

Project: Weld County, CO (NAD 83)
Site: Sec. 31-T1N-R67W
Well: Sack 16N-6HZ
Wellbore: Plan A
Design: Rev A0 Permit

Anadarko Petroleum Corp.

HALLIBURTON
Sperry Drilling

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	2490.00	0.00	0.00	2490.00	0.00	0.00	0.00	0.00	0.00	
3	3240.00	15.00	41.00	3231.46	73.67	64.04	2.00	41.00	-73.67	
4	6325.00	15.00	41.00	6211.34	676.27	587.88	0.00	0.00	-676.27	
5	7075.00	0.00	0.00	6952.81	749.95	651.92	2.00	180.00	-749.95	
6	7177.24	0.00	0.00	7055.05	749.95	651.92	0.00	0.00	-749.95	
7	8075.15	89.79	180.00	7628.00	179.07	651.93	10.00	180.00	-179.07	
8	13566.63	89.79	180.00	7648.00	-5312.37	652.06	0.00	0.00	5312.37	Sack 16N-6HZ_BHL

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	
Sack 16N-6HZ_LD	0.00	0.00	0.00	40° 0' 7.873 N	104° 55' 34.338 W	
Sack 16N-6HZ_SEC	0.00	0.00	0.00	40° 0' 7.873 N	104° 55' 34.338 W	Polygon
Sack 16N-6HZ_SHL	0.00	0.00	0.00	40° 0' 7.873 N	104° 55' 34.338 W	
Sack 16N-6HZ_BHL	7648.00	-5312.37	652.06	39° 59' 15.374 N	104° 55' 25.961 W	

WELL DETAILS: Sack 16N-6HZ

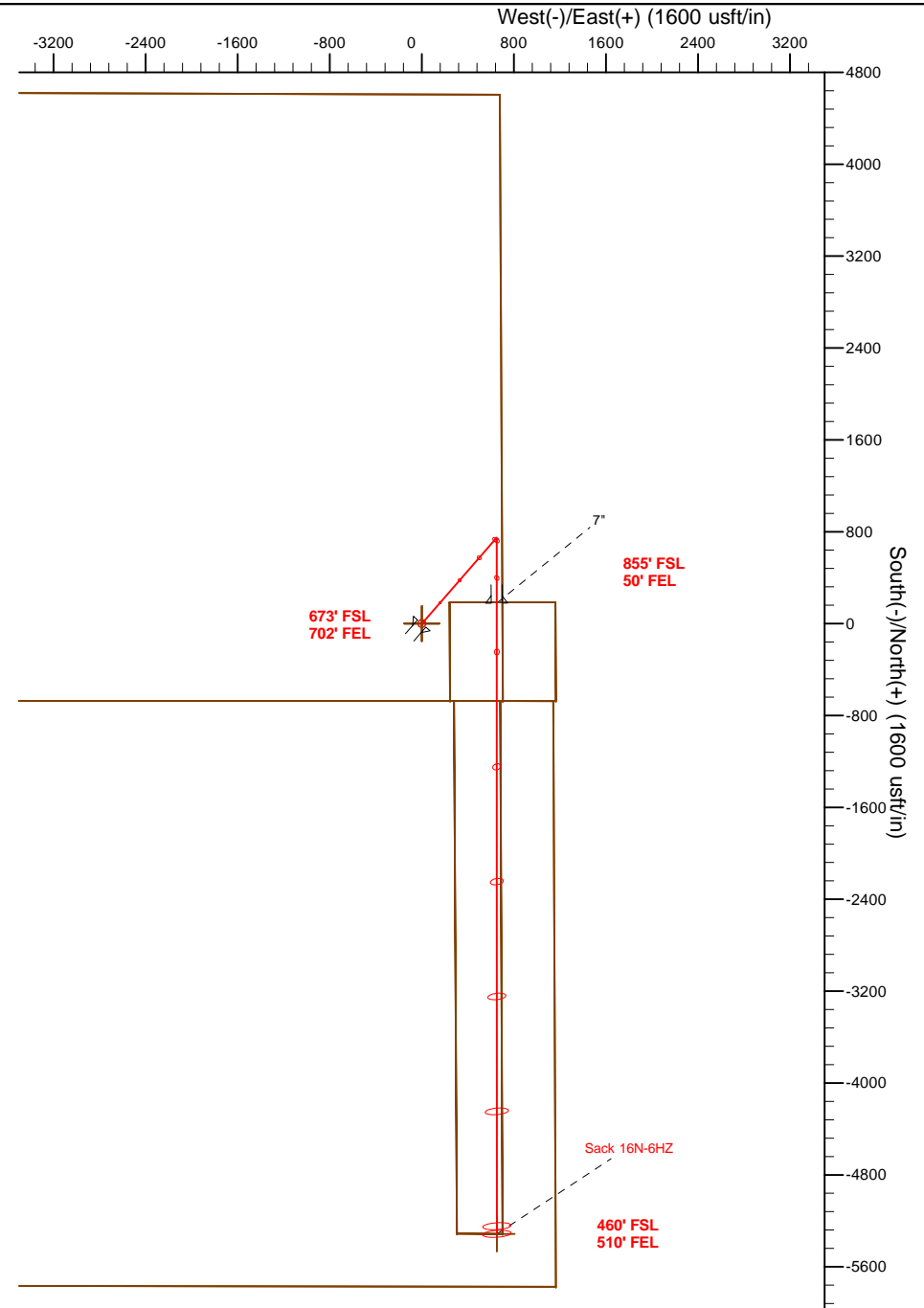
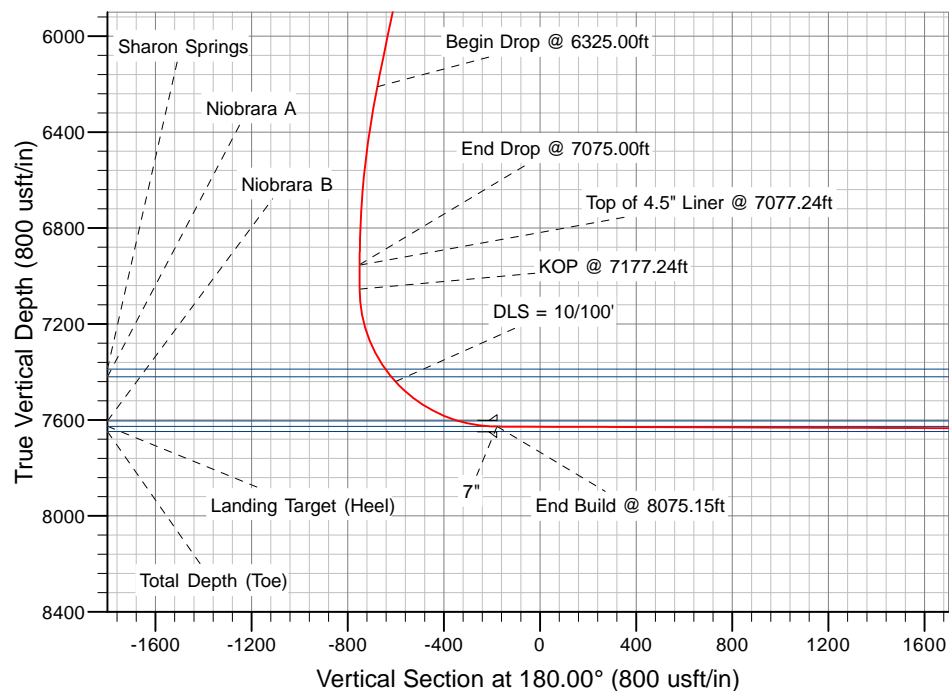
Ground Level: 5055.00
RKB = 17' @ 5072.00usft (Drilling Rig)

Plan: Rev A0 Permit (Sack 16N-6HZ/Plan A)

Created By: Clint Eshelman Date: 12/28/2013
Reviewed: Date:

TVD MD

6955.05 7077.24 Top of 4.5" Liner @ 7077.24ft
7055.05 7177.24 KOP @ 7177.24ft



Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 31-T1N-R67W

Sack 16N-6HZ

Plan A

Plan: Rev A0 Permit

Sperry Drilling Services

Proposal Report

23 December, 2013

Well Coordinates: 1,244,163.56 N, 3,160,744.45 E (40° 00' 07.87" N, 104° 55' 34.34" W)

Ground Level: 5,055.00 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 Sack 16N-6HZ

RKB = 17' @ 5072.00usft (Drilling Rig)

N

True

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Plan Report for Sack 16N-6HZ - Rev A0 Permit

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
Sack 16N-6HZ_LD - Sack 16N-6HZ_SHL - Sack 16N-6HZ_SEC										
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
1,227.00	0.00	0.00	1,227.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fox Hills Marker										
1,277.00	0.00	0.00	1,277.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 5/8"										
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
1,900.00	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
2,100.00	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
2,300.00	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
2,490.00	0.00	0.00	2,490.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Begin Nudge @ 2490.00ft										
2,500.00	0.20	41.00	2,500.00	0.01	0.01	-0.01	2.00	2.00	0.00	41.00
2,600.00	2.20	41.00	2,599.97	1.59	1.39	-1.59	2.00	2.00	0.00	0.00
2,700.00	4.20	41.00	2,699.81	5.81	5.05	-5.81	2.00	2.00	0.00	0.00
2,800.00	6.20	41.00	2,799.40	12.65	10.99	-12.65	2.00	2.00	0.00	0.00
2,900.00	8.20	41.00	2,898.60	22.10	19.22	-22.10	2.00	2.00	0.00	0.00
3,000.00	10.20	41.00	2,997.31	34.17	29.70	-34.17	2.00	2.00	0.00	0.00
3,100.00	12.20	41.00	3,095.40	48.83	42.45	-48.83	2.00	2.00	0.00	0.00
3,200.00	14.20	41.00	3,192.75	66.06	57.43	-66.06	2.00	2.00	0.00	0.00
3,240.00	15.00	41.00	3,231.46	73.67	64.04	-73.67	2.00	2.00	0.00	0.00
End Nudge @ 3240.00ft										
3,300.00	15.00	41.00	3,289.42	85.39	74.23	-85.39	0.00	0.00	0.00	0.00
3,400.00	15.00	41.00	3,386.01	104.92	91.21	-104.92	0.00	0.00	0.00	0.00
3,500.00	15.00	41.00	3,482.60	124.46	108.19	-124.46	0.00	0.00	0.00	0.00
3,600.00	15.00	41.00	3,579.20	143.99	125.17	-143.99	0.00	0.00	0.00	0.00
3,700.00	15.00	41.00	3,675.79	163.52	142.15	-163.52	0.00	0.00	0.00	0.00
3,800.00	15.00	41.00	3,772.38	183.06	159.13	-183.06	0.00	0.00	0.00	0.00
3,900.00	15.00	41.00	3,868.97	202.59	176.11	-202.59	0.00	0.00	0.00	0.00
4,000.00	15.00	41.00	3,965.57	222.12	193.09	-222.12	0.00	0.00	0.00	0.00
4,100.00	15.00	41.00	4,062.16	241.66	210.07	-241.66	0.00	0.00	0.00	0.00
4,200.00	15.00	41.00	4,158.75	261.19	227.05	-261.19	0.00	0.00	0.00	0.00
4,300.00	15.00	41.00	4,255.34	280.72	244.03	-280.72	0.00	0.00	0.00	0.00
4,400.00	15.00	41.00	4,351.94	300.26	261.01	-300.26	0.00	0.00	0.00	0.00
4,500.00	15.00	41.00	4,448.53	319.79	277.99	-319.79	0.00	0.00	0.00	0.00
4,600.00	15.00	41.00	4,545.12	339.32	294.97	-339.32	0.00	0.00	0.00	0.00
4,700.00	15.00	41.00	4,641.71	358.86	311.95	-358.86	0.00	0.00	0.00	0.00
4,800.00	15.00	41.00	4,738.31	378.39	328.93	-378.39	0.00	0.00	0.00	0.00

Plan Report for Sack 16N-6HZ - Rev A0 Permit

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 (°)
4,900.00	15.00	41.00	4,834.90	397.92	345.91	-397.92	0.00	0.00	0.00	0.00
5,000.00	15.00	41.00	4,931.49	417.46	362.89	-417.46	0.00	0.00	0.00	0.00
5,100.00	15.00	41.00	5,028.08	436.99	379.87	-436.99	0.00	0.00	0.00	0.00
5,145.47	15.00	41.00	5,072.00	445.87	387.59	-445.87	0.00	0.00	0.00	0.00
Sussex										
5,200.00	15.00	41.00	5,124.68	456.52	396.85	-456.52	0.00	0.00	0.00	0.00
5,300.00	15.00	41.00	5,221.27	476.06	413.83	-476.06	0.00	0.00	0.00	0.00
5,400.00	15.00	41.00	5,317.86	495.59	430.81	-495.59	0.00	0.00	0.00	0.00
5,477.79	15.00	41.00	5,393.00	510.79	444.02	-510.79	0.00	0.00	0.00	0.00
Shannon										
5,500.00	15.00	41.00	5,414.45	515.12	447.79	-515.12	0.00	0.00	0.00	0.00
5,600.00	15.00	41.00	5,511.05	534.66	464.77	-534.66	0.00	0.00	0.00	0.00
5,700.00	15.00	41.00	5,607.64	554.19	481.75	-554.19	0.00	0.00	0.00	0.00
5,800.00	15.00	41.00	5,704.23	573.72	498.73	-573.72	0.00	0.00	0.00	0.00
5,900.00	15.00	41.00	5,800.82	593.26	515.71	-593.26	0.00	0.00	0.00	0.00
6,000.00	15.00	41.00	5,897.42	612.79	532.69	-612.79	0.00	0.00	0.00	0.00
6,100.00	15.00	41.00	5,994.01	632.32	549.67	-632.32	0.00	0.00	0.00	0.00
6,200.00	15.00	41.00	6,090.60	651.86	566.65	-651.86	0.00	0.00	0.00	0.00
6,300.00	15.00	41.00	6,187.19	671.39	583.63	-671.39	0.00	0.00	0.00	0.00
6,325.00	15.00	41.00	6,211.34	676.27	587.88	-676.27	0.00	0.00	0.00	0.00
Begin Drop @ 6325.00ft										
6,400.00	13.50	41.00	6,284.03	690.21	599.99	-690.21	2.00	-2.00	0.00	-180.00
6,500.00	11.50	41.00	6,381.66	706.54	614.19	-706.54	2.00	-2.00	0.00	180.00
6,600.00	9.50	41.00	6,479.98	720.29	626.14	-720.29	2.00	-2.00	0.00	180.00
6,700.00	7.50	41.00	6,578.88	731.45	635.84	-731.45	2.00	-2.00	0.00	-180.00
6,800.00	5.50	41.00	6,678.23	739.99	643.26	-739.99	2.00	-2.00	0.00	180.00
6,900.00	3.50	41.00	6,777.91	745.91	648.41	-745.91	2.00	-2.00	0.00	180.00
7,000.00	1.50	41.00	6,877.81	749.20	651.27	-749.20	2.00	-2.00	0.00	180.00
7,075.00	0.00	0.00	6,952.81	749.95	651.92	-749.95	2.00	-2.00	0.00	-180.00
End Drop @ 7075.00ft										
7,077.24	0.00	0.00	6,955.05	749.95	651.92	-749.95	0.00	0.00	0.00	0.00
Top of 4.5" Liner @ 7077.24ft										
7,100.00	0.00	0.00	6,977.81	749.95	651.92	-749.95	0.00	0.00	0.00	0.00
7,177.24	0.00	0.00	7,055.05	749.95	651.92	-749.95	0.00	0.00	0.00	0.00
KOP @ 7177.24ft										
7,200.00	2.28	180.00	7,077.80	749.49	651.92	-749.49	10.00	10.00	0.00	180.00
7,300.00	12.28	180.00	7,176.87	736.84	651.92	-736.84	10.00	10.00	0.00	0.00
7,400.00	22.28	180.00	7,272.24	707.18	651.92	-707.18	10.00	10.00	0.00	0.00
7,500.00	32.28	180.00	7,361.00	661.42	651.92	-661.42	10.00	10.00	0.00	0.00
7,532.53	35.53	180.00	7,388.00	643.27	651.92	-643.27	10.00	10.00	0.00	0.00
Sharon Springs										
7,572.90	39.57	180.00	7,420.00	618.68	651.92	-618.68	10.00	10.00	0.00	0.00
Niobrara A										
7,600.00	42.28	180.00	7,440.48	600.93	651.92	-600.93	10.00	10.00	0.00	0.00
DLS = 10/100'										
7,700.00	52.28	180.00	7,508.24	527.56	651.92	-527.56	10.00	10.00	0.00	0.00
7,800.00	62.28	180.00	7,562.23	443.53	651.92	-443.53	10.00	10.00	0.00	0.00
7,900.00	72.28	180.00	7,600.81	351.41	651.93	-351.41	10.00	10.00	0.00	0.00
7,910.81	73.36	180.00	7,604.00	341.09	651.93	-341.09	10.00	10.00	0.00	0.00
Niobrara B										
8,000.00	82.28	180.00	7,622.80	253.99	651.93	-253.99	10.00	10.00	0.00	0.00
8,075.15	89.79	180.00	7,628.00	179.08	651.93	-179.08	10.00	10.00	0.00	0.00
End Build @ 8075.15ft - Landing Target (Heel) - 7"										
8,100.00	89.79	180.00	7,628.09	154.23	651.93	-154.23	0.00	0.00	0.00	0.00
8,200.00	89.79	180.00	7,628.45	54.23	651.93	-54.23	0.00	0.00	0.00	0.00
8,300.00	89.79	180.00	7,628.82	-45.77	651.94	45.77	0.00	0.00	0.00	0.00
8,400.00	89.79	180.00	7,629.18	-145.77	651.94	145.77	0.00	0.00	0.00	0.00
8,500.00	89.79	180.00	7,629.55	-245.77	651.94	245.77	0.00	0.00	0.00	0.00

Plan Report for Sack 16N-6HZ - Rev A0 Permit

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 (°)
8,600.00	89.79	180.00	7,629.91	-345.77	651.94	345.77	0.00	0.00	0.00	0.00
8,700.00	89.79	180.00	7,630.27	-445.77	651.95	445.77	0.00	0.00	0.00	0.00
8,800.00	89.79	180.00	7,630.64	-545.77	651.95	545.77	0.00	0.00	0.00	0.00
8,900.00	89.79	180.00	7,631.00	-645.77	651.95	645.77	0.00	0.00	0.00	0.00
9,000.00	89.79	180.00	7,631.37	-745.77	651.95	745.77	0.00	0.00	0.00	0.00
9,038.69	89.79	180.00	7,631.51	-784.46	651.95	784.46	0.00	0.00	0.00	0.00
Sack 16N-6HZ_CP										
9,100.00	89.79	180.00	7,631.73	-845.77	651.95	845.77	0.00	0.00	0.00	0.00
9,200.00	89.79	180.00	7,632.10	-945.76	651.96	945.76	0.00	0.00	0.00	0.00
9,300.00	89.79	180.00	7,632.46	-1,045.76	651.96	1,045.76	0.00	0.00	0.00	0.00
9,400.00	89.79	180.00	7,632.82	-1,145.76	651.96	1,145.76	0.00	0.00	0.00	0.00
9,500.00	89.79	180.00	7,633.19	-1,245.76	651.96	1,245.76	0.00	0.00	0.00	0.00
9,600.00	89.79	180.00	7,633.55	-1,345.76	651.97	1,345.76	0.00	0.00	0.00	0.00
9,700.00	89.79	180.00	7,633.92	-1,445.76	651.97	1,445.76	0.00	0.00	0.00	0.00
9,800.00	89.79	180.00	7,634.28	-1,545.76	651.97	1,545.76	0.00	0.00	0.00	0.00
9,900.00	89.79	180.00	7,634.65	-1,645.76	651.97	1,645.76	0.00	0.00	0.00	0.00
10,000.00	89.79	180.00	7,635.01	-1,745.76	651.98	1,745.76	0.00	0.00	0.00	0.00
10,100.00	89.79	180.00	7,635.37	-1,845.76	651.98	1,845.76	0.00	0.00	0.00	0.00
10,200.00	89.79	180.00	7,635.74	-1,945.76	651.98	1,945.76	0.00	0.00	0.00	0.00
10,300.00	89.79	180.00	7,636.10	-2,045.76	651.98	2,045.76	0.00	0.00	0.00	0.00
10,400.00	89.79	180.00	7,636.47	-2,145.76	651.98	2,145.76	0.00	0.00	0.00	0.00
10,500.00	89.79	180.00	7,636.83	-2,245.76	651.99	2,245.76	0.00	0.00	0.00	0.00
10,600.00	89.79	180.00	7,637.20	-2,345.76	651.99	2,345.76	0.00	0.00	0.00	0.00
10,700.00	89.79	180.00	7,637.56	-2,445.75	651.99	2,445.75	0.00	0.00	0.00	0.00
10,800.00	89.79	180.00	7,637.92	-2,545.75	651.99	2,545.75	0.00	0.00	0.00	0.00
10,900.00	89.79	180.00	7,638.29	-2,645.75	652.00	2,645.75	0.00	0.00	0.00	0.00
11,000.00	89.79	180.00	7,638.65	-2,745.75	652.00	2,745.75	0.00	0.00	0.00	0.00
11,100.00	89.79	180.00	7,639.02	-2,845.75	652.00	2,845.75	0.00	0.00	0.00	0.00
11,200.00	89.79	180.00	7,639.38	-2,945.75	652.00	2,945.75	0.00	0.00	0.00	0.00
11,300.00	89.79	180.00	7,639.74	-3,045.75	652.01	3,045.75	0.00	0.00	0.00	0.00
11,400.00	89.79	180.00	7,640.11	-3,145.75	652.01	3,145.75	0.00	0.00	0.00	0.00
11,500.00	89.79	180.00	7,640.47	-3,245.75	652.01	3,245.75	0.00	0.00	0.00	0.00
11,600.00	89.79	180.00	7,640.84	-3,345.75	652.01	3,345.75	0.00	0.00	0.00	0.00
11,700.00	89.79	180.00	7,641.20	-3,445.75	652.01	3,445.75	0.00	0.00	0.00	0.00
11,800.00	89.79	180.00	7,641.57	-3,545.75	652.02	3,545.75	0.00	0.00	0.00	0.00
11,900.00	89.79	180.00	7,641.93	-3,645.75	652.02	3,645.75	0.00	0.00	0.00	0.00
12,000.00	89.79	180.00	7,642.29	-3,745.75	652.02	3,745.75	0.00	0.00	0.00	0.00
12,100.00	89.79	180.00	7,642.66	-3,845.75	652.02	3,845.75	0.00	0.00	0.00	0.00
12,200.00	89.79	180.00	7,643.02	-3,945.75	652.03	3,945.75	0.00	0.00	0.00	0.00
12,300.00	89.79	180.00	7,643.39	-4,045.74	652.03	4,045.74	0.00	0.00	0.00	0.00
12,400.00	89.79	180.00	7,643.75	-4,145.74	652.03	4,145.74	0.00	0.00	0.00	0.00
12,500.00	89.79	180.00	7,644.12	-4,245.74	652.03	4,245.74	0.00	0.00	0.00	0.00
12,600.00	89.79	180.00	7,644.48	-4,345.74	652.04	4,345.74	0.00	0.00	0.00	0.00
12,700.00	89.79	180.00	7,644.84	-4,445.74	652.04	4,445.74	0.00	0.00	0.00	0.00
12,800.00	89.79	180.00	7,645.21	-4,545.74	652.04	4,545.74	0.00	0.00	0.00	0.00
12,900.00	89.79	180.00	7,645.57	-4,645.74	652.04	4,645.74	0.00	0.00	0.00	0.00
13,000.00	89.79	180.00	7,645.94	-4,745.74	652.04	4,745.74	0.00	0.00	0.00	0.00
13,100.00	89.79	180.00	7,646.30	-4,845.74	652.05	4,845.74	0.00	0.00	0.00	0.00
13,200.00	89.79	180.00	7,646.66	-4,945.74	652.05	4,945.74	0.00	0.00	0.00	0.00
13,300.00	89.79	180.00	7,647.03	-5,045.74	652.05	5,045.74	0.00	0.00	0.00	0.00
13,400.00	89.79	180.00	7,647.39	-5,145.74	652.05	5,145.74	0.00	0.00	0.00	0.00
13,500.00	89.79	180.00	7,647.76	-5,245.74	652.06	5,245.74	0.00	0.00	0.00	0.00
13,566.63	89.79	180.00	7,648.00	-5,312.37	652.06	5,312.37	0.00	0.00	0.00	0.00

TD Well @ 13566.63ft - Total Depth (Toe) - Sack 16N-6HZ_BHL

Plan Report for Sack 16N-6HZ - Rev A0 Permit

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,490.00	2,490.00	0.00	0.00	Begin Nudge @ 2490.00ft
3,240.00	3,231.46	73.67	64.04	End Nudge @ 3240.00ft
6,325.00	6,211.34	676.27	587.88	Begin Drop @ 6325.00ft
7,075.00	6,952.81	749.95	651.92	End Drop @ 7075.00ft
7,077.24	6,955.05	749.95	651.92	Top of 4.5" Liner @ 7077.24ft
7,177.24	7,055.05	749.95	651.92	KOP @ 7177.24ft
7,600.00	7,440.48	600.93	651.92	DLS = 10/100'
8,075.15	7,628.00	179.08	651.93	End Build @ 8075.15ft
13,566.63	7,648.00	-5,312.37	652.06	TD Well @ 13566.63ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
User	No Target (Freehand)	180.00	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	8,075.15	Rev A0 Permit	MWD
8,075.15	13,566.63	Rev A0 Permit	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,277.00	1,277.00	9 5/8"	9-5/8	13-1/2
8,075.15	7,628.00	7"	7	8-3/4

Formation Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,227.00	1,227.00	Fox Hills Marker		0.00	
5,145.47	5,072.00	Sussex		0.00	
5,477.79	5,393.00	Shannon		0.00	
7,532.53	7,388.00	Sharon Springs		0.00	
7,572.90	7,420.00	Niobrara A		0.00	
7,910.81	7,604.00	Niobrara B		0.00	
8,075.15	7,628.00	Landing Target (Heel)		0.00	
13,566.63	7,648.00	Total Depth (Toe)		0.00	

Plan Report for Sack 16N-6HZ - Rev A0 Permit

Targets associated with this wellbore

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
Sack 16N-6HZ_LD	0.00	0.00	0.00	Polygon
Sack 16N-6HZ_SHL	0.00	0.00	0.00	Point
Sack 16N-6HZ_SEC	0.00	0.00	0.00	Polygon
Sack 16N-6HZ_CP	7,628.00	-784.47	632.33	Point
Sack 16N-6HZ_BHL	7,648.00	-5,312.37	652.06	Point

Directional Difficulty Index

Average Dogleg over Survey:	0.77 °/100usft	Maximum Dogleg over Survey:	10.00 °/100usft at 8,017.58 usft
Net Tortosity applicable to Plans:	0.77 °/100usft	Directional Difficulty Index:	6.268

Audit Info

North Reference Sheet for Sec. 31-T1N-R67W - Sack 16N-6HZ - 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 RKB = 17' @ 5072.00usft (Drilling Rig). Northing and Easting are relative to Sack 16N-6HZ
 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 -105.50°, Longitude Origin:0.000000°, Latitude Origin:40.783333°
 False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99996620

Grid Coordinates of Well: 1,244,163.56 usft N, 3,160,744.45 usft E
 Geographical Coordinates of Well: 40° 00' 07.87" N, 104° 55' 34.34" W
 Grid Convergence at Surface is: 0.37°

Based upon Minimum Curvature type calculations, at a Measured Depth of 13,566.63usft
 the Bottom Hole Displacement is 5,352.23usft in the Direction of 173.00° (True).
 Magnetic Convergence at surface is: -8.25° (23 December 2013, , BGGM2013)

