SPERRY-SUN DRILLING SERVICES

CERTIFIED SURVEY WORK SHEET

OPERATOR:	Anadarko
WELL:	Sack 27N-30HZ
FIELD:	Wattenburg
RIG:	Xtreme 22
LEGALS:	Sec 31-T1N-R67W
COUNTY:	Weld
STATE:	CO
CAL. METHOD:	Min Curvature
MAG. DECL. APPLIED:	8.44
VERTICAL SEC. DIR. :	359.930

SSDS Job Number :	901558192
Start Date of Job :	10/7/2014
End Date of Job :	11/3/2014
Lead Directional Driller:	J. Suitter
	B. Seghetti
Other SSDS DD's :	B. Cristian
SSDS MWD Engineers :	C. Wass
	C. Jones
	D. Macbeth

	Main Hole ==========>		1st Side Track ========>		2nd Side Track ========>		3rd Side Track ========>		4th Side Track ========>	
	1291.00	Tie On		Tie On		Tie On		Tie On		Tie On
First Survey Depth	1392.00									
Last Survey Depth	17135.00									
KOP Depth/Sidetrack MD		KOP		KOP-ST1		KOP-ST2		KOP-ST3		KOP-ST4
First Survey Depth	1392.00	MWD		MWD		MWD		MWD		MWD
Last Survey Depth	17135.00	MWD		MWD		MWD		MWD		MWD
Bit Extrapolation to TD	17177.00	T.D.		T.D.		T.D.		T.D.		T.D.

The following Sperry Sun Drilling Services personnel listed below, do certify the above survey information to be accurate :

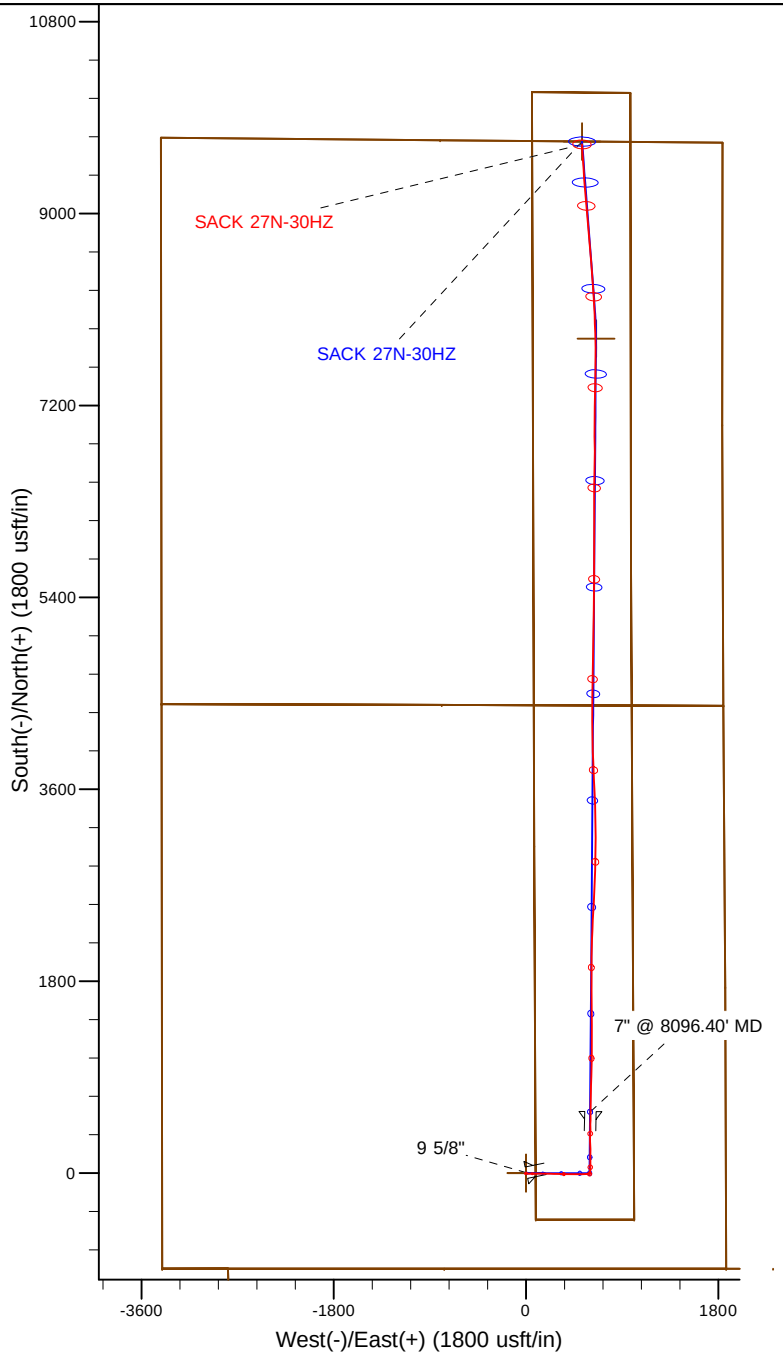
Print Name :	J. Suitter	Print Name :	C. Wass	Print Name :
Sign Name :		Sign Name :		Sign Name :
Print Name :	B. Cristian	Print Name :	C.Jones	Print Name :
Sign Name :	BOGDAN CRISTIAN	Sign Name :		Sign Name :

Examples of Survey Types:	
TieOn	Tie On to Surface Casing (Assumed Vertical), Tie On to existing MWD Survey (prior drilled hole)
MWD	Sperry Sun Drilling Services (SSDS) Measurement While Drilling (MWD) Survey's
ESS	Sperry Sun Drilling Services (SSDS) Electronic Survey System (ESS) Survey's
Gyro	Gyro Survey's ; Provided by third party vendor, or by Sperry Sun Drilling Services (SSDS)
SS	Single Shot (SS) Survey's ; Provided by Sperry Sun Drilling Services (SSDS) or third party vendor.

Project: Weld County, CO (NAD 83)
Site: Sec. 31-T1N-R67W
Well: SACK 27N-30HZ
Wellbore: Plan E
Design: Actual Surveys

Anadarko Petroleum Corporation

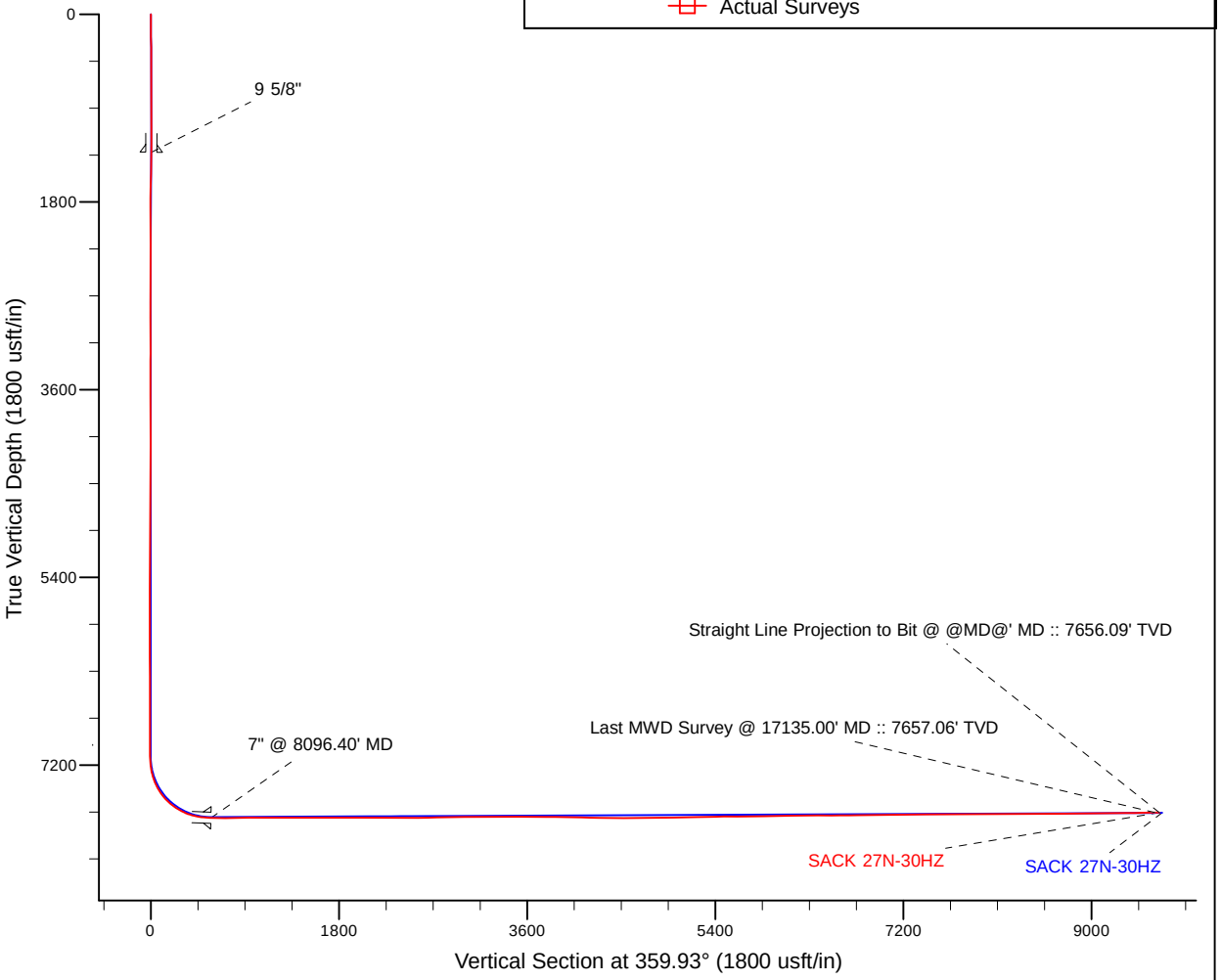
HALLIBURTON
Sperry Drilling



LEGEND

SACK 27N-30HZ, Plan E, Plan E0 V0

Actual Surveys



7" Casing:	~1471.09' FSL, ~1265.54' FEL
Lat/Long:	40.004379 N, -104.928228 E
State Planes - CO Northern:	1,244,958.28' N, 3,160,172.52' E
Location:	Sec. 31-T1N-R67W
BHL:	~27.19 FNL, ~1315.87' FEL
Lat/Long:	40.029285 N, -104.928513 E
State Planes - CO Northern:	1,254,030.37' N, 3,160,034.47' E
Location:	Sec. 30-T1N-R67W

WELL DETAILS: SACK 27N-30HZ

Ground Level: 5040.00

RKB = 16' @ 5056.00usft (Xtreme 22)

Design: Actual Surveys (SACK 27N-30HZ/Plan E)

Created By: Katie Benner Date: 11/19/2014

Reviewed: _____ Date: _____

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)
Sec. 31-T1N-R67W
SACK 27N-30HZ
API # 05-123-39425 JOB # 901558192
Plan E

Design: Actual Surveys

Sperry Drilling Services

Standard Report

27 January, 2015

Surface UWI : API # 05-123-39425 JOB # 901558192

Well Coordinates: 1,244,379.30 N, 3,159,572.60 E (40° 00' 10.08" N, 104° 55' 49.38" W)
Ground Level: 5,040.00 usft

Local Coordinate Origin:	Centered on Well SACK 27N-30HZ
Viewing Datum:	RKB = 16' @ 5056.00usft (Xtreme 22)
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

Design Report for SACK 27N-30HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
116.00	0.17	48.43	116.00	0.11	0.12	0.11	0.14
216.00	0.31	44.79	216.00	0.40	0.42	0.40	0.15
316.00	0.45	54.30	316.00	0.82	0.94	0.82	0.16
416.00	0.34	54.31	415.99	1.23	1.50	1.22	0.11
516.00	0.31	47.48	515.99	1.58	1.94	1.58	0.05
616.00	0.23	62.04	615.99	1.86	2.32	1.86	0.11
716.00	0.31	44.69	715.99	2.15	2.69	2.15	0.12
816.00	0.26	60.04	815.99	2.46	3.08	2.45	0.09
916.00	0.29	62.06	915.99	2.69	3.50	2.69	0.03
1,016.00	0.08	14.63	1,015.99	2.88	3.74	2.87	0.24
1,116.00	0.15	4.54	1,115.99	3.08	3.77	3.07	0.07
1,216.00	0.08	104.43	1,215.99	3.19	3.85	3.19	0.19
1,291.00	0.17	27.62	1,290.99	3.28	3.95	3.27	0.23
Tie-On to Gyro Surveys @ 1291.00ft							
1,324.80	0.65	258.45	1,324.79	3.29	3.79	3.28	2.29
9 5/8"							
1,392.00	2.18	251.34	1,391.96	2.80	2.20	2.80	2.29
1,487.00	3.43	242.43	1,486.85	0.91	-2.03	0.91	1.39
1,581.00	2.36	222.75	1,580.73	-1.82	-5.83	-1.81	1.54
1,763.00	0.47	217.40	1,762.67	-5.16	-8.83	-5.15	1.04
1,855.00	0.72	75.14	1,854.66	-5.31	-8.50	-5.30	1.23
1,947.00	0.66	83.20	1,946.66	-5.10	-7.42	-5.09	0.12
2,037.00	0.53	77.55	2,036.65	-4.95	-6.50	-4.94	0.16
2,128.00	0.56	69.08	2,127.65	-4.70	-5.67	-4.69	0.09
2,220.00	0.54	56.95	2,219.64	-4.30	-4.89	-4.30	0.13
2,311.00	0.42	89.51	2,310.64	-4.07	-4.19	-4.06	0.32
2,402.00	0.44	129.03	2,401.64	-4.28	-3.59	-4.28	0.32
2,586.00	0.50	130.60	2,585.63	-5.25	-2.43	-5.25	0.03
2,770.00	0.34	109.44	2,769.63	-5.96	-1.30	-5.95	0.12
2,953.00	2.58	79.22	2,952.56	-5.37	3.25	-5.37	1.25
3,137.00	5.06	88.62	3,136.14	-4.40	15.44	-4.42	1.39
3,320.00	7.10	95.22	3,318.10	-5.23	34.77	-5.27	1.18
3,491.00	9.10	89.10	3,487.39	-5.98	58.82	-6.05	1.27
3,662.00	9.22	90.90	3,656.21	-5.98	86.04	-6.09	0.18
3,834.00	9.36	87.79	3,825.95	-5.66	113.79	-5.80	0.30
4,004.00	9.66	89.35	3,993.62	-4.97	141.87	-5.14	0.23
4,176.00	10.49	88.56	4,162.96	-4.41	171.95	-4.62	0.49
4,345.00	9.39	89.36	4,329.42	-3.87	201.11	-4.11	0.66
4,516.00	10.01	93.77	4,497.98	-4.69	229.89	-4.97	0.57
4,688.00	9.86	92.86	4,667.40	-6.41	259.52	-6.72	0.13
4,858.00	10.31	91.33	4,834.77	-7.49	289.26	-7.84	0.31
5,028.00	11.43	92.59	5,001.72	-8.60	321.30	-8.99	0.67
5,199.00	10.44	92.05	5,169.61	-9.92	353.71	-10.35	0.58
5,370.00	10.07	90.05	5,337.88	-10.49	384.15	-10.96	0.30
5,541.00	10.16	90.00	5,506.23	-10.50	414.18	-11.01	0.05
5,712.00	9.30	88.57	5,674.76	-10.16	443.07	-10.70	0.52
5,883.00	9.83	92.91	5,843.39	-10.55	471.46	-11.13	0.52
6,053.00	9.60	88.92	6,010.95	-11.02	500.13	-11.63	0.42
6,223.00	9.41	87.08	6,178.62	-10.05	528.18	-10.69	0.21

Design Report for SACK 27N-30HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
6,395.00	7.25	91.59	6,348.80	-9.63	553.08	-10.31	1.31
6,565.00	5.60	86.80	6,517.72	-9.47	572.08	-10.16	1.02
6,736.00	4.00	83.43	6,688.12	-8.32	586.34	-9.03	0.95
6,907.00	2.14	99.16	6,858.87	-8.14	595.42	-8.87	1.18
7,077.00	0.56	117.11	7,028.82	-9.03	599.29	-9.76	0.95
7,120.00	0.52	112.68	7,071.81	-9.20	599.66	-9.93	0.13
7,163.00	1.26	11.39	7,114.81	-8.81	599.93	-9.54	3.38
7,206.00	3.81	4.70	7,157.77	-6.92	600.14	-7.66	5.96
7,249.00	6.34	0.36	7,200.59	-3.12	600.27	-3.86	5.95
7,291.00	9.39	0.98	7,242.19	2.62	600.35	1.89	7.26
7,331.00	12.81	1.03	7,281.44	10.32	600.48	9.59	8.55
7,374.00	18.02	2.26	7,322.88	21.74	600.83	21.01	12.14
7,417.00	22.35	0.90	7,363.23	36.57	601.22	35.83	10.13
7,460.00	26.73	359.73	7,402.33	54.42	601.30	53.69	10.25
7,503.00	30.77	359.76	7,440.03	75.10	601.21	74.37	9.40
7,546.00	35.69	0.12	7,475.98	98.66	601.19	97.92	11.45
7,588.00	40.05	1.44	7,509.13	124.43	601.56	123.69	10.56
7,631.00	44.88	0.18	7,540.84	153.45	601.95	152.71	11.40
7,674.00	49.85	359.64	7,569.96	185.07	601.90	184.34	11.59
7,717.00	54.23	359.10	7,596.40	218.96	601.52	218.23	10.23
7,760.00	58.07	358.87	7,620.35	254.66	600.89	253.93	8.94
7,803.00	62.10	359.50	7,641.79	291.92	600.36	291.19	9.46
7,845.00	66.68	0.40	7,659.94	329.79	600.33	329.05	11.07
7,888.00	71.76	1.57	7,675.19	369.97	601.03	369.23	12.08
7,931.00	76.18	1.09	7,687.06	411.28	601.99	410.54	10.33
7,974.00	80.17	0.41	7,695.87	453.35	602.54	452.61	9.41
8,016.00	83.59	0.30	7,701.80	494.92	602.79	494.19	8.15
8,064.00	87.35	0.71	7,705.59	542.76	603.22	542.02	7.88
8,096.40	88.19	0.83	7,706.86	575.13	603.65	574.40	2.61
7" @ 8096.40' MD							
8,170.00	90.09	1.09	7,707.96	648.71	604.88	647.97	2.61
8,255.00	90.34	1.21	7,707.64	733.69	606.59	732.95	0.33
8,341.00	90.46	1.15	7,707.04	819.67	608.36	818.93	0.16
8,427.00	90.96	0.85	7,705.98	905.65	609.86	904.91	0.68
8,512.00	90.49	0.93	7,704.90	990.64	611.18	989.89	0.56
8,598.00	90.40	1.18	7,704.23	1,076.62	612.76	1,075.87	0.31
8,684.00	89.72	1.27	7,704.14	1,162.60	614.60	1,161.85	0.80
8,769.00	89.60	1.11	7,704.65	1,247.58	616.37	1,246.83	0.24
8,855.00	90.15	0.69	7,704.83	1,333.57	617.72	1,332.81	0.80
8,939.00	89.75	359.68	7,704.91	1,417.57	617.99	1,416.81	1.29
9,025.00	89.82	358.94	7,705.23	1,503.56	616.95	1,502.80	0.86
9,109.00	89.91	358.69	7,705.43	1,587.54	615.22	1,586.79	0.32
9,194.00	90.18	359.08	7,705.36	1,672.52	613.56	1,671.77	0.56
9,280.00	90.52	358.71	7,704.84	1,758.51	611.90	1,757.76	0.58
9,365.00	89.82	359.79	7,704.58	1,843.50	610.79	1,842.75	1.51
9,450.00	89.85	0.76	7,704.83	1,928.49	611.20	1,927.75	1.14
9,536.00	90.49	1.70	7,704.57	2,014.47	613.04	2,013.72	1.32
9,621.00	90.15	1.70	7,704.10	2,099.43	615.57	2,098.68	0.40
9,712.00	89.63	2.11	7,704.27	2,190.38	618.59	2,189.63	0.73
9,804.00	89.29	2.11	7,705.14	2,282.32	621.98	2,281.55	0.37
9,986.00	89.48	3.19	7,707.09	2,464.11	630.39	2,463.34	0.60

Design Report for SACK 27N-30HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
10,078.00	90.99	3.20	7,706.72	2,555.96	635.52	2,555.18	1.64
10,169.00	91.32	2.38	7,704.88	2,646.83	639.95	2,646.05	0.97
10,260.00	91.45	1.89	7,702.68	2,737.74	643.34	2,736.96	0.56
10,351.00	91.39	1.79	7,700.43	2,828.67	646.26	2,827.88	0.13
10,442.00	91.23	1.43	7,698.35	2,919.61	648.81	2,918.82	0.43
10,534.00	90.00	1.39	7,697.36	3,011.58	651.08	3,010.78	1.34
10,619.00	90.12	359.95	7,697.27	3,096.57	652.07	3,095.77	1.70
10,704.00	90.40	359.65	7,696.89	3,181.57	651.78	3,180.77	0.48
10,790.00	90.56	359.37	7,696.17	3,267.56	651.04	3,266.76	0.37
10,875.00	90.31	358.02	7,695.52	3,352.53	649.10	3,351.74	1.62
10,960.00	89.66	357.84	7,695.54	3,437.48	646.03	3,436.68	0.79
11,046.00	89.97	357.99	7,695.82	3,523.42	642.91	3,522.63	0.40
11,131.00	89.72	357.70	7,696.05	3,608.36	639.71	3,607.57	0.45
11,216.00	89.69	357.26	7,696.49	3,693.28	635.97	3,692.50	0.52
11,302.00	89.11	357.03	7,697.39	3,779.16	631.69	3,778.39	0.73
11,387.00	89.45	358.05	7,698.46	3,864.08	628.04	3,863.31	1.26
11,473.00	88.89	358.82	7,699.70	3,950.03	625.69	3,949.27	1.11
11,558.00	88.92	358.24	7,701.33	4,034.99	623.51	4,034.23	0.68
11,643.00	89.01	358.61	7,702.86	4,119.94	621.18	4,119.18	0.45
11,729.00	88.49	0.08	7,704.74	4,205.92	620.19	4,205.16	1.81
11,814.00	88.77	359.51	7,706.77	4,290.89	619.89	4,290.13	0.75
11,900.00	89.82	0.69	7,707.83	4,376.88	620.04	4,376.12	1.84
11,985.00	90.15	0.11	7,707.85	4,461.88	620.63	4,461.12	0.79
12,071.00	89.94	1.10	7,707.78	4,547.87	621.54	4,547.11	1.18
12,156.00	89.69	0.50	7,708.06	4,632.86	622.73	4,632.10	0.76
12,242.00	90.43	1.43	7,707.97	4,718.85	624.18	4,718.08	1.38
12,327.00	90.99	1.71	7,706.91	4,803.81	626.50	4,803.04	0.74
12,411.00	91.11	1.30	7,705.38	4,887.77	628.71	4,887.00	0.51
12,495.00	90.74	0.24	7,704.02	4,971.75	629.84	4,970.97	1.34
12,579.00	91.20	1.47	7,702.60	5,055.72	631.09	5,054.95	1.56
12,665.00	90.93	0.81	7,701.00	5,141.69	632.80	5,140.92	0.83
12,750.00	91.26	0.83	7,699.37	5,226.67	634.02	5,225.89	0.39
12,921.00	90.83	0.52	7,696.26	5,397.63	636.03	5,396.85	0.31
13,007.00	91.17	0.59	7,694.75	5,483.61	636.87	5,482.83	0.40
13,093.00	90.31	359.96	7,693.64	5,569.60	637.28	5,568.82	1.24
13,178.00	89.78	358.86	7,693.58	5,654.59	636.40	5,653.81	1.44
13,264.00	90.62	0.50	7,693.28	5,740.59	635.92	5,739.81	2.14
13,349.00	90.89	0.90	7,692.16	5,825.57	636.96	5,824.79	0.57
13,435.00	91.17	0.78	7,690.61	5,911.55	638.22	5,910.77	0.35
13,521.00	91.35	0.35	7,688.72	5,997.53	639.07	5,996.74	0.54
13,607.00	91.26	359.49	7,686.76	6,083.50	638.95	6,082.72	1.01
13,693.00	91.57	359.38	7,684.64	6,169.47	638.10	6,168.69	0.38
13,778.00	89.63	359.56	7,683.75	6,254.46	637.32	6,253.68	2.29
13,864.00	89.14	359.84	7,684.67	6,340.45	636.87	6,339.67	0.66
13,949.00	89.82	1.58	7,685.44	6,425.44	637.92	6,424.66	2.20
14,035.00	90.71	1.36	7,685.04	6,511.41	640.12	6,510.62	1.07
14,121.00	90.86	1.37	7,683.87	6,597.38	642.17	6,596.59	0.17
14,206.00	90.89	0.62	7,682.57	6,682.35	643.65	6,681.56	0.88
14,292.00	90.74	0.29	7,681.34	6,768.34	644.33	6,767.55	0.42
14,377.00	90.68	359.91	7,680.29	6,853.34	644.48	6,852.54	0.45
14,548.00	90.80	358.92	7,678.08	7,024.31	642.73	7,023.52	0.58

Design Report for SACK 27N-30HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
14,633.00	90.83	0.36	7,676.87	7,109.30	642.20	7,108.51	1.69
14,719.00	90.12	0.36	7,676.16	7,195.29	642.74	7,194.50	0.83
14,805.00	89.72	1.92	7,676.28	7,281.27	644.45	7,280.48	1.87
14,890.00	89.97	1.48	7,676.51	7,366.23	646.97	7,365.44	0.60
14,975.00	90.92	1.96	7,675.85	7,451.19	649.52	7,450.39	1.25
15,061.00	90.06	359.99	7,675.12	7,537.17	650.99	7,536.37	2.50
15,147.00	90.83	0.13	7,674.45	7,623.17	651.08	7,622.37	0.91
15,232.00	91.45	0.50	7,672.76	7,708.15	651.55	7,707.35	0.85
15,317.00	91.14	358.97	7,670.83	7,793.12	651.15	7,792.32	1.84
15,349.53	90.99	358.63	7,670.23	7,825.64	650.47	7,824.84	1.15
SACK 27N-30HZ_Lat Target							
15,403.00	90.74	358.07	7,669.42	7,879.08	648.93	7,878.28	1.15
15,489.00	89.85	357.72	7,668.98	7,965.02	645.77	7,964.23	1.11
15,573.00	90.37	357.79	7,668.82	8,048.96	642.48	8,048.17	0.62
15,658.00	89.72	357.12	7,668.75	8,133.87	638.71	8,133.09	1.10
15,744.00	89.26	355.72	7,669.52	8,219.70	633.34	8,218.92	1.71
15,830.00	89.63	355.45	7,670.35	8,305.44	626.72	8,304.67	0.53
15,915.00	89.88	355.66	7,670.72	8,390.18	620.13	8,389.42	0.38
16,001.00	90.49	355.95	7,670.44	8,475.95	613.84	8,475.20	0.79
16,086.00	91.54	356.72	7,668.93	8,560.76	608.41	8,560.01	1.53
16,172.00	89.91	355.58	7,667.84	8,646.56	602.63	8,645.82	2.31
16,258.00	90.89	355.90	7,667.24	8,732.32	596.24	8,731.58	1.20
16,343.00	91.02	355.44	7,665.83	8,817.06	589.83	8,816.34	0.56
16,429.00	90.25	353.09	7,664.87	8,902.62	581.24	8,901.90	2.88
16,514.00	91.88	355.19	7,663.29	8,987.15	572.56	8,986.45	3.13
16,599.00	89.94	353.71	7,661.94	9,071.74	564.34	9,071.04	2.87
16,685.00	90.31	355.41	7,661.76	9,157.35	556.19	9,156.66	2.02
16,771.00	91.11	356.36	7,660.69	9,243.12	550.02	9,242.44	1.44
16,856.00	89.75	356.08	7,660.05	9,327.93	544.41	9,327.26	1.63
16,942.00	90.46	356.77	7,659.89	9,413.76	539.05	9,413.09	1.15
17,028.00	90.74	356.20	7,658.99	9,499.59	533.78	9,498.93	0.74
17,135.00	91.33	356.18	7,657.06	9,606.34	526.67	9,605.69	0.55
Last MWD Survey @ 17135.00' MD :: 7657.06' TVD							
17,177.00	91.33	356.18	7,656.09	9,648.23	523.87	9,647.59	0.00
Straight Line Projection to Bit @ @MD@' MD :: 7656.09' TVD - Current MWD Survey @ 7120' MD :: 7071.81' TVD - SACK							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
1,291.00	1,290.99	3.28	3.95	Tie-On to Gyro Surveys @ 1291.00ft
17,135.00	7,657.06	9,606.34	526.67	Last MWD Survey @ 17135.00' MD :: 7657.06' TVD
17,177.00	7,656.09	9,648.23	523.87	Straight Line Projection to Bit @ @MD@' MD :: 7656.09' TVD
17,177.00	7,656.09	9,648.23	523.87	Current MWD Survey @ 7120' MD :: 7071.81' TVD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	359.93	Slot	0.00	0.00	0.00

Design Report for SACK 27N-30HZ - Actual Surveys

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
116.00	1,291.00	VES Gyro Surveys	NS-GYRO-MS
1,392.00	8,064.00	MWD Vertical/Build Surveys	MWD+IFR1+SC
8,170.00	17,177.00	MWD Lateral Surveys	MWD+IFR1+SC

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,324.80	1,324.79	9 5/8"	9-5/8	13-1/2
8,096.40	7,706.86	7" @ 8096.40' MD	4-1/2	6

Design Report for SACK 27N-30HZ - Actual Surveys

Wellbore Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
SACK 27N-30HZ_LD	0.00	0.00	0.00	0.00	0.00	1,244,379.30	3,159,572.60	40.002800	-104.930383
- actual wellpath hits target center									
- Polygon									
Point 1				0.00	10,139.60	55.86	1,254,518.71	3,159,563.33		
Point 2				0.00	10,131.44	975.93	1,254,516.46	3,160,483.40		
Point 3				0.00	5,706.98	983.93	1,250,092.29	3,160,519.82		
Point 4				0.00	-436.05	1,012.33	1,243,949.78	3,160,587.67		
Point 5				0.00	-435.98	92.29	1,243,943.94	3,159,667.68		
Point 6				0.00	3,066.77	75.40	1,247,446.39	3,159,628.30		
SACK 27N-30HZ_SHL	0.00	0.00	0.00	0.00	0.00	1,244,379.30	3,159,572.60	40.002800	-104.930383
- actual wellpath hits target center									
- Point									
SACK 27N-30HZ_SEC	0.00	0.00	0.00	0.00	0.00	1,244,379.30	3,159,572.60	40.002800	-104.930383
- actual wellpath hits target center									
- Polygon									
Point 1				0.00	9,710.38	-3,417.44	1,254,067.20	3,156,092.97		
Point 2				0.00	9,687.17	-804.39	1,254,060.78	3,158,706.03		
Point 3				0.00	9,663.74	1,839.81	1,254,054.33	3,161,350.23		
Point 4				0.00	7,017.37	1,836.31	1,251,408.09	3,161,363.73		
Point 5				0.00	4,382.78	1,848.04	1,248,773.71	3,161,392.39		
Point 6				0.00	4,391.27	-789.12	1,248,765.26	3,158,755.32		
Point 7				0.00	4,399.75	-3,412.27	1,248,756.89	3,156,132.25		
Point 8				0.00	4,391.27	-789.12	1,248,765.26	3,158,755.32		
Point 9				0.00	4,382.78	1,848.04	1,248,773.71	3,161,392.39		
Point 10				0.00	1,743.05	1,864.98	1,246,134.24	3,161,426.28		
Point 11				0.00	-896.13	1,874.61	1,243,495.26	3,161,452.86		
Point 12				0.00	-895.92	-765.39	1,243,478.52	3,158,813.01		
Point 13				0.00	-895.64	-3,404.76	1,243,461.84	3,156,173.78		
Point 14				0.00	-895.92	-765.39	1,243,478.52	3,158,813.01		
Point 15				0.00	-896.13	1,874.61	1,243,495.26	3,161,452.86		
Point 16				0.00	-896.92	2,312.92	1,243,497.29	3,161,891.15		
Point 17				0.00	-3,355.27	2,320.33	1,241,039.12	3,161,914.35		
Point 18				0.00	-5,996.62	2,335.55	1,238,398.01	3,161,946.54		
Point 19				0.00	-5,992.32	-296.95	1,238,385.40	3,159,314.16		
Point 20				0.00	-5,988.38	-2,758.40	1,238,373.53	3,156,852.82		
Point 21				0.00	-3,382.58	-2,780.81	1,240,979.04	3,156,813.67		
Point 22				0.00	-895.26	-2,788.96	1,243,466.18	3,156,789.54		
Point 23				0.00	-895.64	-3,404.76	1,243,461.84	3,156,173.78		
Point 24				0.00	4,399.75	-3,412.27	1,248,756.89	3,156,132.25		
SACK 27N-30HZ_TOE	0.00	0.00	7,659.00	9,674.39	524.80	1,254,056.53	3,160,035.23	40.029357	-104.928509
- actual wellpath misses target center by 26.33usft at 17177.00usft MD (7656.09 TVD, 9648.23 N, 523.87 E)									
- Point									
SACK 27N-30HZ_Lat	0.00	0.00	7,667.13	7,825.73	655.68	1,252,208.81	3,160,177.98	40.024282	-104.928042
- actual wellpath misses target center by 6.06usft at 15349.53usft MD (7670.23 TVD, 7825.64 N, 650.47 E)									
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	1.28 °/100usft	Maximum Dogleg over Survey:	12.14 °/100usft at 7,374.00 usft
Net Tortousity applicable to Plans:	0.57 °/100usft	Directional Difficulty Index:	6.703

Audit Info

North Reference Sheet for Sec. 31-T1N-R67W - SACK 27N-30HZ - Plan E

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference.

Vertical Depths are relative to RKB = 16' @ 5056.00usft (Xtreme 22). Northing and Easting are relative to SACK 27N-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 -105.500000°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99996616

Grid Coordinates of Well: 1,244,379.30 usft N, 3,159,572.60 usft E

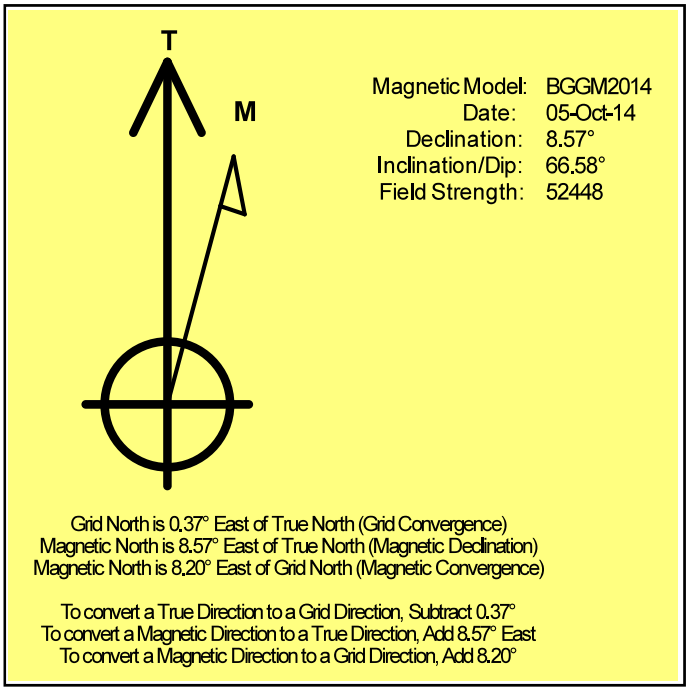
Geographical Coordinates of Well: 40° 00' 10.08" N, 104° 55' 49.38" W

Grid Convergence at Surface is: 0.37°

Based upon Minimum Curvature type calculations, at a Measured Depth of 17,177.00usft

the Bottom Hole Displacement is 9,662.45usft in the Direction of 3.11° (True).

Magnetic Convergence at surface is: -8.20° (5 October 2014, , BGGM2014)



Anadarko Petroleum Corp.

Weld County, CO (NAD 83)
Sec. 31-T1N-R67W
SACK 27N-30HZ
API # 05-123-39425 JOB # 901558192
Plan E

Design: Actual Surveys

Sperry Drilling Services

Geodetic Report

27 January, 2015

Well Coordinates: 1,244,379.30 N, 3,159,572.60 E (40° 00' 10.08" N, 104° 55' 49.38" W)
Ground Level: 5,040.00 usft

Local Coordinate Origin:	Centered on Well SACK 27N-30HZ
Viewing Datum:	RKB = 16' @ 5056.00usft (Xtreme 22)
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

Design Report for SACK 27N-30HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Geographic Coordinates Latitude (usft)	Geographic Coordinates Longitude (usft)	UTM Coordinates Northing (usft)	UTM Coordinates Easting (usft)
0.00	0.00	0.00	0.00	0.00	0.00	40.002800	-104.930383	1,244,379.30	3,159,572.60
116.00	0.17	48.43	116.00	0.11	0.12	40.002800	-104.930383	1,244,379.41	3,159,572.72
216.00	0.31	44.79	216.00	0.40	0.42	40.002801	-104.930382	1,244,379.70	3,159,573.02
316.00	0.45	54.30	316.00	0.82	0.94	40.002802	-104.930380	1,244,380.13	3,159,573.53
416.00	0.34	54.31	415.99	1.23	1.50	40.002803	-104.930378	1,244,380.53	3,159,574.09
516.00	0.31	47.48	515.99	1.58	1.94	40.002804	-104.930376	1,244,380.89	3,159,574.53
616.00	0.23	62.04	615.99	1.86	2.32	40.002805	-104.930375	1,244,381.18	3,159,574.91
716.00	0.31	44.69	715.99	2.15	2.69	40.002806	-104.930374	1,244,381.47	3,159,575.27
816.00	0.26	60.04	815.99	2.46	3.08	40.002807	-104.930372	1,244,381.78	3,159,575.66
916.00	0.29	62.06	915.99	2.69	3.50	40.002807	-104.930371	1,244,382.01	3,159,576.08
1,016.00	0.08	14.63	1,015.99	2.88	3.74	40.002808	-104.930370	1,244,382.20	3,159,576.32
1,116.00	0.15	4.54	1,115.99	3.08	3.77	40.002808	-104.930370	1,244,382.40	3,159,576.35
1,216.00	0.08	104.43	1,215.99	3.19	3.85	40.002809	-104.930370	1,244,382.51	3,159,576.43
1,291.00	0.17	27.62	1,290.99	3.28	3.95	40.002809	-104.930369	1,244,382.60	3,159,576.53
1,324.80	0.65	258.45	1,324.79	3.29	3.79	40.002809	-104.930370	1,244,382.61	3,159,576.37
1,392.00	2.18	251.34	1,391.96	2.80	2.20	40.002808	-104.930375	1,244,382.11	3,159,574.79
1,487.00	3.43	242.43	1,486.85	0.91	-2.03	40.002803	-104.930390	1,244,380.19	3,159,570.57
1,581.00	2.36	222.75	1,580.73	-1.82	-5.83	40.002795	-104.930404	1,244,377.44	3,159,566.78
1,763.00	0.47	217.40	1,762.67	-5.16	-8.83	40.002786	-104.930415	1,244,374.08	3,159,563.80
1,855.00	0.72	75.14	1,854.66	-5.31	-8.50	40.002785	-104.930414	1,244,373.93	3,159,564.13
1,947.00	0.66	83.20	1,946.66	-5.10	-7.42	40.002786	-104.930410	1,244,374.15	3,159,565.22
2,037.00	0.53	77.55	2,036.65	-4.95	-6.50	40.002786	-104.930406	1,244,374.31	3,159,566.14
2,128.00	0.56	69.08	2,127.65	-4.70	-5.67	40.002787	-104.930403	1,244,374.56	3,159,566.96
2,220.00	0.54	56.95	2,219.64	-4.30	-4.89	40.002788	-104.930401	1,244,374.96	3,159,567.74
2,311.00	0.42	89.51	2,310.64	-4.07	-4.19	40.002789	-104.930398	1,244,375.20	3,159,568.43
2,402.00	0.44	129.03	2,401.64	-4.28	-3.59	40.002788	-104.930396	1,244,374.99	3,159,569.04
2,586.00	0.50	130.60	2,585.63	-5.25	-2.43	40.002786	-104.930392	1,244,374.03	3,159,570.20
2,770.00	0.34	109.44	2,769.63	-5.96	-1.30	40.002784	-104.930388	1,244,373.33	3,159,571.33
2,953.00	2.58	79.22	2,952.56	-5.37	3.25	40.002785	-104.930372	1,244,373.95	3,159,575.89
3,137.00	5.06	88.62	3,136.14	-4.40	15.44	40.002788	-104.930328	1,244,375.00	3,159,588.06
3,320.00	7.10	95.22	3,318.10	-5.23	34.77	40.002786	-104.930259	1,244,374.29	3,159,607.40
3,491.00	9.10	89.10	3,487.39	-5.98	58.82	40.002784	-104.930173	1,244,373.70	3,159,631.45
3,662.00	9.22	90.90	3,656.21	-5.98	86.04	40.002784	-104.930076	1,244,373.87	3,159,658.67
3,834.00	9.36	87.79	3,825.95	-5.66	113.79	40.002784	-104.929977	1,244,374.37	3,159,686.42
4,004.00	9.66	89.35	3,993.62	-4.97	141.87	40.002786	-104.929877	1,244,375.24	3,159,714.49
4,176.00	10.49	88.56	4,162.96	-4.41	171.95	40.002788	-104.929769	1,244,376.00	3,159,744.57
4,345.00	9.39	89.36	4,329.42	-3.87	201.11	40.002789	-104.929665	1,244,376.72	3,159,773.73
4,516.00	10.01	93.77	4,497.98	-4.69	229.89	40.002787	-104.929563	1,244,376.09	3,159,802.51
4,688.00	9.86	92.86	4,667.40	-6.41	259.52	40.002782	-104.929457	1,244,374.56	3,159,832.14
4,858.00	10.31	91.33	4,834.77	-7.49	289.26	40.002779	-104.929351	1,244,373.67	3,159,861.90
5,028.00	11.43	92.59	5,001.72	-8.60	321.30	40.002776	-104.929236	1,244,372.76	3,159,893.94
5,199.00	10.44	92.05	5,169.61	-9.92	353.71	40.002773	-104.929121	1,244,371.65	3,159,926.36

Design Report for SACK 27N-30HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Geographic Coordinates Latitude (usft)	Geographic Coordinates Longitude (usft)	UTM Coordinates Northing (usft)	UTM Coordinates Easting (usft)
5,370.00	10.07	90.05	5,337.88	-10.49	384.15	40.002771	-104.929012	1,244,371.28	3,159,956.79
5,541.00	10.16	90.00	5,506.23	-10.50	414.18	40.002771	-104.928905	1,244,371.46	3,159,986.82
5,712.00	9.30	88.57	5,674.76	-10.16	443.07	40.002772	-104.928802	1,244,371.99	3,160,015.71
5,883.00	9.83	92.91	5,843.39	-10.55	471.46	40.002771	-104.928700	1,244,371.78	3,160,044.11
6,053.00	9.60	88.92	6,010.95	-11.02	500.13	40.002770	-104.928598	1,244,371.49	3,160,072.77
6,223.00	9.41	87.08	6,178.62	-10.05	528.18	40.002772	-104.928498	1,244,372.65	3,160,100.82
6,395.00	7.25	91.59	6,348.80	-9.63	553.08	40.002774	-104.928409	1,244,373.22	3,160,125.71
6,565.00	5.60	86.80	6,517.72	-9.47	572.08	40.002774	-104.928341	1,244,373.51	3,160,144.71
6,736.00	4.00	83.43	6,688.12	-8.32	586.34	40.002777	-104.928290	1,244,374.75	3,160,158.96
6,907.00	2.14	99.16	6,858.87	-8.14	595.42	40.002778	-104.928258	1,244,374.98	3,160,168.04
7,077.00	0.56	117.11	7,028.82	-9.03	599.29	40.002775	-104.928244	1,244,374.12	3,160,171.92
7,120.00	0.52	112.68	7,071.81	-9.20	599.66	40.002775	-104.928243	1,244,373.95	3,160,172.28
7,163.00	1.26	11.39	7,114.81	-8.81	599.93	40.002776	-104.928242	1,244,374.34	3,160,172.55
7,206.00	3.81	4.70	7,157.77	-6.92	600.14	40.002781	-104.928241	1,244,376.23	3,160,172.75
7,249.00	6.34	0.36	7,200.59	-3.12	600.27	40.002791	-104.928241	1,244,380.03	3,160,172.86
7,291.00	9.39	0.98	7,242.19	2.62	600.35	40.002807	-104.928240	1,244,385.78	3,160,172.90
7,331.00	12.81	1.03	7,281.44	10.32	600.48	40.002828	-104.928240	1,244,393.48	3,160,172.98
7,374.00	18.02	2.26	7,322.88	21.74	600.83	40.002860	-104.928239	1,244,404.90	3,160,173.26
7,417.00	22.35	0.90	7,363.23	36.57	601.22	40.002900	-104.928237	1,244,419.73	3,160,173.55
7,460.00	26.73	359.73	7,402.33	54.42	601.30	40.002949	-104.928237	1,244,437.58	3,160,173.52
7,503.00	30.77	359.76	7,440.03	75.10	601.21	40.003006	-104.928237	1,244,458.26	3,160,173.30
7,546.00	35.69	0.12	7,475.98	98.66	601.19	40.003071	-104.928237	1,244,481.81	3,160,173.13
7,588.00	40.05	1.44	7,509.13	124.43	601.56	40.003142	-104.928236	1,244,507.59	3,160,173.33
7,631.00	44.88	0.18	7,540.84	153.45	601.95	40.003221	-104.928235	1,244,536.60	3,160,173.53
7,674.00	49.85	359.64	7,569.96	185.07	601.90	40.003308	-104.928235	1,244,568.23	3,160,173.28
7,717.00	54.23	359.10	7,596.40	218.96	601.52	40.003401	-104.928236	1,244,602.11	3,160,172.68
7,760.00	58.07	358.87	7,620.35	254.66	600.89	40.003499	-104.928238	1,244,637.81	3,160,171.82
7,803.00	62.10	359.50	7,641.79	291.92	600.36	40.003601	-104.928240	1,244,675.06	3,160,171.05
7,845.00	66.68	0.40	7,659.94	329.79	600.33	40.003705	-104.928240	1,244,712.92	3,160,170.78
7,888.00	71.76	1.57	7,675.19	369.97	601.03	40.003816	-104.928238	1,244,753.11	3,160,171.22
7,931.00	76.18	1.09	7,687.06	411.28	601.99	40.003929	-104.928234	1,244,794.42	3,160,171.91
7,974.00	80.17	0.41	7,695.87	453.35	602.54	40.004045	-104.928232	1,244,836.49	3,160,172.19
8,016.00	83.59	0.30	7,701.80	494.92	602.79	40.004159	-104.928232	1,244,878.07	3,160,172.18
8,064.00	87.35	0.71	7,705.59	542.76	603.22	40.004290	-104.928230	1,244,925.91	3,160,172.30
8,096.40	88.19	0.83	7,706.86	575.13	603.65	40.004379	-104.928228	1,244,958.28	3,160,172.52
8,170.00	90.09	1.09	7,707.96	648.71	604.88	40.004581	-104.928224	1,245,031.86	3,160,173.28
8,255.00	90.34	1.21	7,707.64	733.69	606.59	40.004814	-104.928218	1,245,116.85	3,160,174.44
8,341.00	90.46	1.15	7,707.04	819.67	608.36	40.005050	-104.928212	1,245,202.84	3,160,175.66
8,427.00	90.96	0.85	7,705.98	905.65	609.86	40.005286	-104.928206	1,245,288.82	3,160,176.61
8,512.00	90.49	0.93	7,704.90	990.64	611.18	40.005519	-104.928202	1,245,373.81	3,160,177.38
8,598.00	90.40	1.18	7,704.23	1,076.62	612.76	40.005755	-104.928196	1,245,459.80	3,160,178.41
8,684.00	89.72	1.27	7,704.14	1,162.60	614.60	40.005991	-104.928189	1,245,545.78	3,160,179.70

Design Report for SACK 27N-30HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Geographic Coordinates Latitude (usft)	Geographic Coordinates Longitude (usft)	UTM Coordinates Northing (usft)	UTM Coordinates Easting (usft)
8,769.00	89.60	1.11	7,704.65	1,247.58	616.37	40.006225	-104.928183	1,245,630.77	3,160,180.92
8,855.00	90.15	0.69	7,704.83	1,333.57	617.72	40.006461	-104.928178	1,245,716.76	3,160,181.72
8,939.00	89.75	359.68	7,704.91	1,417.57	617.99	40.006691	-104.928177	1,245,800.76	3,160,181.45
9,025.00	89.82	358.94	7,705.23	1,503.56	616.95	40.006927	-104.928181	1,245,886.74	3,160,179.86
9,109.00	89.91	358.69	7,705.43	1,587.54	615.22	40.007158	-104.928187	1,245,970.70	3,160,177.58
9,194.00	90.18	359.08	7,705.36	1,672.52	613.56	40.007391	-104.928193	1,246,055.67	3,160,175.38
9,280.00	90.52	358.71	7,704.84	1,758.51	611.90	40.007627	-104.928199	1,246,141.64	3,160,173.17
9,365.00	89.82	359.79	7,704.58	1,843.50	610.79	40.007861	-104.928203	1,246,226.62	3,160,171.51
9,450.00	89.85	0.76	7,704.83	1,928.49	611.20	40.008094	-104.928201	1,246,311.61	3,160,171.38
9,536.00	90.49	1.70	7,704.57	2,014.47	613.04	40.008330	-104.928195	1,246,397.60	3,160,172.67
9,621.00	90.15	1.70	7,704.10	2,099.43	615.57	40.008563	-104.928186	1,246,482.57	3,160,174.65
9,712.00	89.63	2.11	7,704.27	2,190.38	618.59	40.008813	-104.928175	1,246,573.54	3,160,177.09
9,804.00	89.29	2.11	7,705.14	2,282.32	621.98	40.009065	-104.928163	1,246,665.49	3,160,179.88
9,986.00	89.48	3.19	7,707.09	2,464.11	630.39	40.009564	-104.928133	1,246,847.32	3,160,187.13
10,078.00	90.99	3.20	7,706.72	2,555.96	635.52	40.009816	-104.928115	1,246,939.20	3,160,191.67
10,169.00	91.32	2.38	7,704.88	2,646.83	639.95	40.010066	-104.928099	1,247,030.10	3,160,195.51
10,260.00	91.45	1.89	7,702.68	2,737.74	643.34	40.010315	-104.928087	1,247,121.03	3,160,198.32
10,351.00	91.39	1.79	7,700.43	2,828.67	646.26	40.010565	-104.928076	1,247,211.97	3,160,200.65
10,442.00	91.23	1.43	7,698.35	2,919.61	648.81	40.010815	-104.928067	1,247,302.92	3,160,202.62
10,534.00	90.00	1.39	7,697.36	3,011.58	651.08	40.011067	-104.928059	1,247,394.89	3,160,204.30
10,619.00	90.12	359.95	7,697.27	3,096.57	652.07	40.011300	-104.928055	1,247,479.89	3,160,204.75
10,704.00	90.40	359.65	7,696.89	3,181.57	651.78	40.011534	-104.928056	1,247,564.88	3,160,203.90
10,790.00	90.56	359.37	7,696.17	3,267.56	651.04	40.011770	-104.928059	1,247,650.86	3,160,202.61
10,875.00	90.31	358.02	7,695.52	3,352.53	649.10	40.012003	-104.928066	1,247,735.82	3,160,200.13
10,960.00	89.66	357.84	7,695.54	3,437.48	646.03	40.012236	-104.928077	1,247,820.74	3,160,196.52
11,046.00	89.97	357.99	7,695.82	3,523.42	642.91	40.012472	-104.928088	1,247,906.66	3,160,192.84
11,131.00	89.72	357.70	7,696.05	3,608.36	639.71	40.012705	-104.928099	1,247,991.57	3,160,189.10
11,216.00	89.69	357.26	7,696.49	3,693.28	635.97	40.012938	-104.928113	1,248,076.46	3,160,184.81
11,302.00	89.11	357.03	7,697.39	3,779.16	631.69	40.013174	-104.928128	1,248,162.31	3,160,179.98
11,387.00	89.45	358.05	7,698.46	3,864.08	628.04	40.013407	-104.928141	1,248,247.20	3,160,175.78
11,473.00	88.89	358.82	7,699.70	3,950.03	625.69	40.013643	-104.928150	1,248,333.14	3,160,172.88
11,558.00	88.92	358.24	7,701.33	4,034.99	623.51	40.013876	-104.928157	1,248,418.07	3,160,170.16
11,643.00	89.01	358.61	7,702.86	4,119.94	621.18	40.014110	-104.928166	1,248,503.01	3,160,167.28
11,729.00	88.49	0.08	7,704.74	4,205.92	620.19	40.014346	-104.928169	1,248,588.97	3,160,165.74
11,814.00	88.77	359.51	7,706.77	4,290.89	619.89	40.014579	-104.928170	1,248,673.94	3,160,164.89
11,900.00	89.82	0.69	7,707.83	4,376.88	620.04	40.014815	-104.928170	1,248,759.92	3,160,164.49
11,985.00	90.15	0.11	7,707.85	4,461.88	620.63	40.015048	-104.928168	1,248,844.92	3,160,164.54
12,071.00	89.94	1.10	7,707.78	4,547.87	621.54	40.015284	-104.928164	1,248,930.92	3,160,164.89
12,156.00	89.69	0.50	7,708.06	4,632.86	622.73	40.015518	-104.928160	1,249,015.91	3,160,165.53
12,242.00	90.43	1.43	7,707.97	4,718.85	624.18	40.015754	-104.928155	1,249,101.90	3,160,166.43
12,327.00	90.99	1.71	7,706.91	4,803.81	626.50	40.015987	-104.928147	1,249,186.87	3,160,168.21
12,411.00	91.11	1.30	7,705.38	4,887.77	628.71	40.016217	-104.928139	1,249,270.84	3,160,169.88

Design Report for SACK 27N-30HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Geographic Coordinates Latitude (usft)	Geographic Coordinates Longitude (usft)	UTM Coordinates Northing (usft)	UTM Coordinates Easting (usft)
12,495.00	90.74	0.24	7,704.02	4,971.75	629.84	40.016448	-104.928135	1,249,354.82	3,160,170.47
12,579.00	91.20	1.47	7,702.60	5,055.72	631.09	40.016678	-104.928130	1,249,438.80	3,160,171.18
12,665.00	90.93	0.81	7,701.00	5,141.69	632.80	40.016914	-104.928124	1,249,524.78	3,160,172.34
12,750.00	91.26	0.83	7,699.37	5,226.67	634.02	40.017148	-104.928120	1,249,609.75	3,160,173.01
12,921.00	90.83	0.52	7,696.26	5,397.63	636.03	40.017617	-104.928112	1,249,780.72	3,160,173.93
13,007.00	91.17	0.59	7,694.75	5,483.61	636.87	40.017853	-104.928109	1,249,866.70	3,160,174.21
13,093.00	90.31	359.96	7,693.64	5,569.60	637.28	40.018089	-104.928108	1,249,952.69	3,160,174.07
13,178.00	89.78	358.86	7,693.58	5,654.59	636.40	40.018322	-104.928111	1,250,037.67	3,160,172.65
13,264.00	90.62	0.50	7,693.28	5,740.59	635.92	40.018558	-104.928113	1,250,123.66	3,160,171.61
13,349.00	90.89	0.90	7,692.16	5,825.57	636.96	40.018792	-104.928109	1,250,208.65	3,160,172.11
13,435.00	91.17	0.78	7,690.61	5,911.55	638.22	40.019028	-104.928105	1,250,294.63	3,160,172.81
13,521.00	91.35	0.35	7,688.72	5,997.53	639.07	40.019264	-104.928102	1,250,380.60	3,160,173.11
13,607.00	91.26	359.49	7,686.76	6,083.50	638.95	40.019500	-104.928102	1,250,466.57	3,160,172.44
13,693.00	91.57	359.38	7,684.64	6,169.47	638.10	40.019736	-104.928105	1,250,552.53	3,160,171.04
13,778.00	89.63	359.56	7,683.75	6,254.46	637.32	40.019969	-104.928108	1,250,637.51	3,160,169.71
13,864.00	89.14	359.84	7,684.67	6,340.45	636.87	40.020205	-104.928109	1,250,723.50	3,160,168.70
13,949.00	89.82	1.58	7,685.44	6,425.44	637.92	40.020438	-104.928106	1,250,808.49	3,160,169.21
14,035.00	90.71	1.36	7,685.04	6,511.41	640.12	40.020674	-104.928098	1,250,894.47	3,160,170.86
14,121.00	90.86	1.37	7,683.87	6,597.38	642.17	40.020910	-104.928090	1,250,980.44	3,160,172.36
14,206.00	90.89	0.62	7,682.57	6,682.35	643.65	40.021144	-104.928085	1,251,065.42	3,160,173.29
14,292.00	90.74	0.29	7,681.34	6,768.34	644.33	40.021380	-104.928083	1,251,151.41	3,160,173.42
14,377.00	90.68	359.91	7,680.29	6,853.34	644.48	40.021613	-104.928082	1,251,236.40	3,160,173.02
14,548.00	90.80	358.92	7,678.08	7,024.31	642.73	40.022082	-104.928088	1,251,407.35	3,160,170.18
14,633.00	90.83	0.36	7,676.87	7,109.30	642.20	40.022316	-104.928090	1,251,492.33	3,160,169.10
14,719.00	90.12	0.36	7,676.16	7,195.29	642.74	40.022552	-104.928088	1,251,578.33	3,160,169.09
14,805.00	89.72	1.92	7,676.28	7,281.27	644.45	40.022788	-104.928082	1,251,664.31	3,160,170.25
14,890.00	89.97	1.48	7,676.51	7,366.23	646.97	40.023021	-104.928073	1,251,749.29	3,160,172.22
14,975.00	90.92	1.96	7,675.85	7,451.19	649.52	40.023254	-104.928064	1,251,834.26	3,160,174.23
15,061.00	90.06	359.99	7,675.12	7,537.17	650.99	40.023490	-104.928059	1,251,920.24	3,160,175.14
15,147.00	90.83	0.13	7,674.45	7,623.17	651.08	40.023726	-104.928059	1,252,006.23	3,160,174.67
15,232.00	91.45	0.50	7,672.76	7,708.15	651.55	40.023960	-104.928057	1,252,091.21	3,160,174.60
15,317.00	91.14	358.97	7,670.83	7,793.12	651.15	40.024193	-104.928058	1,252,176.18	3,160,173.66
15,349.53	90.99	358.63	7,670.23	7,825.64	650.47	40.024282	-104.928061	1,252,208.70	3,160,172.77
15,403.00	90.74	358.07	7,669.42	7,879.08	648.93	40.024429	-104.928066	1,252,262.12	3,160,170.88
15,489.00	89.85	357.72	7,668.98	7,965.02	645.77	40.024665	-104.928077	1,252,348.04	3,160,167.17
15,573.00	90.37	357.79	7,668.82	8,048.96	642.48	40.024895	-104.928089	1,252,431.95	3,160,163.34
15,658.00	89.72	357.12	7,668.75	8,133.87	638.71	40.025128	-104.928103	1,252,516.83	3,160,159.02
15,744.00	89.26	355.72	7,669.52	8,219.70	633.34	40.025364	-104.928122	1,252,602.62	3,160,153.10
15,830.00	89.63	355.45	7,670.35	8,305.44	626.72	40.025599	-104.928145	1,252,688.31	3,160,145.93
15,915.00	89.88	355.66	7,670.72	8,390.18	620.13	40.025832	-104.928169	1,252,773.01	3,160,138.80
16,001.00	90.49	355.95	7,670.44	8,475.95	613.84	40.026067	-104.928191	1,252,858.73	3,160,131.96
16,086.00	91.54	356.72	7,668.93	8,560.76	608.41	40.026300	-104.928211	1,252,943.50	3,160,125.98

Design Report for SACK 27N-30HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Geographic Coordinates Latitude (usft)	Geographic Coordinates Longitude (usft)	UTM Coordinates Northing (usft)	UTM Coordinates Easting (usft)
16,172.00	89.91	355.58	7,667.84	8,646.56	602.63	40.026536	-104.928231	1,253,029.26	3,160,119.66
16,258.00	90.89	355.90	7,667.24	8,732.32	596.24	40.026771	-104.928254	1,253,114.97	3,160,112.72
16,343.00	91.02	355.44	7,665.83	8,817.06	589.83	40.027004	-104.928277	1,253,199.67	3,160,105.76
16,429.00	90.25	353.09	7,664.87	8,902.62	581.24	40.027239	-104.928308	1,253,285.17	3,160,096.62
16,514.00	91.88	355.19	7,663.29	8,987.15	572.56	40.027471	-104.928339	1,253,369.64	3,160,087.40
16,599.00	89.94	353.71	7,661.94	9,071.74	564.34	40.027703	-104.928368	1,253,454.17	3,160,078.64
16,685.00	90.31	355.41	7,661.76	9,157.35	556.19	40.027938	-104.928397	1,253,539.72	3,160,069.93
16,771.00	91.11	356.36	7,660.69	9,243.12	550.02	40.028173	-104.928419	1,253,625.45	3,160,063.21
16,856.00	89.75	356.08	7,660.05	9,327.93	544.41	40.028406	-104.928439	1,253,710.22	3,160,057.07
16,942.00	90.46	356.77	7,659.89	9,413.76	539.05	40.028642	-104.928458	1,253,796.01	3,160,051.15
17,028.00	90.74	356.20	7,658.99	9,499.59	533.78	40.028877	-104.928477	1,253,881.80	3,160,045.33
17,135.00	91.33	356.18	7,657.06	9,606.34	526.67	40.029170	-104.928503	1,253,988.50	3,160,037.53
17,177.00	91.33	356.18	7,656.09	9,648.23	523.87	40.029285	-104.928513	1,254,030.37	3,160,034.47

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
1,291.00	1,290.99	3.28	3.95	Tie-On to Gyro Surveys @ 1291.00ft
17,135.00	7,657.06	9,606.34	526.67	Last MWD Survey @ 17135.00' MD :: 7657.06' TVD
17,177.00	7,656.09	9,648.23	523.87	Straight Line Projection to Bit @ @MD@' MD :: 7656.09' TVD
17,177.00	7,656.09	9,648.23	523.87	Current MWD Survey @ 7120' MD :: 7071.81' TVD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	359.93	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
116.00	1,291.00	VES Gyro Surveys	NS-GYRO-MS
1,392.00	8,064.00	MWD Vertical/Build Surveys	MWD+IFR1+SC
8,170.00	17,177.00	MWD Lateral Surveys	MWD+IFR1+SC

Design Report for SACK 27N-30HZ - Actual Surveys

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,324.80	1,324.79	9 5/8"	9-5/8	13-1/2
8,096.40	7,706.86	7" @ 8096.40' MD	4-1/2	6

Design Targets

Shape	Target Name	TVD ()	Northing ()	Easting ()	+N/-S	+E/-W	Created	Updated

Directional Difficulty Index

Average Dogleg over Survey:	1.28 °/100usft	Maximum Dogleg over Survey:	12.14 °/100usft at 7,374.00 usft
Net Tortousity applicable to Plans:	0.57 °/100usft	Directional Difficulty Index:	6.703

Audit Info

North Reference Sheet for Sec. 31-T1N-R67W - SACK 27N-30HZ - Plan E

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference.

Vertical Depths are relative to RKB = 16' @ 5056.00usft (Xtreme 22). Northing and Easting are relative to SACK 27N-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 -105.500000°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99996616

Grid Coordinates of Well: 1,244,379.30 usft N, 3,159,572.60 usft E

Geographical Coordinates of Well: 40° 00' 10.08" N, 104° 55' 49.38" W

Grid Convergence at Surface is: 0.37°

Based upon Minimum Curvature type calculations, at a Measured Depth of 17,177.00usft

the Bottom Hole Displacement is 9,662.45usft in the Direction of 3.11° (True).

Magnetic Convergence at surface is: -8.20° (5 October 2014, , BGGM2014)