

# SPERRY-SUN DRILLING SERVICES

## CERTIFIED SURVEY WORK SHEET

OPERATOR:	Anadarko Petroleum Corp
WELL:	Gee 15N-12HZ
FIELD:	Wattenberg
RIG:	Xtreme 22
LEGALS:	Sec 24-T2N-R67W
COUNTY:	Weld
STATE:	Colorado
CAL. METHOD:	Minimum Curvature
MAG. DECL. APPLIED:	8.52
VERTICAL SEC. DIR. :	180.260

SSDS Job Number :	901850068
Start Date of Job :	12-Dec-14
End Date of Job :	20-Feb-15
Lead Directional Driller:	Chris Hopwood
Other SSDS DD's :	Roland Hall
SSDS MWD Engineers :	Clay Wass
	Drew MacBeth

	Main Hole =====>	1st Side Track =====>	2nd Side Track =====>	3rd Side Track =====>	4th Side Track =====>
Tie On Point	998 -982.00	Gyro	Tie On	Tie On	Tie On
First Survey	1106.00	MWD			
KOP Depth	6634.00	KOP	KOP-ST1	KOP-ST2	KOP-ST3
Last Survey Depth	16612.00	MWD			
Bit Extrapolation to TD	16654.00	Projection	MWD	MWD	MWD
			T.D.	T.D.	T.D.

The following personnel listed below, certify the above survey information to be accurate to the their knowledge. :

Print Name : Chris Hopwood

Print Name : Clay Wass

Print Name :

Sign Name :

Sign Name :

Sign Name :

Print Name : Roland Hall

Print Name : Drew MacBeth

Print Name : D MacBeth

Sign Name :

Sign Name :

Sign Name :

### Examples of Survey Types:

TieOn  
MWD  
ESS  
Gyro  
SS

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

# Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 24-T2N-R67W

Gee 15N-25HZ

Plan A

Design: Actual Surveys

## Sperry Drilling Services

### Final Report

08 March, 2015

Well Coordinates: 1,290,361.41 N, 3,185,826.54 E (40° 07' 42.69" N, 104° 50' 07.58" W)

Ground Level: 4,859.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 73

Centered on Well Gee 15N-25HZ

RKB = 16' @ 4875.00usft (Xtreme 22)

N

True

Dec-Deg - API - US Survey Feet - Custom

**HALLIBURTON**

Project: Weld County, CO (NAD 83)  
 Site: Sec. 24-T2N-R67W  
 Well: Gee 15N-25HZ  
 Wellbore: Plan A  
 Design: Actual Surveys



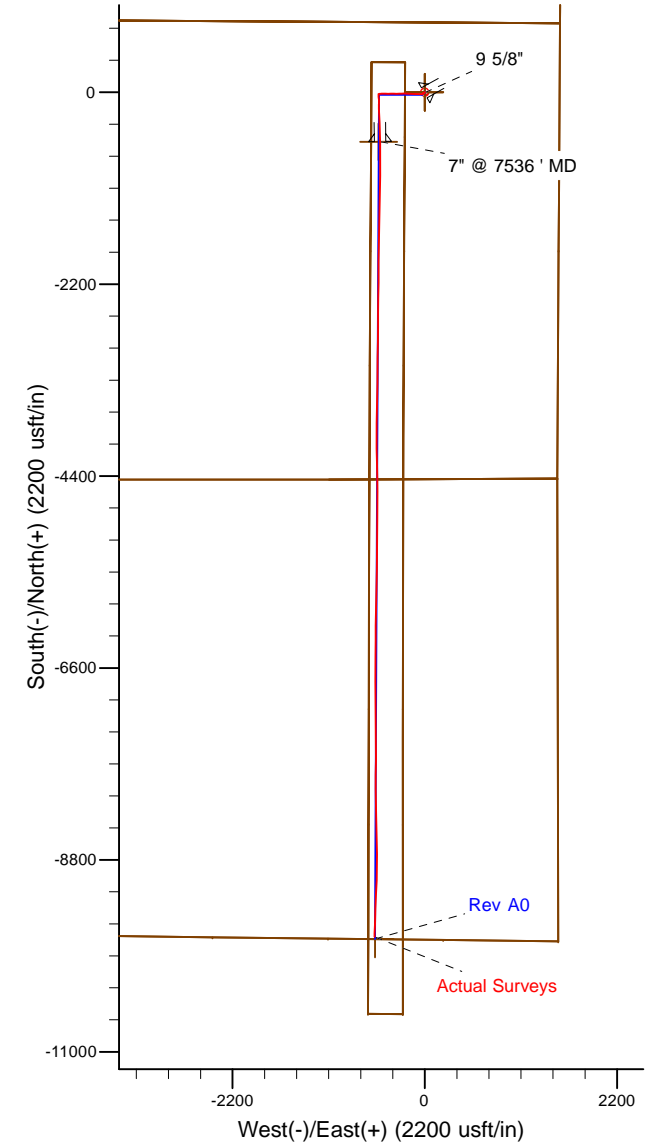
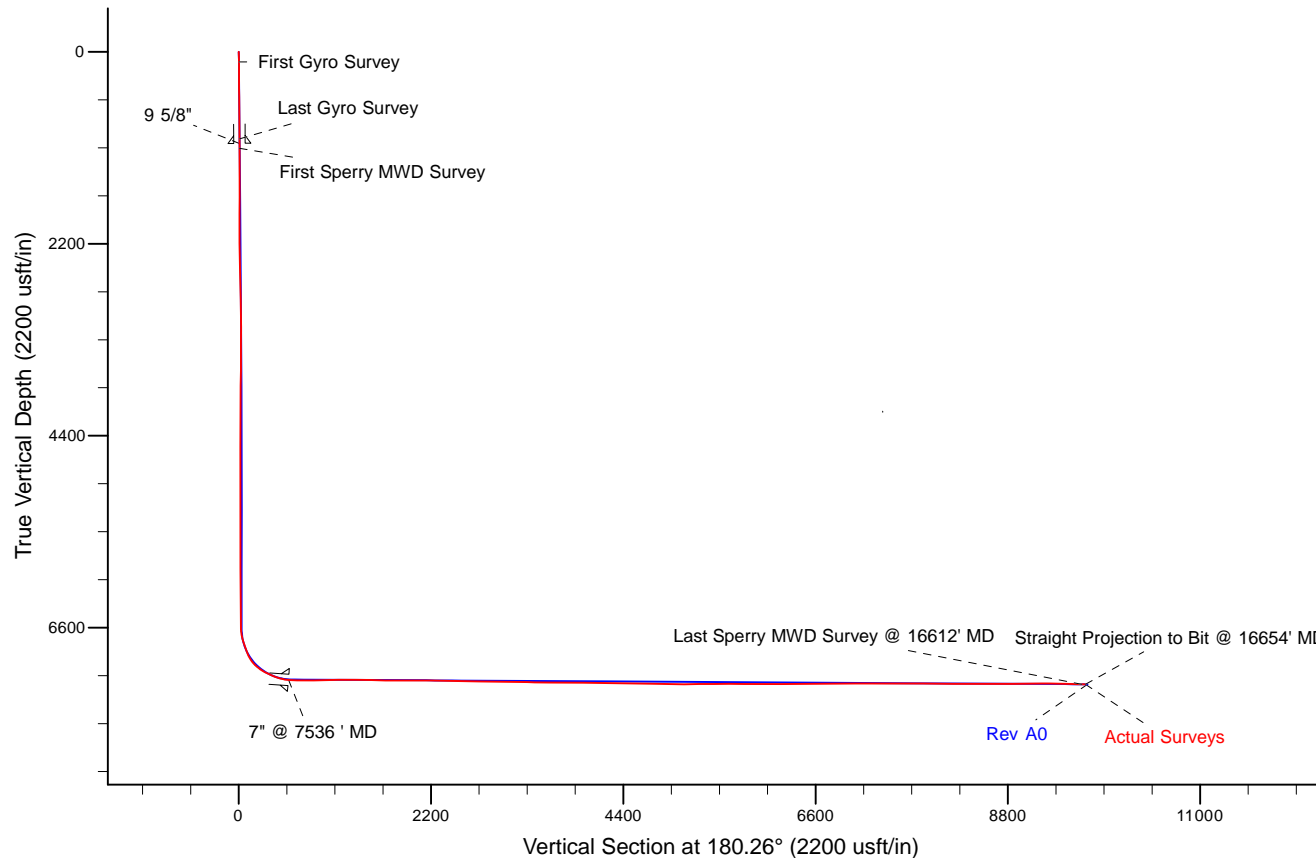
Platted SHL: 800' FNL, 1540' FEL  
 Platted Lat/Long: 40.128524 N, 104.835439 W  
 Location: Sec. 24-T2N-R67W

~ 7" Casing: 1372.8' FNL 2039.4' FEL  
 Lat/Long: 40.126967N, 104.837264W  
 State Planes - CO Northern: 1289790.60N, 3185320.56E  
 Location: Sec. 24-T2N-R67W

~ BHL: 26.4' FSL, 2098.8' FEL  
 Lat/Long: 40.1019441N, 104.837497W  
 State Planes - CO Northern: 1280675.01N, 3185323.49E  
 Location: Sec. 25-T2N-R67W

#### LEGEND

- Gee 15N-25HZ, Plan A, Rev A0 V0
- Actual Surveys



WELL DETAILS: Gee 15N-25HZ	
Ground Level:	4859.00
RKB = 16" @ 4875.00usft (Xtreme 22)	
Created By:	Gordy Roth
Created On:	3/8/15

**Design Report for Gee 15N-25HZ - 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	0.41	192.20	116.00	-0.41	-0.09	0.41	0.35
<b>First Gyro Survey</b>							
216.00	0.24	238.86	216.00	-0.87	-0.34	0.87	0.30
316.00	0.55	176.13	316.00	-1.45	-0.49	1.45	0.49
416.00	0.69	216.27	415.99	-2.41	-0.82	2.42	0.45
516.00	0.50	225.57	515.98	-3.20	-1.48	3.21	0.22
616.00	0.69	218.09	615.98	-3.98	-2.16	3.99	0.21
716.00	0.70	208.00	715.97	-4.99	-2.82	5.00	0.12
816.00	0.47	232.93	815.97	-5.77	-3.43	5.79	0.34
916.00	0.99	222.23	915.96	-6.66	-4.34	6.68	0.54
998.00	0.82	234.32	997.95	-7.53	-5.29	7.55	0.32
<b>Last Gyro Survey</b>							
1,106.00	0.91	247.57	1,105.94	-8.31	-6.71	8.34	0.20
<b>First Sperry MWD Survey</b>							
1,296.00	0.44	168.95	1,295.93	-9.60	-7.97	9.63	0.49
1,485.00	0.62	265.93	1,484.92	-10.38	-8.85	10.42	0.42
1,670.00	1.08	286.91	1,669.90	-9.95	-11.51	10.00	0.30
1,853.00	0.53	319.47	1,852.88	-8.80	-13.71	8.86	0.38
2,036.00	1.02	289.22	2,035.87	-7.62	-15.80	7.69	0.34
2,219.00	1.24	263.59	2,218.83	-7.31	-19.31	7.39	0.30
2,402.00	1.82	166.26	2,401.79	-10.35	-20.59	10.44	1.27
2,586.00	1.98	170.69	2,585.69	-16.33	-19.38	16.41	0.12
2,769.00	0.90	213.04	2,768.63	-20.65	-19.65	20.74	0.79
2,952.00	0.85	227.08	2,951.61	-22.78	-21.43	22.88	0.12
3,136.00	3.07	270.19	3,135.50	-23.69	-27.35	23.82	1.37
3,318.00	5.90	275.13	3,316.92	-22.84	-41.55	23.03	1.57
3,489.00	5.72	265.68	3,487.05	-22.70	-58.80	22.96	0.57
3,660.00	9.04	274.09	3,656.61	-22.38	-80.70	22.75	2.04
3,831.00	9.68	273.09	3,825.33	-20.65	-108.46	21.14	0.39
4,003.00	10.74	271.61	3,994.61	-19.42	-138.92	20.05	0.63
4,174.00	9.62	273.22	4,162.91	-18.17	-169.11	18.93	0.68
4,345.00	10.59	272.93	4,331.26	-16.56	-199.07	17.46	0.57
4,516.00	10.25	272.76	4,499.44	-15.02	-229.96	16.07	0.20
4,687.00	10.21	265.90	4,667.73	-15.38	-260.27	16.56	0.71
4,857.00	10.55	267.46	4,834.95	-17.14	-290.85	18.46	0.26
5,029.00	11.26	271.12	5,003.84	-17.51	-323.37	18.98	0.58
5,200.00	10.54	271.67	5,171.75	-16.73	-355.70	18.34	0.43
5,371.00	10.83	266.62	5,339.79	-17.22	-387.37	18.98	0.57
5,542.00	11.17	272.04	5,507.66	-17.58	-419.96	19.48	0.64
5,713.00	8.88	274.56	5,676.03	-15.94	-449.67	17.98	1.36
5,970.00	7.24	265.68	5,930.50	-15.58	-485.60	17.79	0.80
6,141.00	5.54	262.04	6,100.43	-17.54	-504.52	19.83	1.02
6,311.00	4.20	261.71	6,269.81	-19.57	-518.81	21.93	0.79
6,480.00	1.40	279.00	6,438.60	-20.14	-526.97	22.53	1.71
6,609.00	0.57	243.78	6,567.58	-20.18	-529.10	22.58	0.77
6,651.00	2.11	174.78	6,609.56	-21.04	-529.22	23.44	4.71
6,694.00	7.24	179.76	6,652.41	-24.54	-529.14	26.94	11.96
6,737.00	12.33	176.27	6,694.77	-31.84	-528.83	34.24	11.91
6,780.00	14.94	177.78	6,736.55	-41.96	-528.31	44.36	6.13

**Design Report for Gee 15N-25HZ - Actual Surveys**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
6,823.00	17.12	177.71	6,777.88	-53.82	-527.84	56.22	5.07
6,866.00	19.33	176.81	6,818.72	-67.25	-527.20	69.65	5.18
6,908.00	20.75	176.82	6,858.18	-81.62	-526.40	84.01	3.38
6,951.00	22.11	177.78	6,898.20	-97.32	-525.66	99.70	3.27
6,993.00	28.17	179.35	6,936.21	-115.14	-525.24	117.53	14.51
7,036.00	33.67	182.38	6,973.08	-137.22	-525.62	139.61	13.29
7,078.00	41.44	180.32	7,006.35	-162.79	-526.18	165.18	18.74
7,121.00	47.43	178.38	7,037.05	-192.88	-525.81	195.26	14.28
7,164.00	52.52	178.30	7,064.69	-225.78	-524.86	228.16	11.84
7,207.00	56.60	177.81	7,089.62	-260.79	-523.67	263.16	9.53
7,249.00	60.43	178.12	7,111.55	-296.57	-522.40	298.94	9.14
7,292.00	64.35	177.78	7,131.48	-334.64	-521.03	337.01	9.14
7,334.00	67.50	176.39	7,148.61	-372.94	-519.08	375.29	8.09
7,377.00	69.63	176.85	7,164.32	-412.89	-516.72	415.23	5.05
7,418.00	73.02	176.73	7,177.45	-451.66	-514.54	453.99	8.27
7,461.00	76.25	177.80	7,188.84	-493.07	-512.57	495.39	7.89
7,509.00	82.30	178.05	7,197.77	-540.18	-510.86	542.50	12.61
7,555.00	88.53	180.30	7,201.44	-586.01	-510.21	588.31	14.39
7,616.00	88.24	179.06	7,203.16	-646.98	-509.87	649.29	2.09
7,787.00	89.88	181.05	7,205.97	-817.94	-510.03	820.25	1.51
7,958.00	91.29	181.22	7,204.22	-988.89	-513.42	991.21	0.83
8,130.00	91.73	180.79	7,199.69	-1,160.81	-516.43	1,163.14	0.36
8,301.00	89.48	180.96	7,197.88	-1,331.77	-519.05	1,334.11	1.32
8,472.00	88.71	180.55	7,200.59	-1,502.73	-521.30	1,505.08	0.51
8,644.00	88.67	181.03	7,204.52	-1,674.67	-523.67	1,677.03	0.28
8,814.00	90.00	180.87	7,206.49	-1,844.63	-526.49	1,847.00	0.79
8,985.00	90.74	180.34	7,205.39	-2,015.61	-528.29	2,017.99	0.53
9,155.00	89.45	180.79	7,205.10	-2,185.60	-529.97	2,187.98	0.80
9,326.00	88.00	180.76	7,208.91	-2,356.54	-532.28	2,358.93	0.85
9,497.00	88.49	180.82	7,214.15	-2,527.44	-534.64	2,529.84	0.29
9,668.00	89.20	180.45	7,217.59	-2,698.39	-536.53	2,700.80	0.47
9,839.00	89.85	180.35	7,219.01	-2,869.38	-537.73	2,871.79	0.38
10,010.00	88.80	180.51	7,221.03	-3,040.36	-539.01	3,042.78	0.62
10,181.00	89.54	180.82	7,223.50	-3,211.33	-540.99	3,213.76	0.47
10,352.00	88.30	181.32	7,226.73	-3,382.27	-544.19	3,384.70	0.78
10,523.00	89.14	180.93	7,230.55	-3,553.19	-547.54	3,555.64	0.54
10,694.00	90.06	180.66	7,231.74	-3,724.17	-549.92	3,726.63	0.56
10,865.00	89.51	180.22	7,232.38	-3,895.16	-551.23	3,897.62	0.41
11,036.00	90.03	179.75	7,233.07	-4,066.16	-551.18	4,068.62	0.41
11,207.00	88.52	178.81	7,235.23	-4,237.13	-549.04	4,239.57	1.04
11,378.00	89.32	178.62	7,238.45	-4,408.05	-545.20	4,410.48	0.48
11,549.00	89.08	179.68	7,240.84	-4,579.01	-542.67	4,581.43	0.64
11,720.00	88.43	180.79	7,244.56	-4,749.97	-543.37	4,752.38	0.75
11,891.00	89.32	180.44	7,247.91	-4,920.92	-545.20	4,923.35	0.56
12,062.00	90.03	180.37	7,248.88	-5,091.91	-546.41	5,094.34	0.42
12,233.00	90.65	180.28	7,247.87	-5,262.91	-547.38	5,265.34	0.37
12,405.00	90.37	181.17	7,246.34	-5,434.89	-549.56	5,437.32	0.54
12,574.00	90.06	180.93	7,245.70	-5,603.86	-552.65	5,606.31	0.23
12,745.00	89.45	181.44	7,246.44	-5,774.82	-556.19	5,777.28	0.46
12,915.00	89.45	180.93	7,248.07	-5,944.77	-559.71	5,947.25	0.30
13,086.00	90.00	180.46	7,248.89	-6,115.76	-561.78	6,118.24	0.42

**Design Report for Gee 15N-25HZ - Actual Surveys**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
13,254.00	91.14	179.84	7,247.22	-6,283.74	-562.22	6,286.23	0.77
13,425.00	91.11	180.71	7,243.86	-6,454.71	-563.04	6,457.20	0.51
13,596.00	89.88	180.52	7,242.38	-6,625.69	-564.87	6,628.18	0.73
13,768.00	89.60	179.94	7,243.16	-6,797.68	-565.57	6,800.18	0.37
13,939.00	90.52	179.62	7,242.98	-6,968.68	-564.91	6,971.17	0.57
14,110.00	90.49	179.83	7,241.48	-7,139.67	-564.09	7,142.16	0.12
14,282.00	89.63	179.35	7,241.30	-7,311.66	-562.86	7,314.14	0.57
14,452.00	90.55	179.19	7,241.03	-7,481.65	-560.69	7,484.12	0.55
14,621.00	89.72	180.31	7,240.63	-7,650.64	-559.95	7,653.10	0.82
14,792.00	89.51	180.67	7,241.78	-7,821.63	-561.42	7,824.10	0.24
14,963.00	90.06	180.33	7,242.42	-7,992.62	-562.91	7,995.10	0.38
15,135.00	88.80	178.42	7,244.13	-8,164.59	-561.03	8,167.05	1.33
15,306.00	89.38	178.09	7,246.85	-8,335.49	-555.83	8,337.93	0.39
15,476.00	90.06	177.92	7,247.68	-8,505.38	-549.91	8,507.79	0.41
15,647.00	91.08	180.17	7,245.98	-8,676.34	-547.06	8,678.73	1.44
15,818.00	90.03	181.41	7,244.32	-8,847.31	-549.42	8,849.71	0.95
15,989.00	91.48	181.60	7,242.07	-9,018.23	-553.91	9,020.65	0.86
16,160.00	89.69	182.12	7,240.32	-9,189.12	-559.46	9,191.57	1.09
16,331.00	88.49	182.23	7,243.04	-9,359.98	-565.95	9,362.45	0.70
16,501.00	88.77	181.66	7,247.10	-9,529.83	-571.71	9,532.33	0.37
16,612.00	89.04	181.37	7,249.22	-9,640.77	-574.65	9,643.28	0.36
<b>Last Sperry MWD Survey @ 16612' MD</b>							
16,654.00	89.04	181.37	7,249.93	-9,682.75	-575.65	9,685.26	0.00
<b>Straight Projection to Bit @ 16654' MD</b>							

**Design Annotations**

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
116.00	116.00	-0.41	-0.09	First Gyro Survey
998.00	997.95	-7.53	-5.29	Last Gyro Survey
1,106.00	1,105.94	-8.31	-6.71	First Sperry MWD Survey
16,612.00	7,249.22	-9,640.77	-574.65	Last Sperry MWD Survey @ 16612' MD
16,654.00	7,249.93	-9,682.75	-575.65	Straight Projection to Bit @ 16654' MD

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
User	No Target (Freehand)	180.26	Slot	0.00	0.00	0.00

**Survey tool program**

From (usft)	To (usft)	Survey/Plan	Survey Tool
116.00	998.00	VES Gyro Surface Surveys	NS-GYRO-MS
1,106.00	7,555.00	MWD Vertical/Build Surveys	MWD+IFR1+SC
7,616.00	16,654.00	MWD Lateral Surveys	MWD+IFR1+SC

## Design Report for Gee 15N-25HZ - Actual Surveys

### Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,049.00	1,048.94	9 5/8"	9-5/8	13-3/4
7,536.00	7,200.53	7" @ 7536 ' MD	7	8-3/4

**Design Report for Gee 15N-25HZ - 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
GEE 15N-25HZ_LD	0.00	0.00	0.00	0.01	0.00	1,290,361.42	3,185,826.54	40.128524	-104.835439
- actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	-4,439.03	-635.57	1,285,917.93	3,185,224.28	
Point 2				0.00	-3,128.08	-629.06	1,287,228.84	3,185,220.96	
Point 3				0.00	-1,817.05	-622.55	1,288,539.83	3,185,217.65	
Point 4				0.00	-507.69	-615.40	1,289,849.15	3,185,214.99	
Point 5				0.00	343.77	-610.73	1,290,700.59	3,185,213.27	
Point 6				0.00	341.66	-224.32	1,290,701.37	3,185,599.67	
Point 7				0.00	-509.89	-229.04	1,289,849.85	3,185,601.34	
Point 8				0.00	-1,817.32	-236.27	1,288,542.45	3,185,603.90	
Point 9				0.00	-3,127.36	-243.29	1,287,232.45	3,185,606.70	
Point 10				0.00	-4,437.30	-250.31	1,285,922.55	3,185,609.50	
Point 11				0.00	-5,751.07	-250.46	1,284,608.87	3,185,619.19	
Point 12				0.00	-7,069.94	-250.62	1,283,290.09	3,185,628.92	
Point 13				0.00	-8,393.72	-250.63	1,281,966.40	3,185,638.83	
Point 14				0.00	-9,712.65	-250.63	1,280,647.56	3,185,648.71	
Point 15				0.00	-10,569.70	-252.45	1,279,790.55	3,185,653.32	
Point 16				0.00	-10,564.81	-649.37	1,279,792.47	3,185,256.39	
Point 17				0.00	-9,708.15	-648.79	1,280,649.08	3,185,250.55	
Point 18				0.00	-8,389.15	-644.64	1,281,968.02	3,185,244.81	
Point 19				0.00	-7,067.45	-641.74	1,283,289.65	3,185,237.81	
Point 20				0.00	-5,751.87	-638.65	1,284,605.16	3,185,231.04	
GEE 15N-25HZ_SEC	0.00	0.00	0.00	0.01	0.00	1,290,361.42	3,185,826.54	40.128524	-104.835439
- actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	6,093.49	-3,658.84	1,296,427.07	3,182,122.29	
Point 2				0.00	8,731.23	-3,649.88	1,299,064.69	3,182,111.48	
Point 3				0.00	11,367.42	-3,637.30	1,301,700.80	3,182,104.30	
Point 4				0.00	11,298.93	-1,015.67	1,301,651.96	3,184,726.26	
Point 5				0.00	11,264.75	295.08	1,301,627.60	3,186,037.18	
Point 6				0.00	11,230.37	1,605.89	1,301,603.05	3,187,348.16	
Point 7				0.00	8,621.28	1,589.34	1,298,994.01	3,187,351.16	
Point 8				0.00	6,012.75	1,573.16	1,296,385.54	3,187,354.53	
Point 9				0.00	6,052.36	-1,044.19	1,296,405.54	3,184,737.06	
Point 10				0.00	6,093.49	-3,658.84	1,296,427.07	3,182,122.29	
Point 11				0.00	6,052.36	-1,044.19	1,296,405.54	3,184,737.06	
Point 12				0.00	6,012.75	1,573.16	1,296,385.54	3,187,354.53	
Point 13				0.00	6,012.75	1,573.23	1,296,385.54	3,187,354.60	
Point 14				0.00	3,402.07	1,559.45	1,293,774.94	3,187,360.39	
Point 15				0.00	2,096.79	1,552.16	1,292,469.70	3,187,362.88	
Point 16				0.00	792.03	1,544.89	1,291,164.97	3,187,365.39	
Point 17				0.00	806.29	-1,068.43	1,291,159.65	3,184,752.14	
Point 18				0.00	821.64	-3,681.23	1,291,155.41	3,182,139.41	
Point 19				0.00	806.29	-1,068.43	1,291,159.65	3,184,752.14	
Point 20				0.00	792.03	1,544.89	1,291,164.97	3,187,365.39	
Point 21				0.00	-1,165.95	1,533.75	1,289,207.04	3,187,368.92	
Point 22				0.00	-1,818.62	1,530.00	1,288,554.39	3,187,370.06	
Point 23				0.00	-4,429.39	1,514.98	1,285,943.69	3,187,374.61	
Point 24				0.00	-4,441.14	-1,095.63	1,285,912.37	3,184,764.27	
Point 25				0.00	-4,440.32	-3,705.13	1,285,893.64	3,182,154.94	
Point 26				0.00	-4,441.14	-1,095.63	1,285,912.37	3,184,764.27	
Point 27				0.00	-4,429.39	1,514.98	1,285,943.69	3,187,374.61	
Point 28				0.00	-9,733.10	1,526.04	1,280,640.43	3,187,425.41	
Point 29				0.00	-9,717.96	209.37	1,280,645.70	3,186,108.72	
Point 30				0.00	-9,702.96	-1,107.53	1,280,650.83	3,184,791.80	
Point 31				0.00	-9,687.38	-2,430.20	1,280,656.49	3,183,469.10	
Point 32				0.00	-9,671.54	-3,752.87	1,280,662.42	3,182,146.41	
Point 33				0.00	-8,352.32	-3,739.58	1,281,981.65	3,182,149.81	
Point 34				0.00	-7,033.26	-3,726.17	1,283,300.72	3,182,153.33	
Point 35				0.00	-4,440.32	-3,705.13	1,285,893.64	3,182,154.94	
Point 36				0.00	-4,440.32	-3,705.13	1,285,893.64	3,182,154.94	
Point 37				0.00	-3,126.34	-3,698.95	1,287,207.57	3,182,151.27	



## Design Report for Gee 15N-25HZ - Actual Surveys

Point 38	0.00	-1,812.87	-3,692.81	1,288,521.00	3,182,147.57		
Point 39	0.00	821.61	-3,677.35	1,291,155.41	3,182,143.29		
Point 40	0.00	821.64	-3,681.23	1,291,155.41	3,182,139.41		
Point 41	0.00	3,458.18	-3,669.96	1,293,791.86	3,182,130.92		
Point 42	0.00	4,116.92	-3,667.30	1,294,450.57	3,182,128.64		
Point 43	0.00	4,775.77	-3,664.44	1,295,109.40	3,182,126.56		
Point 44	0.00	6,093.49	-3,658.84	1,296,427.07	3,182,122.29		
GEE 15N-25HZ_SHL	0.00	0.00	0.00	0.01	0.00	1,290,361.42	3,185,826.54
- actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)							
- Point							
GEE 15N-25HZ_HEEL	0.00	0.00	7,195.00	-568.99	-529.00	1,289,788.49	3,185,301.84
- actual wellpath misses target center by 19.59usft at 7537.25usft MD (7200.62 TVD, -568.28 N, -510.25 E)							
- Point							
GEE 15N-25HZ_BHL	0.00	0.00	7,250.00	-9,708.04	-570.00	1,280,649.77	3,185,329.33
- actual wellpath misses target center by 25.91usft at 16654.00usft MD (7249.93 TVD, -9682.75 N, -575.65 E)							
- Point							

### Directional Difficulty Index

Average Dogleg over Survey:	1.14 °/100usft	Maximum Dogleg over Survey:	18.74 °/100usft at 7,078.00 usft
Net Tortousity applicable to Plans:	0.46 °/100usft	Directional Difficulty Index:	6.648

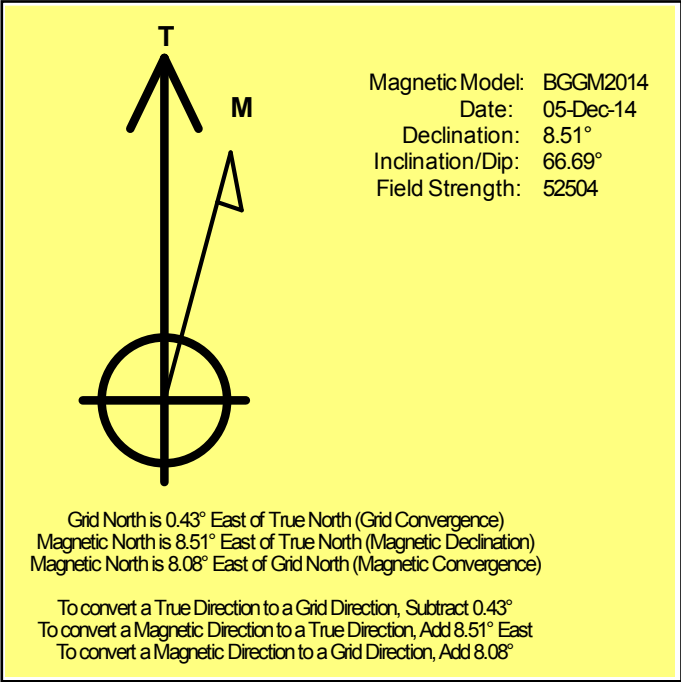
### Audit Info

North Reference Sheet for Sec. 24-T2N-R67W - Gee 15N-25HZ - 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 = 16' @ 4875.00usft (Xtreme 22). Northing and Easting are relative to Gee 15N-25HZ  
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: 0.99995911

Grid Coordinates of Well: 1,290,361.41 usft N, 3,185,826.54 usft E  
Geographical Coordinates of Well: 40° 07' 42.69" N, 104° 50' 07.58" W  
Grid Convergence at Surface is: 0.43°

Based upon Minimum Curvature type calculations, at a Measured Depth of 16,654.00usft  
the Bottom Hole Displacement is 9,699.85usft in the Direction of 183.40° ( True).  
Magnetic Convergence at surface is: -8.08° ( 5 December 2014, , BGGM2014)



# Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 24-T2N-R67W

Gee 15N-25HZ

Plan A

Design: Actual Surveys

## Sperry Drilling Services

### Geodetic Report

08 March, 2015

Well Coordinates: 1,290,361.41 N, 3,185,826.54 E (40° 07' 42.69" N, 104° 50' 07.58" W)

Ground Level: 4,859.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 73

Centered on Well Gee 15N-25HZ

RKB = 16' @ 4875.00usft (Xtreme 22)

N

True

Dec-Deg - API - US Survey Feet - Custom

**HALLIBURTON**

## Design Report for Gee 15N-25HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
0.00	0.00	0.00	0.00	0.00	0.00	40.128524	-104.835439	1,290,361.41	3,185,826.54
116.00	0.41	192.20	116.00	-0.41	-0.09	40.128523	-104.835440	1,290,361.00	3,185,826.45
216.00	0.24	238.86	216.00	-0.87	-0.34	40.128522	-104.835440	1,290,360.54	3,185,826.20
316.00	0.55	176.13	316.00	-1.45	-0.49	40.128520	-104.835441	1,290,359.95	3,185,826.06
416.00	0.69	216.27	415.99	-2.41	-0.82	40.128517	-104.835442	1,290,358.99	3,185,825.74
516.00	0.50	225.57	515.98	-3.20	-1.48	40.128515	-104.835445	1,290,358.20	3,185,825.08
616.00	0.69	218.09	615.98	-3.98	-2.16	40.128513	-104.835447	1,290,357.41	3,185,824.41
716.00	0.70	208.00	715.97	-4.99	-2.82	40.128510	-104.835449	1,290,356.40	3,185,823.76
816.00	0.47	232.93	815.97	-5.77	-3.43	40.128508	-104.835452	1,290,355.61	3,185,823.15
916.00	0.99	222.23	915.96	-6.66	-4.34	40.128506	-104.835455	1,290,354.72	3,185,822.25
998.00	0.82	234.32	997.95	-7.53	-5.29	40.128503	-104.835458	1,290,353.84	3,185,821.30
1,106.00	0.91	247.57	1,105.94	-8.31	-6.71	40.128501	-104.835463	1,290,353.05	3,185,819.89
1,296.00	0.44	168.95	1,295.93	-9.60	-7.97	40.128498	-104.835468	1,290,351.75	3,185,818.65
1,485.00	0.62	265.93	1,484.92	-10.38	-8.85	40.128496	-104.835471	1,290,350.96	3,185,817.77
1,670.00	1.08	286.91	1,669.90	-9.95	-11.51	40.128497	-104.835480	1,290,351.38	3,185,815.10
1,853.00	0.53	319.47	1,852.88	-8.80	-13.71	40.128500	-104.835488	1,290,352.51	3,185,812.89
2,036.00	1.02	289.22	2,035.87	-7.62	-15.80	40.128503	-104.835496	1,290,353.67	3,185,810.80
2,219.00	1.24	263.59	2,218.83	-7.31	-19.31	40.128504	-104.835508	1,290,353.96	3,185,807.29
2,402.00	1.82	166.26	2,401.79	-10.35	-20.59	40.128496	-104.835513	1,290,350.91	3,185,806.03
2,586.00	1.98	170.69	2,585.69	-16.33	-19.38	40.128479	-104.835509	1,290,344.94	3,185,807.29
2,769.00	0.90	213.04	2,768.63	-20.65	-19.65	40.128467	-104.835510	1,290,340.61	3,185,807.05
2,952.00	0.85	227.08	2,951.61	-22.78	-21.43	40.128462	-104.835516	1,290,338.47	3,185,805.28
3,136.00	3.07	270.19	3,135.50	-23.69	-27.35	40.128459	-104.835537	1,290,337.51	3,185,799.36
3,318.00	5.90	275.13	3,316.92	-22.84	-41.55	40.128461	-104.835588	1,290,338.26	3,185,785.17
3,489.00	5.72	265.68	3,487.05	-22.70	-58.80	40.128462	-104.835650	1,290,338.27	3,185,767.91
3,660.00	9.04	274.09	3,656.61	-22.38	-80.70	40.128463	-104.835728	1,290,338.43	3,185,746.01
3,831.00	9.68	273.09	3,825.33	-20.65	-108.46	40.128467	-104.835827	1,290,339.95	3,185,718.24
4,003.00	10.74	271.61	3,994.61	-19.42	-138.92	40.128471	-104.835936	1,290,340.95	3,185,687.77
4,174.00	9.62	273.22	4,162.91	-18.17	-169.11	40.128474	-104.836044	1,290,341.98	3,185,657.57
4,345.00	10.59	272.93	4,331.26	-16.56	-199.07	40.128479	-104.836151	1,290,343.36	3,185,627.61
4,516.00	10.25	272.76	4,499.44	-15.02	-229.96	40.128483	-104.836262	1,290,344.66	3,185,596.71
4,687.00	10.21	265.90	4,667.73	-15.38	-260.27	40.128482	-104.836370	1,290,344.08	3,185,566.40
4,857.00	10.55	267.46	4,834.95	-17.14	-290.85	40.128477	-104.836479	1,290,342.09	3,185,535.84
5,029.00	11.26	271.12	5,003.84	-17.51	-323.37	40.128476	-104.836596	1,290,341.48	3,185,503.32
5,200.00	10.54	271.67	5,171.75	-16.73	-355.70	40.128478	-104.836711	1,290,342.01	3,185,470.99
5,371.00	10.83	266.62	5,339.79	-17.22	-387.37	40.128477	-104.836825	1,290,341.29	3,185,439.33
5,542.00	11.17	272.04	5,507.66	-17.58	-419.96	40.128476	-104.836941	1,290,340.68	3,185,406.74
5,713.00	8.88	274.56	5,676.03	-15.94	-449.67	40.128480	-104.837047	1,290,342.10	3,185,377.02
5,970.00	7.24	265.68	5,930.50	-15.58	-485.60	40.128481	-104.837176	1,290,342.19	3,185,341.09
6,141.00	5.54	262.04	6,100.43	-17.54	-504.52	40.128476	-104.837243	1,290,340.09	3,185,322.19
6,311.00	4.20	261.71	6,269.81	-19.57	-518.81	40.128470	-104.837295	1,290,337.95	3,185,307.92
6,480.00	1.40	279.00	6,438.60	-20.14	-526.97	40.128469	-104.837324	1,290,337.32	3,185,299.76

## Design Report for Gee 15N-25HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
6,609.00	0.57	243.78	6,567.58	-20.18	-529.10	40.128469	-104.837331	1,290,337.27	3,185,297.62
6,651.00	2.11	174.78	6,609.56	-21.04	-529.22	40.128466	-104.837332	1,290,336.40	3,185,297.51
6,694.00	7.24	179.76	6,652.41	-24.54	-529.14	40.128457	-104.837331	1,290,332.91	3,185,297.62
6,737.00	12.33	176.27	6,694.77	-31.84	-528.83	40.128437	-104.837330	1,290,325.61	3,185,297.99
6,780.00	14.94	177.78	6,736.55	-41.96	-528.31	40.128409	-104.837329	1,290,315.49	3,185,298.58
6,823.00	17.12	177.71	6,777.88	-53.82	-527.84	40.128376	-104.837327	1,290,303.64	3,185,299.13
6,866.00	19.33	176.81	6,818.72	-67.25	-527.20	40.128339	-104.837325	1,290,290.21	3,185,299.88
6,908.00	20.75	176.82	6,858.18	-81.62	-526.40	40.128300	-104.837322	1,290,275.85	3,185,300.79
6,951.00	22.11	177.78	6,898.20	-97.32	-525.66	40.128257	-104.837319	1,290,260.16	3,185,301.64
6,993.00	28.17	179.35	6,936.21	-115.14	-525.24	40.128208	-104.837318	1,290,242.34	3,185,302.20
7,036.00	33.67	182.38	6,973.08	-137.22	-525.62	40.128147	-104.837319	1,290,220.26	3,185,301.98
7,078.00	41.44	180.32	7,006.35	-162.79	-526.18	40.128077	-104.837321	1,290,194.68	3,185,301.61
7,121.00	47.43	178.38	7,037.05	-192.88	-525.81	40.127995	-104.837320	1,290,164.60	3,185,302.21
7,164.00	52.52	178.30	7,064.69	-225.78	-524.86	40.127904	-104.837316	1,290,131.71	3,185,303.41
7,207.00	56.60	177.81	7,089.62	-260.79	-523.67	40.127808	-104.837312	1,290,096.72	3,185,304.86
7,249.00	60.43	178.12	7,111.55	-296.57	-522.40	40.127710	-104.837307	1,290,060.94	3,185,306.40
7,292.00	64.35	177.78	7,131.48	-334.64	-521.03	40.127605	-104.837302	1,290,022.88	3,185,308.05
7,334.00	67.50	176.39	7,148.61	-372.94	-519.08	40.127500	-104.837295	1,289,984.61	3,185,310.29
7,377.00	69.63	176.85	7,164.32	-412.89	-516.72	40.127391	-104.837287	1,289,944.68	3,185,312.95
7,418.00	73.02	176.73	7,177.45	-451.66	-514.54	40.127284	-104.837279	1,289,905.92	3,185,315.41
7,461.00	76.25	177.80	7,188.84	-493.07	-512.57	40.127171	-104.837272	1,289,864.53	3,185,317.70
7,509.00	82.30	178.05	7,197.77	-540.18	-510.86	40.127041	-104.837266	1,289,817.44	3,185,319.76
7,555.00	88.53	180.30	7,201.44	-586.01	-510.21	40.126915	-104.837264	1,289,771.62	3,185,320.76
7,616.00	88.24	179.06	7,203.16	-646.98	-509.87	40.126748	-104.837263	1,289,710.65	3,185,321.56
7,787.00	89.88	181.05	7,205.97	-817.94	-510.03	40.126279	-104.837263	1,289,539.70	3,185,322.67
7,958.00	91.29	181.22	7,204.22	-988.89	-513.42	40.125809	-104.837275	1,289,368.74	3,185,320.57
8,130.00	91.73	180.79	7,199.69	-1,160.81	-516.43	40.125338	-104.837286	1,289,196.81	3,185,318.84
8,301.00	89.48	180.96	7,197.88	-1,331.77	-519.05	40.124868	-104.837295	1,289,025.84	3,185,317.51
8,472.00	88.71	180.55	7,200.59	-1,502.73	-521.30	40.124399	-104.837303	1,288,854.88	3,185,316.54
8,644.00	88.67	181.03	7,204.52	-1,674.67	-523.67	40.123927	-104.837312	1,288,682.93	3,185,315.46
8,814.00	90.00	180.87	7,206.49	-1,844.63	-526.49	40.123460	-104.837322	1,288,512.96	3,185,313.91
8,985.00	90.74	180.34	7,205.39	-2,015.61	-528.29	40.122991	-104.837328	1,288,341.98	3,185,313.39
9,155.00	89.45	180.79	7,205.10	-2,185.60	-529.97	40.122524	-104.837334	1,288,171.99	3,185,312.98
9,326.00	88.00	180.76	7,208.91	-2,356.54	-532.28	40.122055	-104.837343	1,288,001.04	3,185,311.95
9,497.00	88.49	180.82	7,214.15	-2,527.44	-534.64	40.121586	-104.837351	1,287,830.14	3,185,310.88
9,668.00	89.20	180.45	7,217.59	-2,698.39	-536.53	40.121117	-104.837358	1,287,659.18	3,185,310.26
9,839.00	89.85	180.35	7,219.01	-2,869.38	-537.73	40.120647	-104.837362	1,287,488.19	3,185,310.35
10,010.00	88.80	180.51	7,221.03	-3,040.36	-539.01	40.120178	-104.837367	1,287,317.22	3,185,310.35
10,181.00	89.54	180.82	7,223.50	-3,211.33	-540.99	40.119709	-104.837374	1,287,146.24	3,185,309.65
10,352.00	88.30	181.32	7,226.73	-3,382.27	-544.19	40.119240	-104.837385	1,286,975.29	3,185,307.74
10,523.00	89.14	180.93	7,230.55	-3,553.19	-547.54	40.118770	-104.837397	1,286,804.36	3,185,305.66
10,694.00	90.06	180.66	7,231.74	-3,724.17	-549.92	40.118301	-104.837406	1,286,633.38	3,185,304.57

## Design Report for Gee 15N-25HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
10,865.00	89.51	180.22	7,232.38	-3,895.16	-551.23	40.117832	-104.837410	1,286,462.38	3,185,304.54
11,036.00	90.03	179.75	7,233.07	-4,066.16	-551.18	40.117362	-104.837410	1,286,291.40	3,185,305.86
11,207.00	88.52	178.81	7,235.23	-4,237.13	-549.04	40.116893	-104.837402	1,286,120.46	3,185,309.29
11,378.00	89.32	178.62	7,238.45	-4,408.05	-545.20	40.116424	-104.837389	1,285,949.58	3,185,314.41
11,549.00	89.08	179.68	7,240.84	-4,579.01	-542.67	40.115954	-104.837380	1,285,778.65	3,185,318.23
11,720.00	88.43	180.79	7,244.56	-4,749.97	-543.37	40.115485	-104.837382	1,285,607.70	3,185,318.81
11,891.00	89.32	180.44	7,247.91	-4,920.92	-545.20	40.115016	-104.837389	1,285,436.74	3,185,318.25
12,062.00	90.03	180.37	7,248.88	-5,091.91	-546.41	40.114547	-104.837393	1,285,265.75	3,185,318.32
12,233.00	90.65	180.28	7,247.87	-5,262.91	-547.38	40.114077	-104.837396	1,285,094.76	3,185,318.64
12,405.00	90.37	181.17	7,246.34	-5,434.89	-549.56	40.113605	-104.837404	1,284,922.78	3,185,317.75
12,574.00	90.06	180.93	7,245.70	-5,603.86	-552.65	40.113141	-104.837415	1,284,753.80	3,185,315.92
12,745.00	89.45	181.44	7,246.44	-5,774.82	-556.19	40.112672	-104.837428	1,284,582.82	3,185,313.66
12,915.00	89.45	180.93	7,248.07	-5,944.77	-559.71	40.112205	-104.837440	1,284,412.85	3,185,311.42
13,086.00	90.00	180.46	7,248.89	-6,115.76	-561.78	40.111736	-104.837448	1,284,241.87	3,185,310.63
13,254.00	91.14	179.84	7,247.22	-6,283.74	-562.22	40.111275	-104.837449	1,284,073.89	3,185,311.45
13,425.00	91.11	180.71	7,243.86	-6,454.71	-563.04	40.110806	-104.837452	1,283,902.93	3,185,311.91
13,596.00	89.88	180.52	7,242.38	-6,625.69	-564.87	40.110336	-104.837459	1,283,731.95	3,185,311.36
13,768.00	89.60	179.94	7,243.16	-6,797.68	-565.57	40.109864	-104.837461	1,283,559.96	3,185,311.95
13,939.00	90.52	179.62	7,242.98	-6,968.68	-564.91	40.109395	-104.837459	1,283,388.98	3,185,313.89
14,110.00	90.49	179.83	7,241.48	-7,139.67	-564.09	40.108925	-104.837456	1,283,218.00	3,185,315.99
14,282.00	89.63	179.35	7,241.30	-7,311.66	-562.86	40.108453	-104.837451	1,283,046.03	3,185,318.51
14,452.00	90.55	179.19	7,241.03	-7,481.65	-560.69	40.107987	-104.837444	1,282,876.08	3,185,321.95
14,621.00	89.72	180.31	7,240.63	-7,650.64	-559.95	40.107523	-104.837441	1,282,707.10	3,185,323.96
14,792.00	89.51	180.67	7,241.78	-7,821.63	-561.42	40.107053	-104.837446	1,282,536.11	3,185,323.78
14,963.00	90.06	180.33	7,242.42	-7,992.62	-562.91	40.106584	-104.837452	1,282,365.12	3,185,323.57
15,135.00	88.80	178.42	7,244.13	-8,164.59	-561.03	40.106112	-104.837445	1,282,193.18	3,185,326.73
15,306.00	89.38	178.09	7,246.85	-8,335.49	-555.83	40.105643	-104.837426	1,282,022.33	3,185,333.22
15,476.00	90.06	177.92	7,247.68	-8,505.38	-549.91	40.105176	-104.837405	1,281,852.49	3,185,340.41
15,647.00	91.08	180.17	7,245.98	-8,676.34	-547.06	40.104707	-104.837395	1,281,681.57	3,185,344.54
15,818.00	90.03	181.41	7,244.32	-8,847.31	-549.42	40.104238	-104.837403	1,281,510.59	3,185,343.46
15,989.00	91.48	181.60	7,242.07	-9,018.23	-553.91	40.103769	-104.837419	1,281,339.65	3,185,340.25
16,160.00	89.69	182.12	7,240.32	-9,189.12	-559.46	40.103300	-104.837439	1,281,168.73	3,185,335.98
16,331.00	88.49	182.23	7,243.04	-9,359.98	-565.95	40.102831	-104.837462	1,280,997.84	3,185,330.78
16,501.00	88.77	181.66	7,247.10	-9,529.83	-571.71	40.102364	-104.837483	1,280,827.95	3,185,326.28
16,612.00	89.04	181.37	7,249.22	-9,640.77	-574.65	40.102060	-104.837493	1,280,717.00	3,185,324.18
16,654.00	89.04	181.37	7,249.93	-9,682.75	-575.65	40.101944	-104.837497	1,280,675.01	3,185,323.49

## Design Report for Gee 15N-25HZ - Actual Surveys

### Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
116.00	116.00	-0.41	-0.09	First Gyro Survey
998.00	997.95	-7.53	-5.29	Last Gyro Survey
1,106.00	1,105.94	-8.31	-6.71	First Sperry MWD Survey
16,612.00	7,249.22	-9,640.77	-574.65	Last Sperry MWD Survey @ 16612' MD
16,654.00	7,249.93	-9,682.75	-575.65	Straight Projection to Bit @ 16654' MD

### Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
User	No Target (Freehand)	180.26	Slot	0.00	0.00	0.00

### Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
116.00	998.00	VES Gyro Surface Surveys	NS-GYRO-MS
1,106.00	7,555.00	MWD Vertical/Build Surveys	MWD+IFR1+SC
7,616.00	16,654.00	MWD Lateral Surveys	MWD+IFR1+SC

### Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,049.00	1,048.94	9 5/8"	9-5/8	13-3/4
7,536.00	7,200.53	7" @ 7536' MD	7	8-3/4

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Design Report for Gee 15N-25HZ - Actual Surveys

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**Design Targets**

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

Average Dogleg over Survey:	1.14 °/100usft	Maximum Dogleg over Survey:	18.74 °/100usft at 7,078.00 usft
Net Tortosity applicable to Plans:	0.46 °/100usft	Directional Difficulty Index:	6.648

**Audit Info**



**North Reference Sheet for Sec. 24-T2N-R67W - Gee 15N-25HZ - 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 = 16' @ 4875.00usft (Xtreme 22). Northing and Easting are relative to Gee 15N-25HZ

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: 0.99995911

Grid Coordinates of Well: 1,290,361.41 usft N, 3,185,826.54 usft E

Geographical Coordinates of Well: 40° 07' 42.69" N, 104° 50' 07.58" W

Grid Convergence at Surface is: 0.43°

Based upon Minimum Curvature type calculations, at a Measured Depth of 16,654.00usft

the Bottom Hole Displacement is 9,699.85usft in the Direction of 183.40° ( True).

Magnetic Convergence at surface is: -8.08° ( 5 December 2014, , BGGM2014)

