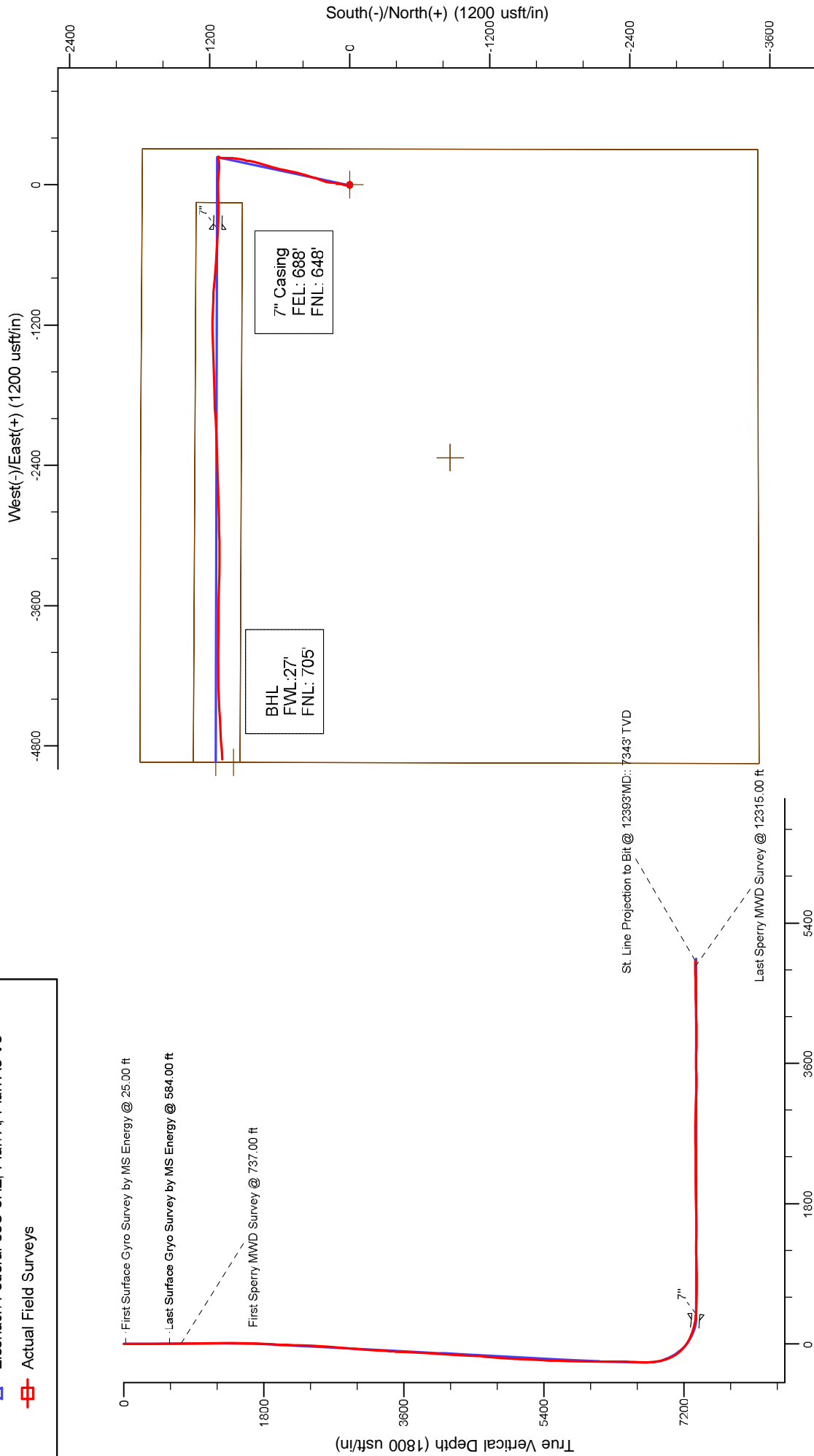


Project: Weld County, CO (NAD 83)
 Site: Sec. 8-T3N-R66W
 Well: Eisenach Federal 30C-8HZ
 Wellbore: Plan A
 Design: Actual Field Surveys



LEGEND

- ▲ Eisenach Federal 30C-8HZ, Plan A, Plan A0 V0
- Actual Field Surveys



BHL
 FWL: 27'
 FNL: 705'

7" Casing
 FEL: 688'
 FNL: 648'

Latitude	Longitude	Northing	Easting
7" Casing: 40.244763	-104.794371	1,332,792.63	3,196,973.08
BHL: 40.244653	-104.810614	1,332,716.91	3,192,439.15

Vertical Section at 270.11° (1800 usft/in)

WELL DETAILS: Eisenach Federal 30C-8HZ

Ground Level:	4825.00
RKB = 25' @ 4850.00usft (H&P 308)	
Design: Actual Field Surveys (Eisenach Federal 30C-8HZ/Plan A)	
Created By: Pari Amanlou	Date: 10/11/2013

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 8-T3N-R66W

Eisenach Federal 30C-8HZ

API # 05-123-37573 Job # 900582953

Plan A

Design: Actual Field Surveys

Sperry Drilling Services

Standard Report

16 October, 2013

Surface UWI : API # 05-123-37573 Job # 900582953

Well Coordinates: 1,331,662.78 N, 3,197,363.25 E (40° 14' 29.95" N, 104° 47' 34.82" W)

Ground Level: 4,825.00 usft

Local Coordinate Origin:

Centered on Well Eisenach Federal 30C-8HZ

Viewing Datum:

RKB = 25' @ 4850.00usft (H&P 308)

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 Eisenach Federal 30C-8HZ - Actual Field 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
25.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00
First Surface Gyro Survey by MS Energy @ 25.00 ft							
125.00	0.24	294.40	125.00	0.09	-0.19	0.19	0.24
225.00	0.09	81.44	225.00	0.18	-0.30	0.30	0.32
325.00	0.12	119.42	325.00	0.14	-0.13	0.14	0.07
425.00	0.29	256.17	425.00	0.03	-0.29	0.29	0.39
525.00	0.51	224.77	525.00	-0.34	-0.85	0.85	0.30
584.00	0.94	204.59	583.99	-0.97	-1.23	1.23	0.84
Last Surface Gyro Survey by MS Energy @ 584.00 ft							
737.00	2.04	219.10	736.94	-4.22	-3.47	3.47	0.75
First Sperry MWD Survey @ 737.00 ft							
829.00	1.99	215.75	828.88	-6.79	-5.44	5.43	0.14
920.00	0.96	240.72	919.85	-8.45	-7.03	7.01	1.31
1,012.00	0.68	258.33	1,011.84	-8.93	-8.24	8.22	0.41
1,104.00	0.75	262.54	1,103.83	-9.12	-9.37	9.35	0.10
1,196.00	0.76	266.16	1,195.83	-9.24	-10.57	10.56	0.05
1,287.00	2.38	0.80	1,286.80	-7.39	-11.15	11.13	2.81
1,378.00	4.20	13.50	1,377.65	-2.26	-10.34	10.34	2.14
1,470.00	6.17	10.16	1,469.26	5.88	-8.69	8.70	2.17
1,562.00	5.78	1.28	1,560.77	15.38	-7.71	7.74	1.09
1,654.00	7.10	6.42	1,652.18	25.66	-6.97	7.02	1.56
1,746.00	9.00	16.28	1,743.28	38.22	-4.32	4.39	2.55
1,838.00	11.35	17.23	1,833.83	53.78	0.38	-0.28	2.56
1,929.00	12.78	14.83	1,922.81	72.06	5.61	-5.47	1.66
2,021.00	13.87	12.14	2,012.34	92.68	10.53	-10.36	1.36
2,113.00	13.31	6.79	2,101.76	113.97	14.11	-13.89	1.50
2,204.00	14.18	8.81	2,190.16	135.39	17.05	-16.79	1.09
2,295.00	12.86	5.11	2,278.64	156.49	19.66	-19.36	1.73
2,387.00	12.87	7.81	2,368.33	176.84	21.96	-21.63	0.65
2,482.00	13.30	9.60	2,460.86	198.10	25.22	-24.84	0.62
2,577.00	13.53	16.16	2,553.27	219.55	30.14	-29.72	1.62
2,672.00	15.21	20.89	2,645.30	241.87	37.68	-37.21	2.16
2,766.00	15.20	20.46	2,736.01	264.93	46.38	-45.87	0.12
2,861.00	15.10	18.94	2,827.71	288.31	54.75	-54.20	0.43
2,956.00	15.14	17.40	2,919.42	311.85	62.48	-61.88	0.42
3,051.00	12.94	15.43	3,011.58	333.94	69.02	-68.38	2.37
3,146.00	14.62	18.45	3,103.84	355.57	75.64	-74.96	1.92
3,240.00	12.45	16.97	3,195.23	376.52	82.36	-81.63	2.34
3,335.00	9.87	15.28	3,288.42	394.17	87.49	-86.74	2.74
3,430.00	11.89	16.64	3,381.71	411.40	92.44	-91.65	2.14
3,525.00	14.66	16.52	3,474.16	432.31	98.66	-97.83	2.92
3,620.00	11.85	11.31	3,566.62	453.40	104.00	-103.12	3.21
3,715.00	12.72	4.97	3,659.45	473.39	106.81	-105.91	1.69
3,805.00	12.52	12.54	3,747.28	492.78	109.79	-108.84	1.85
3,899.00	13.05	14.92	3,838.95	512.99	114.74	-113.75	0.79
3,994.00	17.88	15.96	3,930.49	537.39	121.51	-120.48	5.09
4,088.00	16.93	13.95	4,020.18	564.54	128.78	-127.69	1.20
4,183.00	15.85	12.42	4,111.32	590.64	134.90	-133.77	1.22
4,278.00	13.54	12.74	4,203.21	614.16	140.15	-138.97	2.43

Design Report for Eisenach Federal 30C-8HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,372.00	13.35	11.27	4,294.63	635.53	144.69	-143.47	0.42
4,467.00	14.65	15.10	4,386.81	657.89	149.97	-148.70	1.68
4,561.00	12.66	11.98	4,478.15	679.45	155.20	-153.90	2.26
4,656.00	14.78	18.15	4,570.44	701.15	161.14	-159.79	2.71
4,751.00	14.19	18.05	4,662.42	723.73	168.52	-167.13	0.62
4,845.00	15.15	19.95	4,753.35	746.23	176.28	-174.85	1.14
4,940.00	15.41	13.39	4,845.00	770.18	183.44	-181.96	1.84
5,034.00	15.63	12.32	4,935.58	794.71	189.04	-187.51	0.38
5,129.00	14.32	10.72	5,027.35	818.75	193.95	-192.38	1.45
5,223.00	14.46	11.25	5,118.40	841.69	198.41	-196.79	0.20
5,318.00	12.63	8.79	5,210.75	863.58	202.31	-200.65	2.02
5,413.00	13.48	12.63	5,303.30	884.65	206.32	-204.62	1.28
5,507.00	14.01	12.92	5,394.61	906.44	211.25	-209.51	0.57
5,602.00	13.37	9.81	5,486.91	928.47	215.70	-213.91	1.03
5,696.00	14.47	12.71	5,578.15	950.63	220.13	-218.31	1.39
5,790.00	11.91	8.79	5,669.66	971.68	224.20	-222.33	2.88
5,885.00	11.81	3.84	5,762.64	991.07	226.35	-224.45	1.08
5,981.00	12.37	1.85	5,856.51	1,011.15	227.34	-225.40	0.73
6,075.00	13.28	0.67	5,948.16	1,032.01	227.79	-225.81	1.01
6,170.00	11.38	359.67	6,040.97	1,052.29	227.86	-225.84	2.01
6,265.00	10.49	359.96	6,134.24	1,070.31	227.80	-225.75	0.94
6,360.00	9.27	359.75	6,227.83	1,086.61	227.76	-225.68	1.28
6,455.00	7.46	9.72	6,321.82	1,100.34	228.77	-226.66	2.43
6,550.00	5.89	25.92	6,416.18	1,110.81	231.94	-229.81	2.57
6,644.00	4.48	23.04	6,509.79	1,118.53	235.49	-233.34	1.52
6,739.00	3.10	29.75	6,604.58	1,124.17	238.22	-236.06	1.52
6,814.00	2.07	25.26	6,679.51	1,127.16	239.80	-237.64	1.40
6,834.00	2.24	27.80	6,699.49	1,127.83	240.14	-237.97	0.97
6,881.00	0.87	344.26	6,746.48	1,128.98	240.47	-238.30	3.65
6,929.00	5.65	270.68	6,794.39	1,129.36	238.01	-235.84	11.39
6,976.00	10.65	272.43	6,840.90	1,129.57	231.35	-229.18	10.65
7,024.00	11.25	246.77	6,888.06	1,127.92	222.61	-220.44	10.15
7,071.00	14.14	256.35	6,933.91	1,124.75	212.82	-210.66	7.59
7,119.00	20.72	262.42	6,979.68	1,122.24	198.68	-196.53	14.20
7,166.00	25.06	266.44	7,022.97	1,120.53	180.50	-178.35	9.81
7,218.00	29.95	270.38	7,069.09	1,119.93	156.51	-154.36	10.03
7,262.00	35.35	273.72	7,106.12	1,120.83	132.81	-130.65	12.93
7,309.00	39.96	275.79	7,143.32	1,123.24	104.21	-102.05	10.17
7,356.00	44.74	275.50	7,178.05	1,126.35	72.71	-70.54	10.18
7,404.00	50.03	272.98	7,210.54	1,128.92	37.49	-35.33	11.68
7,451.00	55.43	271.64	7,238.99	1,130.41	0.14	2.03	11.71
7,499.00	62.55	269.69	7,263.71	1,130.87	-40.97	43.14	15.24
7,546.00	67.63	268.25	7,283.50	1,130.09	-83.58	85.75	11.16
7,593.00	70.16	268.08	7,300.42	1,128.68	-127.40	129.56	5.39
7,640.00	72.51	268.55	7,315.46	1,127.38	-171.90	174.07	5.09
7,688.00	74.98	269.69	7,328.90	1,126.67	-217.97	220.14	5.63
7,735.00	78.65	271.99	7,339.62	1,127.35	-263.72	265.88	9.15
7,783.00	80.93	273.45	7,348.12	1,129.59	-310.90	313.07	5.61
7,813.00	83.56	273.04	7,352.17	1,131.27	-340.58	342.75	8.87
7,853.80	85.93	271.76	7,355.91	1,132.98	-381.17	383.34	6.59

7"

Design Report for Eisenach Federal 30C-8HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
7,874.00	87.10	271.13	7,357.14	1,133.48	-401.32	403.50	6.59
7,969.00	87.72	272.94	7,361.43	1,136.85	-496.16	498.34	2.01
8,064.00	88.52	274.23	7,364.55	1,142.79	-590.92	593.11	1.60
8,159.00	89.69	274.60	7,366.03	1,150.10	-685.62	687.83	1.29
8,254.00	90.74	274.11	7,365.68	1,157.32	-780.35	782.57	1.22
8,349.00	90.93	274.40	7,364.29	1,164.36	-875.08	877.31	0.36
8,443.00	91.05	272.73	7,362.67	1,170.21	-968.88	971.12	1.78
8,538.00	92.22	271.77	7,359.96	1,173.94	-1,063.76	1,066.01	1.59
8,633.00	92.04	271.30	7,356.43	1,176.48	-1,158.66	1,160.92	0.53
8,728.00	89.75	269.36	7,354.94	1,177.03	-1,253.64	1,255.90	3.16
8,822.00	88.15	268.08	7,356.66	1,174.93	-1,347.59	1,349.85	2.18
8,917.00	89.01	267.59	7,359.02	1,171.34	-1,442.50	1,444.74	1.04
9,012.00	90.12	267.91	7,359.74	1,167.61	-1,537.42	1,539.66	1.22
9,106.00	90.86	268.33	7,358.94	1,164.53	-1,631.36	1,633.60	0.91
9,201.00	91.17	268.26	7,357.25	1,161.70	-1,726.31	1,728.53	0.33
9,295.00	91.30	268.12	7,355.23	1,158.73	-1,820.24	1,822.46	0.20
9,390.00	90.68	267.64	7,353.59	1,155.22	-1,915.16	1,917.37	0.83
9,484.00	90.12	266.58	7,352.93	1,150.48	-2,009.03	2,011.24	1.28
9,579.00	90.00	267.28	7,352.83	1,145.39	-2,103.90	2,106.09	0.75
9,673.00	90.56	267.90	7,352.37	1,141.44	-2,197.81	2,200.00	0.89
9,768.00	90.49	268.56	7,351.50	1,138.50	-2,292.76	2,294.94	0.70
9,863.00	90.49	268.56	7,350.69	1,136.12	-2,387.73	2,389.91	0.00
9,958.00	90.99	268.52	7,349.46	1,133.70	-2,482.69	2,484.86	0.53
10,053.00	90.68	267.92	7,348.08	1,130.75	-2,577.63	2,579.80	0.71
10,147.00	90.93	267.97	7,346.76	1,127.38	-2,671.56	2,673.72	0.27
10,242.00	89.63	268.05	7,346.29	1,124.08	-2,766.50	2,768.66	1.37
10,337.00	88.70	268.51	7,347.68	1,121.23	-2,861.45	2,863.60	1.09
10,432.00	88.52	269.31	7,349.98	1,119.42	-2,956.40	2,958.55	0.86
10,526.00	88.02	269.47	7,352.82	1,118.42	-3,050.35	3,052.50	0.56
10,621.00	87.84	269.82	7,356.25	1,117.83	-3,145.29	3,147.43	0.41
10,716.00	87.53	270.64	7,360.09	1,118.21	-3,240.21	3,242.35	0.92
10,811.00	90.31	271.69	7,361.88	1,120.14	-3,335.16	3,337.31	3.13
10,906.00	91.24	271.22	7,360.59	1,122.56	-3,430.12	3,432.27	1.10
11,001.00	91.17	271.23	7,358.59	1,124.59	-3,525.08	3,527.23	0.07
11,096.00	89.51	270.03	7,358.03	1,125.63	-3,620.07	3,622.22	2.16
11,191.00	88.89	270.29	7,359.36	1,125.90	-3,715.06	3,717.21	0.71
11,286.00	89.38	270.12	7,360.79	1,126.24	-3,810.05	3,812.20	0.55
11,380.00	89.38	270.50	7,361.81	1,126.74	-3,904.04	3,906.20	0.40
11,475.00	90.31	270.86	7,362.07	1,127.87	-3,999.03	4,001.19	1.05
11,570.00	90.99	270.66	7,360.99	1,129.13	-4,094.02	4,096.18	0.75
11,665.00	90.99	270.02	7,359.35	1,129.69	-4,189.00	4,191.16	0.67
11,760.00	91.48	268.82	7,357.30	1,128.73	-4,283.97	4,286.13	1.36
11,855.00	91.11	267.68	7,355.15	1,125.83	-4,378.90	4,381.05	1.26
11,949.00	90.56	266.03	7,353.78	1,120.68	-4,472.75	4,474.89	1.85
12,044.00	91.30	266.67	7,352.24	1,114.63	-4,567.54	4,569.67	1.03
12,138.00	92.10	266.71	7,349.45	1,109.20	-4,661.34	4,663.46	0.85
12,233.00	91.36	266.85	7,346.58	1,103.87	-4,756.15	4,758.26	0.79
12,315.00	91.48	266.04	7,344.55	1,098.79	-4,837.96	4,840.06	1.00
Last Sperry MWD Survey @ 12315.00 ft							
12,393.00	91.48	266.04	7,342.54	1,093.40	-4,915.75	4,917.84	0.00
St. Line Projection to Bit @ 12393'MD:: 7343' TVD							

Design Report for Eisenach Federal 30C-8HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
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Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
25.00	25.00	0.00	0.00	First Surface Gyro Survey by MS Energy @ 25.00 ft
584.00	583.99	-0.97	-1.23	Last Surface Gyro Survey by MS Energy @ 584.00 ft
737.00	736.94	-4.22	-3.47	First Sperry MWD Survey @ 737.00 ft
12,315.00	7,344.55	1,098.79	-4,837.96	Last Sperry MWD Survey @ 12315.00 ft
12,393.00	7,342.54	1,093.40	-4,915.75	St. Line Projection to Bit @ 12393'MD:: 7343' TVD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	+N/_S (usft)	+E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	270.11	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
25.00	584.00	MS Gyros	NS-GYRO-MS
737.00	7,813.00	MWD Surveys Vert/Build	MWD+IFR1
7,874.00	12,315.00	MWD Surveys Lateral	MWD+IFR1

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
7,853.80	7,355.91	7"	7	8-3/4

Design Report for Eisenach Federal 30C-8HZ - Actual Field 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
Eisenach Federal 30C· - actual wellpath misses target center by 2487.62usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Polygon	0.00	0.00	0.00	-861.41	-2,333.71	1,330,782.82	3,195,036.58	40.239288	-104.801364
Point 1				0.00	2,200.61	-2,607.78	1,332,962.48	3,192,411.45	
Point 2				0.00	1,802.08	-2,607.64	1,332,563.98	3,192,414.77	
Point 3				0.00	1,782.80	2,180.29	1,332,582.87	3,197,202.49	
Point 4				0.00	2,180.82	2,180.93	1,332,980.87	3,197,199.96	
Point 5				0.00	2,200.61	-2,607.78	1,332,962.48	3,192,411.45	
Eisenach Federal 30C· - actual wellpath hits target center - Point	0.00	0.00	0.00	0.00	0.00	1,331,662.78	3,197,363.25	40.241653	-104.793005
Eisenach Federal 30C· - actual wellpath misses target center by 2487.62usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Polygon	0.00	0.00	0.00	-861.41	-2,333.71	1,330,782.82	3,195,036.58	40.239288	-104.801364
Point 1				0.00	2,660.14	-2,607.12	1,333,421.98	3,192,408.45	
Point 2				0.00	2,653.52	-13.36	1,333,436.04	3,195,002.07	
Point 3				0.00	2,649.73	650.46	1,333,437.54	3,195,665.87	
Point 4				0.00	2,645.96	1,314.16	1,333,439.06	3,196,329.55	
Point 5				0.00	2,638.19	2,641.61	1,333,441.87	3,197,656.96	
Point 6				0.00	1.32	2,637.64	1,330,805.17	3,197,674.01	
Point 7				0.00	-2,634.68	2,633.58	1,328,169.34	3,197,690.97	
Point 8				0.00	-2,641.52	6.00	1,328,141.55	3,195,063.64	
Point 9				0.00	-2,647.56	-2,619.52	1,328,114.58	3,192,438.36	
Point 10				0.00	6.41	-2,613.63	1,330,768.39	3,192,423.09	
Point 11				0.00	2,660.14	-2,607.12	1,333,421.98	3,192,408.45	
Eisenach Federal 30C· - actual wellpath misses target center by 61.86usft at 12393.00usft MD (7342.54 TVD, 1093.40 N, -4915.75 E) - Point	0.00	0.00	7,355.00	1,148.70	-4,940.52	1,332,772.00	3,192,413.94	40.244805	-104.810703
Eisenach Federal 30C· - actual wellpath misses target center by 99.00usft at 12393.00usft MD (7342.54 TVD, 1093.40 N, -4915.75 E) - Point	0.00	0.00	7,355.00	998.68	-4,941.72	1,332,621.99	3,192,413.94	40.244393	-104.810707

Directional Difficulty Index

Average Dogleg over Survey:	1.95 °/100usft	Maximum Dogleg over Survey:	15.24 °/100usft at 7,499.00 usft
Net Tortosity applicable to Plans:	0.97 °/100usft	Directional Difficulty Index:	6.411

Audit Info

North Reference Sheet for Sec. 8-T3N-R66W - Eisenach Federal 30C-8HZ - 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 = 25' @ 4850.00usft (H&P 308). Northing and Easting are relative to Eisenach Federal 30C-8HZ

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: 0.99995686

Grid Coordinates of Well: 1,331,662.78 usft N, 3,197,363.25 usft E

Geographical Coordinates of Well: 40° 14' 29.95" N, 104° 47' 34.82" W

Grid Convergence at Surface is: 0.46°

Based upon Minimum Curvature type calculations, at a Measured Depth of 12,393.00usft the Bottom Hole Displacement is 5,035.88usft in the Direction of 282.54° (True).

Magnetic Convergence at surface is: -8.15° (22 July 2013, , BGGM2013)

