

Conoco Phillips Company

Arapahoe County, Colorado

Sec. 17-T4S-R65W (Eastern Hills 4-65 Pad)

Eastern Hills 4-65 17-18 1DH

Plan A (Pilot) (Need MagVar before Drilling)

Plan: Rev A1

Sperry Drilling Services

Proposal Report

30 March, 2015

Well Coordinates: 1,683,421.27 N, 3,230,399.92 E (39° 42' 24.99" N, 104° 40' 51.94" W)

Ground Level: 5,621.80 usft

Local Coordinate Origin:

Centered on Well Eastern Hills 4-65 17-18 1DH

Viewing Datum:

KB 24 ft @ 5645.80usft (Unknown)

TVDs to System:

N

North Reference:

True

Unit System:

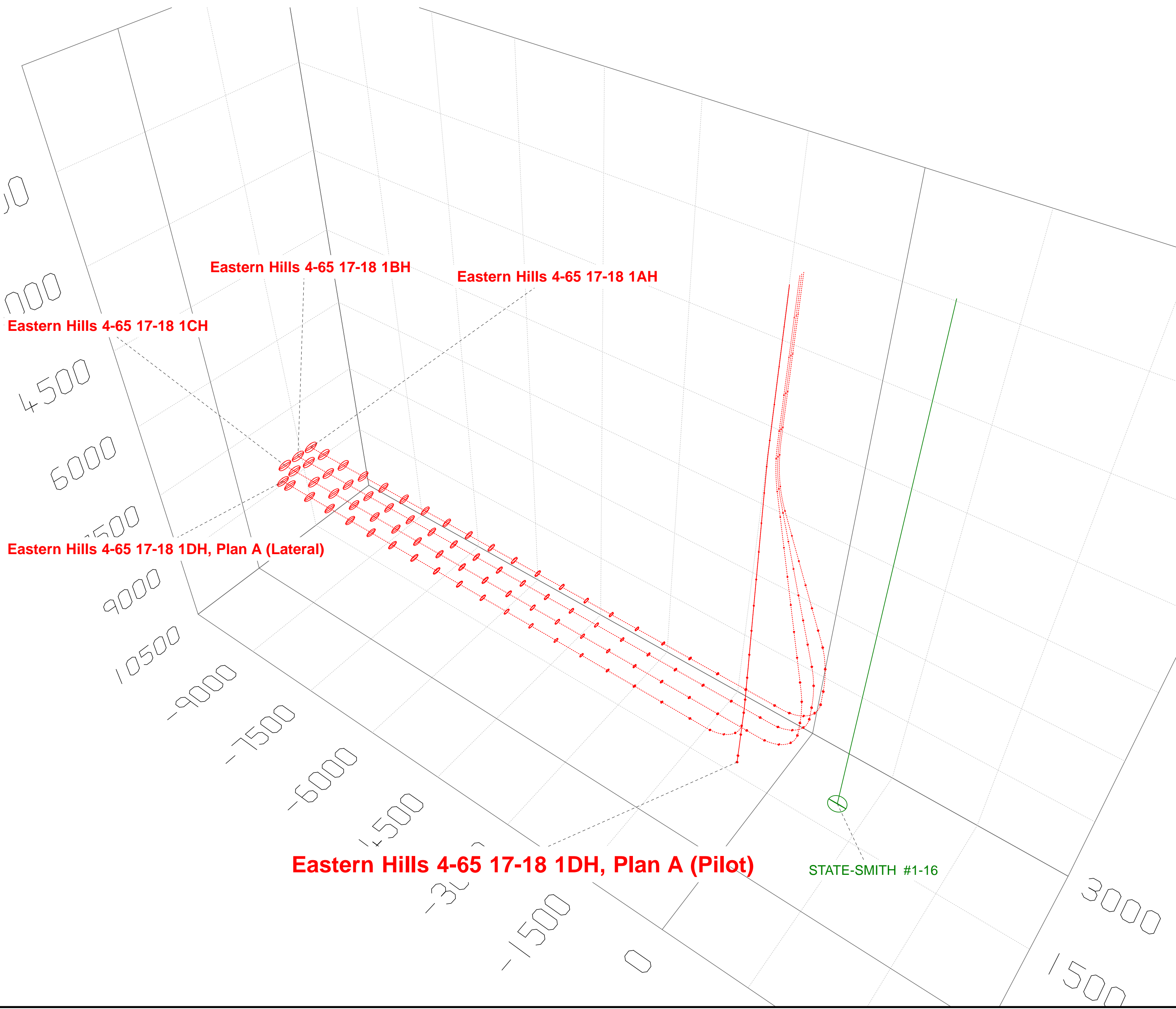
API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 5000.1 Build: 73

HALLIBURTON

Charge for permit plan will be credited back to Conoco Phillips if well is drilled using Sperry Drilling as the directional provider.



Plan Report for Eastern Hills 4-65 17-18 1DH - Rev A1

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)	Toolface Azimuth (°)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,720.00	0.00	0.00	1,720.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fox Hills										
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,897.00	0.00	0.00	1,897.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pierre Shale										
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,097.00	0.00	0.00	2,097.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 5/8" Casing Pt.										
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,175.00	0.00	0.00	2,175.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Begin Nudge @ 2175.00 ft										
2,200.00	0.38	0.00	2,200.00	0.08	0.00	0.08	1.50	1.50	0.00	0.00
2,300.00	1.88	0.00	2,299.98	2.05	0.00	2.05	1.50	1.50	0.00	0.00
2,385.00	3.15	0.00	2,384.89	5.77	0.00	5.77	1.50	1.50	0.00	0.00
End Nudge @ 2385.00 ft										
2,400.00	3.15	0.00	2,399.87	6.60	0.00	6.60	0.00	0.00	0.00	0.00
2,500.00	3.15	0.00	2,499.72	12.09	0.00	12.09	0.00	0.00	0.00	0.00
2,600.00	3.15	0.00	2,599.57	17.59	0.00	17.59	0.00	0.00	0.00	0.00
2,700.00	3.15	0.00	2,699.42	23.08	0.00	23.08	0.00	0.00	0.00	0.00
2,800.00	3.15	0.00	2,799.27	28.58	0.00	28.58	0.00	0.00	0.00	0.00
2,900.00	3.15	0.00	2,899.12	34.07	0.00	34.07	0.00	0.00	0.00	0.00
3,000.00	3.15	0.00	2,998.97	39.57	0.00	39.57	0.00	0.00	0.00	0.00
3,100.00	3.15	0.00	3,098.81	45.06	0.00	45.06	0.00	0.00	0.00	0.00
3,200.00	3.15	0.00	3,198.66	50.56	0.00	50.56	0.00	0.00	0.00	0.00
3,300.00	3.15	0.00	3,298.51	56.05	0.00	56.05	0.00	0.00	0.00	0.00
3,400.00	3.15	0.00	3,398.36	61.55	0.00	61.55	0.00	0.00	0.00	0.00
3,500.00	3.15	0.00	3,498.21	67.04	0.00	67.04	0.00	0.00	0.00	0.00
3,600.00	3.15	0.00	3,598.06	72.54	0.00	72.54	0.00	0.00	0.00	0.00
3,700.00	3.15	0.00	3,697.91	78.03	0.00	78.03	0.00	0.00	0.00	0.00
3,800.00	3.15	0.00	3,797.76	83.53	0.00	83.53	0.00	0.00	0.00	0.00
3,900.00	3.15	0.00	3,897.61	89.02	0.00	89.02	0.00	0.00	0.00	0.00
4,000.00	3.15	0.00	3,997.45	94.52	0.00	94.52	0.00	0.00	0.00	0.00
4,100.00	3.15	0.00	4,097.30	100.01	0.00	100.01	0.00	0.00	0.00	0.00
4,200.00	3.15	0.00	4,197.15	105.51	0.00	105.51	0.00	0.00	0.00	0.00
4,300.00	3.15	0.00	4,297.00	111.00	0.00	111.00	0.00	0.00	0.00	0.00
4,400.00	3.15	0.00	4,396.85	116.50	0.00	116.50	0.00	0.00	0.00	0.00
4,500.00	3.15	0.00	4,496.70	121.99	0.00	121.99	0.00	0.00	0.00	0.00
4,600.00	3.15	0.00	4,596.55	127.49	0.00	127.49	0.00	0.00	0.00	0.00
4,700.00	3.15	0.00	4,696.40	132.98	0.00	132.98	0.00	0.00	0.00	0.00

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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)	Toolface Azimuth (°)
4,800.00	3.15	0.00	4,796.25	138.48	0.00	138.48	0.00	0.00	0.00	0.00
4,900.00	3.15	0.00	4,896.09	143.97	0.00	143.97	0.00	0.00	0.00	0.00
5,000.00	3.15	0.00	4,995.94	149.47	0.00	149.47	0.00	0.00	0.00	0.00
5,100.00	3.15	0.00	5,095.79	154.96	0.00	154.96	0.00	0.00	0.00	0.00
5,200.00	3.15	0.00	5,195.64	160.46	0.00	160.46	0.00	0.00	0.00	0.00
5,300.00	3.15	0.00	5,295.49	165.95	0.00	165.95	0.00	0.00	0.00	0.00
5,400.00	3.15	0.00	5,395.34	171.45	0.00	171.45	0.00	0.00	0.00	0.00
5,500.00	3.15	0.00	5,495.19	176.94	0.00	176.94	0.00	0.00	0.00	0.00
5,600.00	3.15	0.00	5,595.04	182.44	0.00	182.44	0.00	0.00	0.00	0.00
5,700.00	3.15	0.00	5,694.89	187.93	0.00	187.93	0.00	0.00	0.00	0.00
5,800.00	3.15	0.00	5,794.73	193.43	0.00	193.43	0.00	0.00	0.00	0.00
5,900.00	3.15	0.00	5,894.58	198.92	0.00	198.92	0.00	0.00	0.00	0.00
6,000.00	3.15	0.00	5,994.43	204.42	0.00	204.42	0.00	0.00	0.00	0.00
6,100.00	3.15	0.00	6,094.28	209.91	0.00	209.91	0.00	0.00	0.00	0.00
6,200.00	3.15	0.00	6,194.13	215.41	0.00	215.41	0.00	0.00	0.00	0.00
6,300.00	3.15	0.00	6,293.98	220.90	0.00	220.90	0.00	0.00	0.00	0.00
6,400.00	3.15	0.00	6,393.83	226.40	0.00	226.40	0.00	0.00	0.00	0.00
6,500.00	3.15	0.00	6,493.68	231.89	0.00	231.89	0.00	0.00	0.00	0.00
6,600.00	3.15	0.00	6,593.53	237.39	0.00	237.39	0.00	0.00	0.00	0.00
6,700.00	3.15	0.00	6,693.37	242.88	0.00	242.88	0.00	0.00	0.00	0.00
6,800.00	3.15	0.00	6,793.22	248.38	0.00	248.38	0.00	0.00	0.00	0.00
6,881.90	3.15	0.00	6,875.00	252.88	0.00	252.88	0.00	0.00	0.00	0.00
Begin Drop @ 6881.90 ft										
6,900.00	2.88	0.00	6,893.07	253.83	0.00	253.83	1.50	-1.50	0.00	180.00
7,000.00	1.38	0.00	6,993.00	257.54	0.00	257.54	1.50	-1.50	0.00	180.00
7,091.90	0.00	0.00	7,084.89	258.65	0.00	258.65	1.50	-1.50	0.00	-180.00
End Drop @ 7091.90 ft										
7,100.00	0.00	0.00	7,092.99	258.65	0.00	258.65	0.00	0.00	0.00	0.00
7,200.00	0.00	0.00	7,192.99	258.65	0.00	258.65	0.00	0.00	0.00	0.00
7,300.00	0.00	0.00	7,292.99	258.65	0.00	258.65	0.00	0.00	0.00	0.00
7,400.00	0.00	0.00	7,392.99	258.65	0.00	258.65	0.00	0.00	0.00	0.00
7,500.00	0.00	0.00	7,492.99	258.65	0.00	258.65	0.00	0.00	0.00	0.00
7,600.00	0.00	0.00	7,592.99	258.65	0.00	258.65	0.00	0.00	0.00	0.00
7,670.01	0.00	0.00	7,663.00	258.65	0.00	258.65	0.00	0.00	0.00	0.00
Sharon Springs										
7,700.00	0.00	0.00	7,692.99	258.65	0.00	258.65	0.00	0.00	0.00	0.00
7,774.01	0.00	0.00	7,767.00	258.65	0.00	258.65	0.00	0.00	0.00	0.00
Niobrara										
7,800.00	0.00	0.00	7,792.99	258.65	0.00	258.65	0.00	0.00	0.00	0.00
7,845.01	0.00	0.00	7,838.00	258.65	0.00	258.65	0.00	0.00	0.00	0.00
Niobrara B										
7,889.01	0.00	0.00	7,882.00	258.65	0.00	258.65	0.00	0.00	0.00	0.00
Niobrara C										
7,900.00	0.00	0.00	7,892.99	258.65	0.00	258.65	0.00	0.00	0.00	0.00
7,963.01	0.00	0.00	7,956.00	258.65	0.00	258.65	0.00	0.00	0.00	0.00
Niobrara D										
8,000.00	0.00	0.00	7,992.99	258.65	0.00	258.65	0.00	0.00	0.00	0.00
8,084.01	0.00	0.00	8,077.00	258.65	0.00	258.65	0.00	0.00	0.00	0.00
Fort Hays Limestone										
8,100.00	0.00	0.00	8,092.99	258.65	0.00	258.65	0.00	0.00	0.00	0.00
8,156.01	0.00	0.00	8,149.00	258.65	0.00	258.65	0.00	0.00	0.00	0.00
Greenhorn Limestone										
8,200.00	0.00	0.00	8,192.99	258.65	0.00	258.65	0.00	0.00	0.00	0.00
8,259.01	0.00	0.00	8,252.00	258.65	0.00	258.65	0.00	0.00	0.00	0.00
Total Depth 8259.01 ft										

Plan Report for Eastern Hills 4-65 17-18 1DH - Rev A1

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,175.00	2,175.00	0.00	0.00	Begin Nudge @ 2175.00 ft
2,385.00	2,384.89	5.77	0.00	End Nudge @ 2385.00 ft
6,881.90	6,875.00	252.88	0.00	Begin Drop @ 6881.90 ft
7,091.90	7,084.89	258.65	0.00	End Drop @ 7091.90 ft
8,259.01	8,252.00	258.65	0.00	Total Depth 8259.01 ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/-S (usft)	+E/-W (usft)	
Target	Eastern Hills 4-65 17-18 1DH (Pilot)_Rev A1_BHLTgt	0.00	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	2,097.00	Rev A1	MWD+IFR1+MS_WY
2,097.00	8,259.01	Rev A1	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,097.00	2,097.00	9 5/8" Casing Pt.	9-5/8	13-1/2

Formation Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,720.00	1,720.00	Fox Hills			
1,897.00	1,897.00	Pierre Shale			
7,670.01	7,663.00	Sharon Springs			
7,774.01	7,767.00	Niobrara			
7,845.01	7,838.00	Niobrara B			
7,889.01	7,882.00	Niobrara C			
7,963.01	7,956.00	Niobrara D			
8,084.01	8,077.00	Fort Hays Limestone			
8,156.01	8,149.00	Greenhorn Limestone			

Plan Report for Eastern Hills 4-65 17-18 1DH - Rev A1

Targets associated with this wellbore

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
Eastern Hills 4-65 17-18 1DH_SB	0.00	0.00	0.00	Polygon
Eastern Hills 4-65 17-18 1DH_SL	0.00	0.00	0.00	Polygon
Eastern Hills 4-65 17-18 1DH_SHL	0.00	0.00	0.00	Point
State-Smith 1-16_(1500 ft Radius)	3.10	776.30	1,418.28	Circle
Eastern Hills 4-65 17-18 1DH (Pilot)_Rev A1_B	8,252.00	259.14	0.00	Point

Directional Difficulty Index

Average Dogleg over Survey:	0.08 °/100usft	Maximum Dogleg over Survey:	1.50 °/100usft at 2,385.00 usft
Net Tortousity applicable to Plans:	0.08 °/100usft	Directional Difficulty Index:	4.071

Audit Info

North Reference Sheet for Sec. 17-T4S-R65W (Eastern Hills 4-65 Pad) - Eastern Hills 4-65 17-18 1DH - Plan A (Pilot) (Need MagVar before Drilling)

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference .
Vertical Depths are relative to KB 24 ft @ 5645.80usft (Unknown). Northing and Easting are relative to Eastern Hills 4-65 17-18 1DH
Coordinate System is US State Plane 1983, Colorado Central Zone using datum North American Datum 1983, ellipsoid GRS 1980
Projection method is Lambert Conformal Conic (2 parallel)
Central Meridian is -105.50°, Longitude Origin:0° 0' 0.000 E°, Latitude Origin:39° 45' 0.000 N°
False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99999177

Grid Coordinates of Well: 1,683,421.27 usft N, 3,230,399.92 usft E
Geographical Coordinates of Well: 39° 42' 24.99" N, 104° 40' 51.94" W
Grid Convergence at Surface is: 0.52°

Based upon Minimum Curvature type calculations, at a Measured Depth of 8,259.01usft
the Bottom Hole Displacement is 258.65usft in the Direction of 0.00° (True).
Magnetic Convergence at surface is: -7.76° (23 March 2016, , BGGM2014)

