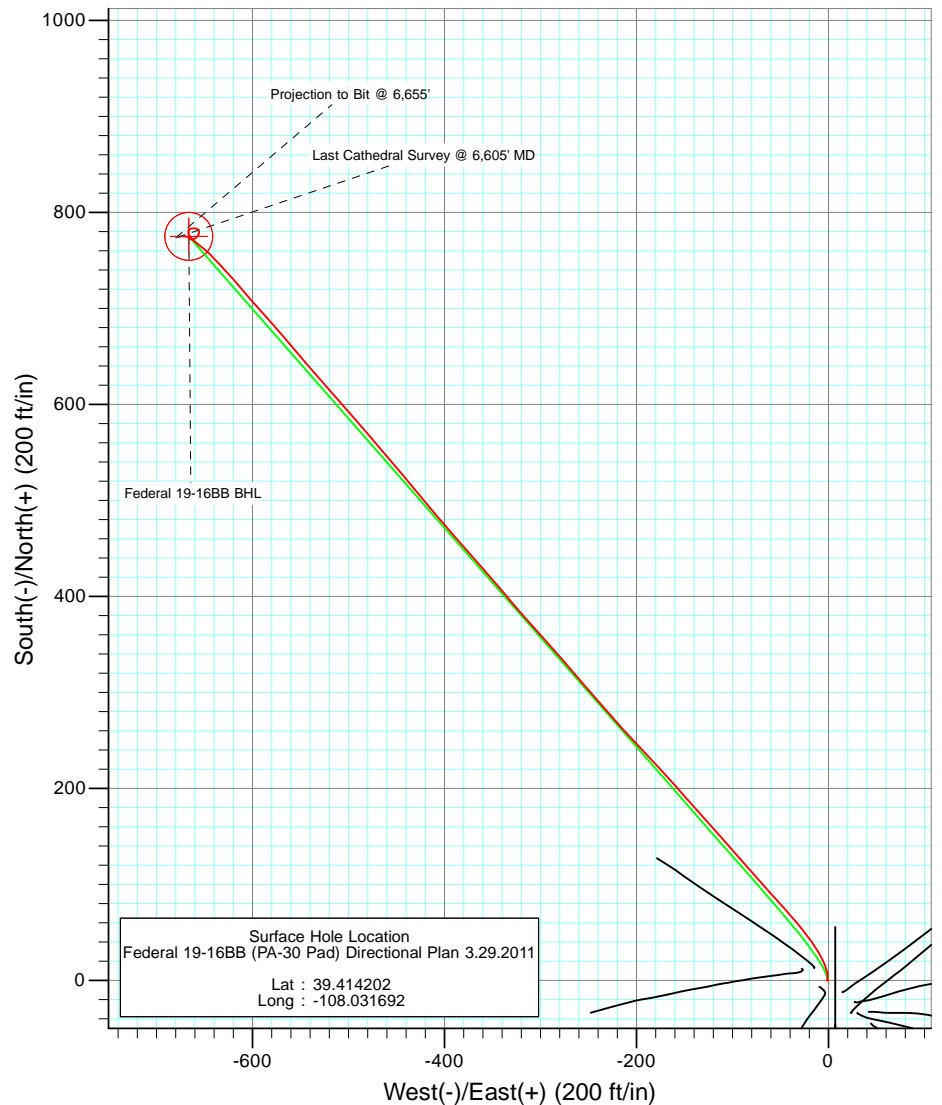
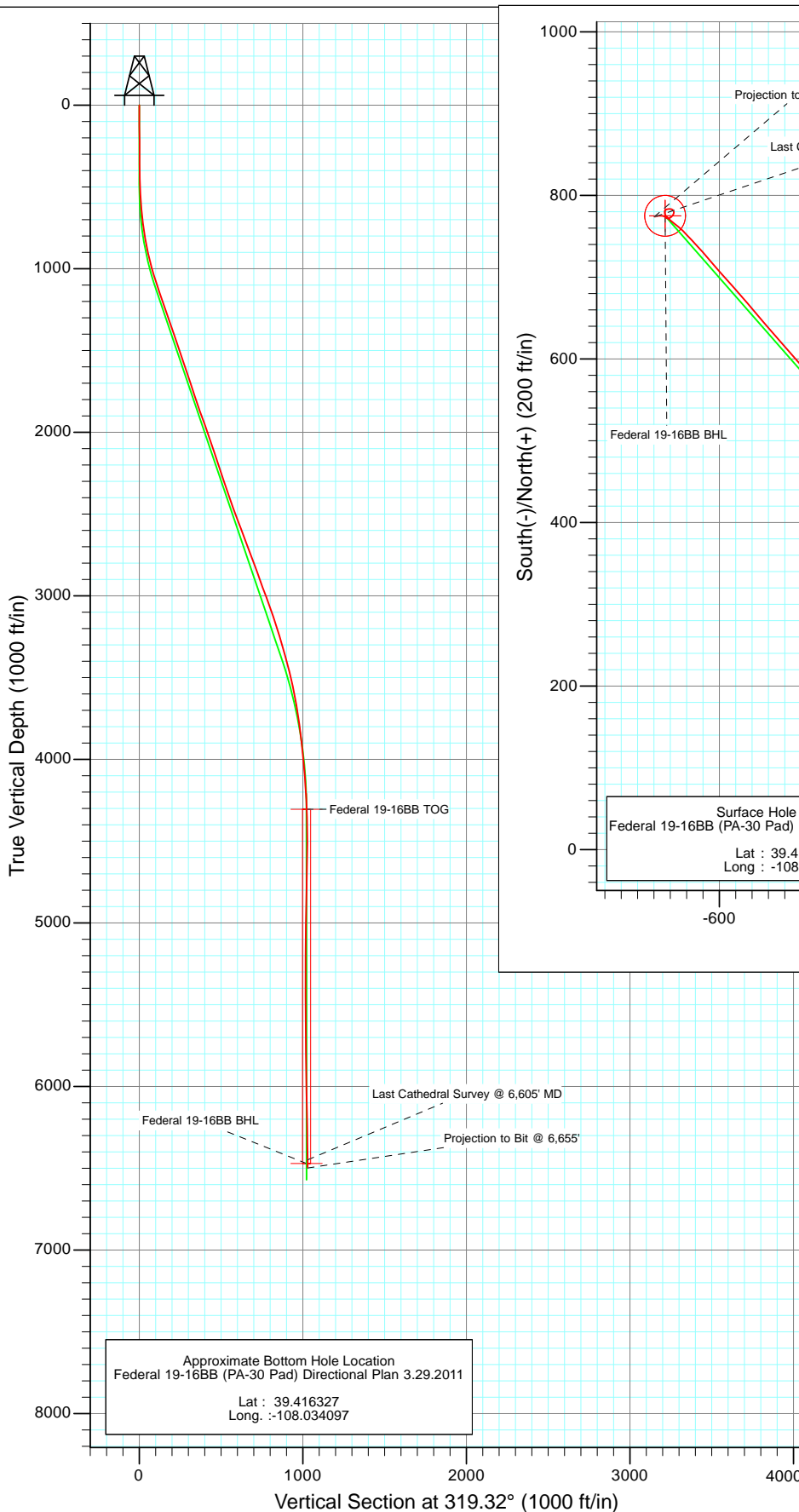




Project: S. Piceance (Parachute)
 Site: SESE 19-7S-95W (PA-30 Pad)
 Well: Federal 19-16BB (PA-30 Pad) Directional Plan 3.29.2011
 Wellbore: DD
 Design: FINAL



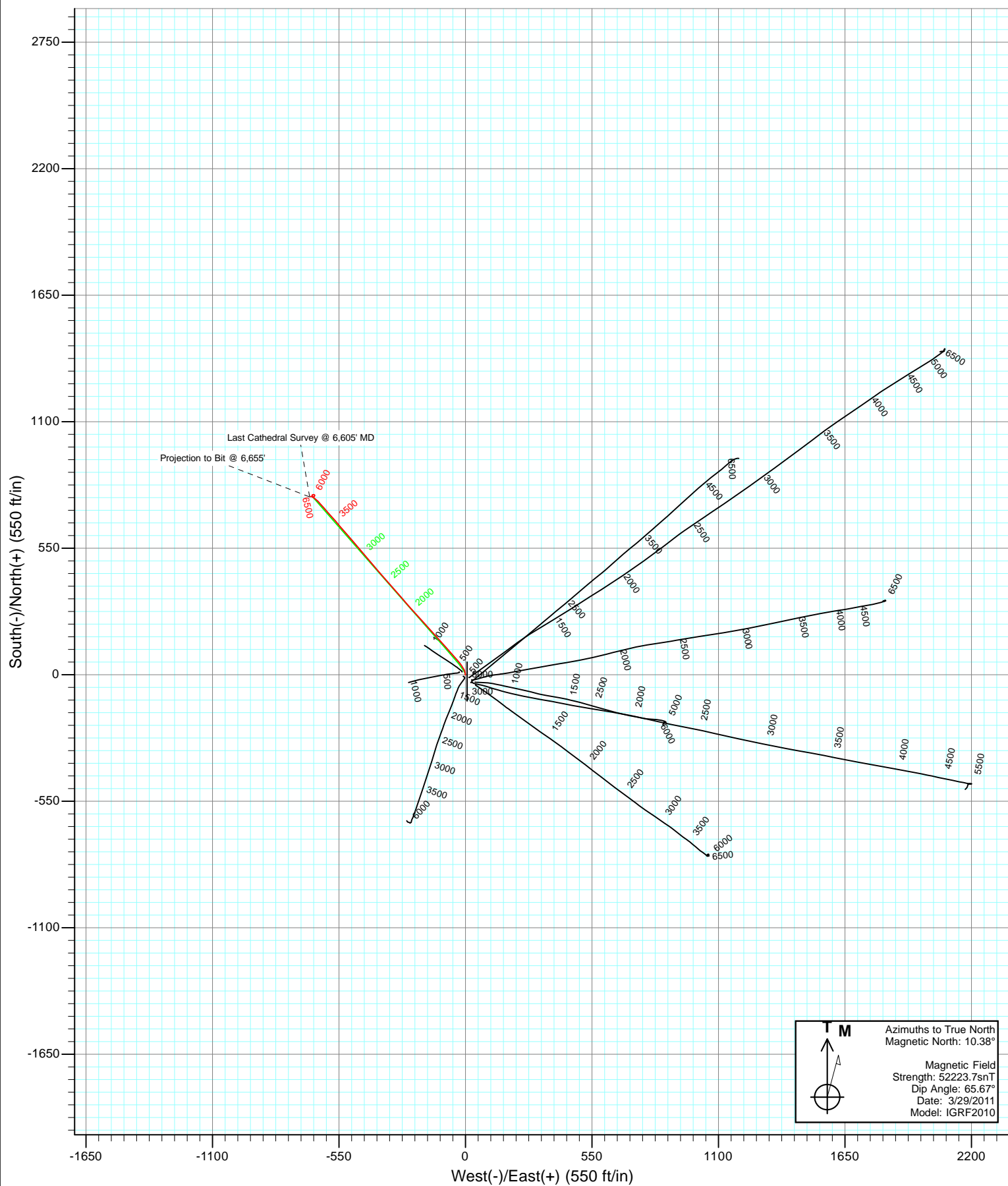
Azimuths to True North
 Magnetic North: 10.38°

Magnetic Field
 Strength: 52223.7snT
 Dip Angle: 65.67°
 Date: 3/29/2011
 Model: IGRF2010

DESIGN DETAILS: DD

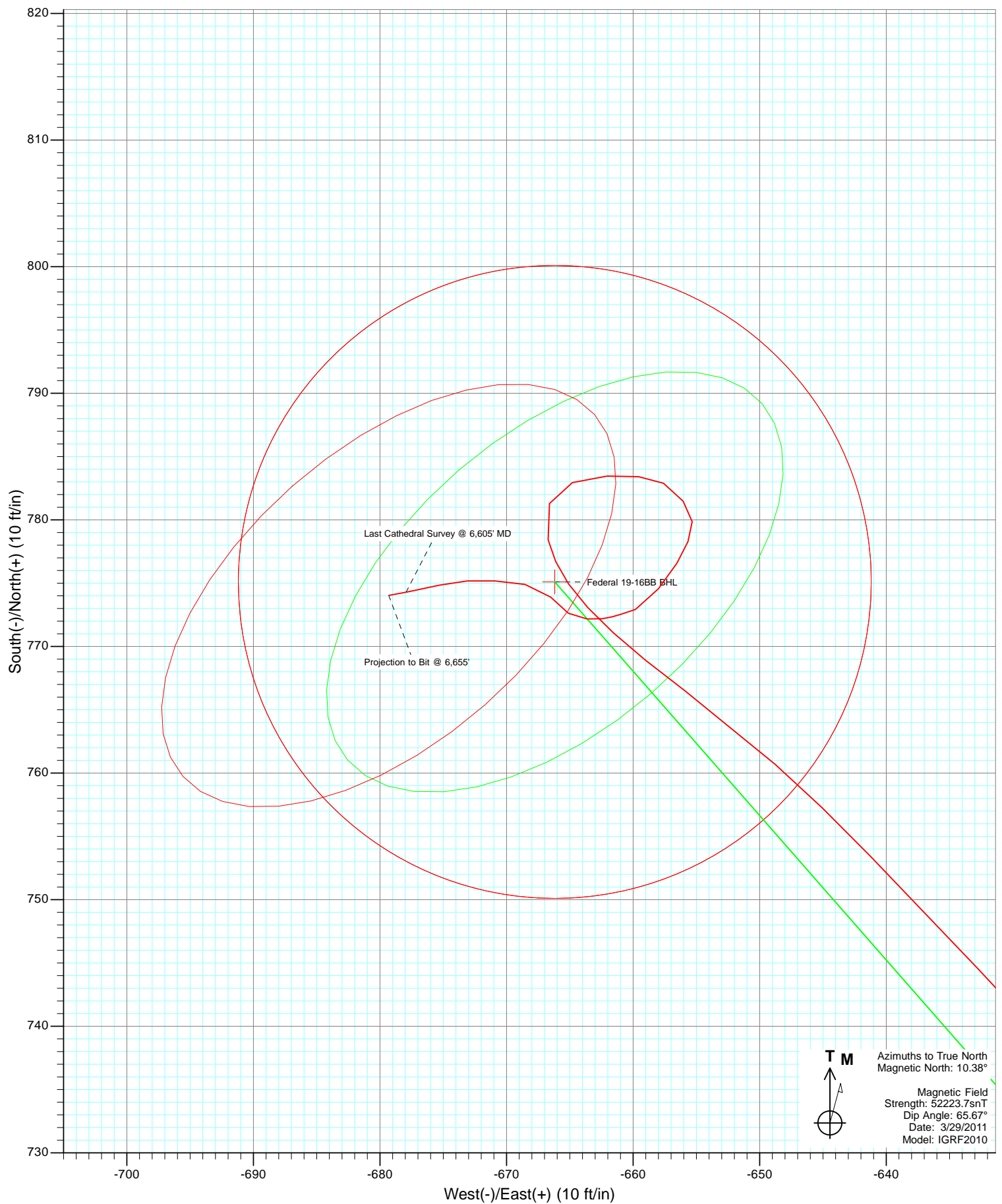
1153827571 (SH); SC
 WELL @ 5827.0ft (Original Well Elev)

Target	Azimuth	Origin	N/S	E/W	From TVD
Federal 19-16BB BHL	319.32	Slot	0.0	0.0	0.0





Project: S. Piceance (Parachute)
Site: SESE 19-7S-95W (PA-30 Pad)
Well: Federal 19-16BB (PA-30 Pad) Directional Plan 3.29.2011
Wellbore: DD
Design: FINAL



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Federal 19-16BB (PA-30 Pad) Directional Pla
Project:	S. Piceance (Parachute)	TVD Reference:	WELL @ 5827.0ft (Original Well Elev)
Site:	SESE 19-7S-95W (PA-30 Pad)	MD Reference:	WELL @ 5827.0ft (Original Well Elev)
Well:	Federal 19-16BB (PA-30 Pad) Directional Plan	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	Database:	USA EDM 5000 Multi Users DB

Project	S. Piceance (Parachute), Garfield County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site	SESE 19-7S-95W (PA-30 Pad)			
Site Position:		Northing:	1,585,669.17 ft	Latitude: 39.414060
From:	Lat/Long	Easting:	2,284,869.32 ft	Longitude: -108.031520
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence: -1.60 °

Well	Federal 19-16BB (PA-30 Pad) Directional Plan 3.29.2011			
Well Position	+N/-S	0.0 ft	Northing:	1,585,722.22 ft
	+E/-W	0.0 ft	Easting:	2,284,822.19 ft
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft
			Ground Level:	5,805.0 ft

Wellbore	DD				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/29/2011	10.39	65.67	52,224

Design	DD			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(ft)	(ft)	(ft)	(°)
	0.0	0.0	0.0	319.32

Survey Program	Date	10/27/2011			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
127.0	1,082.0	Survey #1 (DD)	MWD	Geolink MWD	
1,163.0	6,655.0	Survey #2 (DD)	MWD	Geolink MWD	

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
127.0	0.90	247.60	127.0	-0.4	-0.9	0.3	0.71	0.71	
219.0	1.10	3.90	219.0	0.2	-1.5	1.2	1.85	0.22	
311.0	0.40	29.40	311.0	1.4	-1.3	1.9	0.82	-0.76	
402.0	0.70	34.40	402.0	2.1	-0.8	2.2	0.33	0.33	
495.0	3.00	355.70	494.9	5.0	-0.7	4.3	2.68	2.47	
587.0	4.00	345.10	586.8	10.5	-1.7	9.1	1.29	1.09	
679.0	6.40	336.00	678.4	18.3	-4.6	16.9	2.75	2.61	
771.0	8.60	330.50	769.6	29.0	-10.1	28.6	2.51	2.39	
863.0	11.30	323.70	860.2	42.2	-18.8	44.3	3.20	2.93	
956.0	14.00	320.40	950.9	58.2	-31.4	64.6	3.00	2.90	
1,050.0	17.10	318.00	1,041.5	77.3	-47.9	89.8	3.37	3.30	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Federal 19-16BB (PA-30 Pad) Directional Pla
Project:	S. Piceance (Parachute)	TVD Reference:	WELL @ 5827.0ft (Original Well Elev)
Site:	SESE 19-7S-95W (PA-30 Pad)	MD Reference:	WELL @ 5827.0ft (Original Well Elev)
Well:	Federal 19-16BB (PA-30 Pad) Directional Plan	North Reference:	True
Wellbore:	DD9.2011	Survey Calculation Method:	Minimum Curvature
Design:	DD	Database:	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
1,082.0	18.10	317.50	1,072.0	84.4	-54.4	99.5	3.16	3.12	Last Cathedral Survey @ 1,082' MD
1,163.0	18.40	318.50	1,148.9	103.3	-71.4	124.9	0.54	0.37	
1,258.0	19.60	319.00	1,238.7	126.6	-91.8	155.8	1.27	1.26	
1,353.0	18.60	318.50	1,328.5	149.9	-112.2	186.9	1.07	-1.05	
1,448.0	18.40	317.90	1,418.6	172.4	-132.3	217.0	0.29	-0.21	
1,543.0	18.70	318.60	1,508.6	194.9	-152.5	247.2	0.39	0.32	
1,639.0	19.60	317.70	1,599.3	218.4	-173.5	278.7	0.99	0.94	
1,734.0	18.20	315.50	1,689.2	240.8	-194.6	309.4	1.65	-1.47	
1,830.0	18.50	318.90	1,780.3	262.9	-215.1	339.6	1.16	0.31	
1,926.0	19.00	318.50	1,871.2	286.1	-235.5	370.5	0.54	0.52	
2,022.0	20.30	319.40	1,961.6	310.5	-256.7	402.8	1.39	1.35	Federal 19-16BB TOG
2,115.0	18.60	319.20	2,049.3	333.9	-276.9	433.7	1.83	-1.83	
2,211.0	18.90	318.00	2,140.2	357.1	-297.3	464.6	0.51	0.31	
2,306.0	17.90	318.40	2,230.4	379.4	-317.3	494.6	1.06	-1.05	
2,402.0	18.80	320.30	2,321.5	402.4	-336.9	524.8	1.13	0.94	
2,497.0	19.40	318.40	2,411.3	426.0	-357.2	555.9	0.91	0.63	
2,592.0	20.00	318.70	2,500.7	450.0	-378.4	587.9	0.64	0.63	
2,688.0	21.10	319.40	2,590.6	475.4	-400.5	621.6	1.17	1.15	
2,784.0	20.20	320.50	2,680.4	501.3	-422.3	655.4	1.02	-0.94	
2,879.0	20.80	319.70	2,769.4	526.8	-443.6	688.7	0.70	0.63	
2,974.0	19.40	319.20	2,858.6	551.7	-464.8	721.3	1.48	-1.47	Federal 19-16BB TOG
3,070.0	20.20	319.70	2,948.9	576.4	-486.0	753.9	0.85	0.83	
3,165.0	20.40	318.40	3,038.0	601.3	-507.6	786.8	0.52	0.21	
3,261.0	19.20	318.80	3,128.4	625.6	-529.1	819.3	1.26	-1.25	
3,356.0	16.50	319.90	3,218.8	647.7	-548.1	848.4	2.86	-2.84	
3,452.0	15.80	319.40	3,311.0	668.1	-565.3	875.2	0.74	-0.73	
3,548.0	15.70	318.10	3,403.4	687.7	-582.5	901.2	0.38	-0.10	
3,643.0	13.40	318.60	3,495.3	705.5	-598.4	925.1	2.42	-2.42	
3,738.0	11.60	319.60	3,588.1	721.0	-611.9	945.6	1.91	-1.89	
3,834.0	9.10	318.50	3,682.5	734.1	-623.1	962.9	2.61	-2.60	
3,929.0	8.00	316.40	3,776.5	744.5	-632.7	977.0	1.20	-1.16	Federal 19-16BB TOG
4,025.0	6.80	316.20	3,871.7	753.4	-641.2	989.3	1.25	-1.25	
4,120.0	5.90	311.40	3,966.1	760.7	-648.8	999.8	1.10	-0.95	
4,216.0	5.10	306.60	4,061.6	766.5	-655.9	1,008.8	0.96	-0.83	
4,311.0	3.70	312.20	4,156.4	771.1	-661.6	1,016.0	1.54	-1.47	
4,407.0	2.60	325.40	4,252.2	775.0	-665.1	1,021.2	1.37	-1.15	
4,459.8	2.28	336.30	4,304.9	776.9	-666.2	1,023.4	1.06	-0.60	
4,502.0	2.10	347.10	4,347.1	778.4	-666.7	1,024.9	1.06	-0.43	
4,598.0	1.50	23.50	4,443.1	781.3	-666.6	1,027.0	1.31	-0.62	
4,693.0	1.70	68.70	4,538.1	782.9	-664.8	1,027.1	1.31	0.21	
4,789.0	1.70	90.20	4,634.0	783.5	-662.0	1,025.7	0.66	0.00	Federal 19-16BB TOG
4,884.0	1.30	92.00	4,729.0	783.4	-659.6	1,024.0	0.42	-0.42	
4,980.0	1.20	119.00	4,825.0	782.9	-657.6	1,022.4	0.62	-0.10	
5,075.0	1.40	144.10	4,919.9	781.5	-656.0	1,020.3	0.63	0.21	
5,170.0	0.80	176.80	5,014.9	779.9	-655.3	1,018.6	0.89	-0.63	
5,265.0	1.20	202.10	5,109.9	778.3	-655.7	1,017.6	0.62	0.42	
5,361.0	1.10	212.60	5,205.9	776.6	-656.5	1,016.9	0.24	-0.10	
5,456.0	1.90	218.00	5,300.8	774.6	-658.0	1,016.3	0.85	0.84	
5,552.0	1.10	244.90	5,396.8	772.9	-659.8	1,016.2	1.09	-0.83	
5,647.0	0.40	271.70	5,491.8	772.5	-661.0	1,016.7	0.80	-0.74	
5,742.0	0.50	238.90	5,586.8	772.3	-661.7	1,017.0	0.29	0.11	Federal 19-16BB TOG
5,838.0	0.50	280.30	5,682.8	772.2	-662.4	1,017.4	0.37	0.00	
5,932.0	1.00	263.30	5,776.8	772.2	-663.6	1,018.2	0.58	0.53	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Federal 19-16BB (PA-30 Pad) Directional Pla
Project:	S. Piceance (Parachute)	TVD Reference:	WELL @ 5827.0ft (Original Well Elev)
Site:	SESE 19-7S-95W (PA-30 Pad)	MD Reference:	WELL @ 5827.0ft (Original Well Elev)
Well:	Federal 19-16BB (PA-30 Pad) Directional Plan	North Reference:	True
Wellbore:	009.2011	Survey Calculation Method:	Minimum Curvature
Design:	DD	Database:	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
6,028.0	1.00	310.30	5,872.8	772.6	-665.1	1,019.5	0.83	0.00	
6,123.0	1.30	314.20	5,967.8	773.9	-666.5	1,021.4	0.33	0.32	
6,219.0	1.50	281.10	6,063.7	774.9	-668.5	1,023.4	0.85	0.21	
6,314.0	1.40	271.10	6,158.7	775.2	-670.9	1,025.2	0.29	-0.11	
6,410.0	1.20	268.80	6,254.7	775.2	-673.1	1,026.6	0.22	-0.21	
6,505.0	1.50	255.90	6,349.7	774.8	-675.3	1,027.8	0.45	0.32	
6,605.0	1.60	259.70	6,449.6	774.3	-677.9	1,029.1	0.14	0.10	Last Cathedral Survey @ 6,605' MD - Federal 19 Projection to Bit @ 6,655'
6,655.0	1.60	259.70	6,499.6	774.0	-679.3	1,029.8	0.00	0.00	

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									
Federal 19-16BB BHL	0.00	0.00	6,471.0	775.1	-666.2	1,586,515.59	2,284,177.86	39.416330	-108.034050
- actual wellpath misses target center by 24.4ft at 6605.0ft MD (6449.6 TVD, 774.3 N, -677.9 E)									
- Circle (radius 25.0)									
Federal 19-16BB TOG	0.00	0.00	4,305.0	775.1	-666.2	1,586,515.59	2,284,177.86	39.416330	-108.034050
- actual wellpath misses target center by 1.8ft at 4459.8ft MD (4304.9 TVD, 776.9 N, -666.2 E)									
- Point									

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
1,082.0	1,072.0	84.4	-54.4	Last Cathedral Survey @ 1,082' MD	
6,605.0	6,449.6	774.3	-677.9	Last Cathedral Survey @ 6,605' MD	
6,655.0	6,499.6	774.0	-679.3	Projection to Bit @ 6,655'	

Checked By: _____ Approved By: _____ Date: _____