

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 31-T1N-R67W

Sack 28N-30HZ

Plan A

Plan: Rev A0 Permit

Sperry Drilling Services

Proposal Report

27 December, 2013

Well Coordinates: 1,244,330.16 N, 3,159,519.97 E (40° 00' 09.60" N, 104° 55' 50.06" W)

Ground Level: 5,040.00 usft

Local Coordinate Origin:

Centered on Well Sack 28N-30HZ

Viewing Datum:

GL+RKB=17' @ 5057.00usft (Drilling Rig)

TVDs to System:

N

North Reference:

True

Unit System:

Dec-Deg - API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

HALLIBURTON

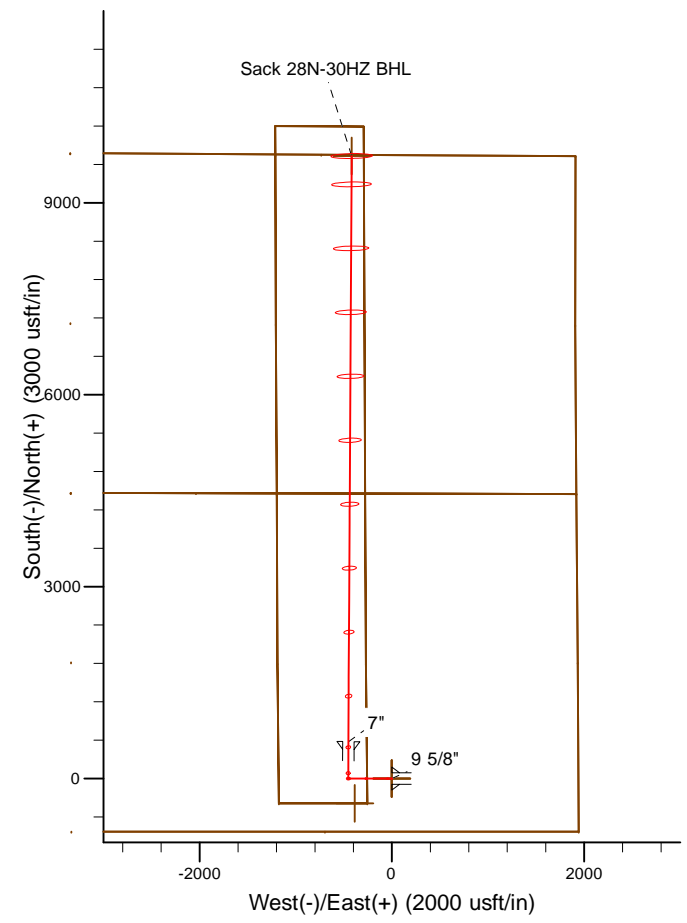
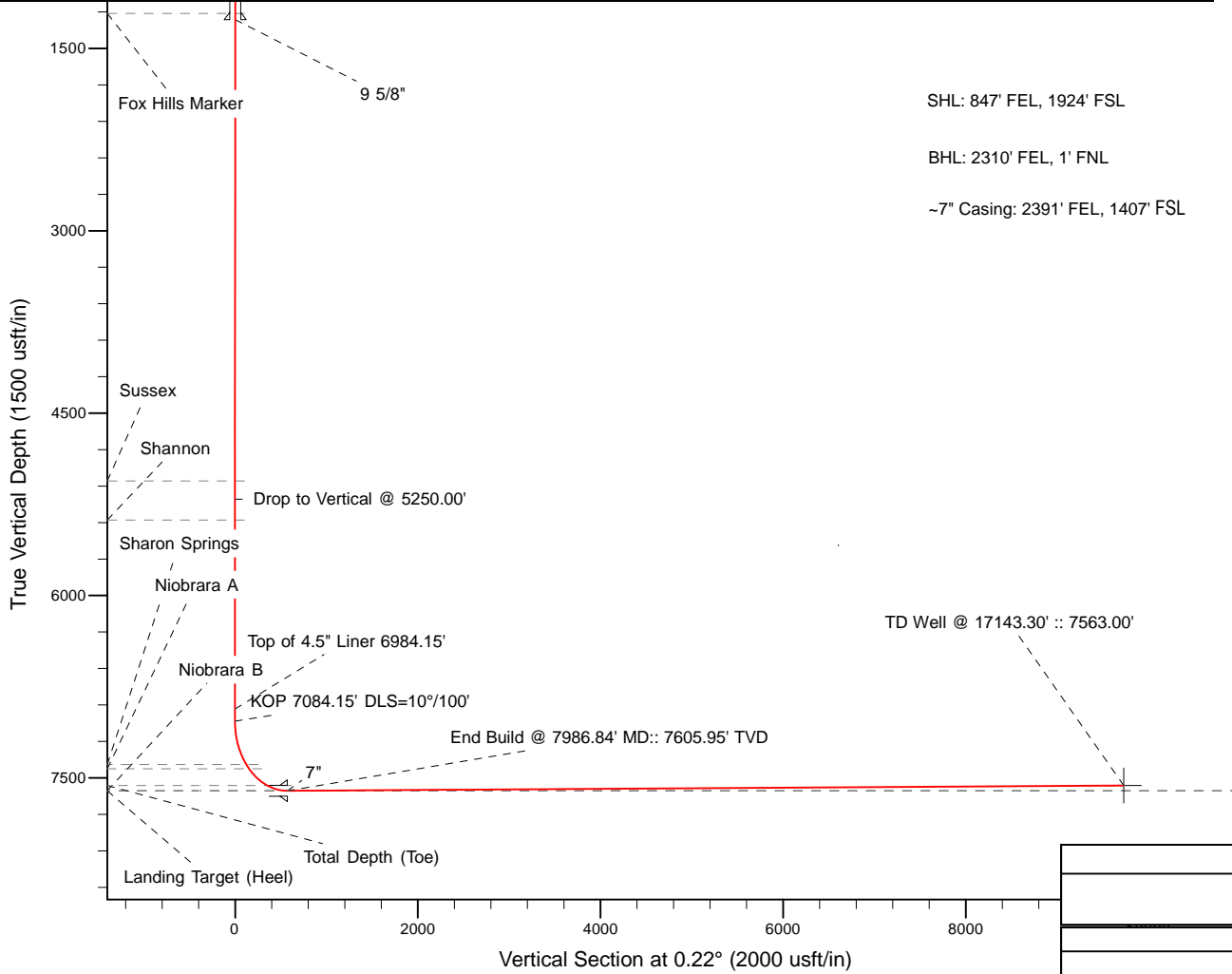
Project: Weld County, CO (NAD 83)
 Site: Sec. 31-T1N-R67W
 Well: Sack 28N-30HZ
 Wellbore: Plan A
 Design: Rev A0 Permit

Anadarko Petroleum Corp.



Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Sack 28N-30HZ SHL	0.00	0.00	0.00	1244330.16	3159519.97	40.002666	-104.930572
Sack 28N-30HZ LD	0.00	0.00	0.00	1244330.16	3159519.97	40.002666	-104.930572
Sack 28N-30HZ Sec. Line 30-31	0.00	0.00	0.00	1244330.16	3159519.97	40.002666	-104.930572
Sack 28N-30HZ BHL	7563.00	9731.93	-417.26	1254058.88	3159040.24	40.029381	-104.932062
Sack 28N-30HZ Heel	7624.00	-387.22	-384.09	1243940.49	3159138.38	40.001603	-104.931943

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	Vsect
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3500.00	0.00	0.00	3500.00	0.00	0.00	0.00	0.00
4250.00	15.00	270.00	4241.46	0.00	-97.62	2.00	-0.37
5250.00	15.00	270.00	5207.39	0.00	-356.43	0.00	-1.37
6000.00	0.00	0.00	5948.85	0.00	-454.05	2.00	-1.74
7084.15	0.00	0.00	7033.00	0.00	-454.05	0.00	-1.74
7986.84	90.27	0.22	7605.95	575.64	-451.87	10.00	573.90
17143.30	90.27	0.22	7563.00	9731.93	-417.26	0.00	9730.26



WELL DETAILS: Sack 28N-30HZ	
Ground Level:	5040.00
GL+RKB=17' @ 5057.00usft (Drilling Rig)	
Plan: Rev A0 Permit (Sack 28N-30HZ/Plan A)	
Created By: Pari Amanlou	Date: 12-23-2013

Plan Report for Sack 28N-30HZ - 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
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
1,212.00	0.00	0.00	1,212.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fox Hills Marker										
1,262.00	0.00	0.00	1,262.00	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
2,500.00	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
Begin Nudge @ 3500.00'										
3,600.00	2.00	270.00	3,599.98	0.00	-1.75	-0.01	2.00	2.00	0.00	270.00
3,700.00	4.00	270.00	3,699.84	0.00	-6.98	-0.03	2.00	2.00	0.00	0.00
3,800.00	6.00	270.00	3,799.45	0.00	-15.69	-0.06	2.00	2.00	0.00	0.00
3,900.00	8.00	270.00	3,898.70	0.00	-27.88	-0.11	2.00	2.00	0.00	0.00
4,000.00	10.00	270.00	3,997.47	0.00	-43.52	-0.17	2.00	2.00	0.00	0.00
4,100.00	12.00	270.00	4,095.62	0.00	-62.60	-0.24	2.00	2.00	0.00	0.00
4,200.00	14.00	270.00	4,193.06	0.00	-85.10	-0.33	2.00	2.00	0.00	0.00
4,250.00	15.00	270.00	4,241.46	0.00	-97.62	-0.37	2.00	2.00	0.00	0.00
End Nudge 4250.00'										
4,300.00	15.00	270.00	4,289.76	0.00	-110.56	-0.42	0.00	0.00	0.00	0.00
4,400.00	15.00	270.00	4,386.35	0.00	-136.44	-0.52	0.00	0.00	0.00	0.00
4,500.00	15.00	270.00	4,482.94	0.00	-162.32	-0.62	0.00	0.00	0.00	0.00
4,600.00	15.00	270.00	4,579.54	0.00	-188.20	-0.72	0.00	0.00	0.00	0.00
4,700.00	15.00	270.00	4,676.13	0.00	-214.08	-0.82	0.00	0.00	0.00	0.00
4,800.00	15.00	270.00	4,772.72	0.00	-239.97	-0.92	0.00	0.00	0.00	0.00
4,900.00	15.00	270.00	4,869.31	0.00	-265.85	-1.02	0.00	0.00	0.00	0.00
5,000.00	15.00	270.00	4,965.91	0.00	-291.73	-1.12	0.00	0.00	0.00	0.00

Plan Report for Sack 28N-30HZ - 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 (°)
5,094.31	15.00	270.00	5,057.00	0.00	-316.14	-1.21	0.00	0.00	0.00	0.00
Sussex										
5,100.00	15.00	270.00	5,062.50	0.00	-317.61	-1.22	0.00	0.00	0.00	0.00
5,200.00	15.00	270.00	5,159.09	0.00	-343.49	-1.32	0.00	0.00	0.00	0.00
5,250.00	15.00	270.00	5,207.39	0.00	-356.43	-1.37	0.00	0.00	0.00	0.00
Drop to Vertical @ 5250.00'										
5,300.00	14.00	270.00	5,255.79	0.00	-368.95	-1.42	2.00	-2.00	0.00	180.00
5,400.00	12.00	270.00	5,353.23	0.00	-391.45	-1.50	2.00	-2.00	0.00	180.00
5,425.30	11.49	270.00	5,378.00	0.00	-396.60	-1.52	2.00	-2.00	0.00	180.00
Shannon										
5,500.00	10.00	270.00	5,451.38	0.00	-410.53	-1.58	2.00	-2.00	0.00	180.00
5,600.00	8.00	270.00	5,550.15	0.00	-426.17	-1.64	2.00	-2.00	0.00	180.00
5,700.00	6.00	270.00	5,649.40	0.00	-438.36	-1.68	2.00	-2.00	0.00	180.00
5,800.00	4.00	270.00	5,749.01	0.00	-447.07	-1.72	2.00	-2.00	0.00	180.00
5,900.00	2.00	270.00	5,848.87	0.00	-452.30	-1.74	2.00	-2.00	0.00	180.00
6,000.00	0.00	0.00	5,948.85	0.00	-454.05	-1.74	2.00	-2.00	0.00	180.00
6,100.00	0.00	0.00	6,048.85	0.00	-454.05	-1.74	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,148.85	0.00	-454.05	-1.74	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,248.85	0.00	-454.05	-1.74	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,348.85	0.00	-454.05	-1.74	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,448.85	0.00	-454.05	-1.74	0.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,548.85	0.00	-454.05	-1.74	0.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,648.85	0.00	-454.05	-1.74	0.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,748.85	0.00	-454.05	-1.74	0.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,848.85	0.00	-454.05	-1.74	0.00	0.00	0.00	0.00
6,984.15	0.00	0.00	6,933.00	0.00	-454.05	-1.74	0.00	0.00	0.00	0.00
Top of 4.5" Liner 6984.15'										
7,000.00	0.00	0.00	6,948.85	0.00	-454.05	-1.74	0.00	0.00	0.00	0.00
7,084.15	0.00	0.00	7,033.00	0.00	-454.05	-1.74	0.00	0.00	0.00	0.00
KOP 7084.15' DLS=10°/100'										
7,100.00	1.58	0.22	7,048.85	0.22	-454.05	-1.52	10.00	10.00	0.00	0.22
7,150.00	6.58	0.22	7,098.70	3.78	-454.04	2.04	10.00	10.00	0.00	0.00
7,200.00	11.58	0.22	7,148.06	11.67	-454.01	9.93	10.00	10.00	0.00	0.00
7,250.00	16.58	0.22	7,196.54	23.84	-453.96	22.09	10.00	10.00	0.00	0.00
7,300.00	21.58	0.22	7,243.78	40.18	-453.90	38.44	10.00	10.00	0.00	0.00
7,350.00	26.58	0.22	7,289.41	60.58	-453.82	58.83	10.00	10.00	0.00	0.00
7,400.00	31.58	0.22	7,333.09	84.87	-453.73	83.13	10.00	10.00	0.00	0.00
7,450.00	36.58	0.22	7,374.49	112.89	-453.62	111.14	10.00	10.00	0.00	0.00
7,469.57	38.54	0.22	7,390.00	124.81	-453.58	123.07	10.00	10.00	0.00	0.00
Sharon Springs										
7,500.00	41.58	0.22	7,413.29	144.40	-453.50	142.66	10.00	10.00	0.00	0.00
7,515.85	43.17	0.22	7,425.00	155.09	-453.46	153.34	10.00	10.00	0.00	0.00
Niobrara A										
7,550.00	46.58	0.22	7,449.19	179.18	-453.37	177.43	10.00	10.00	0.00	0.00
7,600.00	51.58	0.22	7,481.93	216.95	-453.23	215.21	10.00	10.00	0.00	0.00
7,650.00	56.58	0.22	7,511.25	257.43	-453.08	255.69	10.00	10.00	0.00	0.00
7,700.00	61.58	0.22	7,536.93	300.31	-452.91	298.57	10.00	10.00	0.00	0.00
7,750.00	66.58	0.22	7,558.77	345.27	-452.74	343.53	10.00	10.00	0.00	0.00
7,760.87	67.67	0.22	7,563.00	355.28	-452.71	353.54	10.00	10.00	0.00	0.00
Total Depth (Toe)										
7,800.00	71.58	0.22	7,576.62	391.96	-452.57	390.22	10.00	10.00	0.00	0.00
7,850.00	76.58	0.22	7,590.32	440.03	-452.39	438.29	10.00	10.00	0.00	0.00
7,900.00	81.58	0.22	7,599.79	489.11	-452.20	487.37	10.00	10.00	0.00	0.00
7,936.77	85.26	0.22	7,604.00	525.63	-452.06	523.89	10.00	10.00	0.00	0.00
Niobrara B										
7,950.00	86.58	0.22	7,604.94	538.82	-452.01	537.08	10.00	10.00	0.00	0.00
7,986.84	90.27	0.22	7,605.95	575.64	-451.87	573.90	10.00	10.00	0.00	0.00
End Build @ 7986.84' MD:: 7605.95' TVD - Landing Target (Heel) - 7"										

Plan Report for Sack 28N-30HZ - 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 (°)
8,000.00	90.27	0.22	7,605.89	588.80	-451.82	587.06	0.00	0.00	0.00	0.00
8,100.00	90.27	0.22	7,605.42	688.80	-451.45	687.06	0.00	0.00	0.00	0.00
8,200.00	90.27	0.22	7,604.95	788.80	-451.07	787.06	0.00	0.00	0.00	0.00
8,300.00	90.27	0.22	7,604.48	888.80	-450.69	887.06	0.00	0.00	0.00	0.00
8,400.00	90.27	0.22	7,604.01	988.80	-450.31	987.06	0.00	0.00	0.00	0.00
8,500.00	90.27	0.22	7,603.54	1,088.79	-449.93	1,087.06	0.00	0.00	0.00	0.00
8,600.00	90.27	0.22	7,603.08	1,188.79	-449.56	1,187.06	0.00	0.00	0.00	0.00
8,700.00	90.27	0.22	7,602.61	1,288.79	-449.18	1,287.06	0.00	0.00	0.00	0.00
8,800.00	90.27	0.22	7,602.14	1,388.79	-448.80	1,387.06	0.00	0.00	0.00	0.00
8,900.00	90.27	0.22	7,601.67	1,488.79	-448.42	1,487.05	0.00	0.00	0.00	0.00
9,000.00	90.27	0.22	7,601.20	1,588.79	-448.04	1,587.05	0.00	0.00	0.00	0.00
9,100.00	90.27	0.22	7,600.73	1,688.78	-447.67	1,687.05	0.00	0.00	0.00	0.00
9,200.00	90.27	0.22	7,600.26	1,788.78	-447.29	1,787.05	0.00	0.00	0.00	0.00
9,300.00	90.27	0.22	7,599.79	1,888.78	-446.91	1,887.05	0.00	0.00	0.00	0.00
9,400.00	90.27	0.22	7,599.32	1,988.78	-446.53	1,987.05	0.00	0.00	0.00	0.00
9,500.00	90.27	0.22	7,598.85	2,088.78	-446.15	2,087.05	0.00	0.00	0.00	0.00
9,600.00	90.27	0.22	7,598.38	2,188.77	-445.78	2,187.05	0.00	0.00	0.00	0.00
9,700.00	90.27	0.22	7,597.92	2,288.77	-445.40	2,287.05	0.00	0.00	0.00	0.00
9,800.00	90.27	0.22	7,597.45	2,388.77	-445.02	2,387.04	0.00	0.00	0.00	0.00
9,900.00	90.27	0.22	7,596.98	2,488.77	-444.64	2,487.04	0.00	0.00	0.00	0.00
10,000.00	90.27	0.22	7,596.51	2,588.77	-444.26	2,587.04	0.00	0.00	0.00	0.00
10,100.00	90.27	0.22	7,596.04	2,688.77	-443.89	2,687.04	0.00	0.00	0.00	0.00
10,200.00	90.27	0.22	7,595.57	2,788.76	-443.51	2,787.04	0.00	0.00	0.00	0.00
10,300.00	90.27	0.22	7,595.10	2,888.76	-443.13	2,887.04	0.00	0.00	0.00	0.00
10,400.00	90.27	0.22	7,594.63	2,988.76	-442.75	2,987.04	0.00	0.00	0.00	0.00
10,500.00	90.27	0.22	7,594.16	3,088.76	-442.37	3,087.04	0.00	0.00	0.00	0.00
10,600.00	90.27	0.22	7,593.69	3,188.76	-442.00	3,187.04	0.00	0.00	0.00	0.00
10,700.00	90.27	0.22	7,593.22	3,288.75	-441.62	3,287.03	0.00	0.00	0.00	0.00
10,800.00	90.27	0.22	7,592.76	3,388.75	-441.24	3,387.03	0.00	0.00	0.00	0.00
10,900.00	90.27	0.22	7,592.29	3,488.75	-440.86	3,487.03	0.00	0.00	0.00	0.00
11,000.00	90.27	0.22	7,591.82	3,588.75	-440.48	3,587.03	0.00	0.00	0.00	0.00
11,100.00	90.27	0.22	7,591.35	3,688.75	-440.11	3,687.03	0.00	0.00	0.00	0.00
11,200.00	90.27	0.22	7,590.88	3,788.75	-439.73	3,787.03	0.00	0.00	0.00	0.00
11,300.00	90.27	0.22	7,590.41	3,888.74	-439.35	3,887.03	0.00	0.00	0.00	0.00
11,400.00	90.27	0.22	7,589.94	3,988.74	-438.97	3,987.03	0.00	0.00	0.00	0.00
11,500.00	90.27	0.22	7,589.47	4,088.74	-438.59	4,087.03	0.00	0.00	0.00	0.00
11,600.00	90.27	0.22	7,589.00	4,188.74	-438.22	4,187.02	0.00	0.00	0.00	0.00
11,700.00	90.27	0.22	7,588.53	4,288.74	-437.84	4,287.02	0.00	0.00	0.00	0.00
11,800.00	90.27	0.22	7,588.06	4,388.73	-437.46	4,387.02	0.00	0.00	0.00	0.00
11,900.00	90.27	0.22	7,587.60	4,488.73	-437.08	4,487.02	0.00	0.00	0.00	0.00
12,000.00	90.27	0.22	7,587.13	4,588.73	-436.70	4,587.02	0.00	0.00	0.00	0.00
12,100.00	90.27	0.22	7,586.66	4,688.73	-436.33	4,687.02	0.00	0.00	0.00	0.00
12,200.00	90.27	0.22	7,586.19	4,788.73	-435.95	4,787.02	0.00	0.00	0.00	0.00
12,300.00	90.27	0.22	7,585.72	4,888.73	-435.57	4,887.02	0.00	0.00	0.00	0.00
12,400.00	90.27	0.22	7,585.25	4,988.72	-435.19	4,987.02	0.00	0.00	0.00	0.00
12,500.00	90.27	0.22	7,584.78	5,088.72	-434.81	5,087.01	0.00	0.00	0.00	0.00
12,600.00	90.27	0.22	7,584.31	5,188.72	-434.44	5,187.01	0.00	0.00	0.00	0.00
12,700.00	90.27	0.22	7,583.84	5,288.72	-434.06	5,287.01	0.00	0.00	0.00	0.00
12,800.00	90.27	0.22	7,583.37	5,388.72	-433.68	5,387.01	0.00	0.00	0.00	0.00
12,900.00	90.27	0.22	7,582.90	5,488.71	-433.30	5,487.01	0.00	0.00	0.00	0.00
13,000.00	90.27	0.22	7,582.44	5,588.71	-432.92	5,587.01	0.00	0.00	0.00	0.00
13,100.00	90.27	0.22	7,581.97	5,688.71	-432.55	5,687.01	0.00	0.00	0.00	0.00
13,200.00	90.27	0.22	7,581.50	5,788.71	-432.17	5,787.01	0.00	0.00	0.00	0.00
13,300.00	90.27	0.22	7,581.03	5,888.71	-431.79	5,887.01	0.00	0.00	0.00	0.00
13,400.00	90.27	0.22	7,580.56	5,988.71	-431.41	5,987.00	0.00	0.00	0.00	0.00
13,500.00	90.27	0.22	7,580.09	6,088.70	-431.03	6,087.00	0.00	0.00	0.00	0.00
13,600.00	90.27	0.22	7,579.62	6,188.70	-430.66	6,187.00	0.00	0.00	0.00	0.00
13,700.00	90.27	0.22	7,579.15	6,288.70	-430.28	6,287.00	0.00	0.00	0.00	0.00
13,800.00	90.27	0.22	7,578.68	6,388.70	-429.90	6,387.00	0.00	0.00	0.00	0.00
13,900.00	90.27	0.22	7,578.21	6,488.70	-429.52	6,487.00	0.00	0.00	0.00	0.00



Plan Report for Sack 28N-30HZ - 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 (°)
14,000.00	90.27	0.22	7,577.74	6,588.69	-429.14	6,587.00	0.00	0.00	0.00	0.00
14,100.00	90.27	0.22	7,577.28	6,688.69	-428.77	6,687.00	0.00	0.00	0.00	0.00
14,200.00	90.27	0.22	7,576.81	6,788.69	-428.39	6,787.00	0.00	0.00	0.00	0.00
14,300.00	90.27	0.22	7,576.34	6,888.69	-428.01	6,886.99	0.00	0.00	0.00	0.00
14,400.00	90.27	0.22	7,575.87	6,988.69	-427.63	6,986.99	0.00	0.00	0.00	0.00
14,500.00	90.27	0.22	7,575.40	7,088.69	-427.25	7,086.99	0.00	0.00	0.00	0.00
14,600.00	90.27	0.22	7,574.93	7,188.68	-426.88	7,186.99	0.00	0.00	0.00	0.00
14,700.00	90.27	0.22	7,574.46	7,288.68	-426.50	7,286.99	0.00	0.00	0.00	0.00
14,800.00	90.27	0.22	7,573.99	7,388.68	-426.12	7,386.99	0.00	0.00	0.00	0.00
14,900.00	90.27	0.22	7,573.52	7,488.68	-425.74	7,486.99	0.00	0.00	0.00	0.00
15,000.00	90.27	0.22	7,573.05	7,588.68	-425.36	7,586.99	0.00	0.00	0.00	0.00
15,100.00	90.27	0.22	7,572.58	7,688.67	-424.99	7,686.99	0.00	0.00	0.00	0.00
15,200.00	90.27	0.22	7,572.12	7,788.67	-424.61	7,786.98	0.00	0.00	0.00	0.00
15,300.00	90.27	0.22	7,571.65	7,888.67	-424.23	7,886.98	0.00	0.00	0.00	0.00
15,400.00	90.27	0.22	7,571.18	7,988.67	-423.85	7,986.98	0.00	0.00	0.00	0.00
15,500.00	90.27	0.22	7,570.71	8,088.67	-423.47	8,086.98	0.00	0.00	0.00	0.00
15,600.00	90.27	0.22	7,570.24	8,188.67	-423.10	8,186.98	0.00	0.00	0.00	0.00
15,700.00	90.27	0.22	7,569.77	8,288.66	-422.72	8,286.98	0.00	0.00	0.00	0.00
15,800.00	90.27	0.22	7,569.30	8,388.66	-422.34	8,386.98	0.00	0.00	0.00	0.00
15,900.00	90.27	0.22	7,568.83	8,488.66	-421.96	8,486.98	0.00	0.00	0.00	0.00
16,000.00	90.27	0.22	7,568.36	8,588.66	-421.58	8,586.98	0.00	0.00	0.00	0.00
16,100.00	90.27	0.22	7,567.89	8,688.66	-421.21	8,686.97	0.00	0.00	0.00	0.00
16,200.00	90.27	0.22	7,567.42	8,788.65	-420.83	8,786.97	0.00	0.00	0.00	0.00
16,300.00	90.27	0.22	7,566.96	8,888.65	-420.45	8,886.97	0.00	0.00	0.00	0.00
16,400.00	90.27	0.22	7,566.49	8,988.65	-420.07	8,986.97	0.00	0.00	0.00	0.00
16,500.00	90.27	0.22	7,566.02	9,088.65	-419.69	9,086.97	0.00	0.00	0.00	0.00
16,600.00	90.27	0.22	7,565.55	9,188.65	-419.32	9,186.97	0.00	0.00	0.00	0.00
16,700.00	90.27	0.22	7,565.08	9,288.65	-418.94	9,286.97	0.00	0.00	0.00	0.00
16,800.00	90.27	0.22	7,564.61	9,388.64	-418.56	9,386.97	0.00	0.00	0.00	0.00
16,900.00	90.27	0.22	7,564.14	9,488.64	-418.18	9,486.97	0.00	0.00	0.00	0.00
17,000.00	90.27	0.22	7,563.67	9,588.64	-417.80	9,586.96	0.00	0.00	0.00	0.00
17,100.00	90.27	0.22	7,563.20	9,688.64	-417.43	9,686.96	0.00	0.00	0.00	0.00
17,143.30	90.27	0.22	7,563.00	9,731.93	-417.26	9,730.26	0.00	0.00	0.00	0.00

TD Well @ 17143.30' :: 7563.00'

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
3,500.00	3,500.00	0.00	0.00	Begin Nudge @ 3500.00'
4,250.00	4,241.46	0.00	-97.62	End Nudge 4250.00'
5,250.00	5,207.39	0.00	-356.43	Drop to Vertical @ 5250.00'
6,984.15	6,933.00	0.00	-454.05	Top of 4.5" Liner 6984.15'
7,084.15	7,033.00	0.00	-454.05	KOP 7084.15' DLS=10°/100'
7,986.84	7,605.95	575.64	-451.87	End Build @ 7986.84' MD:: 7605.95' TVD
17,143.30	7,563.00	9,731.93	-417.26	TD Well @ 17143.30' :: 7563.00'

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
User	No Target (Freehand)	0.22	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
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Plan Report for Sack 28N-30HZ - Rev A0 Permit**Survey tool program**

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	1,262.00	Rev A0 Permit	MWD
1,262.00	7,986.84	Rev A0 Permit	MWD
7,986.84	17,143.30	Rev A0 Permit	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,262.00	1,262.00	9 5/8"	9-5/8	12-3/4
7,986.84	7,605.95	7"	7	8-3/4

Formation Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,212.00	1,212.00	Fox Hills Marker		0.00	
5,094.31	5,057.00	Sussex		0.00	
5,425.30	5,378.00	Shannon		0.00	
7,469.57	7,390.00	Sharon Springs		0.00	
7,515.85	7,425.00	Niobrara A		0.00	
7,760.87	7,563.00	Total Depth (Toe)		0.00	
7,936.77	7,604.00	Niobrara B		0.00	
7,986.84	7,605.95	Landing Target (Heel)		0.00	

Targets associated with this wellbore

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
Sack 28N-30HZ Sec. Line 30-31	0.00	0.00	0.00	Polygon
Sack 28N-30HZ LD	0.00	0.00	0.00	Polygon
Sack 28N-30HZ SHL	0.00	0.00	0.00	Point
Sack 28N-30HZ BHL	7,563.00	9,731.93	-417.26	Point
Sack 28N-30HZ Heel	7,624.00	-387.22	-384.09	Point

Directional Difficulty Index

Average Dogleg over Survey:	0.70 °/100usft	Maximum Dogleg over Survey:	10.00 °/100usft at 7,986.84 usft
Net Tortosity applicable to Plans:	0.70 °/100usft	Directional Difficulty Index:	6.649

Audit Info

North Reference Sheet for Sec. 31-T1N-R67W - Sack 28N-30HZ - 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 GL+RKB=17' @ 5057.00usft (Drilling Rig). Northing and Easting are relative to Sack 28N-30HZ
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: 0.99996617

Grid Coordinates of Well: 1,244,330.16 usft N, 3,159,519.97 usft E
Geographical Coordinates of Well: 40° 00' 09.60" N, 104° 55' 50.06" W
Grid Convergence at Surface is: 0.37°

Based upon Minimum Curvature type calculations, at a Measured Depth of 17,143.30usft
the Bottom Hole Displacement is 9,740.87usft in the Direction of 357.54° (True).

Magnetic Convergence at surface is: -8.25° (19 December 2013, , BGGM2013)

Magnetic Model: BGGM2013
Date: 19-Dec-13
Declination: 8.62°
Inclination/Dip: 66.61°
Field Strength: 52561

Grid North is 0.37° East of True North (Grid Convergence)
Magnetic North is 8.62° East of True North (Magnetic Declination)
Magnetic North is 8.25° East of Grid North (Magnetic Convergence)

To convert a True Direction to a Grid Direction, Subtract 0.37°
To convert a Magnetic Direction to a True Direction, Add 8.62° East
To convert a Magnetic Direction to a Grid Direction, Add 8.25°