

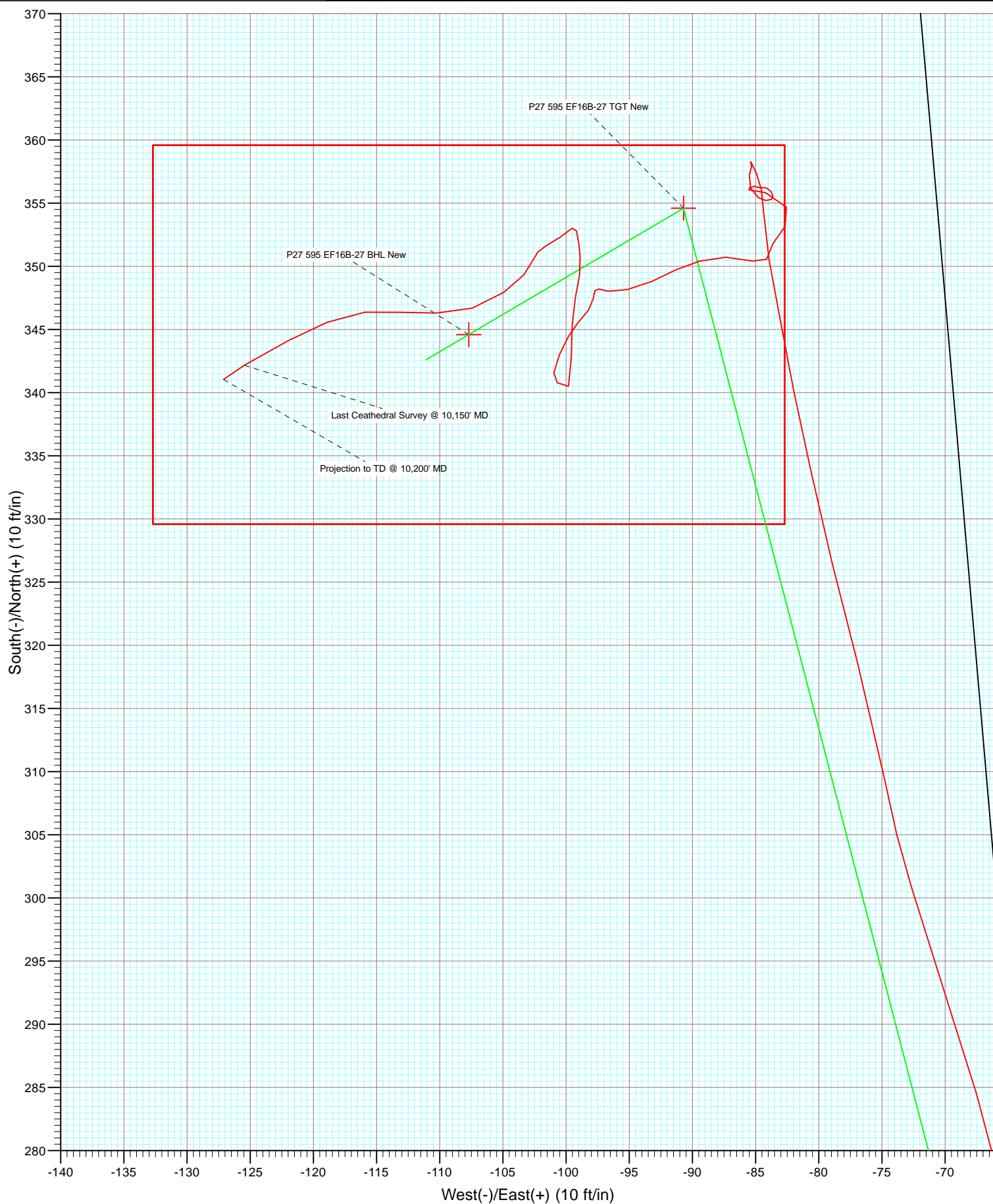
Azimuths to True North
 Magnetic North: 10.26°

Magnetic Field
 Strength: 52188.8snT
 Dip Angle: 65.78°
 Date: 5/29/2012
 Model: IGRF2010

FORMATION TOP DETAILS

No formation data is available

DD NP EF16B-27 P27 595 125283/157255 (SH) 125363/168755 (MH); SC EF16B-27 P27 @ 6671.0ft (Patterson 303) GL @ 6649.0 North American Datum 1983 Well NP EF16B-27 P27 595, True North						
Type	Target	Azimuth	Origin Type	N/S	E/W	From TVD
	P27 595 EF16B-27 BHL New	342.64	Slot	0.0	0.0	0.0
	P27 595 EF16B-27 TGT New	4500.0				
	P27 595 EF16B-27 BHL New	10050.0				
		+N/-S	+E/-W	Latitude	Longitude	
		354.6	-90.7	39° 34' 49.54 N	108° 2' 0.89 W	
		344.6	-107.7	39° 34' 49.44 N	108° 2' 1.11 W	



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well NP EF16B-27 P27 595
Project:	North Piceance	TVD Reference:	EF16B-27 P27 @ 6671.0ft (Patterson 303)
Site:	P27 595 (S27-T5S-R95W)	MD Reference:	EF16B-27 P27 @ 6671.0ft (Patterson 303)
Well:	NP EF16B-27 P27 595	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	Database:	USA EDM 5000 Multi Users DB

Project	North Piceance		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site		P27 595 (S27-T5S-R95W)			
Site Position:		Northing:	1,645,842.89 ft	Latitude:	39° 34' 45.45 N
From:	Lat/Long	Easting:	2,286,079.88 ft	Longitude:	108° 1' 59.43 W
Position Uncertainty:	0.0 ft	Slot Radius:	0.000 in	Grid Convergence:	-1.60 °

Well	NP EF16B-27 P27 595					
Well Position	+N/-S	0.0 ft	Northing:	1,645,903.04 ft	Latitude:	39° 34' 46.04 N
	+E/-W	0.0 ft	Easting:	2,286,057.96 ft	Longitude:	108° 1' 59.73 W
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	6,649.0 ft

Wellbore	DD				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	5/29/2012	10.26	65.78	52,189

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	342.64	

Survey Program	Date	6/4/2012			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
50.0	275.0	Survey #1 (DD)	Gyro	Gyro	
306.0	10,200.0	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		
50.0	0.48	4.33	50.0	0.2	0.0	0.2	0.96	0.96		
100.0	0.95	356.25	100.0	0.8	0.0	0.8	0.96	0.94		
137.0	0.94	335.39	137.0	1.4	-0.1	1.4	0.93	-0.03		
153.0	0.97	297.10	153.0	1.6	-0.3	1.6	3.92	0.19		
183.0	1.10	324.50	183.0	1.9	-0.7	2.1	1.69	0.43		
214.0	0.90	7.80	214.0	2.4	-0.9	2.6	2.45	-0.65		
244.0	1.50	34.72	244.0	3.0	-0.6	3.0	2.69	2.00		
275.0	1.80	35.40	275.0	3.7	-0.1	3.6	0.97	0.97	Last Gyro Survey @ 275' MD	
306.0	1.90	37.90	305.9	4.5	0.5	4.2	0.41	0.32		
336.0	1.90	41.71	335.9	5.3	1.2	4.7	0.42	0.00		
367.0	1.80	35.58	366.9	6.1	1.8	5.3	0.71	-0.32		

Cathedral Energy Services

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Site:	P27 595 (S27-T5S-R95W)	MD Reference:	EF16B-27 P27 @ 6671.0ft (Patterson 303)
Well:	NP EF16B-27 P27 595	North Reference:	True
Wellbore:	DD	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
398.0	1.40	42.70	397.9	6.7	2.3	5.7	1.44	-1.29	
428.0	0.90	49.90	427.9	7.2	2.7	6.0	1.73	-1.67	
459.0	0.40	61.70	458.9	7.4	3.0	6.1	1.66	-1.61	
490.0	0.20	80.80	489.9	7.4	3.2	6.1	0.71	-0.65	
520.0	0.20	37.09	519.9	7.5	3.3	6.2	0.50	0.00	
568.0	0.10	192.70	567.9	7.5	3.3	6.2	0.61	-0.21	
614.0	0.60	291.70	613.9	7.5	3.1	6.3	1.36	1.09	
660.0	2.00	311.30	659.9	8.2	2.2	7.1	3.15	3.04	
695.0	3.00	336.30	694.8	9.4	1.4	8.6	4.16	2.86	
786.0	4.50	339.30	785.6	14.9	-0.8	14.5	1.66	1.65	
878.0	5.80	345.30	877.3	22.8	-3.3	22.7	1.53	1.41	
969.0	5.90	345.50	967.8	31.8	-5.6	32.0	0.11	0.11	
1,061.0	6.80	345.80	1,059.2	41.6	-8.1	42.2	0.98	0.98	
1,153.0	6.80	341.80	1,150.6	52.1	-11.2	53.0	0.51	0.00	
1,244.0	6.00	342.80	1,241.0	61.8	-14.2	63.2	0.89	-0.88	
1,336.0	5.70	346.80	1,332.5	70.8	-16.7	72.6	0.55	-0.33	
1,427.0	6.40	346.80	1,423.0	80.1	-18.9	82.1	0.77	0.77	
1,519.0	6.20	344.30	1,514.5	89.9	-21.4	92.2	0.37	-0.22	
1,610.0	5.80	345.20	1,605.0	99.1	-23.9	101.7	0.45	-0.44	
1,702.0	5.80	344.30	1,696.5	108.1	-26.4	111.0	0.10	0.00	
1,785.0	6.30	344.90	1,779.0	116.5	-28.7	119.7	0.61	0.60	
1,896.0	7.10	344.60	1,889.3	129.0	-32.1	132.7	0.72	0.72	
1,987.0	6.00	348.50	1,979.7	139.1	-34.5	143.0	1.30	-1.21	
2,079.0	5.80	347.50	2,071.2	148.3	-36.5	152.4	0.24	-0.22	
2,170.0	4.90	349.70	2,161.8	156.6	-38.2	160.9	1.01	-0.99	
2,262.0	4.30	349.50	2,253.5	163.9	-39.5	168.2	0.65	-0.65	
2,354.0	5.40	348.60	2,345.2	171.5	-41.0	175.9	1.20	1.20	
2,445.0	5.20	348.90	2,435.8	179.8	-42.6	184.3	0.22	-0.22	
2,537.0	5.10	349.30	2,527.4	187.9	-44.2	192.5	0.12	-0.11	
2,628.0	4.20	341.40	2,618.1	195.0	-46.0	199.9	1.21	-0.99	
2,720.0	3.60	345.50	2,709.9	201.0	-47.8	206.1	0.72	-0.65	
2,811.0	4.30	341.10	2,800.7	207.0	-49.6	212.4	0.84	0.77	
2,903.0	5.20	350.60	2,892.4	214.4	-51.4	219.9	1.30	0.98	
2,994.0	4.90	350.70	2,983.0	222.3	-52.7	227.9	0.33	-0.33	
3,086.0	6.10	343.60	3,074.6	230.8	-54.8	236.7	1.50	1.30	
3,178.0	5.90	345.90	3,166.1	240.1	-57.3	246.3	0.34	-0.22	
3,269.0	5.20	350.20	3,256.7	248.7	-59.1	255.0	0.89	-0.77	
3,360.0	6.10	345.80	3,347.2	257.5	-61.0	263.9	1.10	0.99	
3,452.0	5.90	347.60	3,438.7	266.8	-63.2	273.5	0.30	-0.22	
3,543.0	5.60	347.80	3,529.3	275.7	-65.2	282.6	0.33	-0.33	
3,635.0	5.80	342.40	3,620.8	284.5	-67.5	291.7	0.62	0.22	
3,726.0	5.40	342.70	3,711.4	293.0	-70.2	300.6	0.44	-0.44	
3,818.0	5.00	342.40	3,803.0	301.0	-72.7	309.0	0.44	-0.43	
3,909.0	6.10	349.10	3,893.6	309.5	-74.8	317.7	1.40	1.21	
4,001.0	5.50	344.50	3,985.1	318.5	-76.9	327.0	0.82	-0.65	
4,092.0	5.00	347.10	4,075.7	326.6	-79.0	335.3	0.61	-0.55	
4,184.0	4.30	346.90	4,167.4	333.9	-80.6	342.7	0.76	-0.76	
4,276.0	3.80	349.10	4,259.2	340.2	-82.0	349.2	0.57	-0.54	
4,367.0	3.40	349.50	4,350.0	345.8	-83.1	354.9	0.44	-0.44	
4,459.0	2.50	349.30	4,441.9	350.5	-83.9	359.6	0.98	-0.98	
4,517.3	2.43	354.73	4,500.1	353.0	-84.3	362.1	0.42	-0.12	P27 595 EF16B-27 TGT New
4,550.0	2.40	357.90	4,532.8	354.4	-84.4	363.4	0.42	-0.09	
4,641.0	1.50	335.40	4,623.7	357.3	-84.9	366.4	1.28	-0.99	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well NP EF16B-27 P27 595
Project:	North Piceance	TVD Reference:	EF16B-27 P27 @ 6671.0ft (Patterson 303)
Site:	P27 595 (S27-T5S-R95W)	MD Reference:	EF16B-27 P27 @ 6671.0ft (Patterson 303)
Well:	NP EF16B-27 P27 595	North Reference:	True
Wellbore:	DD	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
4,733.0	0.20	161.70	4,715.7	358.3	-85.4	367.4	1.85	-1.41	
4,825.0	0.30	176.80	4,807.7	357.9	-85.3	367.0	0.13	0.11	
4,916.0	0.60	202.00	4,898.7	357.2	-85.5	366.5	0.39	0.33	
5,007.0	0.80	155.60	4,989.7	356.2	-85.4	365.5	0.64	0.22	
5,099.0	0.50	115.80	5,081.7	355.4	-84.8	364.5	0.57	-0.33	
5,190.0	0.30	100.30	5,172.7	355.2	-84.2	364.2	0.25	-0.22	
5,282.0	0.30	58.30	5,264.7	355.3	-83.7	364.1	0.23	0.00	
5,374.0	0.20	326.80	5,356.7	355.6	-83.6	364.3	0.40	-0.11	
5,465.0	0.30	345.20	5,447.7	355.9	-83.8	364.7	0.14	0.11	
5,557.0	0.40	280.30	5,539.7	356.2	-84.1	365.1	0.42	0.11	
5,648.0	0.40	264.50	5,630.7	356.2	-84.8	365.3	0.12	0.00	
5,740.0	0.20	58.10	5,722.7	356.3	-85.0	365.4	0.64	-0.22	
5,832.0	0.30	263.80	5,814.7	356.4	-85.1	365.5	0.53	0.11	
5,923.0	0.30	235.10	5,905.7	356.2	-85.5	365.5	0.16	0.00	
6,015.0	0.20	91.60	5,997.7	356.1	-85.5	365.4	0.52	-0.11	
6,106.0	1.50	100.30	6,088.7	355.8	-84.2	364.8	1.43	1.43	
6,198.0	1.30	154.10	6,180.7	354.7	-82.6	363.2	1.39	-0.22	
6,289.0	1.00	223.80	6,271.7	353.2	-82.7	361.8	1.47	-0.33	
6,381.0	1.10	206.60	6,363.6	351.8	-83.6	360.7	0.36	0.11	
6,473.0	0.60	195.50	6,455.6	350.6	-84.1	359.7	0.57	-0.54	
6,564.0	1.30	288.70	6,546.6	350.4	-85.2	359.9	1.61	0.77	
6,656.0	1.40	268.00	6,638.6	350.7	-87.3	360.8	0.54	0.11	
6,747.0	1.30	254.30	6,729.6	350.4	-89.5	361.1	0.37	-0.11	
6,839.0	1.20	244.70	6,821.6	349.7	-91.3	361.0	0.25	-0.11	
6,931.0	1.40	243.60	6,913.5	348.8	-93.2	360.7	0.22	0.22	
7,022.0	1.20	261.80	7,004.5	348.2	-95.1	360.7	0.50	-0.22	
7,114.0	0.70	270.60	7,096.5	348.0	-96.7	361.0	0.56	-0.54	
7,205.0	0.30	311.70	7,187.5	348.2	-97.4	361.4	0.56	-0.44	
7,297.0	0.40	206.90	7,279.5	348.1	-97.7	361.4	0.61	0.11	
7,388.0	0.40	174.40	7,370.5	347.5	-97.8	360.8	0.25	0.00	
7,480.0	0.90	213.80	7,462.5	346.6	-98.2	360.1	0.70	0.54	
7,571.0	0.80	226.00	7,553.5	345.5	-99.1	359.3	0.23	-0.11	
7,663.0	0.90	205.40	7,645.5	344.4	-99.8	358.5	0.35	0.11	
7,755.0	1.10	206.90	7,737.4	343.0	-100.5	357.4	0.22	0.22	
7,846.0	0.80	182.10	7,828.4	341.6	-101.0	356.1	0.55	-0.33	
7,938.0	0.40	116.30	7,920.4	340.8	-100.7	355.3	0.80	-0.43	
8,029.0	0.40	97.30	8,011.4	340.6	-100.1	355.0	0.15	0.00	
8,121.0	0.10	216.50	8,103.4	340.5	-99.8	354.8	0.50	-0.33	
8,195.0	0.30	19.50	8,177.4	340.6	-99.8	354.9	0.54	0.27	
8,306.0	1.80	3.50	8,288.4	342.6	-99.6	356.8	1.36	1.35	
8,397.0	1.60	0.20	8,379.4	345.3	-99.5	359.3	0.24	-0.22	
8,489.0	1.10	15.20	8,471.3	347.5	-99.3	361.3	0.66	-0.54	
8,580.0	1.30	6.00	8,562.3	349.3	-98.9	363.0	0.30	0.22	
8,672.0	0.50	350.10	8,654.3	350.8	-98.9	364.3	0.90	-0.87	
8,763.0	0.80	357.20	8,745.3	351.8	-99.0	365.3	0.34	0.33	
8,855.0	0.50	336.30	8,837.3	352.8	-99.2	366.3	0.41	-0.33	
8,946.0	0.30	227.10	8,928.3	353.0	-99.5	366.6	0.73	-0.22	
9,038.0	1.20	234.40	9,020.3	352.3	-100.5	366.2	0.98	0.98	
9,129.0	0.40	254.20	9,111.3	351.6	-101.6	365.9	0.92	-0.88	
9,221.0	0.70	220.20	9,203.3	351.1	-102.2	365.6	0.47	0.33	
9,313.0	0.60	200.00	9,295.3	350.3	-102.8	365.0	0.27	-0.11	
9,404.0	0.80	222.50	9,386.3	349.3	-103.3	364.3	0.37	0.22	
9,496.0	1.80	231.30	9,478.2	348.0	-104.9	363.4	1.11	1.09	

Cathedral Energy Services

Survey Report

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Project:	North Piceance	TVD Reference:	EF16B-27 P27 @ 6671.0ft (Patterson 303)
Site:	P27 595 (S27-T5S-R95W)	MD Reference:	EF16B-27 P27 @ 6671.0ft (Patterson 303)
Well:	NP EF16B-27 P27 595	North Reference:	True
Wellbore:	DD	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
9,587.0	1.80	254.90	9,569.2	346.7	-107.4	362.9	0.81	0.00	
9,679.0	1.80	269.70	9,661.1	346.3	-110.2	363.4	0.50	0.00	
9,770.0	1.70	272.70	9,752.1	346.4	-113.0	364.3	0.15	-0.11	
9,862.0	1.90	268.00	9,844.1	346.4	-115.9	365.2	0.27	0.22	
9,953.0	2.10	243.20	9,935.0	345.6	-118.9	365.3	0.97	0.22	
10,045.0	2.10	246.50	10,026.9	344.1	-122.0	364.8	0.13	0.00	
10,067.6	2.14	243.97	10,049.5	343.8	-122.7	364.7	0.44	0.16	P27 595 EF16B-27 BHL New
10,150.0	2.30	235.50	10,131.9	342.2	-125.5	364.0	0.44	0.20	Last Ceathedral Survey @ 10,150' MD
10,200.0	2.30	235.50	10,181.8	341.0	-127.1	363.4	0.00	0.00	Projection to TD @ 10,200' MD

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
P27 595 EF16B-27 BHL	0.00	0.00	10,050.0	344.6	-107.7	1,646,250.51	2,285,959.91	39° 34' 49.44 N	108° 2' 1.11 W
- hit/miss target									
- Shape									
- actual wellpath misses target center by 15.0ft at 10067.6ft MD (10049.5 TVD, 343.8 N, -122.7 E)									
- Rectangle (sides W30.0 H50.0 D0.0)									
P27 595 EF16B-27 TGT	0.00	0.00	4,500.0	354.6	-90.7	1,646,260.04	2,285,977.18	39° 34' 49.54 N	108° 2' 0.89 W
- actual wellpath misses target center by 6.6ft at 4517.3ft MD (4500.1 TVD, 353.0 N, -84.3 E)									
- Point									

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
275.0	275.0	3.7	-0.1	Last Gyro Survey @ 275' MD
10,150.0	10,131.9	342.2	-125.5	Last Ceathedral Survey @ 10,150' MD
10,200.0	10,181.8	341.0	-127.1	Projection to TD @ 10,200' MD

Checked By: _____ Approved By: _____ Date: _____