

Noble Energy

Weld County, CO (NAD 83)

Sec. 2-T9N-R58W (Sharpe State 2 /Davis State (PAD)

Sharpe State LD02-77HN

05-123-39820

Original Wellbore

Design: Actual Surveys

Sperry Drilling Services

Final Report

05 January, 2015

Surface UWI : 05-123-39820

Well Coordinates: 1,529,487.83 N, 3,460,656.88 E (40° 46' 29.89" N, 103° 50' 12.12" W)

Ground Level: 4,748.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

Centered on Well Sharpe State LD02-77HN

KB=24 @ 4772.00usft (H&P 273)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Project: Weld County, CO (NAD 83)
Site: Sec. 2-T9N-R58W (Sharpe State 2 /Davis State (PAD)
Well: Sharpe State LD02-77HN
Wellbore: Original Wellbore
Design: Actual Surveys



Platted SHL: 615' FSL, 1192' FWL
Platted Lat/Long: 40.77497 N, 103.8367 W
Location: Sec. 2-T9N-R58W

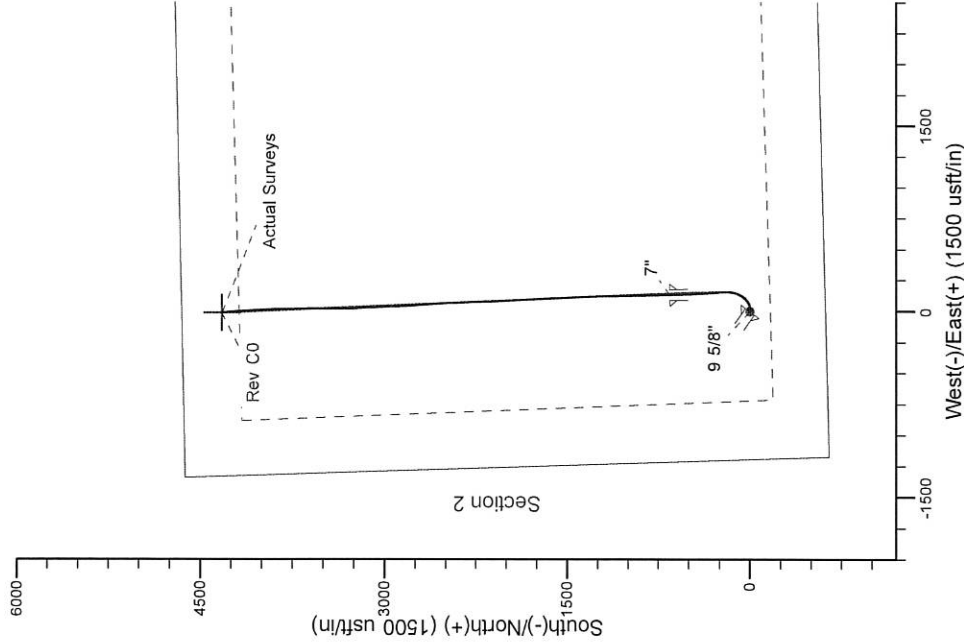
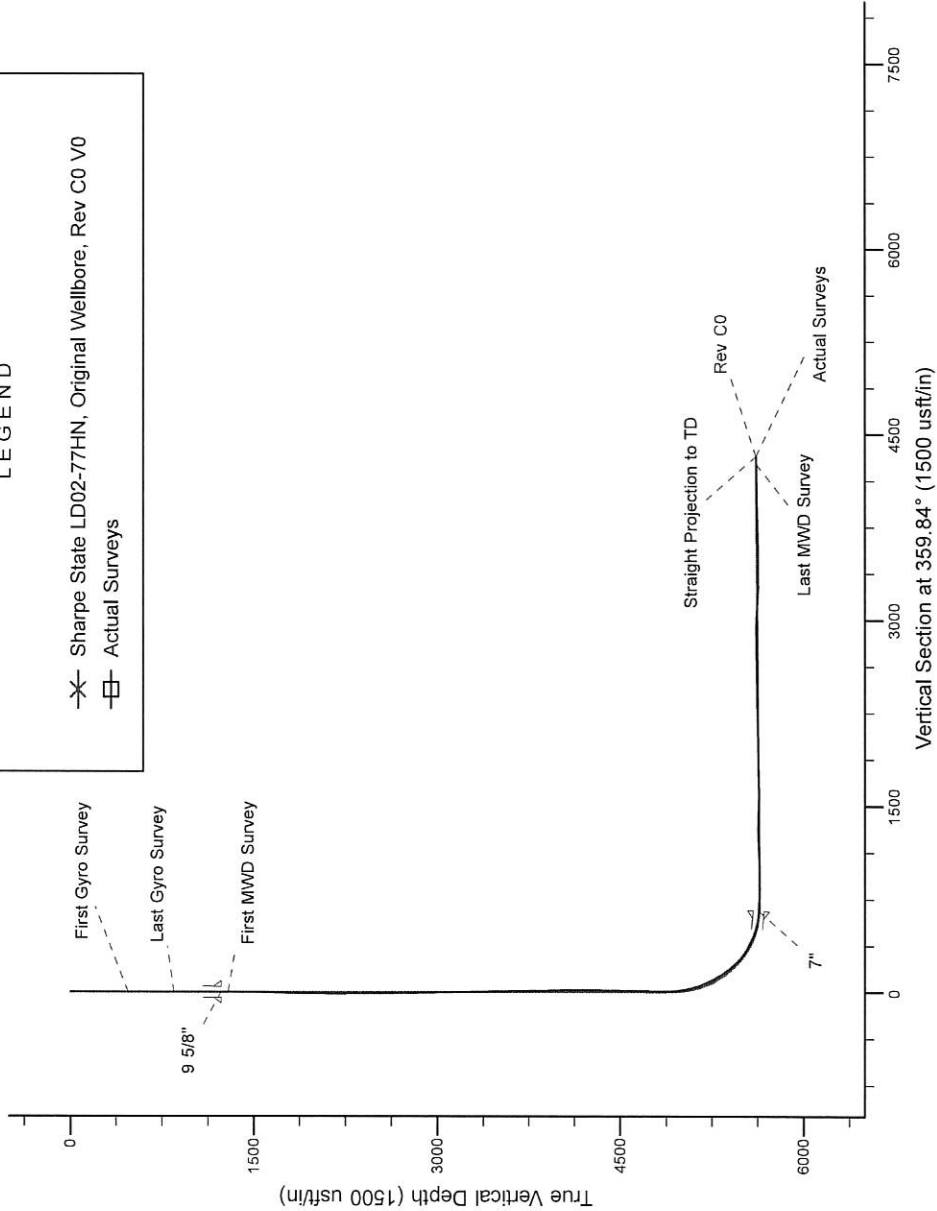
~7" Casing: 1272' FSL, 1347' FWL
Lat/Long: 40.776768N, 103.836180W
State Planes - CO Northern: 1530145.41N, 3460788.59E
Location: Sec. 2-T9N-R58W

Platted BHL: 330' FNL, 1320' FWL
Lat/Long: 40.786830N, 103.836450W
State Planes - CO Northern: 1533809.40N, 3460645.06E
Location: Sec. 2-T9N-R58W

LEGEND

✕ Sharpe State LD02-77HN, Original Wellbore, Rev C0 V0

▣ Actual Surveys



WELL DETAILS: Sharpe State LD02-77HN

Ground Level: 4748.00
KB=24 @ 4772.00usft (H&P 273)

Created By: Gordy Roth
Created On: 1/05/15

Design Report for Sharpe State LD02-77HN - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
474.00	0.50	270.33	473.99	0.01	-2.07	0.02	0.11
First Gyro Survey							
846.00	0.30	64.33	845.99	0.44	-2.81	0.45	0.21
Last Gyro Survey							
1,292.00	0.04	200.38	1,291.99	0.80	-1.82	0.81	0.07
First MWD Survey							
1,570.00	0.64	157.91	1,569.98	-0.73	-1.27	-0.72	0.22
1,662.00	1.13	159.47	1,661.97	-2.05	-0.75	-2.05	0.53
1,847.00	1.53	143.48	1,846.92	-5.75	1.36	-5.75	0.29
2,033.00	1.82	146.41	2,032.84	-10.20	4.47	-10.21	0.16
2,126.00	0.76	115.00	2,125.82	-11.69	5.84	-11.71	1.33
2,218.00	1.39	74.69	2,217.80	-11.66	7.47	-11.68	1.03
2,312.00	1.23	78.36	2,311.78	-11.15	9.56	-11.18	0.19
2,496.00	1.25	67.14	2,495.73	-9.97	13.34	-10.01	0.13
2,588.00	1.31	69.88	2,587.71	-9.22	15.26	-9.26	0.09
2,681.00	2.32	54.64	2,680.66	-7.77	17.79	-7.81	1.19
2,774.00	2.23	55.05	2,773.59	-5.64	20.81	-5.70	0.10
2,869.00	1.11	11.30	2,868.55	-3.68	22.50	-3.74	1.71
3,058.00	0.66	340.80	3,057.53	-0.86	22.50	-0.92	0.34
3,152.00	0.99	350.09	3,151.52	0.46	22.19	0.39	0.38
3,436.00	0.78	11.16	3,435.49	4.77	22.14	4.71	0.14
3,531.00	0.90	21.12	3,530.48	6.10	22.53	6.04	0.20
3,626.00	1.19	13.50	3,625.46	7.75	23.03	7.69	0.34
3,720.00	1.05	6.33	3,719.44	9.56	23.35	9.50	0.21
3,910.00	1.49	313.09	3,909.40	12.98	21.74	12.92	0.63
4,005.00	2.17	312.37	4,004.35	15.03	19.51	14.98	0.72
4,100.00	1.73	298.56	4,099.30	16.93	16.92	16.88	0.67
4,194.00	1.89	277.43	4,193.25	17.81	14.14	17.77	0.73
4,289.00	1.18	221.81	4,288.22	17.28	11.93	17.25	1.65
4,383.00	1.88	245.27	4,382.19	15.92	9.89	15.89	0.98
4,478.00	2.46	205.70	4,477.13	13.43	7.59	13.41	1.65
4,573.00	1.33	158.78	4,572.08	10.56	7.10	10.54	1.93
4,668.00	3.75	112.93	4,666.98	8.32	10.36	8.30	3.14
4,762.00	6.89	102.54	4,760.57	5.90	18.70	5.85	3.48
4,810.00	7.01	98.24	4,808.22	4.86	24.41	4.79	1.11
4,856.00	10.72	83.25	4,853.67	4.96	31.44	4.87	9.44
4,904.00	13.36	78.93	4,900.61	6.55	41.32	6.43	5.81
4,951.00	15.64	70.56	4,946.11	9.70	52.62	9.55	6.58
4,999.00	17.62	58.62	4,992.12	15.64	64.93	15.46	8.21
5,046.00	19.00	56.70	5,036.74	23.54	77.40	23.33	3.20
5,094.00	20.11	49.25	5,081.97	33.22	90.19	32.97	5.68
5,140.00	24.05	40.83	5,124.60	45.48	102.31	45.20	10.97
5,188.00	25.13	38.47	5,168.25	60.86	115.05	60.55	3.04
5,236.00	26.63	29.31	5,211.45	78.23	126.66	77.89	8.89
5,284.00	29.48	23.39	5,253.82	98.46	136.62	98.09	8.29
5,331.00	31.21	17.93	5,294.38	120.67	144.96	120.27	6.92
5,379.00	34.63	9.90	5,334.69	145.95	151.14	145.54	11.54
5,425.00	37.21	4.79	5,371.95	172.70	154.55	172.28	8.59
5,473.00	37.83	359.09	5,410.03	201.89	155.53	201.46	7.34

Design Report for Sharpe State LD02-77HN - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,520.00	41.28	356.85	5,446.26	231.79	154.45	231.37	7.94
5,568.00	46.86	354.06	5,480.74	265.05	151.76	264.63	12.31
5,615.00	53.89	353.93	5,510.70	301.03	147.98	300.62	14.96
5,663.00	61.58	355.83	5,536.30	341.43	144.38	341.03	16.37
5,710.00	62.73	357.54	5,558.26	382.91	141.99	382.52	4.04
5,758.00	64.68	357.71	5,579.52	425.91	140.20	425.52	4.07
5,805.00	69.13	357.75	5,597.95	469.09	138.49	468.71	9.47
5,853.00	74.41	357.29	5,612.96	514.63	136.52	514.25	11.04
5,900.00	79.19	357.36	5,623.69	560.32	134.38	559.95	10.17
5,950.00	84.44	358.66	5,630.81	609.76	132.67	609.40	10.81
6,043.00	87.13	359.38	5,637.64	702.49	131.08	702.13	2.99
6,137.00	85.99	358.77	5,643.28	796.31	129.57	795.95	1.37
6,232.00	89.97	358.86	5,646.63	891.21	127.60	890.86	4.19
6,327.00	92.22	358.79	5,644.81	986.16	125.66	985.82	2.37
6,421.00	93.21	358.29	5,640.36	1,080.03	123.26	1,079.69	1.18
6,516.00	93.27	358.63	5,634.99	1,174.84	120.72	1,174.51	0.36
6,610.00	90.52	358.46	5,631.88	1,268.75	118.33	1,268.42	2.93
6,705.00	89.82	357.98	5,631.60	1,363.70	115.38	1,363.38	0.89
6,800.00	88.89	357.42	5,632.67	1,458.62	111.57	1,458.31	1.14
6,894.00	88.21	357.38	5,635.05	1,552.49	107.30	1,552.19	0.72
6,989.00	90.99	357.50	5,635.71	1,647.39	103.06	1,647.10	2.93
7,083.00	90.15	357.17	5,634.78	1,741.28	98.69	1,741.00	0.96
7,176.00	90.68	357.26	5,634.10	1,834.17	94.17	1,833.90	0.58
7,271.00	91.60	356.55	5,632.21	1,929.01	89.04	1,928.76	1.22
7,365.00	90.86	355.73	5,630.20	2,022.77	82.72	2,022.54	1.17
7,460.00	91.76	358.89	5,628.02	2,117.63	78.26	2,117.41	3.46
7,555.00	92.19	358.68	5,624.75	2,212.55	76.25	2,212.33	0.50
7,649.00	90.52	357.58	5,622.53	2,306.47	73.18	2,306.26	2.13
7,744.00	90.65	357.30	5,621.56	2,401.37	68.94	2,401.17	0.32
7,839.00	91.05	357.13	5,620.15	2,496.25	64.32	2,496.06	0.46
8,028.00	90.43	354.88	5,617.71	2,684.76	51.16	2,684.61	1.23
8,123.00	90.68	357.27	5,616.79	2,779.52	44.66	2,779.39	2.53
8,218.00	90.83	356.91	5,615.54	2,874.39	39.83	2,874.27	0.41
8,313.00	87.66	358.01	5,616.79	2,969.28	35.62	2,969.17	3.53
8,407.00	87.17	357.41	5,621.03	3,063.11	31.87	3,063.01	0.82
8,502.00	86.18	356.74	5,626.54	3,157.82	27.03	3,157.73	1.26
8,597.00	88.33	356.89	5,631.09	3,252.56	21.76	3,252.49	2.27
8,692.00	90.25	0.25	5,632.26	3,347.50	19.39	3,347.44	4.07
8,787.00	90.89	0.69	5,631.32	3,442.50	20.17	3,442.43	0.82
8,882.00	90.71	0.46	5,629.99	3,537.48	21.12	3,537.41	0.31
8,977.00	90.77	359.40	5,628.76	3,632.47	21.01	3,632.40	1.12
9,071.00	91.11	358.84	5,627.22	3,726.45	19.56	3,726.38	0.70
9,166.00	91.39	358.51	5,625.15	3,821.40	17.37	3,821.34	0.46
9,261.00	91.88	358.53	5,622.44	3,916.33	14.91	3,916.27	0.52
9,356.00	91.48	357.67	5,619.65	4,011.24	11.77	4,011.19	1.00
9,451.00	90.83	356.43	5,617.74	4,106.09	6.88	4,106.05	1.47
9,545.00	90.22	354.98	5,616.88	4,199.82	-0.16	4,199.80	1.67
9,603.00	90.83	354.97	5,616.35	4,257.59	-5.24	4,257.59	1.05
Last MWD Survey							
9,665.00	90.83	354.97	5,615.45	4,319.35	-10.68	4,319.36	0.00

Design Report for Sharpe State LD02-77HN - Actual Surveys

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
474.00	473.99	0.01	-2.07	First Gyro Survey
846.00	845.99	0.44	-2.81	Last Gyro Survey
1,292.00	1,291.99	0.80	-1.82	First MWD Survey
9,603.00	5,616.35	4,257.59	-5.24	Last MWD Survey
9,665.00	5,615.45	4,319.35	-10.68	Straight Projection to TD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Sharpe State LD02-77HN_BHL	359.84	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
474.00	846.00	Surface Surveys	Flexi-Shot
1,292.00	5,950.00	Intermediate Surveys	MWD
6,043.00	9,665.00	Production Surveys	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,235.00	1,234.99	9 5/8"	9-5/8	13-3/4
5,998.00	5,634.88	7"	7	8-3/4

Wellbore Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
Sharpe State LD02-77	0.00	0.00	5,612.27	4,321.58	-11.83	1,533,809.40	3,460,645.06	40.786830	-103.836450
- actual wellpath misses target center by 4.05usft at 9665.00usft MD (5615.45 TVD, 4319.35 N, -10.68 E)									
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	1.86 °/100usft	Maximum Dogleg over Survey:	16.37 °/100usft at 5,663.00 usft
Net Tortousity applicable to Plans:	0.74 °/100usft	Directional Difficulty Index:	6.139

Audit Info

North Reference Sheet for Sec. 2-T9N-R58W (Sharpe State 2 /Davis State (PAD) - Sharpe State LD02-77HN - Original Wellbore

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.

Vertical Depths are relative to KB=24 @ 4772.00usft (H&P 273). Northing and Easting are relative to Sharpe State LD02-77HN

Coordinate System is US State Plane 1983, Colorado Northern Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is -105.500000°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99999865

Grid Coordinates of Well: 1,529,487.83 usft N, 3,460,656.88 usft E

Geographical Coordinates of Well: 40° 46' 29.89" N, 103° 50' 12.12" W

Grid Convergence at Surface is: 1.07°

Based upon Minimum Curvature type calculations, at a Measured Depth of 9,665.00usft
the Bottom Hole Displacement is 4,319.36usft in the Direction of 359.86° (Grid).

Magnetic Convergence at surface is: -6.93° (22 December 2014, , BGGM2014)

