

Conoco Phillips Company

Arapahoe County, Colorado

Sec. 20-T4S-R65W (Grande 4-65 20-19 1_Pad)

Grande 4-65 20-19 1DH (MagVAR Cube Required)

Lateral Permit Plan

Plan: Rev A0

Sperry Drilling Services

Proposal Report

31 July, 2015

Well Coordinates: 1,679,074.53 N, 3,230,543.79 E (39° 41' 42.02" N, 104° 40' 50.60" W)

Ground Level: 5,656.50 usft

Local Coordinate Origin:

Centered on Well Grande 4-65 20-19 1DH (MagVAR Cube Required)

Viewing Datum:

KB 24 ft @ 5680.50usft (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.”

Azimuths to True North
 Magnetic Field
 Magnetic North: 8.45°
 Strength: 52268.4snT
 Dip Angle: 66.41°
 Date: 7/30/2015
 Model: BGGM2015

Plan Report for Grande 4-65 20-19 1DH (MagVAR Cube Required) - 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
1,755.00	0.00	0.00	1,755.00	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
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,914.00	0.00	0.00	1,914.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pierre Shale										
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,114.00	0.00	0.00	2,114.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 5/8"										
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4,500.00	0.00	0.00	4,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4,600.00	0.00	0.00	4,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4,700.00	0.00	0.00	4,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4,800.00	0.00	0.00	4,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4,900.00	0.00	0.00	4,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5,000.00	0.00	0.00	5,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5,100.00	0.00	0.00	5,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Plan Report for Grande 4-65 20-19 1DH (MagVAR Cube Required) - 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 (°)
5,200.00	0.00	0.00	5,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5,300.00	0.00	0.00	5,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5,400.00	0.00	0.00	5,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5,500.00	0.00	0.00	5,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5,587.00	0.00	0.00	5,587.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Top of Whipstock @ 5587.00 ft										
5,600.00	7.00	194.00	5,599.97	-0.77	-0.19	0.24	53.85	53.85	0.00	194.00
Bottom of Whipstock/ Kickoff Point @ 5600.00 ft										
5,675.00	12.00	194.00	5,673.92	-12.78	-3.19	4.03	6.67	6.67	0.00	0.00
End of Whipstock Follow Through @ 5675.00 ft										
5,700.00	12.00	194.00	5,698.37	-17.82	-4.44	5.63	0.00	0.00	0.00	0.00
5,800.00	12.00	194.00	5,796.18	-37.99	-9.47	11.99	0.00	0.00	0.00	0.00
5,900.00	12.00	194.00	5,894.00	-58.17	-14.50	18.36	0.00	0.00	0.00	0.00
6,000.00	12.00	194.00	5,991.81	-78.34	-19.53	24.73	0.00	0.00	0.00	0.00
6,100.00	12.00	194.00	6,089.63	-98.51	-24.56	31.10	0.00	0.00	0.00	0.00
6,200.00	12.00	194.00	6,187.44	-118.69	-29.59	37.47	0.00	0.00	0.00	0.00
6,300.00	12.00	194.00	6,285.26	-138.86	-34.62	43.84	0.00	0.00	0.00	0.00
6,400.00	12.00	194.00	6,383.07	-159.04	-39.65	50.21	0.00	0.00	0.00	0.00
6,500.00	12.00	194.00	6,480.89	-179.21	-44.68	56.57	0.00	0.00	0.00	0.00
6,600.00	12.00	194.00	6,578.70	-199.38	-49.71	62.94	0.00	0.00	0.00	0.00
6,700.00	12.00	194.00	6,676.52	-219.56	-54.74	69.31	0.00	0.00	0.00	0.00
6,800.00	12.00	194.00	6,774.33	-239.73	-59.77	75.68	0.00	0.00	0.00	0.00
6,900.00	12.00	194.00	6,872.15	-259.90	-64.80	82.05	0.00	0.00	0.00	0.00
7,000.00	12.00	194.00	6,969.96	-280.08	-69.83	88.42	0.00	0.00	0.00	0.00
7,100.00	12.00	194.00	7,067.78	-300.25	-74.86	94.79	0.00	0.00	0.00	0.00
7,200.00	12.00	194.00	7,165.59	-320.42	-79.89	101.15	0.00	0.00	0.00	0.00
7,300.00	12.00	194.00	7,263.41	-340.60	-84.92	107.52	0.00	0.00	0.00	0.00
7,400.00	12.00	194.00	7,361.22	-360.77	-89.95	113.89	0.00	0.00	0.00	0.00
7,488.00	12.00	194.00	7,447.30	-378.52	-94.38	119.50	0.00	0.00	0.00	0.00
Begin Build/Turn @ 7488.00 ft										
7,500.00	13.14	195.12	7,459.01	-381.05	-95.03	120.32	9.71	9.50	9.31	12.59
7,600.00	22.64	204.43	7,554.07	-409.82	-105.60	132.79	9.89	9.50	9.31	21.26
7,700.00	32.14	213.75	7,642.75	-449.84	-128.09	157.91	10.40	9.50	9.31	28.50
7,800.00	41.64	223.06	7,722.64	-496.66	-165.44	198.31	11.00	9.50	9.31	34.31
7,809.92	42.59	223.98	7,730.00	-501.48	-170.02	203.20	11.42	9.58	9.27	33.32
Sharon Springs										
7,895.00	50.66	231.92	7,788.39	-542.76	-215.93	251.77	11.65	9.49	9.34	38.38
Average Build/Turn Rate 11.93 °/100 ft										
7,900.00	51.14	232.38	7,791.54	-545.14	-219.00	254.99	11.88	9.57	9.06	36.43
7,923.63	53.40	234.56	7,806.00	-556.26	-234.01	270.72	12.02	9.55	9.25	38.12
Niobrara										
8,000.00	60.64	241.69	7,847.55	-589.99	-288.37	327.21	12.29	9.49	9.34	41.55
8,047.06	65.12	246.07	7,869.00	-608.41	-325.96	365.95	12.61	9.52	9.30	42.03
Niobrara B										
8,100.00	70.14	251.01	7,889.15	-626.29	-371.50	412.58	12.82	9.49	9.33	43.25
8,198.97	79.55	260.22	7,915.00	-649.91	-463.85	506.30	13.07	9.50	9.31	44.70
Niobrara C										
8,200.00	79.64	260.32	7,915.19	-650.09	-464.85	507.31	13.19	9.08	9.73	46.52
8,300.00	89.14	269.64	7,924.95	-658.75	-563.76	606.59	13.27	9.50	9.32	44.85
8,304.63	89.58	270.07	7,925.00	-658.76	-568.39	611.21	13.30	9.50	9.32	44.44
End Build @ 8304.63 ft										
8,369.35	89.58	270.07	7,925.48	-658.68	-633.12	675.78	0.01	0.01	0.01	56.83
8,400.00	89.58	270.07	7,925.70	-658.64	-663.76	706.35	0.00	0.00	0.00	0.00
8,500.00	89.58	270.07	7,926.43	-658.51	-763.76	806.12	0.00	0.00	0.00	0.00
8,600.00	89.58	270.07	7,927.15	-658.38	-863.76	905.88	0.00	0.00	0.00	0.00
8,700.00	89.58	270.07	7,927.88	-658.25	-963.75	1,005.64	0.00	0.00	0.00	0.00
8,800.00	89.58	270.07	7,928.61	-658.12	-1,063.75	1,105.41	0.00	0.00	0.00	0.00
8,900.00	89.58	270.07	7,929.33	-657.99	-1,163.75	1,205.17	0.00	0.00	0.00	0.00
9,000.00	89.58	270.07	7,930.06	-657.86	-1,263.75	1,304.94	0.00	0.00	0.00	0.00

Plan Report for Grande 4-65 20-19 1DH (MagVAR Cube Required) - 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 (°)
9,100.00	89.58	270.07	7,930.79	-657.73	-1,363.74	1,404.70	0.00	0.00	0.00	0.00
9,200.00	89.58	270.07	7,931.51	-657.60	-1,463.74	1,504.47	0.00	0.00	0.00	0.00
9,300.00	89.58	270.07	7,932.24	-657.47	-1,563.74	1,604.23	0.00	0.00	0.00	0.00
9,400.00	89.58	270.07	7,932.97	-657.34	-1,663.73	1,703.99	0.00	0.00	0.00	0.00
9,500.00	89.58	270.07	7,933.70	-657.21	-1,763.73	1,803.76	0.00	0.00	0.00	0.00
9,600.00	89.58	270.07	7,934.42	-657.08	-1,863.73	1,903.52	0.00	0.00	0.00	0.00
9,700.00	89.58	270.07	7,935.15	-656.95	-1,963.73	2,003.29	0.00	0.00	0.00	0.00
9,800.00	89.58	270.07	7,935.88	-656.82	-2,063.72	2,103.05	0.00	0.00	0.00	0.00
9,900.00	89.58	270.07	7,936.60	-656.69	-2,163.72	2,202.82	0.00	0.00	0.00	0.00
10,000.00	89.58	270.07	7,937.33	-656.56	-2,263.72	2,302.58	0.00	0.00	0.00	0.00
10,100.00	89.58	270.07	7,938.06	-656.43	-2,363.72	2,402.35	0.00	0.00	0.00	0.00
10,200.00	89.58	270.07	7,938.78	-656.30	-2,463.71	2,502.11	0.00	0.00	0.00	0.00
10,300.00	89.58	270.07	7,939.51	-656.17	-2,563.71	2,601.87	0.00	0.00	0.00	0.00
10,400.00	89.58	270.07	7,940.24	-656.04	-2,663.71	2,701.64	0.00	0.00	0.00	0.00
10,500.00	89.58	270.07	7,940.97	-655.91	-2,763.70	2,801.40	0.00	0.00	0.00	0.00
10,600.00	89.58	270.07	7,941.69	-655.77	-2,863.70	2,901.17	0.00	0.00	0.00	0.00
10,700.00	89.58	270.07	7,942.42	-655.64	-2,963.70	3,000.93	0.00	0.00	0.00	0.00
10,800.00	89.58	270.07	7,943.15	-655.51	-3,063.70	3,100.70	0.00	0.00	0.00	0.00
10,900.00	89.58	270.07	7,943.87	-655.38	-3,163.69	3,200.46	0.00	0.00	0.00	0.00
11,000.00	89.58	270.07	7,944.60	-655.25	-3,263.69	3,300.22	0.00	0.00	0.00	0.00
11,100.00	89.58	270.07	7,945.33	-655.12	-3,363.69	3,399.99	0.00	0.00	0.00	0.00
11,200.00	89.58	270.07	7,946.06	-654.99	-3,463.69	3,499.75	0.00	0.00	0.00	0.00
11,300.00	89.58	270.07	7,946.78	-654.86	-3,563.68	3,599.52	0.00	0.00	0.00	0.00
11,400.00	89.58	270.07	7,947.51	-654.73	-3,663.68	3,699.28	0.00	0.00	0.00	0.00
11,500.00	89.58	270.07	7,948.24	-654.60	-3,763.68	3,799.05	0.00	0.00	0.00	0.00
11,600.00	89.58	270.07	7,948.96	-654.47	-3,863.67	3,898.81	0.00	0.00	0.00	0.00
11,700.00	89.58	270.07	7,949.69	-654.34	-3,963.67	3,998.58	0.00	0.00	0.00	0.00
11,800.00	89.58	270.07	7,950.42	-654.21	-4,063.67	4,098.34	0.00	0.00	0.00	0.00
11,900.00	89.58	270.07	7,951.14	-654.08	-4,163.67	4,198.10	0.00	0.00	0.00	0.00
12,000.00	89.58	270.07	7,951.87	-653.95	-4,263.66	4,297.87	0.00	0.00	0.00	0.00
12,100.00	89.58	270.07	7,952.60	-653.82	-4,363.66	4,397.63	0.00	0.00	0.00	0.00
12,200.00	89.58	270.07	7,953.33	-653.69	-4,463.66	4,497.40	0.00	0.00	0.00	0.00
12,300.00	89.58	270.07	7,954.05	-653.56	-4,563.66	4,597.16	0.00	0.00	0.00	0.00
12,400.00	89.58	270.07	7,954.78	-653.43	-4,663.65	4,696.93	0.00	0.00	0.00	0.00
12,500.00	89.58	270.07	7,955.51	-653.30	-4,763.65	4,796.69	0.00	0.00	0.00	0.00
12,600.00	89.58	270.07	7,956.23	-653.17	-4,863.65	4,896.45	0.00	0.00	0.00	0.00
12,700.00	89.58	270.07	7,956.96	-653.04	-4,963.64	4,996.22	0.00	0.00	0.00	0.00
12,800.00	89.58	270.07	7,957.69	-652.91	-5,063.64	5,095.98	0.00	0.00	0.00	0.00
12,900.00	89.58	270.07	7,958.41	-652.78	-5,163.64	5,195.75	0.00	0.00	0.00	0.00
13,000.00	89.58	270.07	7,959.14	-652.65	-5,263.64	5,295.51	0.00	0.00	0.00	0.00
13,100.00	89.58	270.07	7,959.87	-652.51	-5,363.63	5,395.28	0.00	0.00	0.00	0.00
13,200.00	89.58	270.07	7,960.60	-652.38	-5,463.63	5,495.04	0.00	0.00	0.00	0.00
13,300.00	89.58	270.07	7,961.32	-652.25	-5,563.63	5,594.81	0.00	0.00	0.00	0.00
13,400.00	89.58	270.07	7,962.05	-652.12	-5,663.63	5,694.57	0.00	0.00	0.00	0.00
13,500.00	89.58	270.07	7,962.78	-651.99	-5,763.62	5,794.33	0.00	0.00	0.00	0.00
13,600.00	89.58	270.07	7,963.50	-651.86	-5,863.62	5,894.10	0.00	0.00	0.00	0.00
13,700.00	89.58	270.07	7,964.23	-651.73	-5,963.62	5,993.86	0.00	0.00	0.00	0.00
13,800.00	89.58	270.07	7,964.96	-651.60	-6,063.61	6,093.63	0.00	0.00	0.00	0.00
13,900.00	89.58	270.07	7,965.69	-651.47	-6,163.61	6,193.39	0.00	0.00	0.00	0.00
14,000.00	89.58	270.07	7,966.41	-651.34	-6,263.61	6,293.16	0.00	0.00	0.00	0.00
14,100.00	89.58	270.07	7,967.14	-651.21	-6,363.61	6,392.92	0.00	0.00	0.00	0.00
14,200.00	89.58	270.07	7,967.87	-651.08	-6,463.60	6,492.69	0.00	0.00	0.00	0.00
14,300.00	89.58	270.07	7,968.59	-650.95	-6,563.60	6,592.45	0.00	0.00	0.00	0.00
14,400.00	89.58	270.07	7,969.32	-650.82	-6,663.60	6,692.21	0.00	0.00	0.00	0.00
14,500.00	89.58	270.07	7,970.05	-650.69	-6,763.60	6,791.98	0.00	0.00	0.00	0.00
14,600.00	89.58	270.07	7,970.77	-650.56	-6,863.59	6,891.74	0.00	0.00	0.00	0.00
14,700.00	89.58	270.07	7,971.50	-650.43	-6,963.59	6,991.51	0.00	0.00	0.00	0.00
14,800.00	89.58	270.07	7,972.23	-650.30	-7,063.59	7,091.27	0.00	0.00	0.00	0.00
14,900.00	89.58	270.07	7,972.96	-650.17	-7,163.58	7,191.04	0.00	0.00	0.00	0.00
15,000.00	89.58	270.07	7,973.68	-650.04	-7,263.58	7,290.80	0.00	0.00	0.00	0.00

Plan Report for Grande 4-65 20-19 1DH (MagVAR Cube Required) - 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 (°)
15,100.00	89.58	270.07	7,974.41	-649.91	-7,363.58	7,390.56	0.00	0.00	0.00	0.00
15,200.00	89.58	270.07	7,975.14	-649.78	-7,463.58	7,490.33	0.00	0.00	0.00	0.00
15,300.00	89.58	270.07	7,975.86	-649.65	-7,563.57	7,590.09	0.00	0.00	0.00	0.00
15,400.00	89.58	270.07	7,976.59	-649.52	-7,663.57	7,689.86	0.00	0.00	0.00	0.00
15,500.00	89.58	270.07	7,977.32	-649.39	-7,763.57	7,789.62	0.00	0.00	0.00	0.00
15,600.00	89.58	270.07	7,978.04	-649.25	-7,863.57	7,889.39	0.00	0.00	0.00	0.00
15,700.00	89.58	270.07	7,978.77	-649.12	-7,963.56	7,989.15	0.00	0.00	0.00	0.00
15,800.00	89.58	270.07	7,979.50	-648.99	-8,063.56	8,088.92	0.00	0.00	0.00	0.00
15,900.00	89.58	270.07	7,980.23	-648.86	-8,163.56	8,188.68	0.00	0.00	0.00	0.00
16,000.00	89.58	270.07	7,980.95	-648.73	-8,263.55	8,288.44	0.00	0.00	0.00	0.00
16,100.00	89.58	270.07	7,981.68	-648.60	-8,363.55	8,388.21	0.00	0.00	0.00	0.00
16,200.00	89.58	270.07	7,982.41	-648.47	-8,463.55	8,487.97	0.00	0.00	0.00	0.00
16,300.00	89.58	270.07	7,983.13	-648.34	-8,563.55	8,587.74	0.00	0.00	0.00	0.00
16,400.00	89.58	270.07	7,983.86	-648.21	-8,663.54	8,687.50	0.00	0.00	0.00	0.00
16,500.00	89.58	270.07	7,984.59	-648.08	-8,763.54	8,787.27	0.00	0.00	0.00	0.00
16,600.00	89.58	270.07	7,985.32	-647.95	-8,863.54	8,887.03	0.00	0.00	0.00	0.00
16,700.00	89.58	270.07	7,986.04	-647.82	-8,963.54	8,986.79	0.00	0.00	0.00	0.00
16,800.00	89.58	270.07	7,986.77	-647.69	-9,063.53	9,086.56	0.00	0.00	0.00	0.00
16,900.00	89.58	270.07	7,987.50	-647.56	-9,163.53	9,186.32	0.00	0.00	0.00	0.00
17,000.00	89.58	270.07	7,988.22	-647.43	-9,263.53	9,286.09	0.00	0.00	0.00	0.00
17,100.00	89.58	270.07	7,988.95	-647.30	-9,363.52	9,385.85	0.00	0.00	0.00	0.00
17,200.00	89.58	270.07	7,989.68	-647.17	-9,463.52	9,485.62	0.00	0.00	0.00	0.00
17,300.00	89.58	270.07	7,990.40	-647.04	-9,563.52	9,585.38	0.00	0.00	0.00	0.00
17,381.90	89.58	270.07	7,991.00	-646.93	-9,645.42	9,667.09	0.00	0.00	0.00	0.00
Total Depth 17381.90 ft										

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,587.00	5,587.00	0.00	0.00	Top of Whipstock @ 5587.00 ft
5,600.00	5,599.97	-0.77	-0.19	Bottom of Whipstock/ Kickoff Point @ 5600.00 ft
5,675.00	5,673.92	-12.78	-3.19	End of Whipstock Follow Through @ 5675.00 ft
7,488.00	7,447.30	-378.52	-94.38	Begin Build/Turn @ 7488.00 ft
7,895.00	7,788.39	-542.76	-215.93	Average Build/Turn Rate 11.93 °/100 ft
8,304.63	7,925.00	-658.76	-568.39	End Build @ 8304.63 ft
17,381.90	7,991.00	-646.93	-9,645.42	Total Depth 17381.90 ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
Target	Grande 4-65 20-19 1DH_Rev A0_BHL Tgt	266.16	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	17,381.90	Rev A0	MWD+IFR1+MS_WY

Plan Report for Grande 4-65 20-19 1DH (MagVAR Cube Required) - Rev A0

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,114.00	2,114.00	9 5/8"	9-5/8	13-1/2

Formation Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,755.00	1,755.00	Fox Hills			
1,914.00	1,914.00	Pierre Shale			
7,809.92	7,730.00	Sharon Springs			
7,923.63	7,806.00	Niobrara			
8,047.06	7,869.00	Niobrara B			
8,198.97	7,915.00	Niobrara C			

Targets associated with this wellbore

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
Grande 4-65 20-19 1DH_SB	0.00	0.00	0.00	Polygon
Grande 4-65 20-19 1DH_SHL	0.00	0.01	0.00	Point
Section 19 & 20_SL	0.00	280.13	0.84	Polygon
Grande 4-65 20-19 1DH_Rev A0_EPI	7,991.00	-648.07	-9,510.34	Point
Grande 4-65 20-19 1DH_Rev A0_BHL Tgt	7,991.00	-646.93	-9,645.42	Point

Directional Difficulty Index

Average Dogleg over Survey:	0.63 °/100usft	Maximum Dogleg over Survey:	53.85 °/100usft at 5,600.00 usft
Net Tortousity applicable to Plans:	0.63 °/100usft	Directional Difficulty Index:	6.619

Audit Info

North Reference Sheet for Sec. 20-T4S-R65W (Grande 4-65 20-19 1_Pad) - Grande 4-65 20-19 1DH (MagVAR Cube Required) - Lateral Permit Plan

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 @ 5680.50usft (Unknown). Northing and Easting are relative to Grande 4-65 20-19 1DH (MagVAR Cube Required)
 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: 0.99998958

Grid Coordinates of Well: 1,679,074.53 usft N, 3,230,543.79 usft E
 Geographical Coordinates of Well: 39° 41' 42.02" N, 104° 40' 50.60" W
 Grid Convergence at Surface is: 0.52°

Based upon Minimum Curvature type calculations, at a Measured Depth of 17,381.90usft
 the Bottom Hole Displacement is 9,667.09usft in the Direction of 266.16° (True).
 Magnetic Convergence at surface is: -7.93° (30 July 2015, , BGGM2015)

