

# Petro Operating Company

Location Weld County, CO Slot BEF West 19  
Field Wattenberg Well W BEF West 19  
Installation Brighton East Farm Pad Wellbore W BEF West 19 (PWB)

Tie on - 0.00 Inc, 21.00 MD, 21.00 TVD, 0.00 VS

Scale 1 cm = 400 ft

East (Feet) ->

-5600 -4800 -4000 -3200 -2400 -1600 -800 -0 800 1600

BEF WEST 19 BHL

BEF WEST 19 EP

W BEF West 19 (PWB)

Surface 0.00 N 0.00 E

3DS Kick off Point - 0.00 Inc, 1500.00 MD, 1500.00 TVD, 0.00 VS

End of Build - 10.42 Inc, 1934.36 MD, 1931.97 TVD, -1.08 VS

## WELL PROFILE DATA

Point	MD	Inc	Azi	TVD	North	East	deg/100ft	V. Sect
Tie on	21.00	0.00	0.00	21.00	S 0.00	W 0.00		0.00
KOP	1500.00	0.00	13.67	1500.00	S 0.00	W 0.00	0.00	0.00
End of Build	1934.36	10.42	13.67	1931.97	N 38.29	E 9.31	2.40	-1.08
End of Hold	7045.60	10.42	13.67	6958.84	N 936.92	E 227.92	0.00	-26.36
Target BEF WEST 19 EP	7817.04	90.00	269.30	7450.00	N 1018.66	W 250.09	12.00	458.17
T.D. & Target BEF...BHL	12075.36	90.00	269.30	7450.00	N 966.97	W 4508.10	0.00	4610.64

N  
GRID

Oct-6-2017  
EMMA-2015 (2000.0-2020.0) Dip: 66.30 deg Field: 52108 S 17  
Loc: N29 59 33.9000 Long: W104 44 4.8840 Elev: 5047.00 ft  
Magnetic North is 8.22 deg East of True North  
GRID North is 0.49 deg East of True North  
To correct azimuth from True to GRID subtract 0.49 deg  
To correct azimuth from Magnetic to GRID add 7.72 deg

Created by admin  
Date plotted 21-Feb-2018

Plot reference is W BEF West 19 (PWB).  
Ref wellpath is W BEF West 19 (PWP#1).  
Coordinates are in Feet reference BEF West 19.  
True Vertical Depths are reference Rig Datum.  
Measured Depths are reference Rig Datum.  
Rig Datum: Planned Datum #1  
Rig Datum to Mean Sea Level: 5068.00 ft.  
Plot North is aligned to GRID North.

End of Hold - 10.42 Inc, 7045.60 MD, 6958.84 TVD, -26.36 VS

S/C Kick off Point - 90.00 Inc, 7817.04 MD, 7450.00 TVD, 458.17 VS

T.D. & End of Hold - 7450.00 TVD, 966.97 N 4508.10 W

BEF WEST 19 EP

BEF WEST 19 BHL

W BEF West 19 (PWB)

Scale 1 cm = 200 ft

Vertical Section (Feet) ->

Azimuth 282.11 with reference 0.00 N, 0.00 E from BEF West 19



SYSDRILL  
Well Design Combined Report  
Wellbore: W BEF West 19 (PWB)



Wellhead Details							
Name	Latitude	Longitude	Northing	Easting	North	East	Slot Elevation Above Ground
BEF West 19	39.99481000	-104.73470000	1241881.4997	3214415.1978	750.38N	9.28W	0.00

Declination		
Date	Source	Time
Oct-6-2017	EMM-2015 [2000.0-2020.0]	14:35

Installation Details						
Name	Installation Position (Latitude)	Installation Position (Longitude)	Northing	Easting	Coord System Name	North Alignment
Brighton East Farm Pad	39.99275000	-104.73469000	1241131.1481	3214424.4758	CO83-NF on NORTH AMERICAN DATUM 1983 datum	Grid

Summary Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	Vertical Depth SS	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]
21.00	0.00	0.000	21.00	-5047.00	0.00N	0.00E		0.00
1500.00	0.00	13.670	1500.00	-3568.00	0.00N	0.00E	==>	0.00
1934.36	10.42	13.670	1931.97	-3136.03	38.29N	9.31E	2.40	-1.08
7045.60	10.42	13.670	6958.84	1890.84	936.92N	227.92E	==>	-26.36
7817.04	90.00	269.300	7450.00	2382.00	1018.66N	250.09W	12.00	458.17
12075.36	90.00	269.300	7450.00	2382.00	966.97N	4508.10W	==>	4610.64

Interpolated Wellpath									
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Station Position (Latitude)	Station Position (Longitude)
0.00	0.00	0.000	0.00	0.00N	0.00E		0.00	39.99481000	-104.73470000
21.00	0.00	0.000	21.00	0.00N	0.00E	==>	0.00	39.99481000	-104.73470000
100.00	0.00	0.000	100.00	0.00N	0.00E	==>	0.00	39.99481000	-104.73470000
200.00	0.00	0.000	200.00	0.00N	0.00E	==>	0.00	39.99481000	-104.73470000
300.00	0.00	0.000	300.00	0.00N	0.00E	==>	0.00	39.99481000	-104.73470000
400.00	0.00	0.000	400.00	0.00N	0.00E	==>	0.00	39.99481000	-104.73470000
500.00	0.00	0.000	500.00	0.00N	0.00E	==>	0.00	39.99481000	-104.73470000
600.00	0.00	0.000	600.00	0.00N	0.00E	==>	0.00	39.99481000	-104.73470000
700.00	0.00	0.000	700.00	0.00N	0.00E	==>	0.00	39.99481000	-104.73470000
800.00	0.00	0.000	800.00	0.00N	0.00E	==>	0.00	39.99481000	-104.73470000
900.00	0.00	0.000	900.00	0.00N	0.00E	==>	0.00	39.99481000	-104.73470000
1000.00	0.00	0.000	1000.00	0.00N	0.00E	==>	0.00	39.99481000	-104.73470000
1100.00	0.00	0.000	1100.00	0.00N	0.00E	==>	0.00	39.99481000	-104.73470000
1200.00	0.00	0.000	1200.00	0.00N	0.00E	==>	0.00	39.99481000	-104.73470000
1300.00	0.00	0.000	1300.00	0.00N	0.00E	==>	0.00	39.99481000	-104.73470000
1400.00	0.00	0.000	1400.00	0.00N	0.00E	==>	0.00	39.99481000	-104.73470000
1500.00	0.00	13.670	1500.00	0.00N	0.00E	==>	0.00	39.99481000	-104.73470000
1600.00	2.40	13.670	1599.97	2.03N	0.49E	2.40	-0.06	39.99481557	-104.73469817
1700.00	4.80	13.670	1699.77	8.14N	1.98E	2.40	-0.23	39.99483228	-104.73469269
1800.00	7.20	13.670	1799.21	18.29N	4.45E	2.40	-0.51	39.99486010	-104.73468356
1900.00	9.60	13.670	1898.13	32.48N	7.90E	2.40	-0.91	39.99489898	-104.73467080
2000.00	10.42	13.670	1996.52	49.83N	12.12E	==>	-1.40	39.99494649	-104.73465520
2100.00	10.42	13.670	2094.87	67.41N	16.40E	==>	-1.90	39.99499465	-104.73463940
2200.00	10.42	13.670	2193.22	84.99N	20.68E	==>	-2.39	39.99504281	-104.73462359
2300.00	10.42	13.670	2291.57	102.57N	24.95E	==>	-2.89	39.99509097	-104.73460779
2400.00	10.42	13.670	2389.92	120.16N	29.23E	==>	-3.38	39.99513913	-104.73459198
2500.00	10.42	13.670	2488.27	137.74N	33.51E	==>	-3.87	39.99518729	-104.73457617
2600.00	10.42	13.670	2586.62	155.32N	37.78E	==>	-4.37	39.99523545	-104.73456037
2700.00	10.42	13.670	2684.97	172.90N	42.06E	==>	-4.86	39.99528361	-104.73454456
2800.00	10.42	13.670	2783.32	190.48N	46.34E	==>	-5.36	39.99533177	-104.73452876
2900.00	10.42	13.670	2881.67	208.06N	50.61E	==>	-5.85	39.99537993	-104.73451295
3000.00	10.42	13.670	2980.02	225.64N	54.89E	==>	-6.35	39.99542809	-104.73449714
3100.00	10.42	13.670	3078.37	243.23N	59.17E	==>	-6.84	39.99547625	-104.73448134
3200.00	10.42	13.670	3176.72	260.81N	63.45E	==>	-7.34	39.99552441	-104.73446553

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Coordinates are from Slot MD's are from Rig and TVD's are from Rig ( Planned Datum #1 5068.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 282.110 degrees  
Bottom hole distance is 4610.64 Feet on azimuth 282.11 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by IPT  
Date Printed: 21-Feb-2018

Interpolated Wellpath									
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Station Position (Latitude)	Station Position (Longitude)
3300.00	10.42	13.670	3275.07	278.39N	67.72E	==>	-7.83	39.99557257	-104.73444973
3400.00	10.42	13.670	3373.42	295.97N	72.00E	==>	-8.33	39.99562073	-104.73443392
3500.00	10.42	13.670	3471.76	313.55N	76.28E	==>	-8.82	39.99566889	-104.73441811
3600.00	10.42	13.670	3570.11	331.13N	80.55E	==>	-9.31	39.99571705	-104.73440231
3700.00	10.42	13.670	3668.46	348.71N	84.83E	==>	-9.81	39.99576521	-104.73438650
3800.00	10.42	13.670	3766.81	366.30N	89.11E	==>	-10.30	39.99581337	-104.73437069
3900.00	10.42	13.670	3865.16	383.88N	93.38E	==>	-10.80	39.99586153	-104.73435489
4000.00	10.42	13.670	3963.51	401.46N	97.66E	==>	-11.29	39.99590969	-104.73433908
4100.00	10.42	13.670	4061.86	419.04N	101.94E	==>	-11.79	39.99595784	-104.73432328
4200.00	10.42	13.670	4160.21	436.62N	106.21E	==>	-12.28	39.99600600	-104.73430747
4300.00	10.42	13.670	4258.56	454.20N	110.49E	==>	-12.78	39.99605416	-104.73429166
4400.00	10.42	13.670	4356.91	471.78N	114.77E	==>	-13.27	39.99610232	-104.73427586
4500.00	10.42	13.670	4455.26	489.37N	119.05E	==>	-13.77	39.99615048	-104.73426005
4600.00	10.42	13.670	4553.61	506.95N	123.32E	==>	-14.26	39.99619864	-104.73424424
4700.00	10.42	13.670	4651.96	524.53N	127.60E	==>	-14.75	39.99624680	-104.73422844
4800.00	10.42	13.670	4750.31	542.11N	131.88E	==>	-15.25	39.99629496	-104.73421263
4900.00	10.42	13.670	4848.66	559.69N	136.15E	==>	-15.74	39.99634312	-104.73419682
5000.00	10.42	13.670	4947.01	577.27N	140.43E	==>	-16.24	39.99639128	-104.73418102
5100.00	10.42	13.670	5045.35	594.85N	144.71E	==>	-16.73	39.99643944	-104.73416521
5200.00	10.42	13.670	5143.70	612.44N	148.98E	==>	-17.23	39.99648760	-104.73414941
5300.00	10.42	13.670	5242.05	630.02N	153.26E	==>	-17.72	39.99653576	-104.73413360
5400.00	10.42	13.670	5340.40	647.60N	157.54E	==>	-18.22	39.99658392	-104.73411779
5500.00	10.42	13.670	5438.75	665.18N	161.82E	==>	-18.71	39.99663208	-104.73410199
5600.00	10.42	13.670	5537.10	682.76N	166.09E	==>	-19.21	39.99668024	-104.73408618
5700.00	10.42	13.670	5635.45	700.34N	170.37E	==>	-19.70	39.99672840	-104.73407037
5800.00	10.42	13.670	5733.80	717.92N	174.65E	==>	-20.20	39.99677656	-104.73405457
5900.00	10.42	13.670	5832.15	735.51N	178.92E	==>	-20.69	39.99682472	-104.73403876
6000.00	10.42	13.670	5930.50	753.09N	183.20E	==>	-21.18	39.99687288	-104.73402295
6100.00	10.42	13.670	6028.85	770.67N	187.48E	==>	-21.68	39.99692103	-104.73400715
6200.00	10.42	13.670	6127.20	788.25N	191.75E	==>	-22.17	39.99696919	-104.73399134
6300.00	10.42	13.670	6225.55	805.83N	196.03E	==>	-22.67	39.99701735	-104.73397553
6400.00	10.42	13.670	6323.90	823.41N	200.31E	==>	-23.16	39.99706551	-104.73395973
6500.00	10.42	13.670	6422.25	840.99N	204.59E	==>	-23.66	39.99711367	-104.73394392
6600.00	10.42	13.670	6520.60	858.58N	208.86E	==>	-24.15	39.99716183	-104.73392811
6700.00	10.42	13.670	6618.94	876.16N	213.14E	==>	-24.65	39.99720999	-104.73391230
6800.00	10.42	13.670	6717.29	893.74N	217.42E	==>	-25.14	39.99725815	-104.73389650
6900.00	10.42	13.670	6815.64	911.32N	221.69E	==>	-25.64	39.99730631	-104.73388069
7000.00	10.42	13.670	6913.99	928.90N	225.97E	==>	-26.13	39.99735447	-104.73386488
7100.00	10.84	337.800	7012.36	946.45N	227.15E	12.00	-23.60	39.99740261	-104.73386014
7200.00	18.82	300.840	7109.15	963.49N	209.68E	12.00	-2.95	39.99744980	-104.73392194
7300.00	29.59	287.600	7200.29	979.28N	172.17E	12.00	37.04	39.99749403	-104.73405534
7400.00	41.00	281.130	7281.81	993.13N	116.25E	12.00	94.62	39.99753337	-104.73425452
7500.00	52.65	277.120	7350.13	1004.43N	44.36E	12.00	167.29	39.99756610	-104.73451075
7600.00	64.39	274.210	7402.27	1012.70N	40.36W	12.00	251.85	39.99759080	-104.73481285
7700.00	76.18	271.820	7435.95	1017.56N	134.20W	12.00	344.62	39.99760637	-104.73514761
7800.00	87.99	269.660	7449.70	1018.81N	233.05W	12.00	441.54	39.99761215	-104.73550040
7900.00	90.00	269.300	7450.00	1017.65N	333.04W	==>	539.06	39.99761133	-104.73585731
8000.00	90.00	269.300	7450.00	1016.44N	433.04W	==>	636.58	39.99761036	-104.73621423
8100.00	90.00	269.300	7450.00	1015.22N	533.03W	==>	734.09	39.99760939	-104.73657115
8200.00	90.00	269.300	7450.00	1014.01N	633.02W	==>	831.61	39.99760842	-104.73692807
8300.00	90.00	269.300	7450.00	1012.80N	733.01W	==>	929.12	39.99760745	-104.73728499
8400.00	90.00	269.300	7450.00	1011.58N	833.01W	==>	1026.64	39.99760648	-104.73764191
8500.00	90.00	269.300	7450.00	1010.37N	933.00W	==>	1124.15	39.99760551	-104.73799883
8600.00	90.00	269.300	7450.00	1009.15N	1032.99W	==>	1221.66	39.99760453	-104.73835575
8700.00	90.00	269.300	7450.00	1007.94N	1132.98W	==>	1319.18	39.99760356	-104.73871267
8800.00	90.00	269.300	7450.00	1006.73N	1232.98W	==>	1416.69	39.99760258	-104.73906959
8900.00	90.00	269.300	7450.00	1005.51N	1332.97W	==>	1514.21	39.99760161	-104.73942651
9000.00	90.00	269.300	7450.00	1004.30N	1432.96W	==>	1611.72	39.99760063	-104.73978343

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Vertical Section is from 0.00N 0.00E on azimuth 282.110 degrees  
Bottom hole distance is 4610.64 Feet on azimuth 282.11 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
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SYSDRILL  
Well Design Combined Report  
Wellbore: W BEF West 19 (PWB)



Interpolated Wellpath									
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Station Position (Latitude)	Station Position (Longitude)
9100.00	90.00	269.300	7450.00	1003.09N	1532.95W	==>	1709.23	39.99759965	-104.74014035
9200.00	90.00	269.300	7450.00	1001.87N	1632.95W	==>	1806.75	39.99759867	-104.74049727
9300.00	90.00	269.300	7450.00	1000.66N	1732.94W	==>	1904.26	39.99759769	-104.74085419
9400.00	90.00	269.300	7450.00	999.44N	1832.93W	==>	2001.78	39.99759670	-104.74121111
9500.00	90.00	269.300	7450.00	998.23N	1932.93W	==>	2099.29	39.99759572	-104.74156803
9600.00	90.00	269.300	7450.00	997.02N	2032.92W	==>	2196.81	39.99759473	-104.74192495
9700.00	90.00	269.300	7450.00	995.80N	2132.91W	==>	2294.32	39.99759375	-104.74228187
9800.00	90.00	269.300	7450.00	994.59N	2232.90W	==>	2391.83	39.99759276	-104.74263879
9900.00	90.00	269.300	7450.00	993.37N	2332.90W	==>	2489.35	39.99759177	-104.74299571
10000.00	90.00	269.300	7450.00	992.16N	2432.89W	==>	2586.86	39.99759078	-104.74335262
10100.00	90.00	269.300	7450.00	990.95N	2532.88W	==>	2684.38	39.99758979	-104.74370954
10200.00	90.00	269.300	7450.00	989.73N	2632.87W	==>	2781.89	39.99758880	-104.74406646
10300.00	90.00	269.300	7450.00	988.52N	2732.87W	==>	2879.41	39.99758781	-104.74442338
10400.00	90.00	269.300	7450.00	987.31N	2832.86W	==>	2976.92	39.99758681	-104.74478030
10500.00	90.00	269.300	7450.00	986.09N	2932.85W	==>	3074.43	39.99758582	-104.74513722
10600.00	90.00	269.300	7450.00	984.88N	3032.84W	==>	3171.95	39.99758482	-104.74549414
10700.00	90.00	269.300	7450.00	983.66N	3132.84W	==>	3269.46	39.99758383	-104.74585106
10800.00	90.00	269.300	7450.00	982.45N	3232.83W	==>	3366.98	39.99758283	-104.74620798
10900.00	90.00	269.300	7450.00	981.24N	3332.82W	==>	3464.49	39.99758183	-104.74656490
11000.00	90.00	269.300	7450.00	980.02N	3432.81W	==>	3562.01	39.99758083	-104.74692182
11100.00	90.00	269.300	7450.00	978.81N	3532.81W	==>	3659.52	39.99757983	-104.74727874
11200.00	90.00	269.300	7450.00	977.59N	3632.80W	==>	3757.03	39.99757882	-104.74763566
11300.00	90.00	269.300	7450.00	976.38N	3732.79W	==>	3854.55	39.99757782	-104.74799258
11400.00	90.00	269.300	7450.00	975.17N	3832.79W	==>	3952.06	39.99757682	-104.74834950
11500.00	90.00	269.300	7450.00	973.95N	3932.78W	==>	4049.58	39.99757581	-104.74870642
11600.00	90.00	269.300	7450.00	972.74N	4032.77W	==>	4147.09	39.99757480	-104.74906334
11700.00	90.00	269.300	7450.00	971.52N	4132.76W	==>	4244.61	39.99757379	-104.74942026
11800.00	90.00	269.300	7450.00	970.31N	4232.76W	==>	4342.12	39.99757278	-104.74977718
11900.00	90.00	269.300	7450.00	969.10N	4332.75W	==>	4439.63	39.99757177	-104.75013409
12000.00	90.00	269.300	7450.00	967.88N	4432.74W	==>	4537.15	39.99757076	-104.75049101
12075.36	90.00	269.300	7450.00	966.97N	4508.10W	==>	4610.64	39.99757000	-104.75076000

All data is in Feet unless otherwise stated  
Coordinates are from Slot MD's are from Rig and TVD's are from Rig ( Planned Datum #1 5068.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 282.110 degrees  
Bottom hole distance is 4610.64 Feet on azimuth 282.11 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by IPT  
Date Printed: 21-Feb-2018



SYSDRILL  
Well Design Combined Report  
Wellbore: W BEF West 19 (PWB)



Targets							
Name	North[ft]	East[ft]	TVD[ft]	Latitude	Longitude	Northing	Easting
BEF WEST 19 BHL	966.97N	4508.10W	7450.00	39.99757000	-104.75076000	1242848.43	3209907.26
BEF WEST 19 EP	1018.66N	160.09W	7450.00	39.99761000	-104.73524000	1242900.12	3214255.11

Survey Tool Program						
Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool	Error Model	
577682	Planned	2000.00	1996.52	WdW Rate Gyro	Standard	
577681	Planned	12075.36	7450.00	ISCWSA MWD	Rev 4 + SAG + FLT	

Notes