

Noble Energy

Weld County, CO (NAD 83)

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

Davis State LD02-73-1BHN

05-123-39807

Original Wellbore

Design: Original Wellbore

Sperry Drilling Services

Final Survey Report

05 January, 2015

Surface UWI : 05-123-39807

Well Coordinates: 1,529,420.16 N, 3,464,417.32 E (40° 46' 28.52" N, 103° 49' 23.27" W)

Ground Level: 4,662.00 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 Davis State LD02-73-1BHN

KB=24 @ 4686.00usft (HP 343)

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: Davis State LD02-73-1BHN
 Wellbore: Original Wellbore
 Design: Actual Surveys



HALLIBURTON
 Sperry Drilling

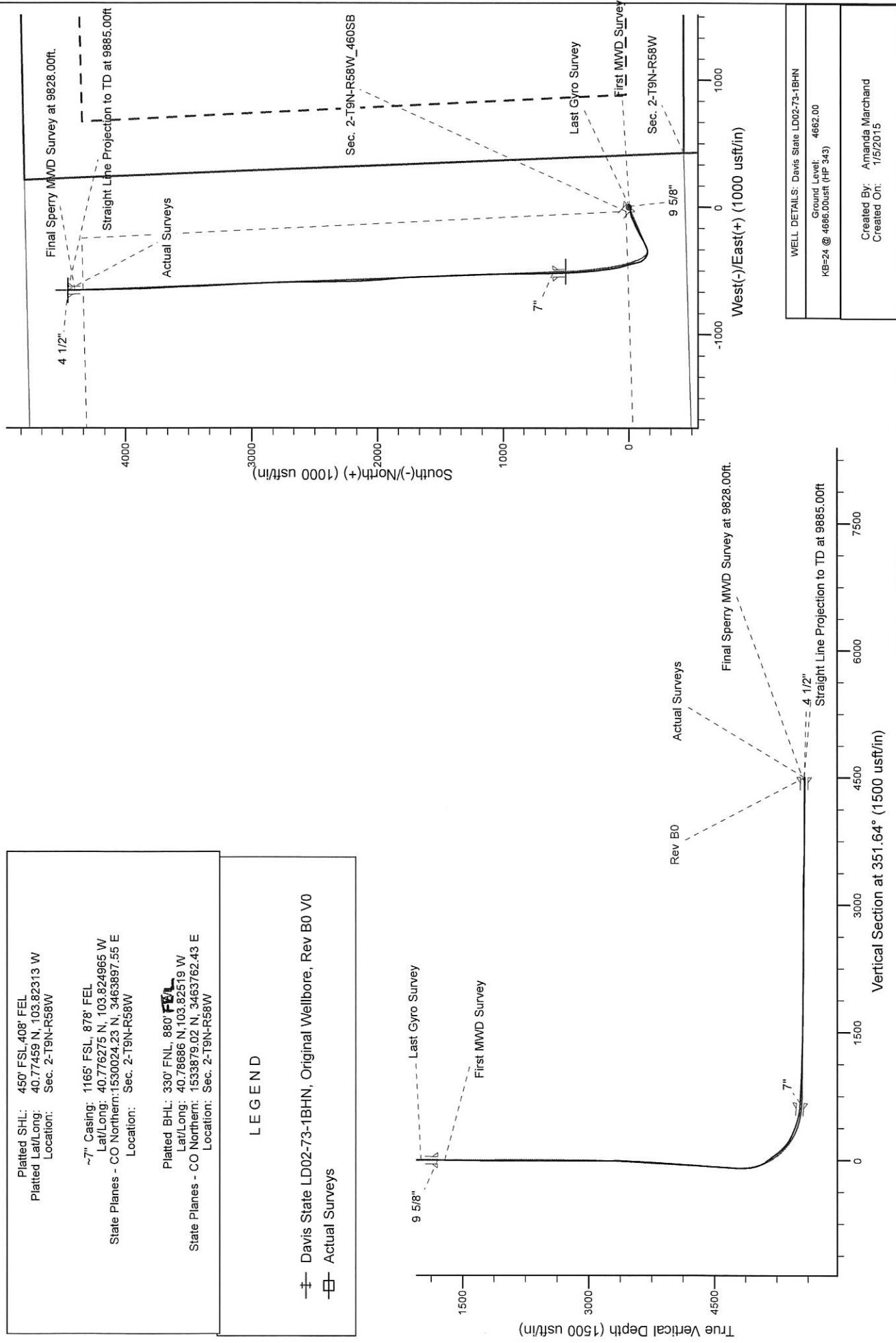
Platted SHL: 450' FSL 408' FEL
 Platted Lat/Long: 40.77459 N, 103.82313 W
 Location: Sec. 2-T9N-R58W

~7" Casing: 1165' FSL, 878' FEL
 Lat/Long: 40.776275 N, 103.824965 W
 State Planes - CO Northern: 1530024.23 N, 3463897.55 E
 Location: Sec. 2-T9N-R58W

Platted BHL: 330' FNL, 880' FEL
 Lat/Long: 40.78686 N, 103.82519 W
 State Planes - CO Northern: 1533879.02 N, 3463762.43 E
 Location: Sec. 2-T9N-R58W

LEGEND

— Davis State LD02-73-1BHN, Original Wellbore, Rev B0 V0
 — Actual Surveys



Design Report for Davis State LD02-73-1BHN - Original Wellbore

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
355.00	0.60	110.92	354.99	-0.66	1.74	-0.91	0.17
635.00	0.20	147.01	634.99	-1.60	3.37	-2.07	0.16
1,005.00	0.60	123.51	1,004.98	-3.21	5.34	-3.95	0.11
Last Gyro Survey							
1,289.00	0.46	138.52	1,288.96	-4.88	7.33	-5.90	0.07
First MWD Survey							
1,381.00	0.57	146.20	1,380.96	-5.54	7.83	-6.62	0.14
1,474.00	0.62	148.70	1,473.96	-6.35	8.35	-7.50	0.06
1,567.00	0.54	162.79	1,566.95	-7.20	8.74	-8.40	0.18
1,660.00	1.26	244.45	1,659.94	-8.06	7.95	-9.13	1.39
1,752.00	1.44	244.42	1,751.92	-9.00	5.99	-9.77	0.20
1,844.00	1.53	248.17	1,843.89	-9.95	3.81	-10.40	0.14
1,937.00	1.54	247.05	1,936.85	-10.90	1.51	-11.01	0.03
2,029.00	1.65	247.36	2,028.82	-11.89	-0.85	-11.64	0.12
2,122.00	1.53	248.31	2,121.78	-12.87	-3.24	-12.26	0.13
2,215.00	1.53	249.12	2,214.75	-13.77	-5.56	-12.82	0.02
2,307.00	1.32	245.36	2,306.72	-14.65	-7.67	-13.38	0.25
2,402.00	0.52	301.98	2,401.71	-14.88	-9.03	-13.41	1.18
2,592.00	0.80	296.35	2,591.69	-13.83	-10.95	-12.10	0.15
2,687.00	0.90	293.25	2,686.68	-13.24	-12.23	-11.33	0.12
2,782.00	1.82	275.90	2,781.66	-12.79	-14.41	-10.56	1.05
2,877.00	3.85	273.37	2,876.54	-12.45	-19.10	-9.54	2.14
2,972.00	4.63	270.46	2,971.28	-12.23	-26.12	-8.31	0.85
3,067.00	5.76	265.63	3,065.88	-12.57	-34.70	-7.39	1.27
3,162.00	6.48	262.63	3,160.34	-13.62	-44.77	-6.97	0.83
3,257.00	7.35	258.57	3,254.65	-15.51	-56.05	-7.20	1.05
3,353.00	9.10	252.71	3,349.66	-18.98	-69.31	-8.71	2.02
3,448.00	10.85	245.24	3,443.23	-24.96	-84.61	-12.40	2.29
3,543.00	11.75	246.12	3,536.38	-32.62	-101.57	-17.51	0.96
3,638.00	12.14	247.61	3,629.33	-40.34	-119.65	-22.53	0.52
3,733.00	11.95	247.48	3,722.23	-47.91	-137.98	-27.36	0.20
3,828.00	12.36	246.70	3,815.10	-55.70	-156.40	-32.38	0.46
3,923.00	11.85	243.24	3,907.99	-64.12	-174.45	-38.09	0.93
4,018.00	12.08	242.70	4,000.93	-73.07	-191.99	-44.39	0.27
4,113.00	11.84	243.19	4,093.87	-82.02	-209.52	-50.71	0.27
4,208.00	11.52	240.36	4,186.90	-91.11	-226.47	-57.23	0.69
4,303.00	11.51	238.15	4,279.99	-100.80	-242.76	-64.46	0.46
4,399.00	10.81	237.12	4,374.17	-110.74	-258.46	-72.01	0.76
4,494.00	12.16	244.37	4,467.27	-119.91	-274.96	-78.68	2.08
4,589.00	10.19	244.16	4,560.47	-127.90	-291.55	-84.18	2.07
4,684.00	10.06	241.95	4,653.99	-135.47	-306.44	-89.50	0.43
4,779.00	13.17	249.70	4,747.04	-143.12	-323.91	-94.54	3.66
4,874.00	13.81	260.02	4,839.43	-148.85	-345.23	-97.10	2.62
4,969.00	15.11	283.70	4,931.50	-147.88	-368.45	-92.77	6.33
5,064.00	27.87	306.06	5,019.85	-131.78	-398.60	-72.46	15.74
5,159.00	34.55	339.37	5,101.66	-93.17	-426.28	-30.24	19.22
5,254.00	35.80	347.26	5,179.35	-40.83	-441.91	23.82	4.96
5,349.00	37.55	344.90	5,255.54	14.23	-455.58	80.28	2.37
5,444.00	44.27	345.80	5,327.30	74.39	-471.27	142.08	7.10

Design Report for Davis State LD02-73-1BHN - Original Wellbore

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,539.00	55.86	351.64	5,388.21	145.71	-485.17	214.66	13.07
5,634.00	65.74	353.61	5,434.50	227.85	-495.74	297.47	10.56
5,730.00	70.46	355.24	5,470.30	316.48	-504.37	386.41	5.16
5,825.00	72.40	355.69	5,500.55	406.24	-511.48	476.26	2.09
5,920.00	81.77	357.63	5,521.76	498.58	-516.84	568.39	10.06
5,978.00	85.77	358.71	5,528.05	556.19	-518.68	625.66	7.14
6,081.00	86.98	358.66	5,534.57	658.96	-521.04	727.68	1.18
6,173.00	87.78	359.42	5,538.77	750.85	-522.58	818.81	1.20
6,267.00	87.90	359.16	5,542.31	844.77	-523.74	911.91	0.30
6,362.00	88.21	359.22	5,545.54	939.71	-525.09	1,006.04	0.33
6,457.00	87.97	358.92	5,548.70	1,034.64	-526.63	1,100.19	0.40
6,552.00	87.53	358.26	5,552.43	1,129.54	-528.96	1,194.42	0.83
6,647.00	87.84	358.50	5,556.27	1,224.42	-531.65	1,288.68	0.41
6,742.00	87.59	358.16	5,560.06	1,319.31	-534.41	1,382.96	0.44
6,837.00	89.32	356.84	5,562.62	1,414.18	-538.56	1,477.43	2.29
6,932.00	90.46	358.69	5,562.80	1,509.10	-542.26	1,571.88	2.29
7,027.00	89.66	357.94	5,562.70	1,604.06	-545.05	1,666.23	1.15
7,122.00	89.66	356.85	5,563.27	1,698.96	-549.37	1,760.75	1.15
7,217.00	89.82	356.56	5,563.70	1,793.80	-554.83	1,855.38	0.35
7,312.00	88.34	355.17	5,565.22	1,888.53	-561.68	1,950.11	2.14
7,407.00	88.18	354.40	5,568.11	1,983.09	-570.31	2,044.92	0.83
7,502.00	89.32	357.26	5,570.18	2,077.81	-577.22	2,139.63	3.24
7,597.00	88.83	356.97	5,571.72	2,172.68	-582.00	2,234.19	0.60
7,692.00	89.72	359.58	5,572.92	2,267.62	-584.86	2,328.54	2.90
7,787.00	88.95	358.99	5,574.02	2,362.60	-586.04	2,422.68	1.02
7,882.00	90.62	359.91	5,574.38	2,457.59	-586.95	2,516.80	2.01
7,977.00	91.11	359.78	5,572.94	2,552.58	-587.21	2,610.82	0.53
8,072.00	90.03	358.94	5,572.00	2,647.57	-588.27	2,704.95	1.44
8,168.00	89.97	358.32	5,572.00	2,743.54	-590.57	2,800.24	0.65
8,263.00	90.15	357.73	5,571.90	2,838.48	-593.84	2,894.65	0.65
8,358.00	90.83	356.86	5,571.09	2,933.37	-598.32	2,989.18	1.16
8,453.00	89.78	358.42	5,570.58	3,028.29	-602.24	3,083.66	1.98
8,548.00	89.14	357.66	5,571.47	3,123.23	-605.48	3,178.06	1.05
8,643.00	88.83	356.84	5,573.16	3,218.10	-610.04	3,272.59	0.92
8,738.00	89.04	355.81	5,574.92	3,312.89	-616.13	3,367.25	1.11
8,833.00	88.49	358.50	5,576.97	3,407.74	-620.84	3,461.78	2.89
8,928.00	88.83	358.64	5,579.19	3,502.68	-623.21	3,556.07	0.39
9,023.00	88.92	357.32	5,581.06	3,597.60	-626.56	3,650.47	1.39
9,118.00	89.23	356.80	5,582.59	3,692.47	-631.43	3,745.03	0.64
9,213.00	89.38	355.99	5,583.74	3,787.27	-637.41	3,839.69	0.87
9,308.00	91.42	358.54	5,583.08	3,882.15	-641.94	3,934.22	3.44
9,403.00	90.09	359.07	5,581.83	3,977.12	-643.92	4,028.47	1.51
9,498.00	88.83	358.75	5,582.72	4,072.09	-645.73	4,122.70	1.37
9,593.00	89.48	358.38	5,584.13	4,167.05	-648.11	4,217.00	0.79
9,688.00	90.65	358.96	5,584.02	4,262.02	-650.31	4,311.28	1.37
9,783.00	89.11	359.06	5,584.22	4,357.01	-651.95	4,405.50	1.62
9,828.00	89.69	359.39	5,584.69	4,402.00	-652.56	4,450.10	1.48
Final Sperry MWD Survey at 9828.00ft.							
9,885.00	89.69	359.39	5,585.00	4,458.99	-653.17	4,506.58	0.00
Straight Line Projection to TD at 9885.00ft							

Design Report for Davis State LD02-73-1BHN - Original Wellbore

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,005.00	1,004.98	-3.21	5.34	Last Gyro Survey
1,289.00	1,288.96	-4.88	7.33	First MWD Survey
9,828.00	5,584.69	4,402.00	-652.56	Final Sperry MWD Survey at 9828.00ft.
9,885.00	5,585.00	4,458.99	-653.17	Straight Line Projection to TD at 9885.00ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Davis State LD02-73-1BHN_BHL	351.64	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
355.00	1,005.00	Surface Surveys	Flexi-Shot
1,289.00	5,978.00	Intermediate Surveys	MWD
6,081.00	9,885.00	Production Surveys	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,202.00	1,201.97	9 5/8"	9-5/8	13-3/4
6,026.00	5,531.36	7"	7	8-3/4
9,885.00	5,585.00	4 1/2"	4-1/2	6-1/8

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									
Davis State LD02-73-1	0.00	0.00	5,540.60	503.30	-505.90	1,529,923.47	3,463,911.42	40.775997	-103.824922
- actual wellpath misses target center by 21.22usft at 5926.40usft MD (5522.65 TVD, 504.91 N, -517.10 E)									
- Point									
Davis State LD02-73-1	0.00	0.00	5,592.19	4,458.86	-654.89	1,533,879.02	3,463,762.43	40.786860	-103.825190
- actual wellpath misses target center by 7.40usft at 9884.92usft MD (5585.00 TVD, 4458.92 N, -653.17 E)									
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	1.79 °/100usft	Maximum Dogleg over Survey:	19.22 °/100usft at 5,159.00 usft
Net Tortousity applicable to Plans:	0.70 °/100usft	Directional Difficulty Index:	6.202

Audit Info

North Reference Sheet for Sec. 2-T9N-R58W (Sharpe State 2 /Davis State (PAD) - Davis State LD02-73-1BHN - 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 @ 4686.00usft (HP 343). Northing and Easting are relative to Davis State LD02-73-1BHN

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: 0.99999859

Grid Coordinates of Well: 1,529,420.16 usft N, 3,464,417.32 usft E

Geographical Coordinates of Well: 40° 46' 28.52" N, 103° 49' 23.27" W

Grid Convergence at Surface is: 1.08°

Based upon Minimum Curvature type calculations, at a Measured Depth of 9,885.00usft
the Bottom Hole Displacement is 4,506.58usft in the Direction of 351.67° (Grid).

Magnetic Convergence at surface is: -6.92° (17 November 2014, , BGGM2014)

