

Noble Energy

Weld County, CO (NAD 83)

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

Davis State LD02-73HN

05-123-39806

Original Wellbore

Design: Actual Surveys

Sperry Drilling Services Standard Report

20 January, 2015

Surface UWI : 05-123-39806

Well Coordinates: 1,529,419.45 N, 3,464,378.55 E (40° 46' 28.52" N, 103° 49' 23.77" 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 LD02-73HN

KB=24 @ 4686.00usft (HP 343)

N

Grid

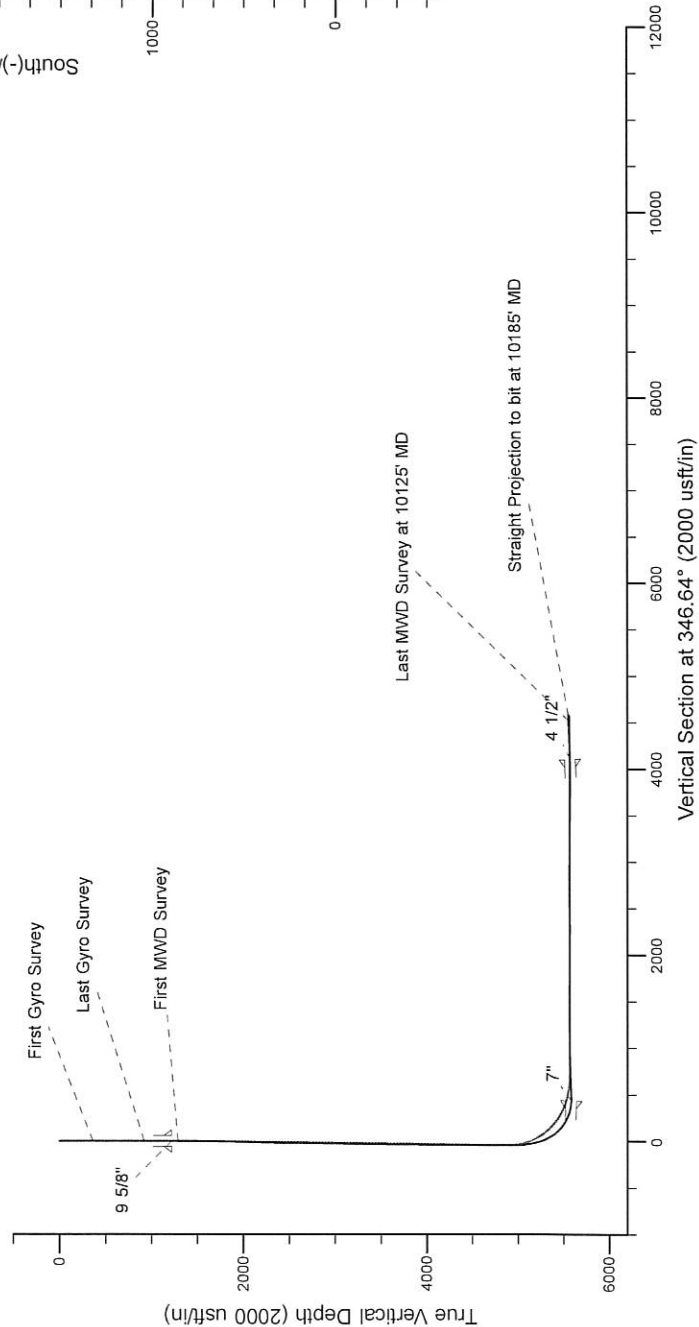
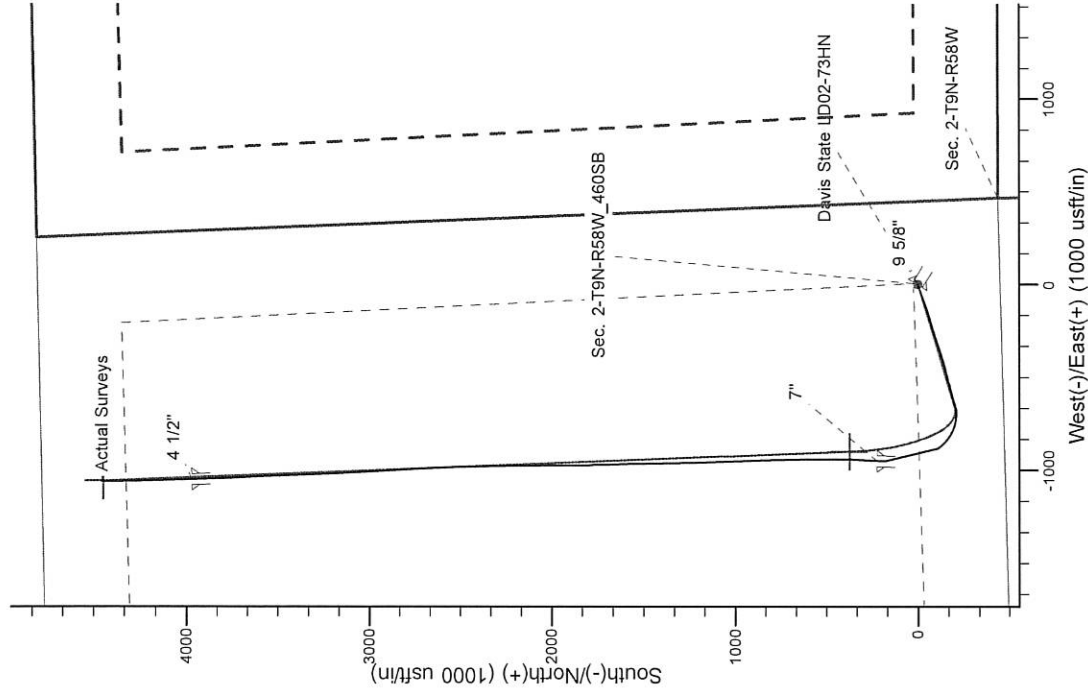
Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Project: Weld County, CO (NAD 83)
 Site: Sec. 2-T9N-R58W (Sharpe State 2 /Davis State (PAD)
 Well: Davis State LD02-73HN
 Wellbore: Original Wellbore
 Design: Actual Surveys



Platted SHL: 450' FSL, 446' FEL Platted Lat/Long: 40.77459 N, 103.82327 W Location: Sec. 2-T9N-R58W ~7" Casing: 1050 Fsl, 1319 FEL Lat/Long: 40.775253 N, 103.826685 W State Planes - CO Northern: 1529642.94 N, 3463428.41 E Location: Sec. 2-T9N-R58W Platted BHL: 330' FNL, 1320' FEL Lat/Long: 40.78685 N, 103.82678 W State Planes - CO Northern: 1529794.45 N, 3464202.66 E Location: Sec. 2-T9N-R58W	<p style="text-align: center;">LEGEND</p> <p>— Davis State LD02-73HN, Original Wellbore, Rev B0 V0</p> <p>— Actual Surveys</p>
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WELL DETAILS: Davis State LD02-73HN
Ground Level: 4652.00
KB-24 @ 4686.00usft (HP 343)
Created By: Amanda Marchand
Created On: 1/7/2015

Design Report for Davis State LD02-73HN - 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
364.00	0.10	257.91	364.00	-0.07	-0.31	0.01	0.03
First Gyro Survey							
640.00	0.40	38.41	640.00	0.64	0.05	0.61	0.17
920.00	0.00	209.11	920.00	1.40	0.66	1.21	0.14
Last Gyro Survey							
1,288.00	0.40	301.96	1,287.99	2.08	-0.43	2.13	0.11
First MWD Survey							
1,381.00	2.28	254.67	1,380.96	1.77	-2.49	2.29	2.18
1,473.00	3.77	248.66	1,472.83	0.18	-7.07	1.81	1.65
1,567.00	5.86	243.10	1,566.50	-3.11	-14.23	0.26	2.28
1,660.00	7.34	251.56	1,658.88	-7.14	-24.10	-1.38	1.90
1,752.00	8.93	250.11	1,749.95	-11.43	-36.39	-2.71	1.74
1,844.00	10.49	250.21	1,840.63	-16.70	-50.99	-4.46	1.70
1,937.00	12.49	251.25	1,931.76	-22.79	-68.48	-6.35	2.16
2,029.00	12.29	249.13	2,021.62	-29.48	-87.05	-8.57	0.54
2,122.00	11.74	247.43	2,112.58	-36.64	-105.03	-11.38	0.70
2,214.00	13.06	250.82	2,202.44	-43.65	-123.49	-13.93	1.64
2,306.00	12.78	249.72	2,292.11	-50.59	-142.86	-16.21	0.41
2,400.00	13.66	255.50	2,383.62	-56.97	-163.36	-17.68	1.69
2,494.00	13.50	255.00	2,474.99	-62.59	-184.70	-18.22	0.21
2,589.00	13.49	254.47	2,567.37	-68.43	-206.09	-18.96	0.13
2,684.00	13.05	254.15	2,659.83	-74.32	-227.08	-19.84	0.47
2,780.00	12.41	253.23	2,753.47	-80.26	-247.39	-20.93	0.70
2,875.00	11.47	253.31	2,846.42	-85.92	-266.21	-22.08	0.99
2,970.00	10.45	251.55	2,939.68	-91.36	-283.43	-23.39	1.13
3,065.00	11.90	252.35	3,032.88	-97.05	-300.94	-24.89	1.53
3,160.00	11.90	251.07	3,125.84	-103.20	-319.53	-26.58	0.28
3,255.00	12.22	249.99	3,218.74	-109.82	-338.25	-28.69	0.41
3,350.00	12.65	250.04	3,311.51	-116.81	-357.47	-31.05	0.45
3,445.00	13.08	250.48	3,404.13	-123.95	-377.38	-33.40	0.46
3,540.00	12.96	252.28	3,496.68	-130.79	-397.66	-35.36	0.45
3,635.00	12.09	252.07	3,589.42	-137.09	-417.27	-36.97	0.92
3,730.00	11.87	256.91	3,682.36	-142.37	-436.26	-37.71	1.08
3,825.00	10.99	256.62	3,775.47	-146.68	-454.58	-37.67	0.93
3,921.00	10.47	256.05	3,869.79	-150.90	-471.95	-37.76	0.55
4,015.00	10.85	256.98	3,962.17	-154.95	-488.86	-37.80	0.44
4,110.00	9.45	258.55	4,055.68	-158.51	-505.21	-37.49	1.50
4,206.00	9.86	250.95	4,150.32	-162.76	-520.71	-38.04	1.39
4,301.00	11.01	251.38	4,243.75	-168.31	-536.99	-39.68	1.21
4,396.00	12.98	256.66	4,336.68	-173.67	-555.97	-40.50	2.37
4,491.00	10.77	257.61	4,429.64	-178.04	-575.03	-40.35	2.34
4,586.00	9.81	253.35	4,523.11	-182.26	-591.45	-40.66	1.29
4,681.00	12.38	256.46	4,616.33	-186.96	-609.11	-41.16	2.78
4,776.00	10.18	252.39	4,709.49	-191.89	-627.01	-41.81	2.46
4,872.00	12.32	250.93	4,803.64	-197.80	-644.78	-43.46	2.25
4,966.00	11.44	255.96	4,895.63	-203.34	-663.30	-44.57	1.44
5,061.00	17.20	265.05	4,987.65	-206.84	-686.46	-42.63	6.49
5,157.00	19.63	277.04	5,078.76	-206.09	-716.62	-34.93	4.68
5,251.00	24.55	283.24	5,165.84	-199.68	-751.33	-20.67	5.79

Design Report for Davis State LD02-73HN - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,347.00	28.40	294.20	5,251.81	-185.74	-791.60	2.20	6.47
5,395.00	32.22	302.21	5,293.26	-174.23	-812.86	18.31	11.57
5,441.00	33.80	308.77	5,331.84	-159.67	-833.22	37.17	8.49
5,489.00	36.27	313.86	5,371.15	-141.47	-853.87	59.66	7.97
5,536.00	38.74	319.15	5,408.44	-120.70	-873.52	84.40	8.63
5,631.00	48.94	334.25	5,477.06	-65.66	-908.71	146.09	15.32
5,679.00	54.74	340.38	5,506.72	-30.85	-923.18	183.29	15.70
5,726.00	60.50	346.44	5,531.90	7.16	-934.43	222.88	16.39
5,774.00	66.05	353.05	5,553.50	49.31	-942.00	265.64	16.87
5,822.00	71.73	358.44	5,570.79	93.93	-945.28	309.81	15.80
5,904.00	83.36	0.16	5,588.45	173.85	-946.23	387.79	14.33
5,988.00	91.88	3.07	5,591.93	257.66	-943.86	468.78	10.72
6,081.00	92.10	3.97	5,588.70	350.43	-938.15	557.72	1.00
6,173.00	93.05	0.55	5,584.57	442.25	-934.53	646.22	3.85
6,267.00	91.45	358.89	5,580.88	536.17	-934.99	737.70	2.45
6,362.00	91.17	358.93	5,578.70	631.13	-936.79	830.51	0.30
6,457.00	91.33	358.50	5,576.63	726.08	-938.92	923.38	0.48
6,552.00	91.69	358.39	5,574.13	821.01	-941.50	1,016.34	0.40
6,647.00	89.78	358.43	5,572.91	915.96	-944.13	1,109.33	2.01
6,742.00	90.22	358.22	5,572.91	1,010.92	-946.91	1,202.36	0.51
6,837.00	90.46	358.01	5,572.35	1,105.87	-950.04	1,295.46	0.34
6,932.00	90.83	357.41	5,571.28	1,200.79	-953.83	1,388.69	0.74
7,027.00	90.96	359.39	5,569.79	1,295.73	-956.48	1,481.68	2.09
7,122.00	88.74	359.15	5,570.04	1,390.72	-957.69	1,574.37	2.35
7,217.00	89.14	358.65	5,571.80	1,485.68	-959.52	1,667.19	0.67
7,312.00	89.97	358.65	5,572.54	1,580.65	-961.76	1,760.11	0.87
7,407.00	88.86	357.95	5,573.51	1,675.61	-964.57	1,853.14	1.38
7,502.00	88.65	357.47	5,575.57	1,770.51	-968.37	1,946.35	0.55
7,597.00	89.57	359.70	5,577.05	1,865.46	-970.71	2,039.28	2.54
7,692.00	90.55	0.47	5,576.95	1,960.46	-970.57	2,131.67	1.31
7,787.00	90.52	359.81	5,576.06	2,055.45	-970.34	2,224.04	0.70
7,882.00	90.83	359.52	5,574.94	2,150.44	-970.90	2,316.59	0.45
7,977.00	91.33	359.31	5,573.15	2,245.42	-971.87	2,409.22	0.57
8,072.00	90.34	358.46	5,571.77	2,340.39	-973.71	2,502.05	1.37
8,168.00	90.77	358.30	5,570.84	2,436.35	-976.43	2,596.04	0.48
8,263.00	91.32	358.17	5,569.10	2,531.29	-979.35	2,689.08	0.59
8,358.00	88.43	357.67	5,569.31	2,626.21	-982.80	2,782.24	3.09
8,453.00	88.46	356.92	5,571.89	2,721.07	-987.28	2,875.56	0.79
8,548.00	89.17	356.91	5,573.85	2,815.91	-992.40	2,969.02	0.75
8,643.00	89.97	357.05	5,574.57	2,910.78	-997.40	3,062.47	0.85
8,738.00	90.80	356.92	5,573.93	3,005.64	-1,002.40	3,155.93	0.88
8,833.00	91.23	356.19	5,572.25	3,100.46	-1,008.10	3,249.49	0.89
8,928.00	88.98	358.10	5,572.07	3,195.33	-1,012.84	3,342.89	3.11
9,023.00	88.27	357.57	5,574.35	3,290.23	-1,016.42	3,436.05	0.93
9,118.00	88.64	357.56	5,576.91	3,385.11	-1,020.46	3,529.30	0.39
9,213.00	89.01	358.46	5,578.86	3,480.03	-1,023.76	3,622.41	1.02
9,308.00	88.80	357.53	5,580.68	3,574.96	-1,027.08	3,715.53	1.00
9,403.00	89.85	356.19	5,581.80	3,669.80	-1,032.28	3,809.02	1.79
9,498.00	89.32	357.85	5,582.48	3,764.67	-1,037.22	3,902.46	1.83
9,593.00	89.60	357.74	5,583.38	3,859.60	-1,040.88	3,995.66	0.32
9,688.00	92.34	358.83	5,581.77	3,954.53	-1,043.72	4,088.68	3.10

Design Report for Davis State LD02-73HN - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
9,783.00	92.25	358.63	5,577.97	4,049.43	-1,045.82	4,181.50	0.23
9,878.00	92.53	358.06	5,574.00	4,144.31	-1,048.56	4,274.44	0.67
9,973.00	92.25	358.38	5,570.04	4,239.18	-1,051.51	4,367.43	0.45
10,068.00	92.34	358.96	5,566.24	4,334.08	-1,053.72	4,460.26	0.62
10,125.00	93.08	358.89	5,563.54	4,391.00	-1,054.78	4,515.90	1.30
Last MWD Survey at 10125' MD							
10,182.00	93.08	358.89	5,560.48	4,447.91	-1,055.89	4,571.52	0.00
Straight Projection to bit at 10185' MD							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
364.00	364.00	-0.07	-0.31	First Gyro Survey
920.00	920.00	1.40	0.66	Last Gyro Survey
1,288.00	1,287.99	2.08	-0.43	First MWD Survey
10,125.00	5,563.54	4,391.00	-1,054.78	Last MWD Survey at 10125' MD
10,182.00	5,560.48	4,447.91	-1,055.89	Straight Projection to bit at 10185' MD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Davis State LD02-73HN_BHL	346.64	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
364.00	920.00	Surface Surveys	Flexi-Shot
1,288.00	5,904.00	Intermediate Surveys	MWD
5,904.00	10,182.00	Production Surveys	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,217.00	1,216.99	9 5/8"	9-5/8	13-3/4
5,948.00	5,591.83	7"	7	8-3/4
9,697.00	5,581.40	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 LD02-73H	0.00	0.00	5,556.00	375.01	-900.00	1,529,794.45	3,463,478.55	40.775666	-103.826493
- actual wellpath misses target center by 48.37usft at 6108.51usft MD (5587.63 TVD, 377.87 N, -936.49 E)									
- Point									
Davis State LD02-73H	0.00	0.00	5,568.00	4,447.62	-1,056.28	1,533,867.06	3,463,322.27	40.786850	-103.826780
- actual wellpath misses target center by 7.50usft at 10181.32usft MD (5560.52 TVD, 4447.23 N, -1055.87 E)									
- Point									

Design Report for Davis State LD02-73HN - Actual Surveys

Directional Difficulty Index

Average Dogleg over Survey:	1.98 °/100usft	Maximum Dogleg over Survey:	16.87 °/100usft at 5,774.00 usft
Net Tortosity applicable to Plans:	0.91 °/100usft	Directional Difficulty Index:	6.308

Audit Info

**North Reference Sheet for Sec. 2-T9N-R58W (Sharpe State 2 /Davis State (PAD) -
Davis State LD02-73HN - 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 LD02-73HN

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: 1,529,419.45 usft N, 3,464,378.55 usft E

Geographical Coordinates of Well: 40° 46' 28.52" N, 103° 49' 23.77" W

Grid Convergence at Surface is: 1.08°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,182.00usft

the Bottom Hole Displacement is 4,571.52usft in the Direction of 346.65° (Grid).

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

