

Conoco Phillips Company

Arapahoe County, Colorado

Sec. 2-T5S-R64W

Moran Trust 2-2H

Plan A

Plan: Rev A0

Sperry Drilling Services

Proposal Report

20 June, 2014

Well Coordinates: 1,659,513.66 N, 3,278,528.36 E (39° 38' 23.99" N, 104° 30' 39.49" W)

Ground Level: 6,005.50 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 Moran Trust 2-2H

KB 24 ft @ 6029.50usft

N

True

API - US Survey Feet - Custom

HALLIBURTON

Plan Report for Moran Trust 2-2H - Rev A0

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
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,884.00	0.00	0.00	1,884.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fox Hills										
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
2,040.00	0.00	0.00	2,040.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pierre Shale										
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,240.00	0.00	0.00	2,240.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Surface Casing - 9 5/8" Casing Pt.										
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,315.00	0.00	0.00	2,315.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Begin Nudge @ 2315.00 ft										
2,400.00	1.70	65.00	2,399.99	0.53	1.14	-1.12	2.00	2.00	0.00	65.00
2,460.00	2.90	65.00	2,459.94	1.55	3.33	-3.25	2.00	2.00	0.00	0.00
End Nudge @ 2460.00 ft										
2,500.00	2.90	65.00	2,499.89	2.41	5.16	-5.04	0.00	0.00	0.00	0.00
2,600.00	2.90	65.00	2,599.76	4.54	9.74	-9.52	0.00	0.00	0.00	0.00
2,700.00	2.90	65.00	2,699.63	6.68	14.33	-13.99	0.00	0.00	0.00	0.00
2,800.00	2.90	65.00	2,799.50	8.82	18.91	-18.47	0.00	0.00	0.00	0.00
2,900.00	2.90	65.00	2,899.37	10.96	23.50	-22.95	0.00	0.00	0.00	0.00
3,000.00	2.90	65.00	2,999.25	13.10	28.09	-27.43	0.00	0.00	0.00	0.00
3,100.00	2.90	65.00	3,099.12	15.23	32.67	-31.91	0.00	0.00	0.00	0.00
3,200.00	2.90	65.00	3,198.99	17.37	37.26	-36.39	0.00	0.00	0.00	0.00
3,300.00	2.90	65.00	3,298.86	19.51	41.84	-40.86	0.00	0.00	0.00	0.00
3,400.00	2.90	65.00	3,398.73	21.65	46.43	-45.34	0.00	0.00	0.00	0.00
3,500.00	2.90	65.00	3,498.61	23.79	51.01	-49.82	0.00	0.00	0.00	0.00
3,600.00	2.90	65.00	3,598.48	25.93	55.60	-54.30	0.00	0.00	0.00	0.00
3,700.00	2.90	65.00	3,698.35	28.06	60.18	-58.78	0.00	0.00	0.00	0.00
3,800.00	2.90	65.00	3,798.22	30.20	64.77	-63.25	0.00	0.00	0.00	0.00
3,900.00	2.90	65.00	3,898.09	32.34	69.35	-67.73	0.00	0.00	0.00	0.00
4,000.00	2.90	65.00	3,997.97	34.48	73.94	-72.21	0.00	0.00	0.00	0.00
4,100.00	2.90	65.00	4,097.84	36.62	78.52	-76.69	0.00	0.00	0.00	0.00
4,200.00	2.90	65.00	4,197.71	38.75	83.11	-81.17	0.00	0.00	0.00	0.00
4,300.00	2.90	65.00	4,297.58	40.89	87.69	-85.65	0.00	0.00	0.00	0.00
4,400.00	2.90	65.00	4,397.45	43.03	92.28	-90.12	0.00	0.00	0.00	0.00
4,500.00	2.90	65.00	4,497.33	45.17	96.86	-94.60	0.00	0.00	0.00	0.00
4,600.00	2.90	65.00	4,597.20	47.31	101.45	-99.08	0.00	0.00	0.00	0.00
4,700.00	2.90	65.00	4,697.07	49.45	106.04	-103.56	0.00	0.00	0.00	0.00

Plan Report for Moran Trust 2-2H - Rev A0

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	2.90	65.00	4,796.94	51.58	110.62	-108.04	0.00	0.00	0.00	0.00
4,900.00	2.90	65.00	4,896.81	53.72	115.21	-112.51	0.00	0.00	0.00	0.00
5,000.00	2.90	65.00	4,996.69	55.86	119.79	-116.99	0.00	0.00	0.00	0.00
5,100.00	2.90	65.00	5,096.56	58.00	124.38	-121.47	0.00	0.00	0.00	0.00
5,200.00	2.90	65.00	5,196.43	60.14	128.96	-125.95	0.00	0.00	0.00	0.00
5,300.00	2.90	65.00	5,296.30	62.27	133.55	-130.43	0.00	0.00	0.00	0.00
5,400.00	2.90	65.00	5,396.17	64.41	138.13	-134.90	0.00	0.00	0.00	0.00
5,500.00	2.90	65.00	5,496.04	66.55	142.72	-139.38	0.00	0.00	0.00	0.00
5,600.00	2.90	65.00	5,595.92	68.69	147.30	-143.86	0.00	0.00	0.00	0.00
5,700.00	2.90	65.00	5,695.79	70.83	151.89	-148.34	0.00	0.00	0.00	0.00
5,800.00	2.90	65.00	5,795.66	72.96	156.47	-152.82	0.00	0.00	0.00	0.00
5,900.00	2.90	65.00	5,895.53	75.10	161.06	-157.30	0.00	0.00	0.00	0.00
6,000.00	2.90	65.00	5,995.40	77.24	165.64	-161.77	0.00	0.00	0.00	0.00
6,100.00	2.90	65.00	6,095.28	79.38	170.23	-166.25	0.00	0.00	0.00	0.00
6,200.00	2.90	65.00	6,195.15	81.52	174.81	-170.73	0.00	0.00	0.00	0.00
6,300.00	2.90	65.00	6,295.02	83.66	179.40	-175.21	0.00	0.00	0.00	0.00
6,400.00	2.90	65.00	6,394.89	85.79	183.98	-179.69	0.00	0.00	0.00	0.00
6,500.00	2.90	65.00	6,494.76	87.93	188.57	-184.16	0.00	0.00	0.00	0.00
6,600.00	2.90	65.00	6,594.64	90.07	193.16	-188.64	0.00	0.00	0.00	0.00
6,700.00	2.90	65.00	6,694.51	92.21	197.74	-193.12	0.00	0.00	0.00	0.00
6,705.50	2.90	65.00	6,700.00	92.33	197.99	-193.37	0.00	0.00	0.00	0.00
Begin Drop @ 6705.50 ft										
6,800.00	1.01	65.00	6,794.44	93.69	200.91	-196.22	2.00	-2.00	0.00	180.00
6,850.50	0.00	0.00	6,844.94	93.88	201.32	-196.61	2.00	-2.00	0.00	-180.00
End Drop @ 6850.50 ft										
6,900.00	0.00	0.00	6,894.44	93.88	201.32	-196.61	0.00	0.00	0.00	0.00
7,000.00	0.00	0.00	6,994.44	93.88	201.32	-196.61	0.00	0.00	0.00	0.00
7,100.00	0.00	0.00	7,094.44	93.88	201.32	-196.61	0.00	0.00	0.00	0.00
7,132.65	0.00	0.00	7,127.09	93.88	201.32	-196.61	0.00	0.00	0.00	0.00
Kick Off Point @ 7132.65 ft										
7,200.00	6.73	271.53	7,194.28	93.98	197.37	-192.66	10.00	10.00	0.00	271.53
7,300.00	16.73	271.53	7,292.07	94.52	177.06	-172.35	10.00	10.00	0.00	0.00
7,400.00	26.73	271.53	7,384.84	95.51	140.09	-135.38	10.00	10.00	0.00	0.00
7,472.07	33.94	271.53	7,447.00	96.48	103.72	-99.01	10.00	10.00	0.00	0.00
Sharon Springs										
7,500.00	36.73	271.53	7,469.78	96.91	87.58	-82.86	10.00	10.00	0.00	0.00
7,600.00	46.73	271.53	7,544.31	98.68	21.12	-16.39	10.00	10.00	0.00	0.00
Build Rate 10.00 °/100 ft										
7,640.49	50.78	271.53	7,571.00	99.50	-9.32	14.05	10.00	10.00	0.00	0.00
Niobrara										
7,700.00	56.73	271.53	7,606.16	100.77	-57.27	62.01	10.00	10.00	0.00	0.00
7,759.15	62.65	271.53	7,636.00	102.14	-108.30	113.04	10.00	10.00	0.00	0.00
Niobrara B										
7,800.00	66.73	271.53	7,653.46	103.12	-145.21	149.96	10.00	10.00	0.00	0.00
7,900.00	76.73	271.53	7,684.76	105.65	-240.01	244.78	10.00	10.00	0.00	0.00
7,925.19	79.25	271.53	7,690.00	106.31	-264.64	269.41	10.00	10.00	0.00	0.00
Niobrara C										
8,000.00	86.73	271.53	7,699.12	108.29	-338.81	343.59	10.00	10.00	0.00	0.00
8,025.55	89.29	271.53	7,700.00	108.97	-364.34	369.12	10.00	10.00	0.00	0.00
End Build @ 8025.55 ft - 7" Casing Pt.										
8,100.00	89.29	271.53	7,700.93	110.95	-438.76	443.55	0.00	0.00	0.00	0.00
8,200.00	89.29	271.53	7,702.17	113.62	-538.71	543.52	0.00	0.00	0.00	0.00
8,300.00	89.29	271.53	7,703.41	116.29	-638.67	643.49	0.00	0.00	0.00	0.00
8,400.00	89.29	271.53	7,704.65	118.95	-738.63	743.46	0.00	0.00	0.00	0.00
8,500.00	89.29	271.53	7,705.89	121.62	-838.58	843.43	0.00	0.00	0.00	0.00
8,600.00	89.29	271.53	7,707.13	124.29	-938.54	943.40	0.00	0.00	0.00	0.00
8,700.00	89.29	271.53	7,708.37	126.95	-1,038.50	1,043.37	0.00	0.00	0.00	0.00
8,800.00	89.29	271.53	7,709.61	129.62	-1,138.45	1,143.34	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 (°)
8,900.00	89.29	271.53	7,710.85	132.29	-1,238.41	1,243.31	0.00	0.00	0.00	0.00
9,000.00	89.29	271.53	7,712.09	134.95	-1,338.37	1,343.28	0.00	0.00	0.00	0.00
9,100.00	89.29	271.53	7,713.33	137.62	-1,438.32	1,443.25	0.00	0.00	0.00	0.00
9,200.00	89.29	271.53	7,714.57	140.29	-1,538.28	1,543.22	0.00	0.00	0.00	0.00
9,300.00	89.29	271.53	7,715.81	142.95	-1,638.24	1,643.19	0.00	0.00	0.00	0.00
9,400.00	89.29	271.53	7,717.05	145.62	-1,738.19	1,743.16	0.00	0.00	0.00	0.00
9,500.00	89.29	271.53	7,718.29	148.29	-1,838.15	1,843.13	0.00	0.00	0.00	0.00
9,600.00	89.29	271.53	7,719.53	150.95	-1,938.11	1,943.10	0.00	0.00	0.00	0.00
9,700.00	89.29	271.53	7,720.77	153.62	-2,038.06	2,043.07	0.00	0.00	0.00	0.00
9,800.00	89.29	271.53	7,722.01	156.29	-2,138.02	2,143.04	0.00	0.00	0.00	0.00
9,900.00	89.29	271.53	7,723.25	158.95	-2,237.98	2,243.01	0.00	0.00	0.00	0.00
10,000.00	89.29	271.53	7,724.49	161.62	-2,337.93	2,342.98	0.00	0.00	0.00	0.00
10,100.00	89.29	271.53	7,725.73	164.28	-2,437.89	2,442.95	0.00	0.00	0.00	0.00
10,200.00	89.29	271.53	7,726.97	166.95	-2,537.85	2,542.92	0.00	0.00	0.00	0.00
10,300.00	89.29	271.53	7,728.21	169.62	-2,637.80	2,642.89	0.00	0.00	0.00	0.00
10,400.00	89.29	271.53	7,729.45	172.28	-2,737.76	2,742.86	0.00	0.00	0.00	0.00
10,500.00	89.29	271.53	7,730.69	174.95	-2,837.72	2,842.83	0.00	0.00	0.00	0.00
10,600.00	89.29	271.53	7,731.93	177.62	-2,937.67	2,942.80	0.00	0.00	0.00	0.00
10,700.00	89.29	271.53	7,733.17	180.28	-3,037.63	3,042.77	0.00	0.00	0.00	0.00
10,800.00	89.29	271.53	7,734.41	182.95	-3,137.59	3,142.74	0.00	0.00	0.00	0.00
10,900.00	89.29	271.53	7,735.65	185.62	-3,237.54	3,242.71	0.00	0.00	0.00	0.00
11,000.00	89.29	271.53	7,736.89	188.28	-3,337.50	3,342.68	0.00	0.00	0.00	0.00
11,100.00	89.29	271.53	7,738.13	190.95	-3,437.46	3,442.65	0.00	0.00	0.00	0.00
11,200.00	89.29	271.53	7,739.37	193.62	-3,537.41	3,542.62	0.00	0.00	0.00	0.00
11,300.00	89.29	271.53	7,740.61	196.28	-3,637.37	3,642.59	0.00	0.00	0.00	0.00
11,400.00	89.29	271.53	7,741.85	198.95	-3,737.33	3,742.56	0.00	0.00	0.00	0.00
11,500.00	89.29	271.53	7,743.09	201.62	-3,837.29	3,842.53	0.00	0.00	0.00	0.00
11,600.00	89.29	271.53	7,744.33	204.28	-3,937.24	3,942.50	0.00	0.00	0.00	0.00
11,700.00	89.29	271.53	7,745.57	206.95	-4,037.20	4,042.47	0.00	0.00	0.00	0.00
11,800.00	89.29	271.53	7,746.81	209.62	-4,137.16	4,142.44	0.00	0.00	0.00	0.00
11,900.00	89.29	271.53	7,748.05	212.28	-4,237.11	4,242.41	0.00	0.00	0.00	0.00
12,000.00	89.29	271.53	7,749.29	214.95	-4,337.07	4,342.38	0.00	0.00	0.00	0.00
12,100.00	89.29	271.53	7,750.53	217.62	-4,437.03	4,442.36	0.00	0.00	0.00	0.00
12,200.00	89.29	271.53	7,751.77	220.28	-4,536.98	4,542.33	0.00	0.00	0.00	0.00
12,300.00	89.29	271.53	7,753.01	222.95	-4,636.94	4,642.30	0.00	0.00	0.00	0.00
12,379.55	89.29	271.53	7,754.00	225.07	-4,716.46	4,721.82	0.00	0.00	0.00	0.00
Total Depth 12379.55 ft										

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,315.00	2,315.00	0.00	0.00	Begin Nudge @ 2315.00 ft
2,460.00	2,459.94	1.55	3.33	End Nudge @ 2460.00 ft
6,705.50	6,700.00	92.33	197.99	Begin Drop @ 6705.50 ft
6,850.50	6,844.94	93.88	201.32	End Drop @ 6850.50 ft
7,132.65	7,127.09	93.88	201.32	Kick Off Point @ 7132.65 ft
7,600.00	7,544.31	98.68	21.12	Build Rate 10.00 °/100 ft
8,025.55	7,700.00	108.97	-364.33	End Build @ 8025.55 ft
12,379.55	7,754.00	225.07	-4,716.46	Total Depth 12379.55 ft

Plan Report for Moran Trust 2-2H - Rev A0

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Moran Trust 2-2H_Rev A0_BHL Tgt	272.73	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	2,240.00	Rev A0	NS-GYRO-MS
2,240.00	8,025.55	Rev A0	MWD
8,025.55	12,379.55	Rev A0	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,240.00	2,240.00	9 5/8" Casing Pt.	9-5/8	13-1/2
8,025.55	7,700.00	7" Casing Pt.	7	8-3/4

Formation Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,884.00	1,884.00	Fox Hills			
2,040.00	2,040.00	Pierre Shale			
2,240.00	2,240.00	Surface Casing			
2,818.50	7,755.00	Niobrara D			
7,472.07	7,447.00	Sharon Springs			
7,640.49	7,571.00	Niobrara			
7,759.15	7,636.00	Niobrara B			
7,925.19	7,690.00	Niobrara C			

Targets associated with this wellbore

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
Moran Trust 2-1_500 ft Radius Setback	0.00	622.34	-1,593.51	Circle
Moran Trust 2-2H_SB	0.00	0.00	0.00	Polygon
Harrington 1_500 ft Radius Setback	0.00	-1,713.89	-1,753.26	Circle
Moran Trust 2-2H_SL	0.00	0.00	0.00	Polygon
Moran Trust 2-2H_Rev A0_EPI	7,754.00	221.00	-4,581.12	Point
Moran Trust 2-2H_Rev A0_BHL Tgt	7,754.00	225.07	-4,716.46	Point

Plan Report for Moran Trust 2-2H - Rev A0

Directional Difficulty Index

Average Dogleg over Survey:	0.00 °/100usft	Maximum Dogleg over Survey:	0.00 °/100usft at 30.50 usft
Net Tortosity applicable to Plans:	0.00 °/100usft	Directional Difficulty Index:	6.093

Audit Info

North Reference Sheet for Sec. 2-T5S-R64W - Moran Trust 2-2H - Plan A

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 @ 6029.50usft. Northing and Easting are relative to Moran Trust 2-2H
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: 0.99998009

Grid Coordinates of Well: 1,659,513.66 usft N, 3,278,528.36 usft E
Geographical Coordinates of Well: 39° 38' 23.99" N, 104° 30' 39.49" W
Grid Convergence at Surface is: 0.62°

Based upon Minimum Curvature type calculations, at a Measured Depth of 12,379.55usft
the Bottom Hole Displacement is 4,721.82usft in the Direction of 272.73° (True).
Magnetic Convergence at surface is: -7.70° (19 September 2014, , BGGM2014)

