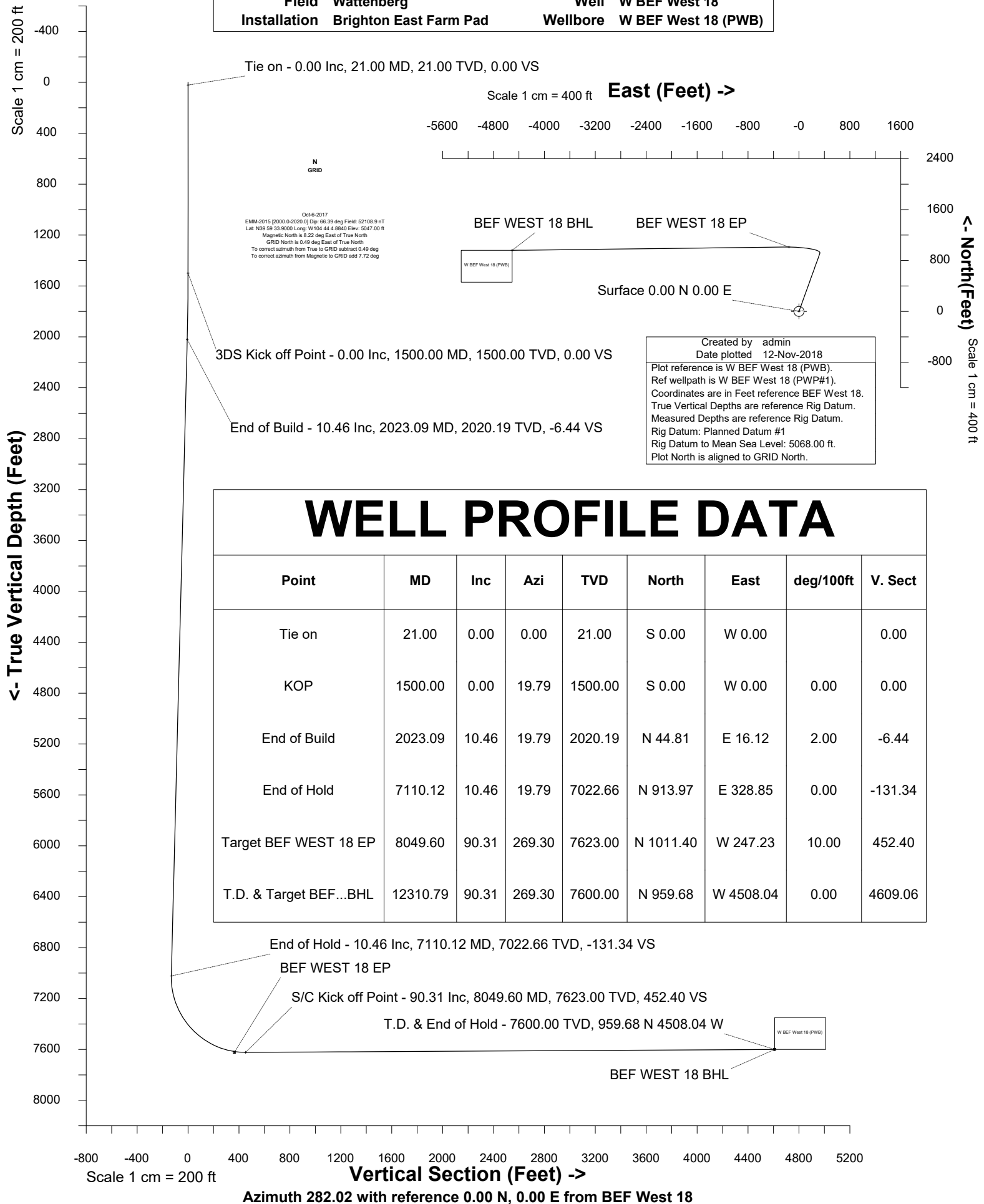


# Petro Operating Company

Location Weld County, CO Slot BEF West 18  
Field Wattenberg Well W BEF West 18  
Installation Brighton East Farm Pad Wellbore W BEF West 18 (PWB)





SYSDRILL  
Well Design Combined Report  
Wellbore: W BEF West 18 (PWB)



Wellhead Details							
Name	Latitude	Longitude	Northing	Easting	North	East	Slot Elevation Above Ground
BEF West 18	39.99476000	-104.73470000	1241863.2867	3214415.3550	732.16N	9.12W	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	19.790	1500.00	-3568.00	0.00N	0.00E	==>	0.00
2023.09	10.46	19.790	2020.19	-3047.81	44.81N	16.12E	2.00	-6.44
7110.12	10.46	19.790	7022.66	1954.66	913.97N	328.85E	==>	-131.34
8049.60	90.31	269.300	7623.00	2555.00	1011.40N	247.23W	10.00	452.40
12310.79	90.31	269.300	7600.00	2532.00	959.68N	4508.04W	==>	4609.06

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	39.99476000	-104.73470000
21.00	0.00	0.000	21.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
100.00	0.00	0.000	100.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
200.00	0.00	0.000	200.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
300.00	0.00	0.000	300.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
400.00	0.00	0.000	400.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
500.00	0.00	0.000	500.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
600.00	0.00	0.000	600.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
700.00	0.00	0.000	700.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
800.00	0.00	0.000	800.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
900.00	0.00	0.000	900.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
1000.00	0.00	0.000	1000.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
1100.00	0.00	0.000	1100.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
1200.00	0.00	0.000	1200.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
1300.00	0.00	0.000	1300.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
1400.00	0.00	0.000	1400.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
1500.00	0.00	19.790	1500.00	0.00N	0.00E	==>	0.00	39.99476000	-104.73470000
1600.00	2.00	19.790	1599.98	1.64N	0.59E	2.00	-0.24	39.99476449	-104.73469784
1700.00	4.00	19.790	1699.84	6.57N	2.36E	2.00	-0.94	39.99477797	-104.73469137
1800.00	6.00	19.790	1799.45	14.77N	5.31E	2.00	-2.12	39.99480041	-104.73468058
1900.00	8.00	19.790	1898.70	26.23N	9.44E	2.00	-3.77	39.99483179	-104.73466551
2000.00	10.00	19.790	1997.47	40.95N	14.73E	2.00	-5.88	39.99487206	-104.73464615
2023.09	10.46	19.790	2020.19	44.81N	16.12E	2.00	-6.44	39.99488262	-104.73464108
2100.00	10.46	19.790	2095.82	57.95N	20.85E	==>	-8.33	39.99491858	-104.73462380
2200.00	10.46	19.790	2194.16	75.04N	27.00E	==>	-10.78	39.99496534	-104.73460133
2300.00	10.46	19.790	2292.49	92.12N	33.15E	==>	-13.24	39.99501209	-104.73457887
2400.00	10.46	19.790	2390.83	109.21N	39.29E	==>	-15.69	39.99505885	-104.73455640
2500.00	10.46	19.790	2489.17	126.29N	45.44E	==>	-18.15	39.99510560	-104.73453393
2600.00	10.46	19.790	2587.51	143.38N	51.59E	==>	-20.60	39.99515236	-104.73451147
2700.00	10.46	19.790	2685.85	160.47N	57.74E	==>	-23.06	39.99519911	-104.73448900
2800.00	10.46	19.790	2784.18	177.55N	63.88E	==>	-25.51	39.99524586	-104.73446653
2900.00	10.46	19.790	2882.52	194.64N	70.03E	==>	-27.97	39.99529262	-104.73444407

All data is in Feet unless otherwise stated  
Coordinates are from Slot MD's are from Rig ( Planned Datum #1 5068.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 282.020 degrees  
Bottom hole distance is 4609.06 Feet on azimuth 282.02 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	10.46	19.790	2980.86	211.72N	76.18E	==>	-30.42	39.99533937	-104.73442160
3100.00	10.46	19.790	3079.20	228.81N	82.33E	==>	-32.88	39.99538613	-104.73439913
3200.00	10.46	19.790	3177.53	245.89N	88.47E	==>	-35.33	39.99543288	-104.73437667
3300.00	10.46	19.790	3275.87	262.98N	94.62E	==>	-37.79	39.99547964	-104.73435420
3400.00	10.46	19.790	3374.21	280.07N	100.77E	==>	-40.24	39.99552639	-104.73433173
3500.00	10.46	19.790	3472.55	297.15N	106.92E	==>	-42.70	39.99557314	-104.73430927
3600.00	10.46	19.790	3570.88	314.24N	113.06E	==>	-45.16	39.99561990	-104.73428680
3700.00	10.46	19.790	3669.22	331.32N	119.21E	==>	-47.61	39.99566665	-104.73426433
3800.00	10.46	19.790	3767.56	348.41N	125.36E	==>	-50.07	39.99571341	-104.73424187
3900.00	10.46	19.790	3865.90	365.49N	131.51E	==>	-52.52	39.99576016	-104.73421940
4000.00	10.46	19.790	3964.23	382.58N	137.65E	==>	-54.98	39.99580692	-104.73419693
4100.00	10.46	19.790	4062.57	399.67N	143.80E	==>	-57.43	39.99585367	-104.73417447
4200.00	10.46	19.790	4160.91	416.75N	149.95E	==>	-59.89	39.99590042	-104.73415200
4300.00	10.46	19.790	4259.25	433.84N	156.09E	==>	-62.34	39.99594718	-104.73412953
4400.00	10.46	19.790	4357.59	450.92N	162.24E	==>	-64.80	39.99599393	-104.73410707
4500.00	10.46	19.790	4455.92	468.01N	168.39E	==>	-67.25	39.99604069	-104.73408460
4600.00	10.46	19.790	4554.26	485.09N	174.54E	==>	-69.71	39.99608744	-104.73406213
4700.00	10.46	19.790	4652.60	502.18N	180.68E	==>	-72.16	39.99613420	-104.73403967
4800.00	10.46	19.790	4750.94	519.27N	186.83E	==>	-74.62	39.99618095	-104.73401720
4900.00	10.46	19.790	4849.27	536.35N	192.98E	==>	-77.07	39.99622770	-104.73399473
5000.00	10.46	19.790	4947.61	553.44N	199.13E	==>	-79.53	39.99627446	-104.73397227
5100.00	10.46	19.790	5045.95	570.52N	205.27E	==>	-81.98	39.99632121	-104.73394980
5200.00	10.46	19.790	5144.29	587.61N	211.42E	==>	-84.44	39.99636797	-104.73392733
5300.00	10.46	19.790	5242.62	604.69N	217.57E	==>	-86.89	39.99641472	-104.73390486
5400.00	10.46	19.790	5340.96	621.78N	223.72E	==>	-89.35	39.99646147	-104.73388240
5500.00	10.46	19.790	5439.30	638.86N	229.86E	==>	-91.80	39.99650823	-104.73385993
5600.00	10.46	19.790	5537.64	655.95N	236.01E	==>	-94.26	39.99655498	-104.73383746
5700.00	10.46	19.790	5635.97	673.04N	242.16E	==>	-96.71	39.99660174	-104.73381499
5800.00	10.46	19.790	5734.31	690.12N	248.31E	==>	-99.17	39.99664849	-104.73379253
5900.00	10.46	19.790	5832.65	707.21N	254.45E	==>	-101.62	39.99669525	-104.73377006
6000.00	10.46	19.790	5930.99	724.29N	260.60E	==>	-104.08	39.99674200	-104.73374759
6100.00	10.46	19.790	6029.32	741.38N	266.75E	==>	-106.53	39.99678875	-104.73372513
6200.00	10.46	19.790	6127.66	758.46N	272.90E	==>	-108.99	39.99683551	-104.73370266
6300.00	10.46	19.790	6226.00	775.55N	279.04E	==>	-111.45	39.99688226	-104.73368019
6400.00	10.46	19.790	6324.34	792.64N	285.19E	==>	-113.90	39.99692902	-104.73365772
6500.00	10.46	19.790	6422.68	809.72N	291.34E	==>	-116.36	39.99697577	-104.73363526
6600.00	10.46	19.790	6521.01	826.81N	297.49E	==>	-118.81	39.99702252	-104.73361279
6700.00	10.46	19.790	6619.35	843.89N	303.63E	==>	-121.27	39.99706928	-104.73359032
6800.00	10.46	19.790	6717.69	860.98N	309.78E	==>	-123.72	39.99711603	-104.73356785
6900.00	10.46	19.790	6816.03	878.06N	315.93E	==>	-126.18	39.99716279	-104.73354538
7000.00	10.46	19.790	6914.36	895.15N	322.08E	==>	-128.63	39.99720954	-104.73352292
7100.00	10.46	19.790	7012.70	912.24N	328.22E	==>	-131.09	39.99725630	-104.73350045
7110.12	10.46	19.790	7022.66	913.97N	328.85E	==>	-131.34	39.99726103	-104.73349818
7200.00	11.17	330.560	7111.12	929.26N	327.33E	10.00	-126.67	39.99730304	-104.73350312
7300.00	18.16	301.200	7207.92	945.80N	309.19E	10.00	-105.48	39.99734889	-104.73356734
7400.00	27.07	289.150	7300.19	961.38N	274.28E	10.00	-68.09	39.99739248	-104.73369147
7500.00	36.52	282.870	7385.11	975.51N	223.65E	10.00	-15.63	39.99743246	-104.73387174
7600.00	46.18	278.920	7460.11	987.76N	158.84E	10.00	50.31	39.99746762	-104.73410267
7700.00	55.93	276.080	7522.90	997.76N	81.82E	10.00	127.73	39.99749691	-104.73437725
7800.00	65.74	273.830	7571.58	1005.21N	5.07W	10.00	214.26	39.99751942	-104.73468713
7900.00	75.57	271.910	7604.66	1009.88N	99.19W	10.00	307.29	39.99753447	-104.73502290
8000.00	85.42	270.150	7621.15	1011.63N	197.67W	10.00	403.98	39.99754160	-104.73537436
8049.60	90.31	269.300	7623.00	1011.40N	247.23W	10.00	452.40	39.99754213	-104.73555122
8100.00	90.31	269.300	7622.73	1010.79N	297.62W	==>	501.56	39.99754164	-104.73573109
8200.00	90.31	269.300	7622.19	1009.57N	397.61W	==>	599.11	39.99754068	-104.73608801
8300.00	90.31	269.300	7621.65	1008.36N	497.60W	==>	696.65	39.99753971	-104.73644492
8400.00	90.31	269.300	7621.11	1007.15N	597.59W	==>	794.20	39.99753874	-104.73680184
8500.00	90.31	269.300	7620.57	1005.93N	697.58W	==>	891.75	39.99753777	-104.73715875

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 282.020 degrees  
Bottom hole distance is 4609.06 Feet on azimuth 282.02 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 18 (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	90.31	269.300	7620.03	1004.72N	797.58W	==>	989.29	39.99753680	-104.73751567
8700.00	90.31	269.300	7619.49	1003.50N	897.57W	==>	1086.84	39.99753583	-104.73787258
8800.00	90.31	269.300	7618.95	1002.29N	997.56W	==>	1184.39	39.99753486	-104.73822949
8900.00	90.31	269.300	7618.41	1001.08N	1097.55W	==>	1281.93	39.99753388	-104.73858641
9000.00	90.31	269.300	7617.87	999.86N	1197.54W	==>	1379.48	39.99753291	-104.73894332
9100.00	90.31	269.300	7617.33	998.65N	1297.53W	==>	1477.03	39.99753193	-104.73930024
9200.00	90.31	269.300	7616.79	997.44N	1397.52W	==>	1574.58	39.99753095	-104.73965715
9300.00	90.31	269.300	7616.25	996.22N	1497.51W	==>	1672.12	39.99752998	-104.74001406
9400.00	90.31	269.300	7615.71	995.01N	1597.51W	==>	1769.67	39.99752900	-104.74037098
9500.00	90.31	269.300	7615.17	993.80N	1697.50W	==>	1867.22	39.99752802	-104.74072789
9600.00	90.31	269.300	7614.63	992.58N	1797.49W	==>	1964.76	39.99752703	-104.74108481
9700.00	90.31	269.300	7614.09	991.37N	1897.48W	==>	2062.31	39.99752605	-104.74144172
9800.00	90.31	269.300	7613.55	990.15N	1997.47W	==>	2159.86	39.99752507	-104.74179863
9900.00	90.31	269.300	7613.01	988.94N	2097.46W	==>	2257.40	39.99752408	-104.74215555
10000.00	90.31	269.300	7612.47	987.73N	2197.45W	==>	2354.95	39.99752310	-104.74251246
10100.00	90.31	269.300	7611.93	986.51N	2297.44W	==>	2452.50	39.99752211	-104.74286938
10200.00	90.31	269.300	7611.39	985.30N	2397.43W	==>	2550.05	39.99752112	-104.74322629
10300.00	90.31	269.300	7610.85	984.09N	2497.43W	==>	2647.59	39.99752013	-104.74358320
10400.00	90.31	269.300	7610.31	982.87N	2597.42W	==>	2745.14	39.99751914	-104.74394012
10500.00	90.31	269.300	7609.77	981.66N	2697.41W	==>	2842.69	39.99751815	-104.74429703
10600.00	90.31	269.300	7609.23	980.45N	2797.40W	==>	2940.23	39.99751716	-104.74465395
10700.00	90.31	269.300	7608.69	979.23N	2897.39W	==>	3037.78	39.99751616	-104.74501086
10800.00	90.31	269.300	7608.15	978.02N	2997.38W	==>	3135.33	39.99751517	-104.74536777
10900.00	90.31	269.300	7607.61	976.80N	3097.37W	==>	3232.87	39.99751417	-104.74572469
11000.00	90.31	269.300	7607.08	975.59N	3197.36W	==>	3330.42	39.99751317	-104.74608160
11100.00	90.31	269.300	7606.54	974.38N	3297.36W	==>	3427.97	39.99751218	-104.74643852
11200.00	90.31	269.300	7606.00	973.16N	3397.35W	==>	3525.51	39.99751118	-104.74679543
11300.00	90.31	269.300	7605.46	971.95N	3497.34W	==>	3623.06	39.99751018	-104.74715234
11400.00	90.31	269.300	7604.92	970.74N	3597.33W	==>	3720.61	39.99750917	-104.74750926
11500.00	90.31	269.300	7604.38	969.52N	3697.32W	==>	3818.16	39.99750817	-104.74786617
11600.00	90.31	269.300	7603.84	968.31N	3797.31W	==>	3915.70	39.99750717	-104.74822309
11700.00	90.31	269.300	7603.30	967.10N	3897.30W	==>	4013.25	39.99750616	-104.74858000
11800.00	90.31	269.300	7602.76	965.88N	3997.29W	==>	4110.80	39.99750516	-104.74893691
11900.00	90.31	269.300	7602.22	964.67N	4097.28W	==>	4208.34	39.99750415	-104.74929383
12000.00	90.31	269.300	7601.68	963.45N	4197.28W	==>	4305.89	39.99750314	-104.74965074
12100.00	90.31	269.300	7601.14	962.24N	4297.27W	==>	4403.44	39.99750213	-104.75000765
12200.00	90.31	269.300	7600.60	961.03N	4397.26W	==>	4500.98	39.99750112	-104.75036457
12300.00	90.31	269.300	7600.06	959.81N	4497.25W	==>	4598.53	39.99750011	-104.75072148
12310.79	90.31	269.300	7600.00	959.68N	4508.04W	==>	4609.06	39.99750000	-104.75076000

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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 282.020 degrees  
Bottom hole distance is 4609.06 Feet on azimuth 282.02 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 18 BHL	959.68N	4508.04W	7600.00	39.99750000	-104.75076000	1242822.94	3209907.47
BEF WEST 18 EP	1011.40N	157.23W	7623.00	39.99754000	-104.73523000	1242874.65	3214258.13

Survey Tool Program						
Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool	Error Model	
577675	Planned	2000.00	1997.47	WdW Rate Gyro	Standard	
577674	Planned	12310.79	7600.00	ISCWSA MWD	Rev 4 + SAG + FLT	

Notes