

PDC ENERGY

Project: Weld County, CO (NAD83)
Site: Stroh 13GK-HZ Pad (True)
Well: 13K-223
Wellbore: Lateral
Design: Lateral

T M Azimuths to True North
 Magnetic North: 8.46°
 Magnetic Field
 Strength: 52575.4snT
 Dip Angle: 66.82°
 Date: 05/18/2015
 Model: IGRF2015

Plats by Lat40 drawn in Grid North
 Section Lines provided by
 Lat40 PLS and Rotated
 +.42° to True North
 All Info is drawn in True North

Ground Elevation 4805.00 Ensign 123 KB = 13' RKB = 4818'
 Grid North is 0.42° East of True North (Grid Convergence)
 To convert a Magnetic Direction to a True Direction, Add 8.47° East

INTERPOLATED DEPTHS FOR SECTION LINE AND SETBACK CROSSING

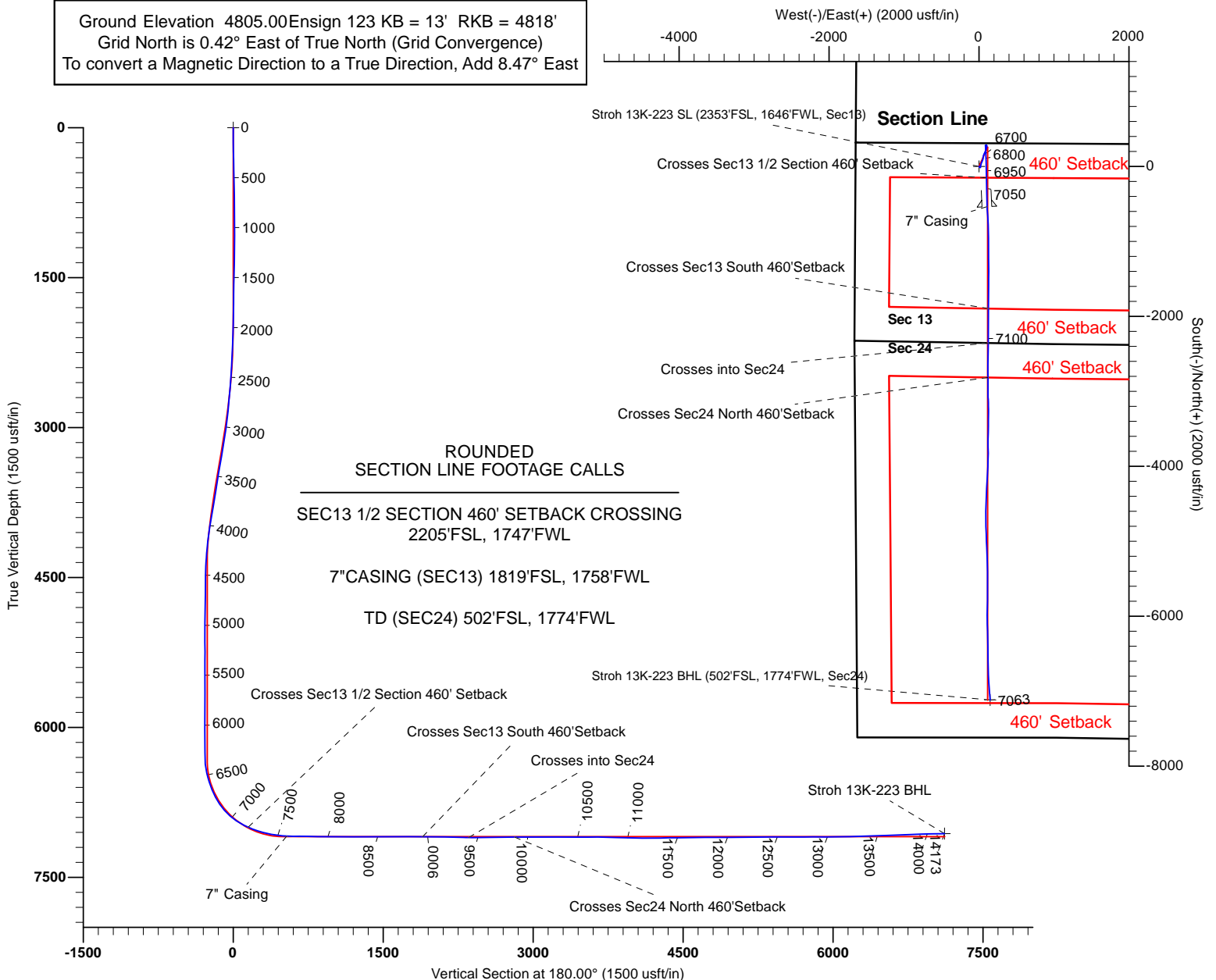
TVD	MD	+N/-S	+E/-W	Annotation
6998.67	7190.00	-150.05	99.87	Crosses Sec13 1/2 Section 460' Setback
7087.55	7589.00	-536.51	107.83	7" Casing
7094.81	8949.00	-1895.78	126.21	Crosses Sec13 South 460' Setback
7102.07	9409.00	-2355.65	123.35	Crosses into Sec24
7098.67	9869.00	-2815.56	120.70	Crosses Sec24 North 460' Setback
7062.50	14173.00	-7116.33	148.02	TD

TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
Stroh 13K-223 SL	0.00	0.00	0.00	40.311028	-104.842759	Point
Stroh 13K-223 BHL	7062.50	-7116.33	148.02	40.291493	-104.842229	Point

CASING DETAILS

TVD	MD	Name	Size
7087.55	7589.00	7"	7.00



Survey Report

Company:	PDC ENERGY	Local Co-ordinate Reference:	Well 13K-223 - Slot 13K-223
Project:	Weld County, CO (NAD83)	TVD Reference:	4805+13 @ 4818.00usft (ensign 123)
Site:	Stroh 13GK-HZ Pad (True)	MD Reference:	4805+13 @ 4818.00usft (ensign 123)
Well:	13K-223	North Reference:	True
Wellbore:	Lateral	Survey Calculation Method:	Minimum Curvature
Design:	Lateral	Database:	EDM 5000.1 Single User Db

Project	Weld County, CO (NAD83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site	Stroh 13GK-HZ Pad (True), centered on 13G-203				
Site Position:		Northing:	1,356,827.556 usft	Latitude:	40.311030
From:	Lat/Long	Easting:	3,183,166.780 usft	Longitude:	-104.843190
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	0.42 °

Well	13K-223 - Slot 13K-223					
Well Position	+N/-S	0.00 usft	Northing:	1,356,827.628 usft	Latitude:	40.311028
	+E/-W	0.00 usft	Easting:	3,183,286.848 usft	Longitude:	-104.842760
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	4,805.00 usft

Wellbore	Lateral				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	05/18/15	8.47	66.82	52,575

Design	Lateral				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	180.00	

Survey Program	Date	06/01/15			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
141.00	14,127.00	Survey #1 (Lateral)	MWD	MWD v3:standard declination	
14,173.00	14,173.00	Survey #2 (Lateral)	Projection	Projection	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Stroh 13K-223 SL										
141.00	1.50	126.80	140.98	-1.11	1.48	1.11	1.06	1.06	0.00	
234.00	1.70	131.70	233.95	-2.75	3.48	2.75	0.26	0.22	5.27	
327.00	1.60	136.40	326.91	-4.61	5.41	4.61	0.18	-0.11	5.05	
419.00	1.40	134.30	418.88	-6.33	7.10	6.33	0.23	-0.22	-2.28	
512.00	1.10	135.00	511.86	-7.75	8.54	7.75	0.32	-0.32	0.75	
605.00	1.30	142.40	604.83	-9.22	9.82	9.22	0.27	0.22	7.96	
699.00	1.30	143.10	698.81	-10.91	11.11	10.91	0.02	0.00	0.74	
791.00	1.10	149.80	790.79	-12.51	12.18	12.51	0.27	-0.22	7.28	

Survey Report

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Project:	Weld County, CO (NAD83)	TVD Reference:	4805+13 @ 4818.00usft (ensign 123)
Site:	Stroh 13GK-HZ Pad (True)	MD Reference:	4805+13 @ 4818.00usft (ensign 123)
Well:	13K-223	North Reference:	True
Wellbore:	Lateral	Survey Calculation Method:	Minimum Curvature
Design:	Lateral	Database:	EDM 5000.1 Single User Db

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
1,009.00	1.20	108.00	1,008.75	-15.03	15.40	15.03	0.38	0.05	-19.17	
1,102.00	1.30	67.20	1,101.73	-14.92	17.30	14.92	0.94	0.11	-43.87	
1,196.00	1.20	46.60	1,195.71	-13.83	19.00	13.83	0.49	-0.11	-21.91	
1,289.00	1.30	20.40	1,288.69	-12.17	20.07	12.17	0.62	0.11	-28.17	
1,382.00	1.20	4.30	1,381.66	-10.21	20.52	10.21	0.39	-0.11	-17.31	
1,476.00	1.00	356.00	1,475.65	-8.41	20.53	8.41	0.27	-0.21	-8.83	
1,570.00	0.90	351.20	1,569.63	-6.86	20.36	6.86	0.14	-0.11	-5.11	
1,663.00	1.00	328.70	1,662.62	-5.45	19.83	5.45	0.41	0.11	-24.19	
1,757.00	0.80	319.10	1,756.61	-4.25	18.97	4.25	0.27	-0.21	-10.21	
1,850.00	0.80	304.30	1,849.60	-3.39	18.01	3.39	0.22	0.00	-15.91	
1,944.00	1.70	6.70	1,943.58	-1.64	17.63	1.64	1.60	0.96	66.38	
2,033.00	1.70	4.40	2,032.54	0.99	17.89	-0.99	0.08	0.00	-2.58	
2,123.00	2.00	10.10	2,122.50	3.86	18.26	-3.86	0.39	0.33	6.33	
2,213.00	2.00	9.30	2,212.44	6.96	18.79	-6.96	0.03	0.00	-0.89	
2,303.00	3.50	22.70	2,302.34	11.04	20.11	-11.04	1.80	1.67	14.89	
2,392.00	3.30	25.50	2,391.18	15.86	22.26	-15.86	0.29	-0.22	3.15	
2,481.00	4.30	19.90	2,479.98	21.31	24.50	-21.31	1.20	1.12	-6.29	
2,571.00	4.50	15.90	2,569.72	27.88	26.61	-27.88	0.41	0.22	-4.44	
2,661.00	5.60	18.70	2,659.37	35.44	28.99	-35.44	1.25	1.22	3.11	
2,751.00	5.50	18.10	2,748.94	43.70	31.74	-43.70	0.13	-0.11	-0.67	
2,841.00	6.10	21.50	2,838.48	52.24	34.83	-52.24	0.77	0.67	3.78	
2,930.00	7.30	23.40	2,926.87	61.83	38.81	-61.83	1.37	1.35	2.13	
3,020.00	8.40	22.90	3,016.03	73.14	43.64	-73.14	1.22	1.22	-0.56	
3,110.00	8.90	19.40	3,105.01	85.76	48.51	-85.76	0.81	0.56	-3.89	
3,200.00	9.70	13.60	3,193.82	99.70	52.60	-99.70	1.37	0.89	-6.44	
3,289.00	10.20	8.60	3,281.49	114.78	55.54	-114.78	1.12	0.56	-5.62	
3,379.00	10.30	8.50	3,370.05	130.61	57.93	-130.61	0.11	0.11	-0.11	
3,469.00	9.80	13.90	3,458.67	146.01	60.95	-146.01	1.18	-0.56	6.00	
3,558.00	9.10	22.20	3,546.47	159.88	65.43	-159.88	1.72	-0.79	9.33	
3,648.00	9.50	25.50	3,635.29	173.17	71.32	-173.17	0.74	0.44	3.67	
3,738.00	10.70	24.30	3,723.89	187.49	77.96	-187.49	1.35	1.33	-1.33	
3,828.00	10.80	24.10	3,812.31	202.80	84.84	-202.80	0.12	0.11	-0.22	
3,918.00	10.60	23.20	3,900.74	218.11	91.54	-218.11	0.29	-0.22	-1.00	
4,008.00	9.60	18.00	3,989.35	232.85	97.12	-232.85	1.50	-1.11	-5.78	
4,097.00	7.50	9.70	4,077.36	245.64	100.39	-245.64	2.73	-2.36	-9.33	
4,187.00	6.20	9.00	4,166.72	256.23	102.14	-256.23	1.45	-1.44	-0.78	
4,277.00	4.60	7.10	4,256.31	264.61	103.35	-264.61	1.79	-1.78	-2.11	
4,367.00	3.60	14.30	4,346.08	270.93	104.50	-270.93	1.25	-1.11	8.00	
4,457.00	1.80	10.80	4,435.98	275.06	105.46	-275.06	2.01	-2.00	-3.89	
4,547.00	0.30	303.10	4,525.96	276.57	105.53	-276.57	1.90	-1.67	-75.22	
4,637.00	1.10	297.50	4,615.96	277.10	104.56	-277.10	0.89	0.89	-6.22	
4,727.00	1.30	330.10	4,705.94	278.38	103.29	-278.38	0.78	0.22	36.22	
4,817.00	1.20	328.40	4,795.92	280.07	102.28	-280.07	0.12	-0.11	-1.89	

Survey Report

Company:	PDC ENERGY	Local Co-ordinate Reference:	Well 13K-223 - Slot 13K-223
Project:	Weld County, CO (NAD83)	TVD Reference:	4805+13 @ 4818.00usft (ensign 123)
Site:	Stroh 13GK-HZ Pad (True)	MD Reference:	4805+13 @ 4818.00usft (ensign 123)
Well:	13K-223	North Reference:	True
Wellbore:	Lateral	Survey Calculation Method:	Minimum Curvature
Design:	Lateral	Database:	EDM 5000.1 Single User Db

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
4,907.00	1.30	322.60	4,885.89	281.69	101.17	-281.69	0.18	0.11	-6.44	
4,997.00	0.20	158.60	4,975.89	282.35	100.61	-282.35	1.66	-1.22	-182.22	
5,087.00	0.50	263.70	5,065.89	282.16	100.27	-282.16	0.65	0.33	116.78	
5,177.00	0.80	264.80	5,155.88	282.06	99.26	-282.06	0.33	0.33	1.22	
5,266.00	1.00	268.80	5,244.87	281.99	97.86	-281.99	0.24	0.22	4.49	
5,356.00	1.50	296.20	5,334.85	282.49	96.02	-282.49	0.85	0.56	30.44	
5,446.00	1.00	265.50	5,424.83	282.95	94.18	-282.95	0.91	-0.56	-34.11	
5,536.00	0.40	137.30	5,514.82	282.66	93.61	-282.66	1.43	-0.67	-142.44	
5,626.00	0.60	208.70	5,604.82	282.01	93.60	-282.01	0.67	0.22	79.33	
5,715.00	1.00	328.60	5,693.82	282.27	92.97	-282.27	1.57	0.45	134.72	
5,805.00	1.10	281.80	5,783.80	283.12	91.71	-283.12	0.93	0.11	-52.00	
5,895.00	0.40	187.40	5,873.80	282.98	90.83	-282.98	1.33	-0.78	-104.89	
5,985.00	0.50	299.60	5,963.79	282.86	90.45	-282.86	0.83	0.11	124.67	
6,075.00	0.60	274.60	6,053.79	283.09	89.64	-283.09	0.29	0.11	-27.78	
6,165.00	1.00	283.20	6,143.78	283.31	88.40	-283.31	0.46	0.44	9.56	
6,254.00	1.10	298.90	6,232.77	283.90	86.90	-283.90	0.34	0.11	17.64	
6,344.00	3.40	184.40	6,322.72	281.66	85.94	-281.66	4.43	2.56	-127.22	
6,389.00	6.90	177.60	6,367.53	277.63	85.95	-277.63	7.88	7.78	-15.11	
6,434.00	9.30	180.00	6,412.08	271.29	86.06	-271.29	5.38	5.33	5.33	
6,479.00	11.80	178.30	6,456.31	263.05	86.20	-263.05	5.60	5.56	-3.78	
6,524.00	14.40	175.30	6,500.14	252.87	86.79	-252.87	5.97	5.78	-6.67	
6,569.00	17.60	175.50	6,543.39	240.51	87.78	-240.51	7.11	7.11	0.44	
6,614.00	20.00	174.20	6,585.98	226.07	89.10	-226.07	5.41	5.33	-2.89	
6,658.00	23.30	175.30	6,626.87	209.91	90.57	-209.91	7.56	7.50	2.50	
6,703.00	25.50	176.70	6,667.85	191.36	91.86	-191.36	5.05	4.89	3.11	
6,748.00	28.20	177.60	6,708.00	171.07	92.86	-171.07	6.07	6.00	2.00	
6,793.00	31.80	178.30	6,746.96	148.59	93.66	-148.59	8.04	8.00	1.56	
6,838.00	35.80	180.00	6,784.35	123.56	94.01	-123.56	9.13	8.89	3.78	
6,883.00	39.70	181.30	6,819.93	96.02	93.68	-96.02	8.84	8.67	2.89	
6,928.00	44.10	178.80	6,853.41	65.98	93.68	-65.98	10.46	9.78	-5.56	
6,972.00	48.50	179.00	6,883.81	34.18	94.29	-34.18	10.01	10.00	0.45	
7,017.00	53.00	177.90	6,912.27	-0.64	95.25	0.64	10.18	10.00	-2.44	
7,062.00	57.20	177.40	6,938.01	-37.51	96.76	37.51	9.38	9.33	-1.11	
7,107.00	60.80	178.10	6,961.18	-76.04	98.27	76.04	8.11	8.00	1.56	
7,152.00	63.30	179.00	6,982.27	-115.78	99.27	115.78	5.83	5.56	2.00	
7,190.00	65.58	179.00	6,998.67	-150.05	99.87	150.05	6.00	6.00	0.00	
Crosses Sec13 1/2 Section 460' Setback										
7,197.00	66.00	179.00	7,001.54	-156.44	99.98	156.44	6.00	6.00	0.00	
7,242.00	68.90	178.50	7,018.79	-197.98	100.89	197.98	6.53	6.44	-1.11	
7,287.00	71.90	178.30	7,033.89	-240.35	102.08	240.35	6.68	6.67	-0.44	
7,332.00	74.20	178.80	7,047.01	-283.38	103.16	283.38	5.22	5.11	1.11	
7,377.00	77.00	179.50	7,058.20	-326.96	103.81	326.96	6.40	6.22	1.56	
7,422.00	79.10	178.80	7,067.51	-370.97	104.46	370.97	4.91	4.67	-1.56	
7,467.00	80.40	179.70	7,075.52	-415.25	105.04	415.25	3.50	2.89	2.00	

Survey Report

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Site:	Stroh 13GK-HZ Pad (True)	MD Reference:	4805+13 @ 4818.00usft (ensign 123)
Well:	13K-223	North Reference:	True
Wellbore:	Lateral	Survey Calculation Method:	Minimum Curvature
Design:	Lateral	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
7,512.00	83.00	178.80	7,082.02	-459.77	105.63	459.77	6.11	5.78	-2.00
7,557.00	86.60	178.50	7,086.09	-504.57	106.68	504.57	8.03	8.00	-0.67
7,589.00	88.17	177.38	7,087.55	-536.51	107.83	536.51	6.03	4.92	-3.50
7" Casing									
7,620.00	89.70	176.30	7,088.13	-567.46	109.54	567.46	6.03	4.92	-3.49
7,713.00	89.20	175.30	7,089.02	-660.20	116.35	660.20	1.20	-0.54	-1.08
7,806.00	88.50	177.60	7,090.89	-753.00	122.11	753.00	2.58	-0.75	2.47
7,899.00	88.30	179.90	7,093.48	-845.93	124.14	845.93	2.48	-0.22	2.47
7,992.00	89.50	179.20	7,095.27	-938.91	124.87	938.91	1.49	1.29	-0.75
8,085.00	90.00	178.50	7,095.68	-1,031.89	126.73	1,031.89	0.92	0.54	-0.75
8,178.00	89.50	180.00	7,096.08	-1,124.88	127.95	1,124.88	1.70	-0.54	1.61
8,272.00	91.00	179.20	7,095.67	-1,218.87	128.61	1,218.87	1.81	1.60	-0.85
8,365.00	91.20	178.80	7,093.89	-1,311.84	130.23	1,311.84	0.48	0.22	-0.43
8,455.00	90.60	180.90	7,092.47	-1,401.82	130.46	1,401.82	2.43	-0.67	2.33
8,545.00	90.00	180.20	7,092.00	-1,491.82	129.60	1,491.82	1.02	-0.67	-0.78
8,635.00	89.30	179.90	7,092.55	-1,581.82	129.52	1,581.82	0.85	-0.78	-0.33
8,724.00	90.40	181.30	7,092.78	-1,670.81	128.59	1,670.81	2.00	1.24	1.57
8,814.00	89.30	180.40	7,093.02	-1,760.79	127.25	1,760.79	1.58	-1.22	-1.00
8,903.00	89.20	180.40	7,094.18	-1,849.78	126.63	1,849.78	0.11	-0.11	0.00
8,949.00	89.25	180.66	7,094.81	-1,895.78	126.21	1,895.78	0.57	0.11	0.56
Crosses Sec13 South 460'Setback									
8,993.00	89.30	180.90	7,095.36	-1,939.77	125.61	1,939.77	0.57	0.11	0.56
9,083.00	90.00	180.60	7,095.91	-2,029.76	124.43	2,029.76	0.85	0.78	-0.33
9,173.00	87.90	179.70	7,097.56	-2,119.74	124.20	2,119.74	2.54	-2.33	-1.00
9,262.00	90.70	181.30	7,098.65	-2,208.72	123.42	2,208.72	3.62	3.15	1.80
9,352.00	87.40	179.50	7,100.14	-2,298.69	122.79	2,298.69	4.18	-3.67	-2.00
9,409.00	88.73	179.37	7,102.07	-2,355.65	123.35	2,355.65	2.34	2.33	-0.22
Crosses into Sec24									
9,442.00	89.50	179.30	7,102.58	-2,388.64	123.73	2,388.64	2.34	2.33	-0.22
9,531.00	91.20	180.90	7,102.03	-2,477.64	123.58	2,477.64	2.62	1.91	1.80
9,621.00	90.70	181.60	7,100.54	-2,567.60	121.62	2,567.60	0.96	-0.56	0.78
9,711.00	90.70	180.70	7,099.44	-2,657.57	119.81	2,657.57	1.00	0.00	-1.00
9,801.00	90.20	179.20	7,098.73	-2,747.57	119.89	2,747.57	1.76	-0.56	-1.67
9,869.00	89.90	179.43	7,098.67	-2,815.56	120.70	2,815.56	0.56	-0.44	0.33
Crosses Sec24 North 460'Setback									
9,891.00	89.80	179.50	7,098.73	-2,837.56	120.91	2,837.56	0.56	-0.44	0.33
9,980.00	90.60	180.60	7,098.42	-2,926.56	120.83	2,926.56	1.53	0.90	1.24
10,070.00	90.70	179.70	7,097.40	-3,016.55	120.60	3,016.55	1.01	0.11	-1.00
10,160.00	90.10	177.70	7,096.77	-3,106.52	122.64	3,106.52	2.32	-0.67	-2.22
10,250.00	89.70	178.80	7,096.93	-3,196.48	125.39	3,196.48	1.30	-0.44	1.22
10,340.00	89.10	179.90	7,097.87	-3,286.47	126.41	3,286.47	1.39	-0.67	1.22
10,430.00	90.40	181.30	7,098.27	-3,376.46	125.47	3,376.46	2.12	1.44	1.56
10,519.00	89.50	179.90	7,098.34	-3,465.45	124.53	3,465.45	1.87	-1.01	-1.57
10,609.00	90.40	181.80	7,098.42	-3,555.43	123.20	3,555.43	2.34	1.00	2.11

Survey Report

Company:	PDC ENERGY	Local Co-ordinate Reference:	Well 13K-223 - Slot 13K-223
Project:	Weld County, CO (NAD83)	TVD Reference:	4805+13 @ 4818.00usft (ensign 123)
Site:	Stroh 13GK-HZ Pad (True)	MD Reference:	4805+13 @ 4818.00usft (ensign 123)
Well:	13K-223	North Reference:	True
Wellbore:	Lateral	Survey Calculation Method:	Minimum Curvature
Design:	Lateral	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
10,699.00	90.20	181.10	7,097.95	-3,645.40	120.92	3,645.40	0.81	-0.22	-0.78
10,789.00	88.70	178.80	7,098.81	-3,735.39	121.00	3,735.39	3.05	-1.67	-2.56
10,879.00	87.70	179.50	7,101.64	-3,825.33	122.33	3,825.33	1.36	-1.11	0.78
10,969.00	87.70	181.60	7,105.25	-3,915.25	121.47	3,915.25	2.33	0.00	2.33
11,059.00	89.20	182.80	7,107.69	-4,005.15	118.02	4,005.15	2.13	1.67	1.33
11,149.00	90.00	184.10	7,108.32	-4,094.98	112.60	4,094.98	1.70	0.89	1.44
11,239.00	90.60	182.30	7,107.84	-4,184.84	107.58	4,184.84	2.11	0.67	-2.00
11,329.00	91.10	183.40	7,106.51	-4,274.71	103.10	4,274.71	1.34	0.56	1.22
11,419.00	90.70	182.80	7,105.10	-4,364.57	98.24	4,364.57	0.80	-0.44	-0.67
11,509.00	90.30	181.80	7,104.31	-4,454.49	94.62	4,454.49	1.20	-0.44	-1.11
11,599.00	91.20	181.40	7,103.13	-4,544.45	92.11	4,544.45	1.09	1.00	-0.44
11,688.00	90.80	180.90	7,101.58	-4,633.42	90.33	4,633.42	0.72	-0.45	-0.56
11,778.00	90.00	178.80	7,100.95	-4,723.41	90.56	4,723.41	2.50	-0.89	-2.33
11,868.00	89.30	177.20	7,101.50	-4,813.35	93.70	4,813.35	1.94	-0.78	-1.78
11,958.00	90.30	178.50	7,101.81	-4,903.28	97.08	4,903.28	1.82	1.11	1.44
12,048.00	91.30	178.50	7,100.56	-4,993.24	99.43	4,993.24	1.11	1.11	0.00
12,137.00	90.90	177.60	7,098.85	-5,082.17	102.46	5,082.17	1.11	-0.45	-1.01
12,227.00	90.20	177.00	7,097.99	-5,172.07	106.70	5,172.07	1.02	-0.78	-0.67
12,317.00	89.70	178.10	7,098.06	-5,261.98	110.55	5,261.98	1.34	-0.56	1.22
12,407.00	89.90	180.00	7,098.38	-5,351.97	112.04	5,351.97	2.12	0.22	2.11
12,497.00	90.60	180.00	7,097.99	-5,441.96	112.04	5,441.96	0.78	0.78	0.00
12,587.00	90.10	178.50	7,097.44	-5,531.95	113.22	5,531.95	1.76	-0.56	-1.67
12,676.00	89.60	179.70	7,097.67	-5,620.94	114.62	5,620.94	1.46	-0.56	1.35
12,766.00	90.90	181.30	7,097.28	-5,710.93	113.83	5,710.93	2.29	1.44	1.78
12,856.00	90.30	180.40	7,096.33	-5,800.91	112.50	5,800.91	1.20	-0.67	-1.00
12,946.00	90.70	181.80	7,095.55	-5,890.89	110.77	5,890.89	1.62	0.44	1.56
13,036.00	90.10	179.30	7,094.92	-5,980.88	109.91	5,980.88	2.86	-0.67	-2.78
13,125.00	91.10	179.70	7,093.99	-6,069.87	110.68	6,069.87	1.21	1.12	0.45
13,215.00	89.80	177.60	7,093.28	-6,159.83	112.80	6,159.83	2.74	-1.44	-2.33
13,305.00	91.40	178.10	7,092.34	-6,249.76	116.18	6,249.76	1.86	1.78	0.56
13,394.00	92.10	179.30	7,089.62	-6,338.69	118.20	6,338.69	1.56	0.79	1.35
13,484.00	92.90	180.00	7,085.69	-6,428.61	118.75	6,428.61	1.18	0.89	0.78
13,574.00	93.00	179.00	7,081.06	-6,518.48	119.53	6,518.48	1.12	0.11	-1.11
13,664.00	91.90	179.20	7,077.22	-6,608.39	120.94	6,608.39	1.24	-1.22	0.22
13,754.00	91.80	178.30	7,074.31	-6,698.32	122.91	6,698.32	1.01	-0.11	-1.00
13,844.00	91.80	177.70	7,071.48	-6,788.22	126.04	6,788.22	0.67	0.00	-0.67
13,934.00	91.60	176.50	7,068.81	-6,878.06	130.60	6,878.06	1.35	-0.22	-1.33
14,024.00	91.60	176.20	7,066.30	-6,967.84	136.32	6,967.84	0.33	0.00	-0.33
14,113.00	91.40	175.30	7,063.97	-7,056.57	142.92	7,056.57	1.04	-0.22	-1.01
14,127.00	91.40	175.10	7,063.63	-7,070.51	144.09	7,070.51	1.43	0.00	-1.43
14,171.31	91.40	175.10	7,062.55	-7,114.65	147.87	7,114.65	0.00	0.00	0.00
Stroh 13K-223 PBHL p1									
14,173.00	91.40	175.10	7,062.50	-7,116.33	148.02	7,116.33	0.00	0.00	0.00

Survey Report

Company:	PDC ENERGY	Local Co-ordinate Reference:	Well 13K-223 - Slot 13K-223
Project:	Weld County, CO (NAD83)	TVD Reference:	4805+13 @ 4818.00usft (ensign 123)
Site:	Stroh 13GK-HZ Pad (True)	MD Reference:	4805+13 @ 4818.00usft (ensign 123)
Well:	13K-223	North Reference:	True
Wellbore:	Lateral	Survey Calculation Method:	Minimum Curvature
Design:	Lateral	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
TD									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
Stroh 13K-223 SL	0.00	0.00	0.00	0.00	0.00	1,356,827.628	3,183,286.848	40.311028	-104.842760
- actual wellpath hits target center									
- Point									
Stroh 13K-223 BHL	0.00	0.00	7,062.50	-7,116.33	148.02	1,349,712.591	3,183,487.609	40.291493	-104.842229
- actual wellpath misses target center by 0.01usft at 14173.00usft MD (7062.50 TVD, -7116.33 N, 148.02 E)									
- Point									

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
7,190.00	6,998.67	-150.05	99.87	Crosses Sec13 1/2 Section 460' Setback	
7,589.00	7,087.55	-536.51	107.83	7" Casing	
8,949.00	7,094.81	-1,895.78	126.21	Crosses Sec13 South 460'Setback	
9,409.00	7,102.07	-2,355.65	123.35	Crosses into Sec24	
9,869.00	7,098.67	-2,815.56	120.70	Crosses Sec24 North 460'Setback	
14,173.00	7,062.50	-7,116.33	148.02	TD	