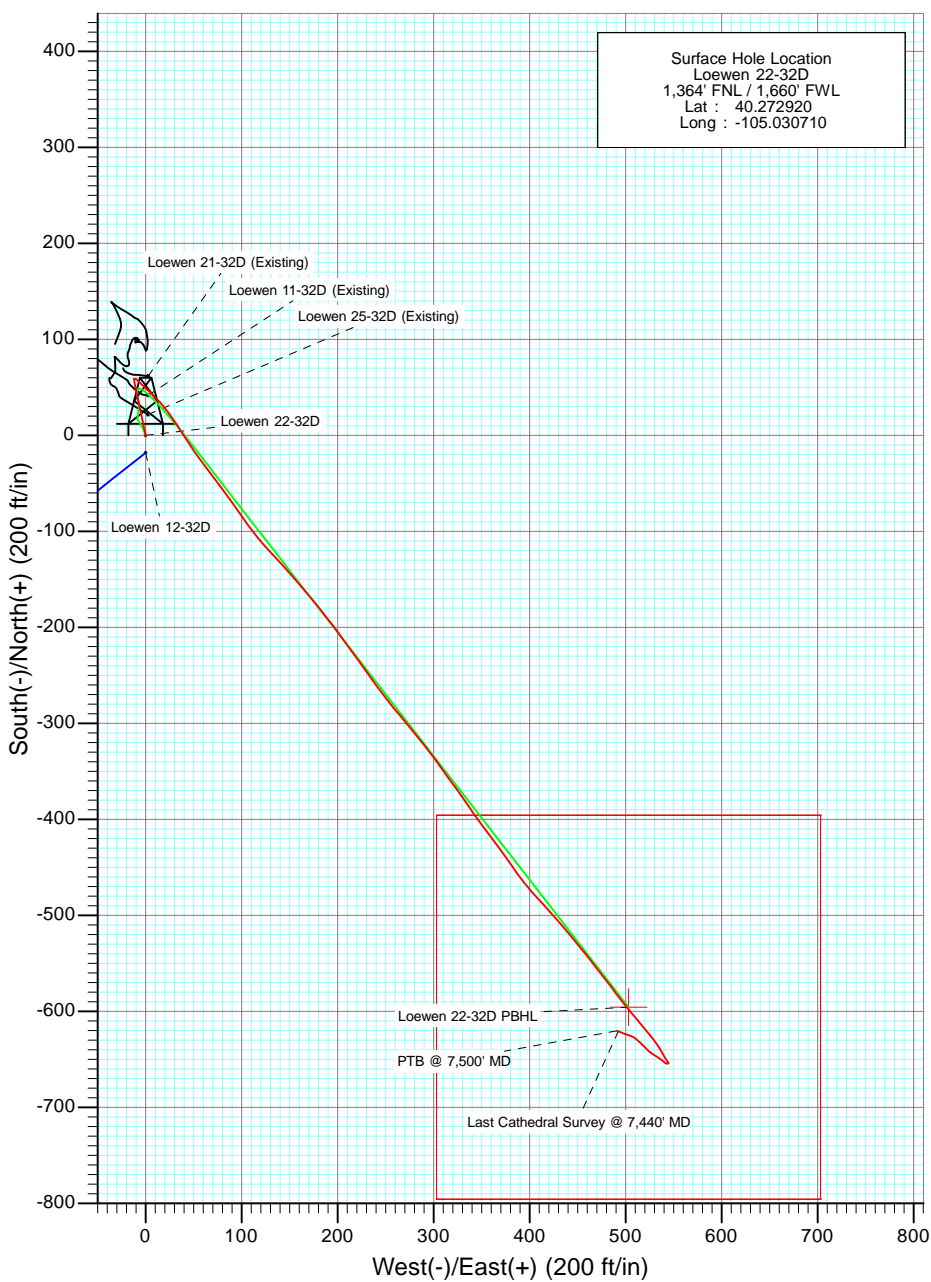
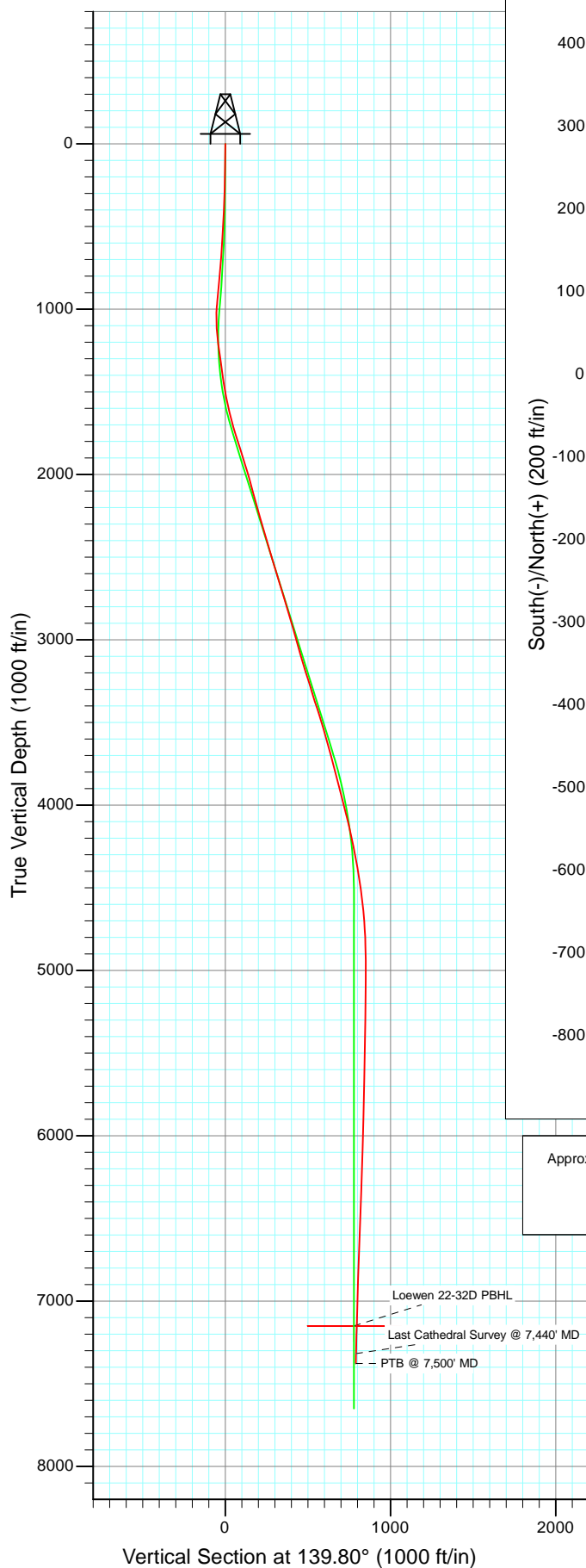




Project: Weld County, CO
 Site: Sec 32-T4N-R68W (Loewen)
 Well: Loewen 22-32D
 Wellbore: DD
 Design: FINAL



Approximate Bottom Hole Location
 Loewen 22-32D
 Lat : 40.271218
 Long : -105.028951



Azimuths to True North
 Magnetic North: 8.96°
 Magnetic Field
 Strength: 53010.5snT
 Dip Angle: 66.90°
 Date: 9/5/2011
 Model: IGRF2010

DD Loewen 22-32D 115360; LR KBE @ 5021.0ft (Original Well Elev) Ground Elevation 5000.0 North American Datum 1983 Well Loewen 22-32D, True North					
Type Target	Target Loewen 22-32D PBHL	Azimuth 139.80	Origin Type Slot	N/S 0.0	E/W 0.0
Name Loewen 22-32D PBHL	TVD 7150.0	+N/-S -595.4	+E/-W 503.1	Latitude 40.271286	Longitude -105.028907
		From TVD 0.0			

Cathedral Energy Services

Survey Report - Geographic

Company:	Apollo Operating, LLC	Local Co-ordinate Reference:	Well Loewen 22-32D
Project:	Weld County, CO	TVD Reference:	KBE @ 5021.0ft (Original Well Elev)
Site:	Sec 32-T4N-R68W (Loewen)	MD Reference:	KBE @ 5021.0ft (Original Well Elev)
Well:	Loewen 22-32D	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	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 32-T4N-R68W (Loewen)			
Site Position:		Northing:	1,342,617.27 ft	Latitude:	40.272925
From:	Lat/Long	Easting:	3,130,955.56 ft	Longitude:	-105.030700
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	0.30 °

Well	Loewen 22-32D					
Well Position	+N/-S	0.0 ft	Northing:	1,342,615.33 ft	Latitude:	40.272920
	+E/-W	0.0 ft	Easting:	3,130,952.78 ft	Longitude:	-105.030710
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	5,000.0 ft

Wellbore	DD				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/5/2011	8.96	66.90	53,010

Design	DD				
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	139.80	

Survey Program	Date	9/11/2011			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
960.0	7,500.0	Survey #2 (DD)	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	1,342,615.33	3,130,952.78	40.272920	-105.030710
960.0	6.60	348.20	957.9	54.1	-11.3	1,342,669.33	3,130,941.20	40.273068	-105.030751
1,025.0	2.60	357.10	1,022.7	59.2	-12.1	1,342,674.46	3,130,940.33	40.273083	-105.030754
1,119.0	4.10	134.60	1,116.6	59.0	-9.8	1,342,674.24	3,130,942.62	40.273082	-105.030746
1,212.0	7.30	134.20	1,209.1	52.5	-3.2	1,342,667.82	3,130,949.26	40.273064	-105.030722
1,306.0	8.10	132.20	1,302.3	43.9	5.9	1,342,659.26	3,130,958.49	40.273041	-105.030689
1,399.0	7.80	140.60	1,394.4	34.6	14.8	1,342,650.03	3,130,967.40	40.273015	-105.030657
1,493.0	9.70	139.90	1,487.3	23.6	24.0	1,342,639.09	3,130,976.61	40.272985	-105.030624
1,586.0	12.60	149.60	1,578.5	8.9	34.1	1,342,624.39	3,130,986.87	40.272944	-105.030588
1,680.0	14.90	145.70	1,669.8	-9.9	46.1	1,342,605.63	3,130,998.97	40.272893	-105.030545
1,774.0	17.40	142.90	1,760.1	-31.1	61.4	1,342,584.51	3,131,014.37	40.272835	-105.030490
1,867.0	17.30	143.00	1,848.9	-53.3	78.1	1,342,562.47	3,131,031.20	40.272774	-105.030430

Cathedral Energy Services

Survey Report - Geographic

Company:	Apollo Operating, LLC	Local Co-ordinate Reference:	Well Loewen 22-32D
Project:	Weld County, CO	TVD Reference:	KBE @ 5021.0ft (Original Well Elev)
Site:	Sec 32-T4N-R68W (Loewen)	MD Reference:	KBE @ 5021.0ft (Original Well Elev)
Well:	Loewen 22-32D	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)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude
1,961.0	17.60	145.40	1,938.5	-76.1	94.6	1,342,539.69	3,131,047.80	40.272711	-105.030371
2,055.0	15.80	143.30	2,028.6	-98.1	110.3	1,342,517.82	3,131,063.64	40.272651	-105.030315
2,148.0	15.00	136.80	2,118.2	-117.0	126.1	1,342,498.97	3,131,079.54	40.272599	-105.030258
2,241.0	16.30	138.50	2,207.8	-135.6	143.0	1,342,480.52	3,131,096.53	40.272548	-105.030198
2,335.0	15.30	138.80	2,298.2	-154.8	159.9	1,342,461.39	3,131,113.54	40.272495	-105.030137
2,428.0	16.70	140.60	2,387.6	-174.3	176.5	1,342,441.92	3,131,130.21	40.272441	-105.030078
2,522.0	16.70	142.60	2,477.7	-195.5	193.3	1,342,420.85	3,131,147.09	40.272383	-105.030018
2,615.0	17.40	144.00	2,566.6	-217.4	209.6	1,342,399.07	3,131,163.50	40.272323	-105.029959
2,709.0	16.80	145.00	2,656.4	-239.9	225.6	1,342,376.65	3,131,179.67	40.272262	-105.029902
2,802.0	16.70	143.50	2,745.5	-261.6	241.3	1,342,354.99	3,131,195.44	40.272202	-105.029846
2,896.0	17.10	141.10	2,835.4	-283.2	258.0	1,342,333.46	3,131,212.27	40.272143	-105.029786
2,992.0	14.90	139.80	2,927.7	-303.6	274.8	1,342,313.14	3,131,229.21	40.272087	-105.029725
3,084.0	16.30	141.80	3,016.3	-322.8	290.4	1,342,294.04	3,131,244.93	40.272034	-105.029669
3,178.0	15.90	144.80	3,106.6	-343.7	306.0	1,342,273.23	3,131,260.62	40.271977	-105.029614
3,271.0	18.20	143.20	3,195.5	-365.8	322.1	1,342,251.28	3,131,276.78	40.271916	-105.029556
3,365.0	16.50	146.40	3,285.3	-388.6	338.3	1,342,228.49	3,131,293.09	40.271853	-105.029498
3,458.0	18.10	142.00	3,374.1	-411.0	354.5	1,342,206.19	3,131,309.41	40.271792	-105.029440
3,552.0	17.10	145.40	3,463.7	-433.9	371.3	1,342,183.39	3,131,326.37	40.271729	-105.029380
3,646.0	16.40	144.20	3,553.7	-456.0	386.9	1,342,161.34	3,131,342.10	40.271668	-105.029324
3,739.0	16.00	138.10	3,643.0	-476.2	403.2	1,342,141.23	3,131,358.44	40.271613	-105.029265
3,832.0	14.40	136.80	3,732.7	-494.2	419.6	1,342,123.35	3,131,375.01	40.271563	-105.029206
3,926.0	15.10	140.80	3,823.6	-512.2	435.4	1,342,105.42	3,131,390.85	40.271514	-105.029150
4,020.0	13.40	140.30	3,914.7	-530.1	450.1	1,342,087.63	3,131,405.64	40.271465	-105.029097
4,113.0	14.80	141.90	4,004.9	-547.7	464.3	1,342,070.07	3,131,419.95	40.271417	-105.029046
4,207.0	14.00	141.70	4,096.0	-566.1	478.7	1,342,051.77	3,131,434.50	40.271366	-105.028995
4,301.0	12.30	144.00	4,187.5	-583.1	491.7	1,342,034.82	3,131,447.52	40.271319	-105.028948
4,394.0	11.30	140.10	4,278.5	-598.1	503.3	1,342,019.88	3,131,459.27	40.271278	-105.028906
4,491.0	9.50	139.60	4,373.9	-611.5	514.6	1,342,006.55	3,131,470.62	40.271241	-105.028866
4,586.0	8.90	141.10	4,467.7	-623.2	524.3	1,341,994.91	3,131,480.38	40.271209	-105.028831
4,682.0	7.20	144.80	4,562.8	-633.9	532.4	1,341,984.26	3,131,488.57	40.271180	-105.028802
4,776.0	5.20	151.90	4,656.2	-642.5	537.8	1,341,975.71	3,131,494.02	40.271156	-105.028783
4,871.0	3.30	147.70	4,751.0	-648.6	541.3	1,341,969.62	3,131,497.54	40.271140	-105.028770
4,966.0	1.50	142.00	4,845.9	-651.9	543.6	1,341,966.34	3,131,499.78	40.271131	-105.028762
5,061.0	0.70	139.10	4,940.8	-653.3	544.7	1,341,964.93	3,131,500.94	40.271127	-105.028758
5,156.0	0.70	236.90	5,035.8	-654.0	544.6	1,341,964.17	3,131,500.84	40.271125	-105.028759
5,251.0	1.30	271.20	5,130.8	-654.3	543.0	1,341,963.87	3,131,499.27	40.271124	-105.028764
5,346.0	0.70	318.20	5,225.8	-653.9	541.6	1,341,964.32	3,131,497.81	40.271125	-105.028769
5,441.0	1.00	311.20	5,320.8	-652.9	540.6	1,341,965.29	3,131,496.79	40.271128	-105.028773
5,536.0	1.10	294.30	5,415.8	-652.0	539.1	1,341,966.21	3,131,495.33	40.271130	-105.028778
5,632.0	1.20	329.80	5,511.8	-650.7	537.8	1,341,967.45	3,131,493.98	40.271134	-105.028783
5,727.0	0.50	300.00	5,606.8	-649.7	536.9	1,341,968.51	3,131,493.11	40.271137	-105.028786
5,822.0	1.20	292.80	5,701.7	-649.1	535.6	1,341,969.10	3,131,491.83	40.271138	-105.028791
5,917.0	1.50	307.80	5,796.7	-647.9	533.7	1,341,970.23	3,131,489.93	40.271141	-105.028798
6,013.0	1.80	302.60	5,892.7	-646.3	531.5	1,341,971.80	3,131,487.66	40.271146	-105.028806
6,108.0	1.60	302.60	5,987.6	-644.8	529.1	1,341,973.31	3,131,485.28	40.271150	-105.028814
6,202.0	2.20	302.60	6,081.6	-643.1	526.5	1,341,974.97	3,131,482.64	40.271155	-105.028824
6,297.0	1.40	312.40	6,176.5	-641.4	524.1	1,341,976.73	3,131,480.24	40.271159	-105.028832
6,392.0	1.80	322.60	6,271.5	-639.4	522.3	1,341,978.68	3,131,478.47	40.271165	-105.028838
6,487.0	2.00	311.10	6,366.5	-637.1	520.2	1,341,980.95	3,131,476.30	40.271171	-105.028846
6,582.0	2.20	312.00	6,461.4	-634.8	517.6	1,341,983.24	3,131,473.68	40.271177	-105.028856
6,677.0	2.30	313.80	6,556.3	-632.3	514.8	1,341,985.77	3,131,470.94	40.271184	-105.028865
6,771.0	2.20	313.80	6,650.2	-629.7	512.2	1,341,988.31	3,131,468.26	40.271191	-105.028875
6,866.0	1.80	306.80	6,745.2	-627.6	509.6	1,341,990.45	3,131,465.74	40.271197	-105.028884
6,959.0	2.30	295.70	6,838.1	-625.9	506.8	1,341,992.12	3,131,462.88	40.271202	-105.028894
7,054.0	2.10	281.70	6,933.1	-624.7	503.4	1,341,993.28	3,131,459.45	40.271205	-105.028906

Cathedral Energy Services

Survey Report - Geographic

Company:	Apollo Operating, LLC	Local Co-ordinate Reference:	Well Loewen 22-32D
Project:	Weld County, CO	TVD Reference:	KBE @ 5021.0ft (Original Well Elev)
Site:	Sec 32-T4N-R68W (Loewen)	MD Reference:	KBE @ 5021.0ft (Original Well Elev)
Well:	Loewen 22-32D	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)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude
7,148.0	1.70	290.10	7,027.0	-623.9	500.4	1,341,994.10	3,131,456.45	40.271207	-105.028917
7,241.0	1.80	292.10	7,120.0	-622.9	497.7	1,341,995.10	3,131,453.79	40.271210	-105.028927
7,336.0	1.60	296.70	7,214.9	-621.7	495.2	1,341,996.25	3,131,451.22	40.271213	-105.028936
7,429.0	1.60	284.80	7,307.9	-620.8	492.7	1,341,997.15	3,131,448.80	40.271216	-105.028944
7,440.0	1.70	291.80	7,318.9	-620.7	492.4	1,341,997.25	3,131,448.50	40.271216	-105.028945
Last Cathedral Survey @ 7,440' MD									
7,500.0	1.70	291.80	7,378.9	-620.0	490.8	1,341,997.90	3,131,446.84	40.271218	-105.028951
PTB @ 7,500' MD									

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									
Loewen 22-32D PBHL	0.00	0.00	7,150.0	-595.4	503.1	1,342,022.60	3,131,459.01	40.271286	-105.028907
- actual wellpath misses target center by 27.8ft at 7271.2ft MD (7150.2 TVD, -622.5 N, 496.9 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	
7,440.0	7,318.9	-620.7	492.4	Last Cathedral Survey @ 7,440' MD	
7,500.0	7,378.9	-620.0	490.8	PTB @ 7,500' MD	

Checked By: _____ Approved By: _____ Date: _____