5	3.37	-0.39	3.35
10,235.0	86.22	268.98	6,600.6	378.6	-3,978.7	3,994.0	3.00	-1.59	2.55
10,329.0	86.14	269.46	6,606.9	377.3	-4,072.5	4,087.5	0.52	-0.09	0.51
10,424.0	87.58	269.79	6,612.1	376.7	-4,167.3	4,182.2	1.55	1.52	0.35
10,519.0	90.10	269.02	6,614.0	375.7	-4,262.3	4,276.9	2.77	2.65	-0.81
10,613.0	91.60	267.33	6,612.6	372.7	-4,356.2	4,370.5	2.40	1.60	-1.80
10,708.0	92.86	266.92	6,608.9	367.9	-4,451.1	4,464.9	1.39	1.33	-0.43
10,803.0	93.63	267.02	6,603.5	362.9	-4,545.8	4,559.2	0.82	0.81	0.11
10,897.0	93.93	267.84	6,597.3	358.7	-4,639.5	4,652.5	0.93	0.32	0.87
10,992.0	94.33	267.49	6,590.5	354.9	-4,734.1	4,746.8	0.56	0.42	-0.37
11,086.0	93.30	268.90	6,584.2	351.9	-4,827.9	4,840.2	1.85	-1.10	1.50
11,181.0	86.67	269.60	6,584.3	350.7	-4,922.8	4,934.9	7.02	-6.98	0.74
11,276.0	86.28	269.82	6,590.1	350.2	-5,017.6	5,029.5	0.47	-0.41	0.23
11,370.0	86.61	269.03	6,595.9	349.3	-5,111.5	5,123.1	0.91	0.35	-0.84
11,465.0	89.27	270.58	6,599.3	348.9	-5,206.4	5,217.9	3.24	2.80	1.63
11,560.0	91.59	270.40	6,598.6	349.7	-5,301.4	5,312.7	2.45	2.44	-0.19
11,655.0	91.23	269.11	6,596.3	349.3	-5,396.3	5,407.5	1.41	-0.38	-1.36
11,750.0	90.09	268.18	6,595.2	347.1	-5,491.3	5,502.2	1.55	-1.20	-0.98
11,845.0	89.35	267.44	6,595.7	343.5	-5,586.2	5,596.7	1.10	-0.78	-0.78
11,939.0	89.80	268.46	6,596.4	340.1	-5,680.2	5,690.3	1.19	0.48	1.09
11,994.0	90.19	268.55	6,596.4	338.7	-5,735.1	5,745.1	0.73	0.71	0.16
Last MWD									
12,063.0	90.19	268.55	6,596.1	336.9	-5,804.1	5,813.9	0.00	0.00	0.00

PTD @ 12063' MD / 6596' TVD



IDS
Survey Report



Company: Noble Energy, Inc
Project: Weld County, CO (NAD 83)
Site: Sec 29, T6N-R62W (Wells Ranch AE30 Pad)
Well: Wells Ranch AE30-64-1HNC
Wellbore: Wellbore #1
Design: OH

Local Co-ordinate Reference: Well Wells Ranch AE30-64-1HNC
TVD Reference: Well @ 4777.0usft (H&P277)
MD Reference: Well @ 4777.0usft (H&P277)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
6,917.0	6,558.2	7"	7	8-3/4

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
734.0	734.0	-0.1	-5.1	First MWD
11,994.0	6,596.4	338.7	-5,735.1	Last MWD
12,063.0	6,596.1	336.9	-5,804.1	PTD @ 12063' MD / 6596' TVD

Checked By: _____ Approved By: _____ Date: _____



Weld County, CO (NAD 83) Wells Ranch AE30-64-1HNC H&P277 Plan #2



Azimuths to Grid North
True North: -0.74°
Magnetic North: 7.53°

Magnetic Field
Strength: 52905.2snT
Dip Angle: 67.06°
Date: 4/9/2014
Model: IGRF2010

CASING DETAILS

MD	TVD	Name	Size
6917.0	6558.2	7"	7

SITE DETAILS: Sec 29, T6N-R62W (Wells Ranch AE30 Pad)

Site Centre Northing: 1410139.62
Easting: 3318293.89

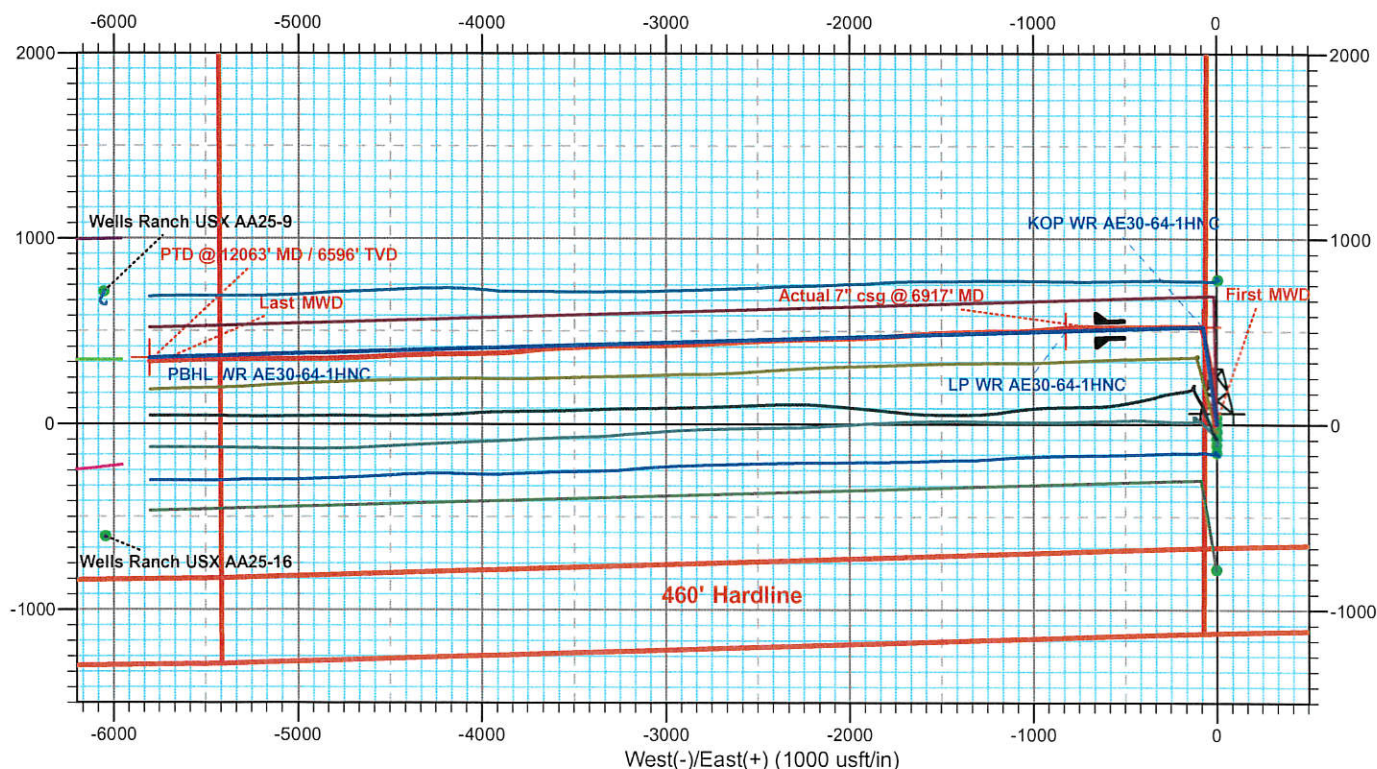
Positional Uncertainty: 0.0
Convergence: 0.74
Local North: Grid

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
1200.0	0.00	0.00	1200.0	0.0	0.0	0.00	0.00	0.0	
1700.0	10.00	351.87	1697.5	43.1	-6.2	2.00	351.87	8.8	
4252.9	10.00	351.87	4211.5	481.9	-68.8	0.00	0.00	98.2	
4752.9	0.00	0.00	4709.0	525.0	-75.0	2.00	180.00	107.0	
5975.9	0.00	0.00	5932.0	525.0	-75.0	0.00	0.00	107.0	KOP WR AE30-64-1HNC
6920.3	85.00	268.31	6566.2	507.9	-655.9	9.00	268.31	685.7	
6970.3	85.00	268.31	6570.6	506.4	-705.7	0.00	0.00	735.3	
7087.7	89.70	268.31	6576.0	502.9	-822.9	4.00	-0.03	852.1	
12071.6	89.70	268.31	6602.4	355.7	-5804.5	0.00	0.00	5815.4	PBHL WR AE30-64-1HNC

WELL DETAILS: Wells Ranch AE30-64-1HNC

+N/-S	+E/-W	North	East	Latitude	Longitude
0.0	0.0	1410103.19	3318294.36	40° 27' 12.600 N	104° 21' 22.392 W

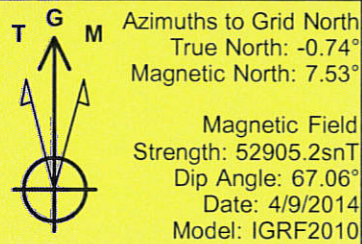


SHL @ 1123' FSL & 65' FWL Sec 29
Actual 7" Csg @ 1655' FSL & 596' FEL Sec 30
Actual BHL @ 1629 FSL & 384' FEL Sec 25





Weld County, CO (NAD 83) Wells Ranch AE30-64-1HNC H&P277 Plan #2



ACTUAL CASING DETAILS

MD	TVD	Name	Size
6808.0	6437.3	7"	7

SITE DETAILS: Sec 29, T6N-R62W (Wells Ranch AE30 Pad)

Site Centre Northing: 1410139.62
Easting: 3318293.89
Positional Uncertainty: 0.0
Convergence: 0.74
Local North: Grid

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
1200.0	0.00	0.00	1200.0	0.0	0.0	0.00	0.00	0.0	
1700.0	10.00	351.87	1697.5	43.1	-6.2	2.00	351.87	8.8	
4252.9	10.00	351.87	4211.5	481.9	-68.8	0.00	0.00	98.2	
4752.9	0.00	0.00	4709.0	525.0	-75.0	2.00	180.00	107.0	
5975.9	0.00	0.00	5932.0	525.0	-75.0	0.00	0.00	107.0	KOP WR AE30-64-1HNC
6920.3	85.00	268.31	6566.2	507.9	-655.9	9.00	268.31	685.7	
6970.3	85.00	268.31	6570.6	506.4	-705.7	0.00	0.00	735.3	
7087.7	89.70	268.31	6576.0	502.9	-822.9	4.00	-0.03	852.1	
12071.6	89.70	268.31	6602.4	355.7	-5804.5	0.00	0.00	5815.4	PBHL WR AE30-64-1HNC

WELL DETAILS: Wells Ranch AE30-64-1HNC

+N/-S	+E/-W	Ground Level:	North	East	Lat	Long
0.0	0.0	4753.0	1410103.19	3318294.36	40° 27' 12.600 N	104° 21' 22.392 W

