



Azimuths to True North
Magnetic North: 8.93°

Magnetic Field
Strength: 53004.7snT
Dip Angle: 66.89°
Date: 9/19/2011
Model: IGRF2010

Approximate Bottom Hole Location
Margil Farms 25-2D

Lat : 40.258882
Long : -104.975075

OH Margil Farms 25-2D 115418/115655; SC KBE @ 5026.0ft (Original Well Elev) Ground Elevation 5015.0 North American Datum 1983 Well Margil Farms 25-2D, True North						
Type Target	Target Margil Farms 25-2D BHL	Azimuth 76.13	Origin Type Slot	N/S 0.0	E/W 0.0	From TVD 0.0
Name	TVD	+N/-S	+E/-W	Latitude	Longitude	
Margil Farms 25-2D TGT	4740.0	153.0	619.6	40.258900	-104.975090	
Margil Farms 25-2D BHL	7568.0	153.0	619.6	40.258900	-104.975090	

Cathedral Energy Services

Survey Report - Geographic

Company:	Apollo Operating, LLC	Local Co-ordinate Reference:	Well Margil Farms 25-2D
Project:	Weld County, CO	TVD Reference:	KBE @ 5026.0ft (Original Well Elev)
Site:	Sec 2-T3N-R68W (Steffes/Margil Farms)	MD Reference:	KBE @ 5026.0ft (Original Well Elev)
Well:	Margil Farms 25-2D	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	USA EDM 5000 Multi Users DB

Project	Weld County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site	Sec 2-T3N-R68W (Steffes/Margil Farms)				
Site Position:		Northing:	1,337,438.45 ft	Latitude:	40.258480
From:	Lat/Long	Easting:	3,145,883.91 ft	Longitude:	-104.977310
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	0.34 °

Well	Margil Farms 25-2D					
Well Position	+N/-S	0.0 ft	Northing:	1,337,438.44 ft	Latitude:	40.258480
	+E/-W	0.0 ft	Easting:	3,145,883.91 ft	Longitude:	-104.977310
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	5,015.0 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/19/2011	8.93	66.89	53,005

Design	OH				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.0	0.0	0.0	76.13	

Survey Program	Date	10/4/2011			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
101.0	7,614.0	Survey #1 (OH)	MWD	Geolink MWD	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude	
0.0	0.00	0.00	0.0	0.0	0.0	1,337,438.44	3,145,883.91	40.258480	-104.977310	
101.0	0.10	41.40	101.0	0.1	0.1	1,337,438.51	3,145,883.97	40.258480	-104.977310	
190.0	0.50	232.00	190.0	-0.1	-0.2	1,337,438.33	3,145,883.72	40.258480	-104.977311	
279.0	0.60	206.10	279.0	-0.8	-0.7	1,337,437.67	3,145,883.21	40.258478	-104.977313	
368.0	0.90	240.10	368.0	-1.5	-1.5	1,337,436.90	3,145,882.40	40.258476	-104.977316	
460.0	1.20	247.20	460.0	-2.3	-3.0	1,337,436.15	3,145,880.89	40.258474	-104.977321	
552.0	0.80	248.60	552.0	-2.9	-4.5	1,337,435.54	3,145,879.41	40.258472	-104.977326	
644.0	0.40	226.10	644.0	-3.3	-5.3	1,337,435.08	3,145,878.58	40.258471	-104.977329	
736.0	0.40	254.10	736.0	-3.6	-5.9	1,337,434.76	3,145,878.05	40.258470	-104.977331	
828.0	1.10	241.60	827.9	-4.2	-7.0	1,337,434.25	3,145,876.96	40.258469	-104.977335	
868.0	0.70	238.10	867.9	-4.5	-7.5	1,337,433.93	3,145,876.42	40.258468	-104.977337	
937.0	0.50	278.90	936.9	-4.6	-8.2	1,337,433.75	3,145,875.76	40.258467	-104.977340	

Cathedral Energy Services

Survey Report - Geographic

Company:	Apollo Operating, LLC	Local Co-ordinate Reference:	Well Margil Farms 25-2D
Project:	Weld County, CO	TVD Reference:	KBE @ 5026.0ft (Original Well Elev)
Site:	Sec 2-T3N-R68W (Steffes/Margil Farms)	MD Reference:	KBE @ 5026.0ft (Original Well Elev)
Well:	Margil Farms 25-2D	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude
1,032.0	0.80	119.20	1,031.9	-4.9	-8.0	1,337,433.49	3,145,875.94	40.258467	-104.977339
1,126.0	1.80	80.80	1,125.9	-5.0	-6.0	1,337,433.42	3,145,877.97	40.258466	-104.977332
1,220.0	2.70	65.10	1,219.8	-3.8	-2.5	1,337,434.61	3,145,881.43	40.258470	-104.977319
1,315.0	3.50	66.70	1,314.7	-1.7	2.2	1,337,436.73	3,145,886.11	40.258475	-104.977302
1,409.0	4.50	61.70	1,408.5	1.2	8.1	1,337,439.65	3,145,891.97	40.258483	-104.977281
1,503.0	3.40	56.60	1,502.2	4.4	13.6	1,337,442.96	3,145,897.53	40.258492	-104.977261
1,596.0	3.60	56.70	1,595.1	7.6	18.4	1,337,446.11	3,145,902.25	40.258501	-104.977244
1,691.0	4.90	64.70	1,689.8	10.9	24.5	1,337,449.52	3,145,908.39	40.258510	-104.977222
1,785.0	5.30	62.40	1,783.4	14.7	32.0	1,337,453.29	3,145,915.85	40.258520	-104.977196
1,879.0	7.20	69.30	1,876.9	18.7	41.4	1,337,457.44	3,145,925.18	40.258532	-104.977162
1,974.0	9.50	72.00	1,970.9	23.3	54.4	1,337,462.04	3,145,938.18	40.258544	-104.977115
2,069.0	9.90	73.40	2,064.5	28.0	69.7	1,337,466.89	3,145,953.43	40.258557	-104.977061
2,163.0	10.80	78.90	2,157.0	32.0	86.1	1,337,470.99	3,145,969.80	40.258568	-104.977002
2,257.0	12.50	78.00	2,249.0	35.8	104.7	1,337,474.91	3,145,988.37	40.258578	-104.976935
2,351.0	13.50	73.70	2,340.6	41.0	125.2	1,337,480.22	3,146,008.82	40.258593	-104.976862
2,446.0	14.50	75.20	2,432.8	47.2	147.3	1,337,486.51	3,146,030.93	40.258610	-104.976783
2,541.0	15.20	74.30	2,524.6	53.6	170.8	1,337,493.05	3,146,054.38	40.258627	-104.976698
2,636.0	14.60	75.40	2,616.4	60.0	194.4	1,337,499.58	3,146,077.91	40.258645	-104.976614
2,729.0	12.60	72.50	2,706.8	66.0	215.4	1,337,505.71	3,146,098.90	40.258661	-104.976539
2,824.0	13.10	71.40	2,799.4	72.5	235.5	1,337,512.38	3,146,118.94	40.258679	-104.976467
2,918.0	14.40	75.70	2,890.7	78.8	256.9	1,337,518.79	3,146,140.33	40.258696	-104.976390
3,013.0	14.60	77.70	2,982.7	84.3	280.0	1,337,524.39	3,146,163.44	40.258711	-104.976307
3,108.0	16.20	79.20	3,074.3	89.3	304.8	1,337,529.57	3,146,188.13	40.258725	-104.976218
3,202.0	14.40	78.40	3,165.0	94.1	329.1	1,337,534.52	3,146,212.43	40.258738	-104.976131
3,297.0	14.90	81.90	3,256.9	98.2	352.7	1,337,538.76	3,146,236.07	40.258750	-104.976046
3,391.0	13.10	78.50	3,348.1	102.1	375.2	1,337,542.72	3,146,258.46	40.258760	-104.975966
3,486.0	13.70	80.20	3,440.5	106.1	396.8	1,337,546.91	3,146,280.07	40.258771	-104.975889
3,580.0	13.50	77.80	3,531.9	110.3	418.5	1,337,551.25	3,146,301.74	40.258783	-104.975811
3,674.0	15.30	76.10	3,622.9	115.6	441.2	1,337,556.68	3,146,324.47	40.258797	-104.975729
3,770.0	14.40	76.40	3,715.7	121.5	465.1	1,337,562.67	3,146,348.33	40.258814	-104.975644
3,865.0	14.20	74.50	3,807.8	127.4	487.9	1,337,568.70	3,146,371.01	40.258830	-104.975562
3,959.0	14.80	77.40	3,898.8	133.1	510.7	1,337,574.53	3,146,393.80	40.258845	-104.975480
4,053.0	12.80	78.60	3,990.1	137.8	532.6	1,337,579.34	3,146,415.70	40.258858	-104.975402
4,147.0	11.20	78.00	4,082.0	141.7	551.7	1,337,583.41	3,146,434.81	40.258869	-104.975333
4,242.0	10.20	75.90	4,175.3	145.7	568.9	1,337,587.48	3,146,451.97	40.258880	-104.975272
4,337.0	9.40	77.00	4,269.0	149.5	584.6	1,337,591.36	3,146,467.67	40.258890	-104.975215
4,431.0	8.40	76.90	4,361.8	152.8	598.8	1,337,594.73	3,146,481.82	40.258899	-104.975165
4,526.0	6.70	76.40	4,456.0	155.6	611.0	1,337,597.68	3,146,493.94	40.258907	-104.975121
4,620.0	4.70	87.20	4,549.5	157.1	620.1	1,337,599.21	3,146,503.11	40.258911	-104.975088
4,714.0	4.30	88.70	4,643.2	157.4	627.5	1,337,599.52	3,146,510.48	40.258912	-104.975062
4,807.0	3.30	97.30	4,736.0	157.1	633.6	1,337,599.30	3,146,516.62	40.258911	-104.975040
4,902.0	2.20	129.40	4,830.9	155.6	637.8	1,337,597.81	3,146,520.75	40.258907	-104.975025
4,998.0	1.00	159.00	4,926.9	153.7	639.5	1,337,595.87	3,146,522.49	40.258902	-104.975019
5,092.0	0.80	173.60	5,020.9	152.2	639.9	1,337,594.46	3,146,522.86	40.258898	-104.975018
5,187.0	0.80	184.10	5,115.9	150.9	639.9	1,337,593.14	3,146,522.90	40.258894	-104.975018
5,282.0	0.40	192.40	5,210.9	149.9	639.8	1,337,592.15	3,146,522.79	40.258892	-104.975018
5,375.0	0.20	190.80	5,303.9	149.5	639.7	1,337,591.67	3,146,522.69	40.258890	-104.975018
5,471.0	0.80	195.40	5,399.9	148.7	639.5	1,337,590.86	3,146,522.48	40.258888	-104.975019
5,564.0	0.50	236.20	5,492.9	147.8	638.9	1,337,590.01	3,146,521.98	40.258886	-104.975021
5,660.0	1.20	249.80	5,588.8	147.2	637.7	1,337,589.42	3,146,520.69	40.258884	-104.975025
5,755.0	1.10	255.50	5,683.8	146.6	635.8	1,337,588.84	3,146,518.88	40.258883	-104.975032
5,850.0	0.70	259.50	5,778.8	146.3	634.4	1,337,588.49	3,146,517.43	40.258882	-104.975037
5,944.0	0.40	315.40	5,872.8	146.4	633.6	1,337,588.62	3,146,516.63	40.258882	-104.975040
6,039.0	0.10	196.80	5,967.8	146.6	633.3	1,337,588.77	3,146,516.37	40.258882	-104.975041
6,133.0	0.40	312.90	6,061.8	146.7	633.1	1,337,588.92	3,146,516.11	40.258883	-104.975042

Cathedral Energy Services

Survey Report - Geographic

Company:	Apollo Operating, LLC	Local Co-ordinate Reference:	Well Margil Farms 25-2D
Project:	Weld County, CO	TVD Reference:	KBE @ 5026.0ft (Original Well Elev)
Site:	Sec 2-T3N-R68W (Steffes/Margil Farms)	MD Reference:	KBE @ 5026.0ft (Original Well Elev)
Well:	Margil Farms 25-2D	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude
6,228.0	0.00	278.90	6,156.8	147.0	632.8	1,337,589.14	3,146,515.86	40.258883	-104.975043
6,321.0	0.40	336.10	6,249.8	147.3	632.7	1,337,589.44	3,146,515.73	40.258884	-104.975043
6,415.0	0.40	28.20	6,343.8	147.9	632.7	1,337,590.03	3,146,515.75	40.258886	-104.975043
6,510.0	0.30	21.30	6,438.8	148.4	633.0	1,337,590.55	3,146,515.99	40.258887	-104.975042
6,604.0	0.20	309.90	6,532.8	148.7	632.9	1,337,590.89	3,146,515.95	40.258888	-104.975042
6,699.0	0.20	278.90	6,627.8	148.8	632.6	1,337,591.02	3,146,515.66	40.258889	-104.975043
6,794.0	0.70	285.30	6,722.8	149.0	631.9	1,337,591.19	3,146,514.94	40.258889	-104.975046
6,889.0	0.80	284.30	6,817.8	149.3	630.7	1,337,591.50	3,146,513.73	40.258890	-104.975050
6,985.0	1.00	267.30	6,913.8	149.5	629.2	1,337,591.62	3,146,512.25	40.258890	-104.975056
7,080.0	1.10	254.80	7,008.8	149.2	627.5	1,337,591.33	3,146,510.54	40.258890	-104.975062
7,176.0	0.70	242.50	7,104.8	148.7	626.1	1,337,590.81	3,146,509.13	40.258888	-104.975067
7,269.0	0.80	211.50	7,197.8	147.9	625.3	1,337,589.99	3,146,508.30	40.258886	-104.975070
7,363.0	0.60	218.80	7,291.8	146.9	624.6	1,337,589.04	3,146,507.65	40.258883	-104.975072
7,459.0	0.20	228.00	7,387.7	146.4	624.2	1,337,588.54	3,146,507.21	40.258882	-104.975074
7,551.0	0.20	320.49	7,479.7	146.4	624.0	1,337,588.55	3,146,506.99	40.258882	-104.975075
Last Cathedral Survey @ 7,551' MD									
7,614.0	0.20	320.50	7,542.7	146.6	623.8	1,337,588.72	3,146,506.85	40.258882	-104.975075
Projection to Bit @ 7,614'									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
Margil Farms 25-2D TG1	0.00	0.00	4,740.0	153.0	619.6	1,337,595.11	3,146,502.58	40.258900	-104.975090
- actual wellpath misses target center by 14.8ft at 4810.4ft MD (4739.4 TVD, 157.1 N, 633.8 E)									
- Point									
Margil Farms 25-2D BHL	0.00	0.00	7,568.0	153.0	619.6	1,337,595.11	3,146,502.58	40.258900	-104.975090
- actual wellpath misses target center by 26.4ft at 7614.0ft MD (7542.7 TVD, 146.6 N, 623.8 E)									
- Rectangle (sides W400.0 H400.0 D0.0)									

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
7,551.0	7,479.7	146.4	624.0	Last Cathedral Survey @ 7,551' MD	
7,614.0	7,542.7	146.6	623.8	Projection to Bit @ 7,614'	

Checked By: _____ Approved By: _____ Date: _____