

# Petro Operating Company

Location Weld County, CO Slot BEF West 13  
Field Wattenberg Well W BEF West 13  
Installation Brighton East Farm Pad Wellbore W BEF West 13 (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 13 BHL

BEF WEST 13 EP

W BEF West 13 (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 - 2.68 Inc, 1611.75 MD, 1611.71 TVD, -2.58 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	80.63	1500.00	S 0.00	W 0.00	0.00	-0.00
End of Build	1611.75	2.68	80.63	1611.71	N 0.43	E 2.58	2.40	-2.58
End of Hold	6956.36	2.68	80.63	6950.46	N 41.14	E 249.33	0.00	-249.45
Target BEF WEST 13 EP	7728.45	90.00	269.30	7450.00	N 38.89	W 227.63	12.00	227.52
T.D. & Target BEF...BHL	11989.76	90.00	269.30	7450.00	S 12.83	W 4488.63	0.00	4488.65

N  
GRID

Oct-6-2017  
EMM-2015 (2000.0-2020.0) Dep: 66.39 deg Field: 52108.9 nT  
Lat: N39 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 13 (PWB).  
Ref wellpath is W BEF West 13 (PWP#1).  
Coordinates are in Feet reference BEF West 13.  
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 - 2.68 Inc, 6956.36 MD, 6950.46 TVD, -249.45 VS

S/C Kick off Point - 90.00 Inc, 7728.45 MD, 7450.00 TVD, 227.52 VS

T.D. & End of Hold - 7450.00 TVD, 12.83 S 4488.63 W

BEF WEST 13 EP

BEF WEST 13 BHL

W BEF West 13 (PWB)

Scale 1 cm = 200 ft

<- True Vertical Depth (Feet)

<- North (Feet) : South (Feet) ->  
Scale 1 cm = 400 ft

-800 -400 0 400 800 1200 1600 2000 2400 2800 3200 3600 4000 4400 4800

Scale 1 cm = 200 ft

Vertical Section (Feet) ->

Azimuth 269.84 with reference 0.00 N, 0.00 E from BEF West 13



SYSDRILL  
Well Design Combined Report  
Wellbore: W BEF West 13 (PWB)



### Wellhead Details

Name	Latitude	Longitude	Northing	Easting	North	East	Slot Elevation Above Ground
BEF West 13	39.99454000	-104.73470000	1241783.1495	3214416.0466	652.02N	8.43W	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	80.630	1500.00	-3568.00	0.00N	0.00E	==>	0.00
1611.75	2.68	80.630	1611.71	-3456.29	0.43N	2.58E	2.40	-2.58
6956.36	2.68	80.630	6950.46	1882.46	41.14N	249.33E	==>	-249.45
7728.45	90.00	269.300	7450.00	2382.00	38.89N	227.63W	12.00	227.52
11989.76	90.00	269.300	7450.00	2382.00	12.83S	4488.63W	==>	4488.65

### 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	39.99454000	-104.73470000
21.00	0.00	0.000	21.00	0.00N	0.00E	==>	0.00	39.99454000	-104.73470000
100.00	0.00	0.000	100.00	0.00N	0.00E	==>	0.00	39.99454000	-104.73470000
200.00	0.00	0.000	200.00	0.00N	0.00E	==>	0.00	39.99454000	-104.73470000
300.00	0.00	0.000	300.00	0.00N	0.00E	==>	0.00	39.99454000	-104.73470000
400.00	0.00	0.000	400.00	0.00N	0.00E	==>	0.00	39.99454000	-104.73470000
500.00	0.00	0.000	500.00	0.00N	0.00E	==>	0.00	39.99454000	-104.73470000
600.00	0.00	0.000	600.00	0.00N	0.00E	==>	0.00	39.99454000	-104.73470000
700.00	0.00	0.000	700.00	0.00N	0.00E	==>	0.00	39.99454000	-104.73470000
800.00	0.00	0.000	800.00	0.00N	0.00E	==>	0.00	39.99454000	-104.73470000
900.00	0.00	0.000	900.00	0.00N	0.00E	==>	0.00	39.99454000	-104.73470000
1000.00	0.00	0.000	1000.00	0.00N	0.00E	==>	0.00	39.99454000	-104.73470000
1100.00	0.00	0.000	1100.00	0.00N	0.00E	==>	0.00	39.99454000	-104.73470000
1200.00	0.00	0.000	1200.00	0.00N	0.00E	==>	0.00	39.99454000	-104.73470000
1300.00	0.00	0.000	1300.00	0.00N	0.00E	==>	0.00	39.99454000	-104.73470000
1400.00	0.00	0.000	1400.00	0.00N	0.00E	==>	0.00	39.99454000	-104.73470000
1500.00	0.00	80.630	1500.00	0.00N	0.00E	==>	0.00	39.99454000	-104.73470000
1600.00	2.40	80.630	1599.97	0.34N	2.07E	2.40	-2.07	39.99454089	-104.73469262
1700.00	2.68	80.630	1699.86	1.10N	6.65E	==>	-6.66	39.99454286	-104.73467622
1800.00	2.68	80.630	1799.75	1.86N	11.27E	==>	-11.28	39.99454484	-104.73465972
1900.00	2.68	80.630	1899.64	2.62N	15.89E	==>	-15.90	39.99454682	-104.73464322
2000.00	2.68	80.630	1999.53	3.38N	20.50E	==>	-20.51	39.99454880	-104.73462672
2100.00	2.68	80.630	2099.42	4.15N	25.12E	==>	-25.13	39.99455078	-104.73461021
2200.00	2.68	80.630	2199.31	4.91N	29.74E	==>	-29.75	39.99455277	-104.73459371
2300.00	2.68	80.630	2299.21	5.67N	34.36E	==>	-34.37	39.99455475	-104.73457721
2400.00	2.68	80.630	2399.10	6.43N	38.97E	==>	-38.99	39.99455673	-104.73456071
2500.00	2.68	80.630	2498.99	7.19N	43.59E	==>	-43.61	39.99455871	-104.73454421
2600.00	2.68	80.630	2598.88	7.96N	48.21E	==>	-48.23	39.99456069	-104.73452771
2700.00	2.68	80.630	2698.77	8.72N	52.82E	==>	-52.85	39.99456268	-104.73451121
2800.00	2.68	80.630	2798.66	9.48N	57.44E	==>	-57.47	39.99456466	-104.73449471
2900.00	2.68	80.630	2898.55	10.24N	62.06E	==>	-62.09	39.99456664	-104.73447821
3000.00	2.68	80.630	2998.44	11.00N	66.67E	==>	-66.70	39.99456862	-104.73446171
3100.00	2.68	80.630	3098.33	11.76N	71.29E	==>	-71.32	39.99457060	-104.73444521
3200.00	2.68	80.630	3198.22	12.53N	75.91E	==>	-75.94	39.99457259	-104.73442871

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 269.840 degrees  
Bottom hole distance is 4488.65 Feet on azimuth 269.84 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 13 (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)
3300.00	2.68	80.630	3298.11	13.29N	80.52E	==>	-80.56	39.99457457	-104.73441221
3400.00	2.68	80.630	3398.00	14.05N	85.14E	==>	-85.18	39.99457655	-104.73439571
3500.00	2.68	80.630	3497.89	14.81N	89.76E	==>	-89.80	39.99457853	-104.73437921
3600.00	2.68	80.630	3597.78	15.57N	94.37E	==>	-94.42	39.99458051	-104.73436271
3700.00	2.68	80.630	3697.67	16.34N	98.99E	==>	-99.04	39.99458250	-104.73434621
3800.00	2.68	80.630	3797.56	17.10N	103.61E	==>	-103.66	39.99458448	-104.73432971
3900.00	2.68	80.630	3897.45	17.86N	108.22E	==>	-108.27	39.99458646	-104.73431321
4000.00	2.68	80.630	3997.34	18.62N	112.84E	==>	-112.89	39.99458844	-104.73429671
4100.00	2.68	80.630	4097.23	19.38N	117.46E	==>	-117.51	39.99459042	-104.73428020
4200.00	2.68	80.630	4197.12	20.14N	122.07E	==>	-122.13	39.99459240	-104.73426370
4300.00	2.68	80.630	4297.01	20.91N	126.69E	==>	-126.75	39.99459439	-104.73424720
4400.00	2.68	80.630	4396.91	21.67N	131.31E	==>	-131.37	39.99459637	-104.73423070
4500.00	2.68	80.630	4496.80	22.43N	135.92E	==>	-135.99	39.99459835	-104.73421420
4600.00	2.68	80.630	4596.69	23.19N	140.54E	==>	-140.61	39.99460033	-104.73419770
4700.00	2.68	80.630	4696.58	23.95N	145.16E	==>	-145.23	39.99460231	-104.73418120
4800.00	2.68	80.630	4796.47	24.72N	149.78E	==>	-149.85	39.99460430	-104.73416470
4900.00	2.68	80.630	4896.36	25.48N	154.39E	==>	-154.46	39.99460628	-104.73414820
5000.00	2.68	80.630	4996.25	26.24N	159.01E	==>	-159.08	39.99460826	-104.73413170
5100.00	2.68	80.630	5096.14	27.00N	163.63E	==>	-163.70	39.99461024	-104.73411520
5200.00	2.68	80.630	5196.03	27.76N	168.24E	==>	-168.32	39.99461222	-104.73409870
5300.00	2.68	80.630	5295.92	28.53N	172.86E	==>	-172.94	39.99461421	-104.73408220
5400.00	2.68	80.630	5395.81	29.29N	177.48E	==>	-177.56	39.99461619	-104.73406570
5500.00	2.68	80.630	5495.70	30.05N	182.09E	==>	-182.18	39.99461817	-104.73404920
5600.00	2.68	80.630	5595.59	30.81N	186.71E	==>	-186.80	39.99462015	-104.73403270
5700.00	2.68	80.630	5695.48	31.57N	191.33E	==>	-191.42	39.99462213	-104.73401620
5800.00	2.68	80.630	5795.37	32.33N	195.94E	==>	-196.03	39.99462412	-104.73399970
5900.00	2.68	80.630	5895.26	33.10N	200.56E	==>	-200.65	39.99462610	-104.73398320
6000.00	2.68	80.630	5995.15	33.86N	205.18E	==>	-205.27	39.99462808	-104.73396670
6100.00	2.68	80.630	6095.04	34.62N	209.79E	==>	-209.89	39.99463006	-104.73395019
6200.00	2.68	80.630	6194.93	35.38N	214.41E	==>	-214.51	39.99463204	-104.73393369
6300.00	2.68	80.630	6294.82	36.14N	219.03E	==>	-219.13	39.99463402	-104.73391719
6400.00	2.68	80.630	6394.71	36.91N	223.64E	==>	-223.75	39.99463601	-104.73390069
6500.00	2.68	80.630	6494.60	37.67N	228.26E	==>	-228.37	39.99463799	-104.73388419
6600.00	2.68	80.630	6594.50	38.43N	232.88E	==>	-232.99	39.99463997	-104.73386769
6700.00	2.68	80.630	6694.39	39.19N	237.49E	==>	-237.61	39.99464195	-104.73385119
6800.00	2.68	80.630	6794.28	39.95N	242.11E	==>	-242.22	39.99464393	-104.73383469
6900.00	2.68	80.630	6894.17	40.72N	246.73E	==>	-246.84	39.99464592	-104.73381819
7000.00	2.62	278.200	6994.09	41.45N	249.35E	12.00	-249.47	39.99464788	-104.73380881
7100.00	14.59	270.860	7092.78	41.97N	234.44E	12.00	-234.56	39.99464965	-104.73386200
7200.00	26.59	270.110	7186.23	42.20N	199.34E	12.00	-199.46	39.99465113	-104.73398727
7300.00	38.59	269.810	7270.33	42.15N	145.58E	12.00	-145.70	39.99465224	-104.73417914
7400.00	50.59	269.640	7341.42	41.80N	75.51E	12.00	-75.63	39.99465295	-104.73442923
7500.00	62.59	269.510	7396.38	41.17N	7.81W	12.00	7.69	39.99465321	-104.73472660
7600.00	74.59	269.420	7432.83	40.30N	100.73W	12.00	100.62	39.99465302	-104.73505827
7700.00	86.59	269.330	7449.15	39.22N	199.20W	12.00	199.09	39.99465239	-104.73540972
7800.00	90.00	269.300	7450.00	38.02N	299.18W	==>	299.07	39.99465144	-104.73576657
7900.00	90.00	269.300	7450.00	36.80N	399.17W	==>	399.06	39.99465047	-104.73612347
8000.00	90.00	269.300	7450.00	35.59N	499.16W	==>	499.06	39.99464951	-104.73648037
8100.00	90.00	269.300	7450.00	34.38N	599.15W	==>	599.05	39.99464854	-104.73683728
8200.00	90.00	269.300	7450.00	33.16N	699.15W	==>	699.05	39.99464757	-104.73719418
8300.00	90.00	269.300	7450.00	31.95N	799.14W	==>	799.04	39.99464660	-104.73755109
8400.00	90.00	269.300	7450.00	30.74N	899.13W	==>	899.04	39.99464562	-104.73790799
8500.00	90.00	269.300	7450.00	29.52N	999.12W	==>	999.04	39.99464465	-104.73826490
8600.00	90.00	269.300	7450.00	28.31N	1099.12W	==>	1099.03	39.99464368	-104.73862180
8700.00	90.00	269.300	7450.00	27.09N	1199.11W	==>	1199.03	39.99464270	-104.73897870
8800.00	90.00	269.300	7450.00	25.88N	1299.10W	==>	1299.02	39.99464173	-104.73933561
8900.00	90.00	269.300	7450.00	24.67N	1399.09W	==>	1399.02	39.99464075	-104.73969251
9000.00	90.00	269.300	7450.00	23.45N	1499.09W	==>	1499.01	39.99463977	-104.74004942

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 269.840 degrees  
Bottom hole distance is 4488.65 Feet on azimuth 269.84 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 13 (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	22.24N	1599.08W	==>	1599.01	39.99463879	-104.74040632
9200.00	90.00	269.300	7450.00	21.03N	1699.07W	==>	1699.01	39.99463781	-104.74076323
9300.00	90.00	269.300	7450.00	19.81N	1799.07W	==>	1799.00	39.99463683	-104.74112013
9400.00	90.00	269.300	7450.00	18.60N	1899.06W	==>	1899.00	39.99463584	-104.74147703
9500.00	90.00	269.300	7450.00	17.38N	1999.05W	==>	1998.99	39.99463486	-104.74183394
9600.00	90.00	269.300	7450.00	16.17N	2099.04W	==>	2098.99	39.99463387	-104.74219084
9700.00	90.00	269.300	7450.00	14.96N	2199.04W	==>	2198.98	39.99463289	-104.74254775
9800.00	90.00	269.300	7450.00	13.74N	2299.03W	==>	2298.98	39.99463190	-104.74290465
9900.00	90.00	269.300	7450.00	12.53N	2399.02W	==>	2398.98	39.99463091	-104.74326155
10000.00	90.00	269.300	7450.00	11.32N	2499.01W	==>	2498.97	39.99462992	-104.74361846
10100.00	90.00	269.300	7450.00	10.10N	2599.01W	==>	2598.97	39.99462893	-104.74397536
10200.00	90.00	269.300	7450.00	8.89N	2699.00W	==>	2698.96	39.99462794	-104.74433227
10300.00	90.00	269.300	7450.00	7.68N	2798.99W	==>	2798.96	39.99462695	-104.74468917
10400.00	90.00	269.300	7450.00	6.46N	2898.98W	==>	2898.95	39.99462595	-104.74504607
10500.00	90.00	269.300	7450.00	5.25N	2998.98W	==>	2998.95	39.99462496	-104.74540298
10600.00	90.00	269.300	7450.00	4.03N	3098.97W	==>	3098.95	39.99462396	-104.74575988
10700.00	90.00	269.300	7450.00	2.82N	3198.96W	==>	3198.94	39.99462296	-104.74611679
10800.00	90.00	269.300	7450.00	1.61N	3298.95W	==>	3298.94	39.99462196	-104.74647369
10900.00	90.00	269.300	7450.00	0.39N	3398.95W	==>	3398.93	39.99462097	-104.74683059
11000.00	90.00	269.300	7450.00	0.82S	3498.94W	==>	3498.93	39.99461996	-104.74718750
11100.00	90.00	269.300	7450.00	2.03S	3598.93W	==>	3598.92	39.99461896	-104.74754440
11200.00	90.00	269.300	7450.00	3.25S	3698.93W	==>	3698.92	39.99461796	-104.74790131
11300.00	90.00	269.300	7450.00	4.46S	3798.92W	==>	3798.92	39.99461696	-104.74825821
11400.00	90.00	269.300	7450.00	5.68S	3898.91W	==>	3898.91	39.99461595	-104.74861511
11500.00	90.00	269.300	7450.00	6.89S	3998.90W	==>	3998.91	39.99461494	-104.74897202
11600.00	90.00	269.300	7450.00	8.10S	4098.90W	==>	4098.90	39.99461394	-104.74932892
11700.00	90.00	269.300	7450.00	9.32S	4198.89W	==>	4198.90	39.99461293	-104.74968583
11800.00	90.00	269.300	7450.00	10.53S	4298.88W	==>	4298.89	39.99461192	-104.75004273
11900.00	90.00	269.300	7450.00	11.74S	4398.87W	==>	4398.89	39.99461091	-104.75039963
11989.76	90.00	269.300	7450.00	12.83S	4488.63W	==>	4488.65	39.99461000	-104.75072000

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 269.840 degrees  
Bottom hole distance is 4488.65 Feet on azimuth 269.84 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 13 (PWB)



Targets							
Name	North[ft]	East[ft]	TVD[ft]	Latitude	Longitude	Northing	Easting
BEF WEST 13 BHL	12.83S	4488.63W	7450.00	39.99461000	-104.75072000	1241770.32	3209927.58
BEF WEST 13 EP	38.89N	137.63W	7450.00	39.99465000	-104.73519000	1241822.03	3214278.42

Survey Tool Program						
Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool	Error Model	
577640	Planned	2000.00	1999.53	WdW Rate Gyro	Standard	
577639	Planned	11989.76	7450.00	ISCWSA MWD	Rev 4 + SAG + FLT	

Notes