

Petro Operating Company

Location Weld County, CO Slot BEF West 21
Field Wattenberg Well W BEF West 21
Installation Brighton East Farm Pad Wellbore W BEF West 21 (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

Created by admin
Date plotted 12-Nov-2018

Plot reference is W BEF West 21 (PWB).
Ref wellpath is W BEF West 21 (PWP#1).
Coordinates are in Feet reference BEF West 21.
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.

BEF WEST 21 BHL

BEF WEST 21 EP

W BEF West 21 (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 - 15.12 Inc, 2256.03 MD, 2247.29 TVD, 8.05 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	13.16	1500.00	S 0.00	W 0.00	0.00	0.00
End of Build	2256.03	15.12	13.16	2247.29	N 96.58	E 22.57	2.00	8.05
End of Hold	7209.65	15.12	13.16	7029.40	N 1354.83	E 316.67	0.00	112.90
Target BEF WEST 21 EP	8148.31	90.30	269.30	7618.00	N 1503.09	W 259.87	10.00	707.17
T.D. & Target BEF...BHL	12406.60	90.30	269.30	7596.00	N 1451.40	W 4517.79	0.00	4745.21

End of Hold - 15.12 Inc, 7209.65 MD, 7029.40 TVD, 112.90 VS

BEF WEST 21 EP

S/C Kick off Point - 90.30 Inc, 8148.31 MD, 7618.00 TVD, 707.17 VS

T.D. & End of Hold - 7596.00 TVD, 1451.40 N 4517.79 W

BEF WEST 21 BHL

N
GRID

Oct 6-2017
EMMA-2015 (2000.0, 2000.0) (0.0, 0.0) (0.0, 0.0) (0.0, 0.0)
Lat: N39 59 33.9000 Long: W 104 44 4.8940 Elev: 5047.00 ft
Magnetic North is 8.23 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

W BEF West 21 (PWB)

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

<- True Vertical Depth (Feet)

-400 -0 400 800 1200 1600 2000 2400 2800 3200 3600 4000 4400 4800 5200

Scale 1 cm = 200 ft

Vertical Section (Feet) ->

Azimuth 287.81 with reference 0.00 N, 0.00 E from BEF West 21



SYSDRILL
Well Design Combined Report
Wellbore: W BEF West 21 (PWB)



Wellhead Details							
Name	Latitude	Longitude	Northing	Easting	North	East	Slot Elevation Above Ground
BEF West 21	39.99489000	-104.73470000	1241910.6405	3214414.9463	779.52N	9.53W	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	13.160	1500.00	-3568.00	0.00N	0.00E	==>	0.00
2256.03	15.12	13.160	2247.29	-2820.71	96.58N	22.57E	2.00	8.05
7209.65	15.12	13.160	7029.40	1961.40	1354.83N	316.67E	==>	112.90
8148.31	90.30	269.300	7618.00	2550.00	1503.09N	259.87W	10.00	707.17
12406.60	90.30	269.300	7596.00	2528.00	1451.40N	4517.79W	==>	4745.21

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	39.99489000	-104.73470000
21.00	0.00	0.000	21.00	0.00N	0.00E	==>	0.00	39.99489000	-104.73470000
100.00	0.00	0.000	100.00	0.00N	0.00E	==>	0.00	39.99489000	-104.73470000
200.00	0.00	0.000	200.00	0.00N	0.00E	==>	0.00	39.99489000	-104.73470000
300.00	0.00	0.000	300.00	0.00N	0.00E	==>	0.00	39.99489000	-104.73470000
400.00	0.00	0.000	400.00	0.00N	0.00E	==>	0.00	39.99489000	-104.73470000
500.00	0.00	0.000	500.00	0.00N	0.00E	==>	0.00	39.99489000	-104.73470000
600.00	0.00	0.000	600.00	0.00N	0.00E	==>	0.00	39.99489000	-104.73470000
700.00	0.00	0.000	700.00	0.00N	0.00E	==>	0.00	39.99489000	-104.73470000
800.00	0.00	0.000	800.00	0.00N	0.00E	==>	0.00	39.99489000	-104.73470000
900.00	0.00	0.000	900.00	0.00N	0.00E	==>	0.00	39.99489000	-104.73470000
1000.00	0.00	0.000	1000.00	0.00N	0.00E	==>	0.00	39.99489000	-104.73470000
1100.00	0.00	0.000	1100.00	0.00N	0.00E	==>	0.00	39.99489000	-104.73470000
1200.00	0.00	0.000	1200.00	0.00N	0.00E	==>	0.00	39.99489000	-104.73470000
1300.00	0.00	0.000	1300.00	0.00N	0.00E	==>	0.00	39.99489000	-104.73470000
1400.00	0.00	0.000	1400.00	0.00N	0.00E	==>	0.00	39.99489000	-104.73470000
1500.00	0.00	13.160	1500.00	0.00N	0.00E	==>	0.00	39.99489000	-104.73470000
1600.00	2.00	13.160	1599.98	1.70N	0.40E	2.00	0.14	39.99489466	-104.73469853
1700.00	4.00	13.160	1699.84	6.80N	1.59E	2.00	0.57	39.99490862	-104.73469412
1800.00	6.00	13.160	1799.45	15.28N	3.57E	2.00	1.27	39.99493186	-104.73468678
1900.00	8.00	13.160	1898.70	27.15N	6.35E	2.00	2.26	39.99496437	-104.73467652
2000.00	10.00	13.160	1997.47	42.38N	9.91E	2.00	3.53	39.99500610	-104.73466334
2100.00	12.00	13.160	2095.62	60.96N	14.25E	2.00	5.08	39.99505700	-104.73464727
2200.00	14.00	13.160	2193.06	82.86N	19.37E	2.00	6.91	39.99511700	-104.73462832
2256.03	15.12	13.160	2247.29	96.58N	22.57E	2.00	8.05	39.99515458	-104.73461646
2300.00	15.12	13.160	2289.73	107.75N	25.18E	==>	8.98	39.99518517	-104.73460680
2400.00	15.12	13.160	2386.27	133.15N	31.12E	==>	11.10	39.99525475	-104.73458483
2500.00	15.12	13.160	2482.81	158.55N	37.06E	==>	13.21	39.99532434	-104.73456286
2600.00	15.12	13.160	2579.35	183.95N	43.00E	==>	15.33	39.99539392	-104.73454088
2700.00	15.12	13.160	2675.88	209.35N	48.93E	==>	17.45	39.99546351	-104.73451891
2800.00	15.12	13.160	2772.42	234.75N	54.87E	==>	19.56	39.99553309	-104.73449694
2900.00	15.12	13.160	2868.96	260.15N	60.81E	==>	21.68	39.99560267	-104.73447497

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 287.810 degrees
Bottom hole distance is 4745.21 Feet on azimuth 287.81 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by IPT
Date Printed: 12-Nov-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)
3000.00	15.12	13.160	2965.50	285.55N	66.74E	==>	23.80	39.99567226	-104.73445300
3100.00	15.12	13.160	3062.04	310.95N	72.68E	==>	25.91	39.99574184	-104.73443102
3200.00	15.12	13.160	3158.57	336.35N	78.62E	==>	28.03	39.99581142	-104.73440905
3300.00	15.12	13.160	3255.11	361.75N	84.55E	==>	30.15	39.99588101	-104.73438708
3400.00	15.12	13.160	3351.65	387.16N	90.49E	==>	32.26	39.99595059	-104.73436511
3500.00	15.12	13.160	3448.19	412.56N	96.43E	==>	34.38	39.99602018	-104.73434314
3600.00	15.12	13.160	3544.72	437.96N	102.37E	==>	36.50	39.99608976	-104.73432116
3700.00	15.12	13.160	3641.26	463.36N	108.30E	==>	38.61	39.99615934	-104.73429919
3800.00	15.12	13.160	3737.80	488.76N	114.24E	==>	40.73	39.99622893	-104.73427722
3900.00	15.12	13.160	3834.34	514.16N	120.18E	==>	42.85	39.99629851	-104.73425525
4000.00	15.12	13.160	3930.88	539.56N	126.11E	==>	44.96	39.99636810	-104.73423328
4100.00	15.12	13.160	4027.41	564.96N	132.05E	==>	47.08	39.99643768	-104.73421130
4200.00	15.12	13.160	4123.95	590.36N	137.99E	==>	49.20	39.99650726	-104.73418933
4300.00	15.12	13.160	4220.49	615.76N	143.93E	==>	51.31	39.99657685	-104.73416736
4400.00	15.12	13.160	4317.03	641.16N	149.86E	==>	53.43	39.99664643	-104.73414539
4500.00	15.12	13.160	4413.57	666.56N	155.80E	==>	55.55	39.99671602	-104.73412341
4600.00	15.12	13.160	4510.10	691.96N	161.74E	==>	57.66	39.99678560	-104.73410144
4700.00	15.12	13.160	4606.64	717.36N	167.67E	==>	59.78	39.99685518	-104.73407947
4800.00	15.12	13.160	4703.18	742.76N	173.61E	==>	61.90	39.99692477	-104.73405750
4900.00	15.12	13.160	4799.72	768.17N	179.55E	==>	64.01	39.99699435	-104.73403552
5000.00	15.12	13.160	4896.25	793.57N	185.48E	==>	66.13	39.99706393	-104.73401355
5100.00	15.12	13.160	4992.79	818.97N	191.42E	==>	68.25	39.99713352	-104.73399158
5200.00	15.12	13.160	5089.33	844.37N	197.36E	==>	70.36	39.99720310	-104.73396960
5300.00	15.12	13.160	5185.87	869.77N	203.30E	==>	72.48	39.99727269	-104.73394763
5400.00	15.12	13.160	5282.41	895.17N	209.23E	==>	74.60	39.99734227	-104.73392566
5500.00	15.12	13.160	5378.94	920.57N	215.17E	==>	76.71	39.99741185	-104.73390369
5600.00	15.12	13.160	5475.48	945.97N	221.11E	==>	78.83	39.99748144	-104.73388171
5700.00	15.12	13.160	5572.02	971.37N	227.04E	==>	80.95	39.99755102	-104.73385974
5800.00	15.12	13.160	5668.56	996.77N	232.98E	==>	83.06	39.99762060	-104.73383777
5900.00	15.12	13.160	5765.10	1022.17N	238.92E	==>	85.18	39.99769019	-104.73381579
6000.00	15.12	13.160	5861.63	1047.57N	244.86E	==>	87.30	39.99775977	-104.73379382
6100.00	15.12	13.160	5958.17	1072.97N	250.79E	==>	89.42	39.99782936	-104.73377185
6200.00	15.12	13.160	6054.71	1098.37N	256.73E	==>	91.53	39.99789894	-104.73374987
6300.00	15.12	13.160	6151.25	1123.77N	262.67E	==>	93.65	39.99796852	-104.73372790
6400.00	15.12	13.160	6247.78	1149.18N	268.60E	==>	95.77	39.99803811	-104.73370593
6500.00	15.12	13.160	6344.32	1174.58N	274.54E	==>	97.88	39.99810769	-104.73368395
6600.00	15.12	13.160	6440.86	1199.98N	280.48E	==>	100.00	39.99817727	-104.73366198
6700.00	15.12	13.160	6537.40	1225.38N	286.41E	==>	102.12	39.99824686	-104.73364001
6800.00	15.12	13.160	6633.94	1250.78N	292.35E	==>	104.23	39.99831644	-104.73361803
6900.00	15.12	13.160	6730.47	1276.18N	298.29E	==>	106.35	39.99838603	-104.73359606
7000.00	15.12	13.160	6827.01	1301.58N	304.23E	==>	108.47	39.99845561	-104.73357409
7100.00	15.12	13.160	6923.55	1326.98N	310.16E	==>	110.58	39.99852519	-104.73355211
7200.00	15.12	13.160	7020.09	1352.38N	316.10E	==>	112.70	39.99859478	-104.73353014
7209.65	15.12	13.160	7029.40	1354.83N	316.67E	==>	112.90	39.99860149	-104.73352802
7300.00	15.67	338.700	7116.69	1377.72N	314.92E	10.00	121.58	39.99866437	-104.73353358
7400.00	21.22	311.900	7211.68	1402.45N	296.49E	10.00	146.68	39.99873269	-104.73359857
7500.00	29.17	297.430	7302.18	1425.83N	261.30E	10.00	187.33	39.99879768	-104.73372345
7600.00	38.03	288.990	7385.44	1447.13N	210.42E	10.00	242.30	39.99885737	-104.73390440
7700.00	47.29	283.400	7458.92	1465.71N	145.39E	10.00	309.90	39.99890992	-104.73413595
7800.00	56.76	279.290	7520.40	1481.02N	68.18E	10.00	388.08	39.99895376	-104.73441103
7900.00	66.33	275.990	7568.01	1492.57N	18.85W	10.00	474.48	39.99898754	-104.73472131
8000.00	75.96	273.140	7600.29	1500.03N	113.07W	10.00	566.46	39.99901025	-104.73505735
8100.00	85.62	270.530	7616.28	1503.16N	211.60W	10.00	661.23	39.99902118	-104.73540895
8148.31	90.30	269.300	7618.00	1503.09N	259.87W	10.00	707.17	39.99902213	-104.73558122
8200.00	90.30	269.300	7617.73	1502.47N	311.56W	==>	756.18	39.99902163	-104.73576571
8300.00	90.30	269.300	7617.22	1501.25N	411.55W	==>	851.01	39.99902066	-104.73612263
8400.00	90.30	269.300	7616.70	1500.04N	511.54W	==>	945.84	39.99901970	-104.73647955
8500.00	90.30	269.300	7616.18	1498.83N	611.53W	==>	1040.66	39.99901873	-104.73683648

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 287.810 degrees
Bottom hole distance is 4745.21 Feet on azimuth 287.81 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by IPT
Date Printed: 12-Nov-2018



SYSDRILL
Well Design Combined Report
Wellbore: W BEF West 21 (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)
8600.00	90.30	269.300	7615.67	1497.61N	711.52W	==>	1135.49	39.99901776	-104.73719340
8700.00	90.30	269.300	7615.15	1496.40N	811.51W	==>	1230.32	39.99901678	-104.73755032
8800.00	90.30	269.300	7614.63	1495.18N	911.50W	==>	1325.15	39.99901581	-104.73790724
8900.00	90.30	269.300	7614.12	1493.97N	1011.49W	==>	1419.97	39.99901484	-104.73826417
9000.00	90.30	269.300	7613.60	1492.76N	1111.49W	==>	1514.80	39.99901386	-104.73862109
9100.00	90.30	269.300	7613.08	1491.54N	1211.48W	==>	1609.63	39.99901289	-104.73897801
9200.00	90.30	269.300	7612.57	1490.33N	1311.47W	==>	1704.46	39.99901191	-104.73933493
9300.00	90.30	269.300	7612.05	1489.11N	1411.46W	==>	1799.29	39.99901093	-104.73969185
9400.00	90.30	269.300	7611.53	1487.90N	1511.45W	==>	1894.11	39.99900995	-104.74004878
9500.00	90.30	269.300	7611.02	1486.69N	1611.44W	==>	1988.94	39.99900897	-104.74040570
9600.00	90.30	269.300	7610.50	1485.47N	1711.43W	==>	2083.77	39.99900799	-104.74076262
9700.00	90.30	269.300	7609.98	1484.26N	1811.42W	==>	2178.60	39.99900701	-104.74111954
9800.00	90.30	269.300	7609.47	1483.05N	1911.42W	==>	2273.42	39.99900603	-104.74147647
9900.00	90.30	269.300	7608.95	1481.83N	2011.41W	==>	2368.25	39.99900504	-104.74183339
10000.00	90.30	269.300	7608.43	1480.62N	2111.40W	==>	2463.08	39.99900406	-104.74219031
10100.00	90.30	269.300	7607.92	1479.40N	2211.39W	==>	2557.91	39.99900307	-104.74254723
10200.00	90.30	269.300	7607.40	1478.19N	2311.38W	==>	2652.74	39.99900208	-104.74290415
10300.00	90.30	269.300	7606.88	1476.98N	2411.37W	==>	2747.56	39.99900109	-104.74326108
10400.00	90.30	269.300	7606.37	1475.76N	2511.36W	==>	2842.39	39.99900010	-104.74361800
10500.00	90.30	269.300	7605.85	1474.55N	2611.36W	==>	2937.22	39.99899911	-104.74397492
10600.00	90.30	269.300	7605.33	1473.33N	2711.35W	==>	3032.05	39.99899812	-104.74433184
10700.00	90.30	269.300	7604.82	1472.12N	2811.34W	==>	3126.88	39.99899713	-104.74468877
10800.00	90.30	269.300	7604.30	1470.91N	2911.33W	==>	3221.70	39.99899613	-104.74504569
10900.00	90.30	269.300	7603.78	1469.69N	3011.32W	==>	3316.53	39.99899513	-104.74540261
11000.00	90.30	269.300	7603.27	1468.48N	3111.31W	==>	3411.36	39.99899414	-104.74575953
11100.00	90.30	269.300	7602.75	1467.27N	3211.30W	==>	3506.19	39.99899314	-104.74611645
11200.00	90.30	269.300	7602.23	1466.05N	3311.29W	==>	3601.01	39.99899214	-104.74647338
11300.00	90.30	269.300	7601.72	1464.84N	3411.29W	==>	3695.84	39.99899114	-104.74683030
11400.00	90.30	269.300	7601.20	1463.62N	3511.28W	==>	3790.67	39.99899014	-104.74718722
11500.00	90.30	269.300	7600.68	1462.41N	3611.27W	==>	3885.50	39.99898914	-104.74754414
11600.00	90.30	269.300	7600.17	1461.20N	3711.26W	==>	3980.33	39.99898813	-104.74790106
11700.00	90.30	269.300	7599.65	1459.98N	3811.25W	==>	4075.15	39.99898713	-104.74825799
11800.00	90.30	269.300	7599.13	1458.77N	3911.24W	==>	4169.98	39.99898612	-104.74861491
11900.00	90.30	269.300	7598.62	1457.55N	4011.23W	==>	4264.81	39.99898512	-104.74897183
12000.00	90.30	269.300	7598.10	1456.34N	4111.22W	==>	4359.64	39.99898411	-104.74932875
12100.00	90.30	269.300	7597.58	1455.13N	4211.22W	==>	4454.47	39.99898310	-104.74968567
12200.00	90.30	269.300	7597.07	1453.91N	4311.21W	==>	4549.29	39.99898209	-104.75004260
12300.00	90.30	269.300	7596.55	1452.70N	4411.20W	==>	4644.12	39.99898108	-104.75039952
12400.00	90.30	269.300	7596.03	1451.48N	4511.19W	==>	4738.95	39.99898007	-104.75075644
12406.60	90.30	269.300	7596.00	1451.40N	4517.79W	==>	4745.21	39.99898000	-104.75078000

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 287.810 degrees
Bottom hole distance is 4745.21 Feet on azimuth 287.81 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by IPT
Date Printed: 12-Nov-2018



Targets							
Name	North[ft]	East[ft]	TVD[ft]	Latitude	Longitude	Northing	Easting
BEF WEST 21 BHL	1451.40N	4517.79W	7596.00	39.99898000	-104.75078000	1243361.99	3209897.32
BEF WEST 21 EP	1503.09N	169.87W	7618.00	39.99902000	-104.73526000	1243413.68	3214245.08

Survey Tool Program						
Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool	Error Model	
577696	Planned	2000.00	1997.47	WdW Rate Gyro	Standard	
577695	Planned	12406.60	7596.00	ISCWSA MWD	Rev 4 + SAG + FLT	

Notes