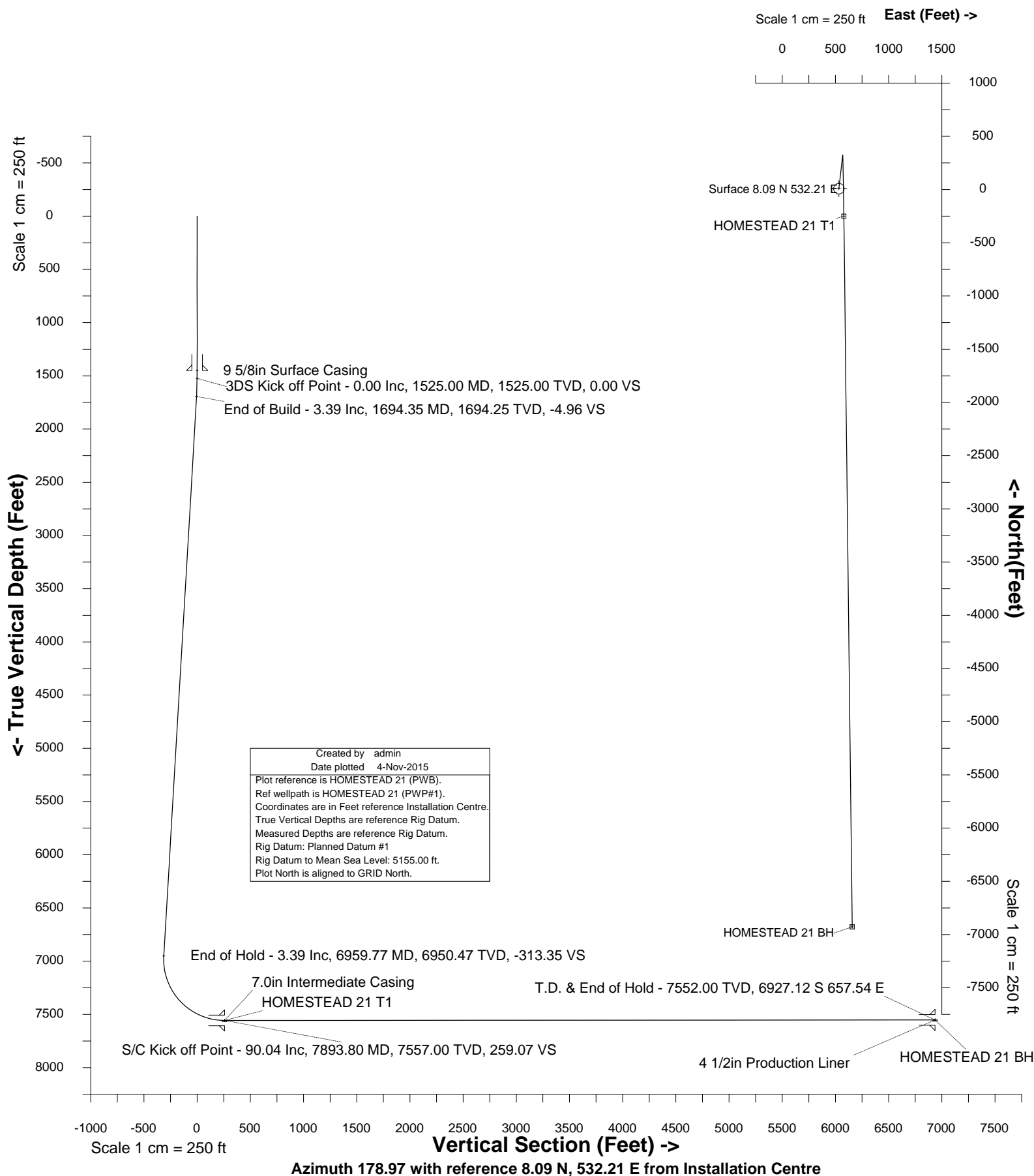




# Petro Operating Company

Location	Weld County, CO	Slot	HOMESTEAD 21
Field	Wattenberg	Well	HOMESTEAD 21
Installation	Homestead	Wellbore	HOMESTEAD 21 (PWB)





SYSDRILL  
Well Design Combined Report  
Wellbore: HOMESTEAD 21 (PWB)

Wellhead Details							
Name	Latitude	Longitude	Northing	Easting	North	East	Slot Elevation Above Ground
HOMESTEAD 21	40.00720000	-104.75738000	1246340.6677	3208023.2633	8.09N	532.21E	0.00

Declination		
Date	Source	Time
13-Aug-2015	IGRF Model [1900.0-2020.0]	08:38

Installation Details						
Name	Installation Position (Latitude)	Installation Position (Longitude)	Northing	Easting	Coord System Name	North Alignment
Homestead	40.00719000	-104.75928000	1246332.5735	3207491.0767	CO83-NF on NORTH AMERICAN DATUM 1983 datum	Grid

Summary Wellpath									
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Northing	Easting
23.00	0.00	0.000	23.00	0.00N	0.00E		0.00	1246340.67	3208023.26
14571.22	90.04	179.330	7552.00	6935.22S	125.33E	==>	6936.35	1239405.70	3208148.59

Interpolated Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
0.00	0.00	0.000	0.00	0.00N	0.00E		0.00	Rig Datum Slot Datum
23.00	0.00	0.000	23.00	0.00N	0.00E	==>	0.00	
100.00	0.00	0.000	100.00	0.00N	0.00E	==>	0.00	
200.00	0.00	0.000	200.00	0.00N	0.00E	==>	0.00	
300.00	0.00	0.000	300.00	0.00N	0.00E	==>	0.00	
400.00	0.00	0.000	400.00	0.00N	0.00E	==>	0.00	
500.00	0.00	0.000	500.00	0.00N	0.00E	==>	0.00	
600.00	0.00	0.000	600.00	0.00N	0.00E	==>	0.00	
700.00	0.00	0.000	700.00	0.00N	0.00E	==>	0.00	
800.00	0.00	0.000	800.00	0.00N	0.00E	==>	0.00	
900.00	0.00	0.000	900.00	0.00N	0.00E	==>	0.00	
1000.00	0.00	0.000	1000.00	0.00N	0.00E	==>	0.00	
1100.00	0.00	0.000	1100.00	0.00N	0.00E	==>	0.00	
1200.00	0.00	0.000	1200.00	0.00N	0.00E	==>	0.00	
1300.00	0.00	0.000	1300.00	0.00N	0.00E	==>	0.00	
1400.00	0.00	0.000	1400.00	0.00N	0.00E	==>	0.00	9 5/8in Surface Casing
1450.00	0.00	0.000	1450.00	0.00N	0.00E	==>	0.00	
1500.00	0.00	0.000	1500.00	0.00N	0.00E	==>	0.00	
1600.00	1.50	6.500	1599.99	0.98N	0.11E	2.00	-0.97	
1700.00	3.39	6.500	1699.89	5.30N	0.60E	==>	-5.29	
1800.00	3.39	6.500	1799.72	11.17N	1.27E	==>	-11.15	
1900.00	3.39	6.500	1899.54	17.04N	1.94E	==>	-17.01	
2000.00	3.39	6.500	1999.37	22.91N	2.61E	==>	-22.86	
2100.00	3.39	6.500	2099.19	28.78N	3.28E	==>	-28.72	
2200.00	3.39	6.500	2199.02	34.65N	3.95E	==>	-34.58	
2300.00	3.39	6.500	2298.84	40.52N	4.62E	==>	-40.43	
2400.00	3.39	6.500	2398.67	46.39N	5.29E	==>	-46.29	
2500.00	3.39	6.500	2498.49	52.26N	5.96E	==>	-52.15	
2600.00	3.39	6.500	2598.32	58.13N	6.62E	==>	-58.00	
2700.00	3.39	6.500	2698.14	64.00N	7.29E	==>	-63.86	
2800.00	3.39	6.500	2797.97	69.87N	7.96E	==>	-69.72	
2900.00	3.39	6.500	2897.80	75.74N	8.63E	==>	-75.57	
3000.00	3.39	6.500	2997.62	81.61N	9.30E	==>	-81.43	
3100.00	3.39	6.500	3097.45	87.48N	9.97E	==>	-87.29	
3200.00	3.39	6.500	3197.27	93.35N	10.64E	==>	-93.15	
3300.00	3.39	6.500	3297.10	99.22N	11.31E	==>	-99.00	
3400.00	3.39	6.500	3396.92	105.09N	11.98E	==>	-104.86	
3500.00	3.39	6.500	3496.75	110.96N	12.64E	==>	-110.72	
3600.00	3.39	6.500	3596.57	116.83N	13.31E	==>	-116.57	

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 5155.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 178.960 degrees  
Bottom hole distance is 6936.35 Feet on azimuth 178.96 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by Integrated Petroleum Technologies, Inc.  
Date Printed: 4-Nov-2015



SYSDRILL  
Well Design Combined Report  
Wellbore: HOMESTEAD 21 (PWB)

Interpolated Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
3700.00	3.39	6.500	3696.40	122.70N	13.98E	==>	-122.43	
3800.00	3.39	6.500	3796.22	128.57N	14.65E	==>	-128.29	
3900.00	3.39	6.500	3896.05	134.44N	15.32E	==>	-134.14	
4000.00	3.39	6.500	3995.87	140.31N	15.99E	==>	-140.00	
4100.00	3.39	6.500	4095.70	146.18N	16.66E	==>	-145.86	
4200.00	3.39	6.500	4195.52	152.05N	17.33E	==>	-151.71	
4300.00	3.39	6.500	4295.35	157.92N	17.99E	==>	-157.57	
4400.00	3.39	6.500	4395.18	163.79N	18.66E	==>	-163.43	
4500.00	3.39	6.500	4495.00	169.66N	19.33E	==>	-169.29	
4600.00	3.39	6.500	4594.83	175.53N	20.00E	==>	-175.14	
4700.00	3.39	6.500	4694.65	181.40N	20.67E	==>	-181.00	
4800.00	3.39	6.500	4794.48	187.27N	21.34E	==>	-186.86	
4900.00	3.39	6.500	4894.30	193.14N	22.01E	==>	-192.71	
5000.00	3.39	6.500	4994.13	199.01N	22.68E	==>	-198.57	
5100.00	3.39	6.500	5093.95	204.88N	23.35E	==>	-204.43	
5200.00	3.39	6.500	5193.78	210.75N	24.01E	==>	-210.28	
5300.00	3.39	6.500	5293.60	216.62N	24.68E	==>	-216.14	
5400.00	3.39	6.500	5393.43	222.49N	25.35E	==>	-222.00	
5500.00	3.39	6.500	5493.25	228.36N	26.02E	==>	-227.85	
5600.00	3.39	6.500	5593.08	234.23N	26.69E	==>	-233.71	
5700.00	3.39	6.500	5692.90	240.10N	27.36E	==>	-239.57	
5800.00	3.39	6.500	5792.73	245.97N	28.03E	==>	-245.43	
5900.00	3.39	6.500	5892.56	251.84N	28.70E	==>	-251.28	
6000.00	3.39	6.500	5992.38	257.71N	29.37E	==>	-257.14	
6100.00	3.39	6.500	6092.21	263.58N	30.03E	==>	-263.00	
6200.00	3.39	6.500	6192.03	269.45N	30.70E	==>	-268.85	
6300.00	3.39	6.500	6291.86	275.32N	31.37E	==>	-274.71	
6400.00	3.39	6.500	6391.68	281.19N	32.04E	==>	-280.57	
6500.00	3.39	6.500	6491.51	287.06N	32.71E	==>	-286.42	
6600.00	3.39	6.500	6591.33	292.93N	33.38E	==>	-292.28	
6700.00	3.39	6.500	6691.16	298.80N	34.05E	==>	-298.14	
6800.00	3.39	6.500	6790.98	304.67N	34.72E	==>	-303.99	
6900.00	3.39	6.500	6890.81	310.54N	35.39E	==>	-309.85	
7000.00	0.79	146.750	6990.68	315.00N	36.07E	10.00	-314.30	
7100.00	10.67	177.080	7090.07	305.16N	36.92E	10.00	-304.44	
7200.00	20.67	178.200	7186.23	278.20N	37.95E	10.00	-277.47	
7300.00	30.67	178.610	7276.25	234.96N	39.12E	10.00	-234.22	
7400.00	40.66	178.830	7357.39	176.75N	40.40E	10.00	-175.99	
7500.00	50.66	178.980	7427.19	105.32N	41.76E	10.00	-104.55	
7600.00	60.66	179.090	7483.52	22.87N	43.14E	10.00	-22.08	
7700.00	70.66	179.180	7524.68	68.12S	44.52E	10.00	68.92	
7800.00	80.66	179.260	7549.41	164.88S	45.83E	10.00	165.68	7.0in Intermediate Casing
7893.00	89.96	179.330	7557.00	257.46S	46.98E	10.00	258.26	
7900.00	90.04	179.330	7557.00	264.46S	47.06E	==>	265.26	
8000.00	90.04	179.330	7556.92	364.45S	48.23E	==>	365.26	
8100.00	90.04	179.330	7556.85	464.44S	49.41E	==>	465.26	
8200.00	90.04	179.330	7556.77	564.44S	50.58E	==>	565.26	
8300.00	90.04	179.330	7556.70	664.43S	51.75E	==>	665.26	
8400.00	90.04	179.330	7556.62	764.42S	52.93E	==>	765.25	
8500.00	90.04	179.330	7556.55	864.41S	54.10E	==>	865.25	
8600.00	90.04	179.330	7556.47	964.41S	55.27E	==>	965.25	
8700.00	90.04	179.330	7556.40	1064.40S	56.45E	==>	1065.25	
8800.00	90.04	179.330	7556.32	1164.39S	57.62E	==>	1165.24	
8900.00	90.04	179.330	7556.25	1264.39S	58.79E	==>	1265.24	
9000.00	90.04	179.330	7556.17	1364.38S	59.97E	==>	1365.24	
9100.00	90.04	179.330	7556.10	1464.37S	61.14E	==>	1465.24	
9200.00	90.04	179.330	7556.02	1564.37S	62.31E	==>	1565.24	
9300.00	90.04	179.330	7555.95	1664.36S	63.49E	==>	1665.23	
9400.00	90.04	179.330	7555.87	1764.35S	64.66E	==>	1765.23	
9500.00	90.04	179.330	7555.80	1864.35S	65.83E	==>	1865.23	
9600.00	90.04	179.330	7555.72	1964.34S	67.01E	==>	1965.23	

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 5155.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 178.960 degrees  
Bottom hole distance is 6936.35 Feet on azimuth 178.96 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by Integrated Petroleum Technologies, Inc.  
Date Printed: 4-Nov-2015



SYSDRILL  
Well Design Combined Report  
Wellbore: HOMESTEAD 21 (PWB)

Interpolated Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
9700.00	90.04	179.330	7555.65	2064.33S	68.18E	==>	2065.23	
9800.00	90.04	179.330	7555.57	2164.32S	69.35E	==>	2165.22	
9900.00	90.04	179.330	7555.50	2264.32S	70.53E	==>	2265.22	
10000.00	90.04	179.330	7555.42	2364.31S	71.70E	==>	2365.22	
10100.00	90.04	179.330	7555.35	2464.30S	72.87E	==>	2465.22	
10200.00	90.04	179.330	7555.27	2564.30S	74.05E	==>	2565.22	
10300.00	90.04	179.330	7555.20	2664.29S	75.22E	==>	2665.21	
10400.00	90.04	179.330	7555.12	2764.28S	76.39E	==>	2765.21	
10500.00	90.04	179.330	7555.05	2864.28S	77.57E	==>	2865.21	
10600.00	90.04	179.330	7554.97	2964.27S	78.74E	==>	2965.21	
10700.00	90.04	179.330	7554.90	3064.26S	79.91E	==>	3065.21	
10800.00	90.04	179.330	7554.82	3164.26S	81.09E	==>	3165.20	
10900.00	90.04	179.330	7554.75	3264.25S	82.26E	==>	3265.20	
11000.00	90.04	179.330	7554.67	3364.24S	83.43E	==>	3365.20	
11100.00	90.04	179.330	7554.60	3464.23S	84.61E	==>	3465.20	
11200.00	90.04	179.330	7554.52	3564.23S	85.78E	==>	3565.20	
11300.00	90.04	179.330	7554.45	3664.22S	86.95E	==>	3665.19	
11400.00	90.04	179.330	7554.37	3764.21S	88.13E	==>	3765.19	
11500.00	90.04	179.330	7554.30	3864.21S	89.30E	==>	3865.19	
11600.00	90.04	179.330	7554.22	3964.20S	90.47E	==>	3965.19	
11700.00	90.04	179.330	7554.15	4064.19S	91.65E	==>	4065.19	
11800.00	90.04	179.330	7554.08	4164.19S	92.82E	==>	4165.18	
11900.00	90.04	179.330	7554.00	4264.18S	93.99E	==>	4265.18	
12000.00	90.04	179.330	7553.93	4364.17S	95.17E	==>	4365.18	
12100.00	90.04	179.330	7553.85	4464.17S	96.34E	==>	4465.18	
12200.00	90.04	179.330	7553.78	4564.16S	97.51E	==>	4565.18	
12300.00	90.04	179.330	7553.70	4664.15S	98.69E	==>	4665.17	
12400.00	90.04	179.330	7553.63	4764.14S	99.86E	==>	4765.17	
12500.00	90.04	179.330	7553.55	4864.14S	101.03E	==>	4865.17	
12600.00	90.04	179.330	7553.48	4964.13S	102.21E	==>	4965.17	
12700.00	90.04	179.330	7553.40	5064.12S	103.38E	==>	5065.17	
12800.00	90.04	179.330	7553.33	5164.12S	104.55E	==>	5165.16	
12900.00	90.04	179.330	7553.25	5264.11S	105.73E	==>	5265.16	
13000.00	90.04	179.330	7553.18	5364.10S	106.90E	==>	5365.16	
13100.00	90.04	179.330	7553.10	5464.10S	108.07E	==>	5465.16	
13200.00	90.04	179.330	7553.03	5564.09S	109.25E	==>	5565.16	
13300.00	90.04	179.330	7552.95	5664.08S	110.42E	==>	5665.15	
13400.00	90.04	179.330	7552.88	5764.08S	111.59E	==>	5765.15	
13500.00	90.04	179.330	7552.80	5864.07S	112.77E	==>	5865.15	
13600.00	90.04	179.330	7552.73	5964.06S	113.94E	==>	5965.15	
13700.00	90.04	179.330	7552.65	6064.06S	115.11E	==>	6065.15	
13800.00	90.04	179.330	7552.58	6164.05S	116.29E	==>	6165.14	
13900.00	90.04	179.330	7552.50	6264.04S	117.46E	==>	6265.14	
14000.00	90.04	179.330	7552.43	6364.03S	118.63E	==>	6365.14	
14100.00	90.04	179.330	7552.35	6464.03S	119.81E	==>	6465.14	
14200.00	90.04	179.330	7552.28	6564.02S	120.98E	==>	6565.13	
14300.00	90.04	179.330	7552.20	6664.01S	122.15E	==>	6665.13	
14400.00	90.04	179.330	7552.13	6764.01S	123.33E	==>	6765.13	
14500.00	90.04	179.330	7552.05	6864.00S	124.50E	==>	6865.13	
14571.22	90.04	179.330	7552.00	6935.22S	125.33E	==>	6936.35	4 1/2in Production Liner

All data is in Feet unless otherwise stated  
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Vertical Section is from 0.00N 0.00E on azimuth 178.960 degrees  
Bottom hole distance is 6936.35 Feet on azimuth 178.96 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by Integrated Petroleum Technologies, Inc.  
Date Printed: 4-Nov-2015



SYSDRILL  
Well Design Combined Report  
Wellbore: HOMESTEAD 21 (PWB)

Hole Sections								
Diameter [in]	Start MD[ft]	Start TVD[ft]	Start North[ft]	Start East[ft]	End MD[ft]	End TVD[ft]	End North[ft]	End East[ft]
13 1/2	23.00	23.00	0.00N	0.00E	1450.00	1450.00	0.00N	0.00E
8 3/4	1450.00	1450.00	0.00N	0.00E	7893.00	7557.00	257.46S	46.98E
6 1/8	7893.00	7557.00	257.46S	46.98E	14571.22	7552.00	6935.22S	125.33E

Casings								
Name	Top MD[ft]	Top TVD[ft]	Top North[ft]	Top East[ft]	Shoe MD[ft]	Shoe TVD[ft]	Shoe North[ft]	Shoe East[ft]
9 5/8in Surface Casing	23.00	23.00	0.00N	0.00E	1450.00	1450.00	0.00N	0.00E
7.0in Intermediate Casing	23.00	23.00	0.00N	0.00E	7893.00	7557.00	257.46S	46.98E
4 1/2in Production Liner	6994.00	6984.68	315.04N	36.03E	14571.22	7552.00	6935.22S	125.33E

Targets							
Name	North[ft]	East[ft]	TVD[ft]	Latitude	Longitude	Northing	Easting
HOMESTEAD 21 BH	6935.22S	125.33E	7552.00	39.98816000	-104.75714000	1239405.70	3208148.59
HOMESTEAD 21 T1	258.26S	46.99E	7557.00	40.00649000	-104.75722000	1246082.42	3208070.25

Survey Tool Program					
Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool	Error Model
400870	Planned	14571.22	7552.00	ISCWSA MWD	Rev 3 + Fixed Rig + Rotating

Notes



SYSDRILL  
Closest Approach + Clearance Factor Summary Report  
Wellbore: HOMESTEAD 21 (PWB)

Ellipse separations are reported ONLY if BOTH wells have uncertainty data
Only Depth and Magnetic Reference Field error terms are correlated across tie points
Scan limit is calculated on CENTRE to CENTRE distance
Summary data uses Closest Approach clearance calculation for all minima
Hole size/Casings ARE included
Hole size/Casings are NOT subtracted from Centre-Centre distance
Confidence limit of 95.00% / 2.80 SD.

Wellbore		
Name	Created	Last Revised
HOMESTEAD 21 (PWB)	18-Aug-2015	24-Sep-2015

Well		
Name	Government ID	Last Revised
HOMESTEAD 21		18-Aug-2015

Slot						
Name	Latitude	Longitude	Grid Northing	Grid Easting	North	East
HOMESTEAD 21	40.00720000	-104.75738000	1246340.6677	3208023.2633	8.09N	532.21E

Installation						
Name	Installation Position (Latitude)	Installation Position (Longitude)	Easting	Northing	Coord System Name	North Alignment
Homestead	40.00719000	-104.75928000	3207491.0767	1246332.5735	CO83-NF on NORTH AMERICAN DATUM 1983 datum	Grid

Clearance Summary							
Offset WellName	Separation [ft]	MD[ft]	Diverging From[ft]	Ellipse Separation [ft]	Ellipse MD[ft]	Clearance Factor	Clearance MD[ft]
HOMESTEAD 20	14.01	1532.19	1532.19	-41.74	14571.22	0.84	14571.22
HOMESTEAD 22	16.81	1499.38	1499.38	-155.02	14571.22	0.53	14571.22
HOMESTEAD 19	30.82	1532.19	7897.02	-18.05	14571.22	0.95	14571.22
HOMESTEAD 23	33.62	1476.00	1476.00	24.32	1499.38	1.11	14571.22
HOMESTEAD 24	47.62	1451.00	1451.00	38.36	1433.76	1.36	14571.22
HOMESTEAD 18	47.62	1532.19	14571.22	37.89	1581.40	1.36	14571.22
HOMESTEAD 17	64.43	1532.19	1532.19	54.80	1564.99	1.92	14571.22
HOMESTEAD 16	78.44	1525.00	1525.00	68.93	1548.59	2.28	14571.22
HOMESTEAD 15	95.25	1499.38	14571.22	85.85	1523.00	2.71	14571.22
HOMESTEAD 14	112.05	1474.00	1474.00	102.78	1433.76	3.23	14571.22
HOMESTEAD 13	126.06	1449.00	1449.00	116.70	1449.00	3.63	14571.22
HOMESTEAD 12	355.77	1532.19	14571.22	345.87	1663.42	4.15	14571.22
HOMESTEAD 11	372.58	1532.19	14571.22	362.68	1663.42	4.70	14571.22
HOMESTEAD 10	389.39	1532.19	14571.22	379.48	1663.42	5.18	14571.22
HOMESTEAD 9	406.20	1532.19	14571.22	396.29	1663.42	5.69	14571.22
HOMESTEAD 8	420.20	1532.19	14571.22	410.31	1647.02	6.23	14571.22
HOMESTEAD 7	437.01	1532.19	14571.22	427.15	1623.00	6.72	14571.22
HOMESTEAD 6	453.82	1532.19	14571.22	444.01	1597.80	7.23	14571.22
HOMESTEAD 5	467.83	1532.19	14571.22	458.21	1548.59	7.77	14571.22
HOMESTEAD 4	484.63	1519.00	14571.22	475.15	1532.19	8.25	14571.22
HOMESTEAD 3	501.44	1482.97	14571.22	492.07	1515.78	8.76	14571.22
HOMESTEAD 2	518.26	1468.00	14571.22	508.97	1433.76	9.30	14571.22
HOMESTEAD 1	532.27	1443.00	14571.22	522.92	1443.00	9.78	14571.22

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 5155.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 178.960 degrees  
Prepared by Integrated Petroleum Technologies, Inc.  
Date Printed: 4-Nov-2015

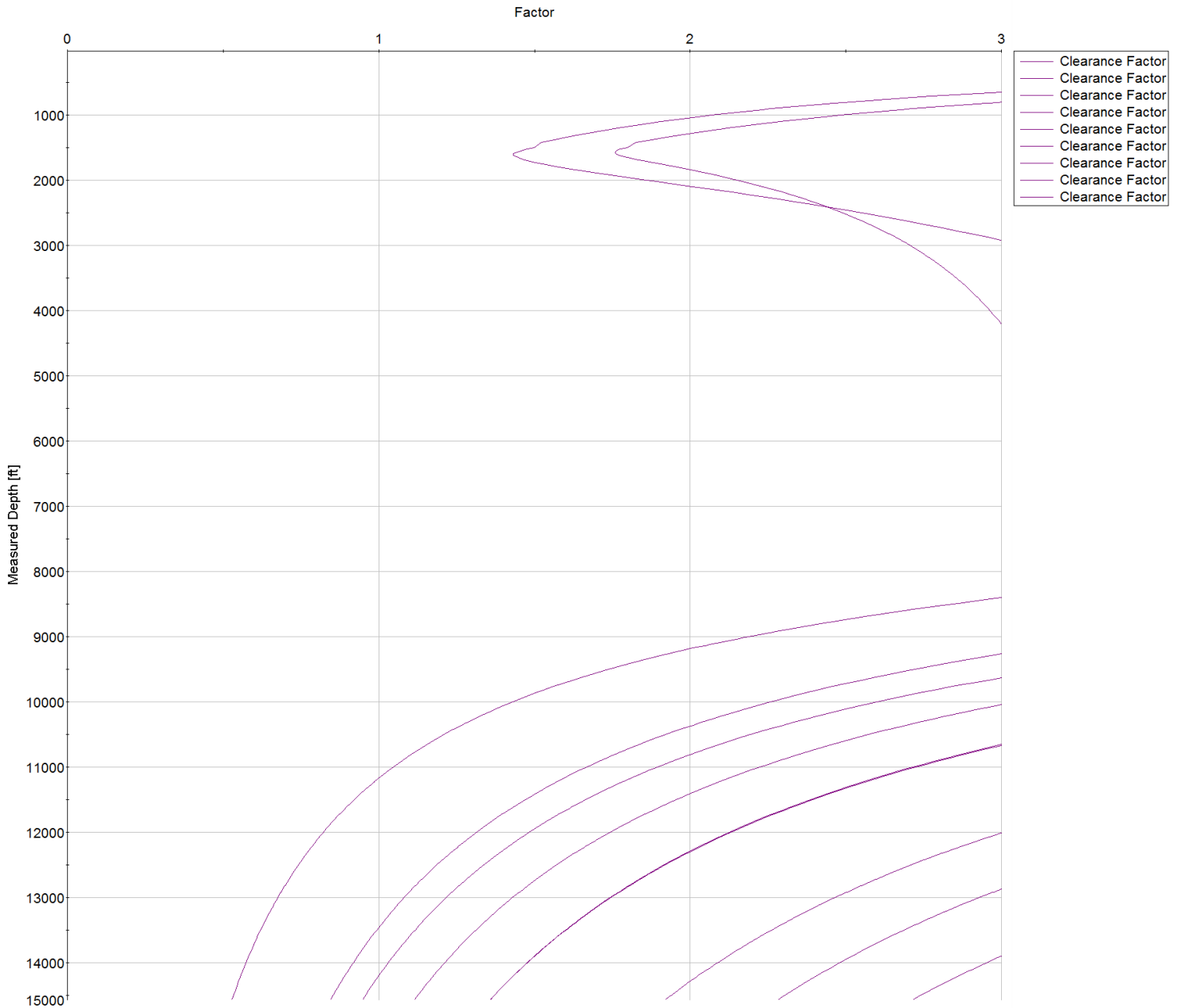


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Closest Approach + Clearance Factor Summary Report  
Wellbore: HOMESTEAD 21 (PWB)

Clearance Summary							
Offset WellName	Separation [ft]	MD[ft]	Diverging From[ft]	Ellipse Separation [ft]	Ellipse MD[ft]	Clearance Factor	Clearance MD[ft]
BERGMAN #1	637.55	10767.75	10767.75	530.57	10784.15	5.93	10823.00
WILLARD, JOHN W. GAS UNIT #1	1133.27	6994.78	6994.78	1087.38	6994.78	24.62	7060.40
UPRR 50 PAN AM M #1	1927.14	9068.47	9068.47	1858.91	9110.93	25.37	9783.50
BEN STEVENSON GAS UNIT #1	2151.98	14571.22	14571.22	2088.21	14571.22	33.75	14571.22
BERGMAN #2	2670.19	13691.47	13691.47	2490.93	13753.31	14.45	14196.23
BRIGHTON COMPANY #1	2983.30	13401.12	13401.12	2811.29	13474.44	16.61	14081.40
VISTA USX #WW33-08D	5068.77	7027.59	7027.59	5010.82	7027.59	67.17	11686.39
SHAW A #1	5107.61	14571.22	14571.22	5003.99	14571.22	49.29	14571.22



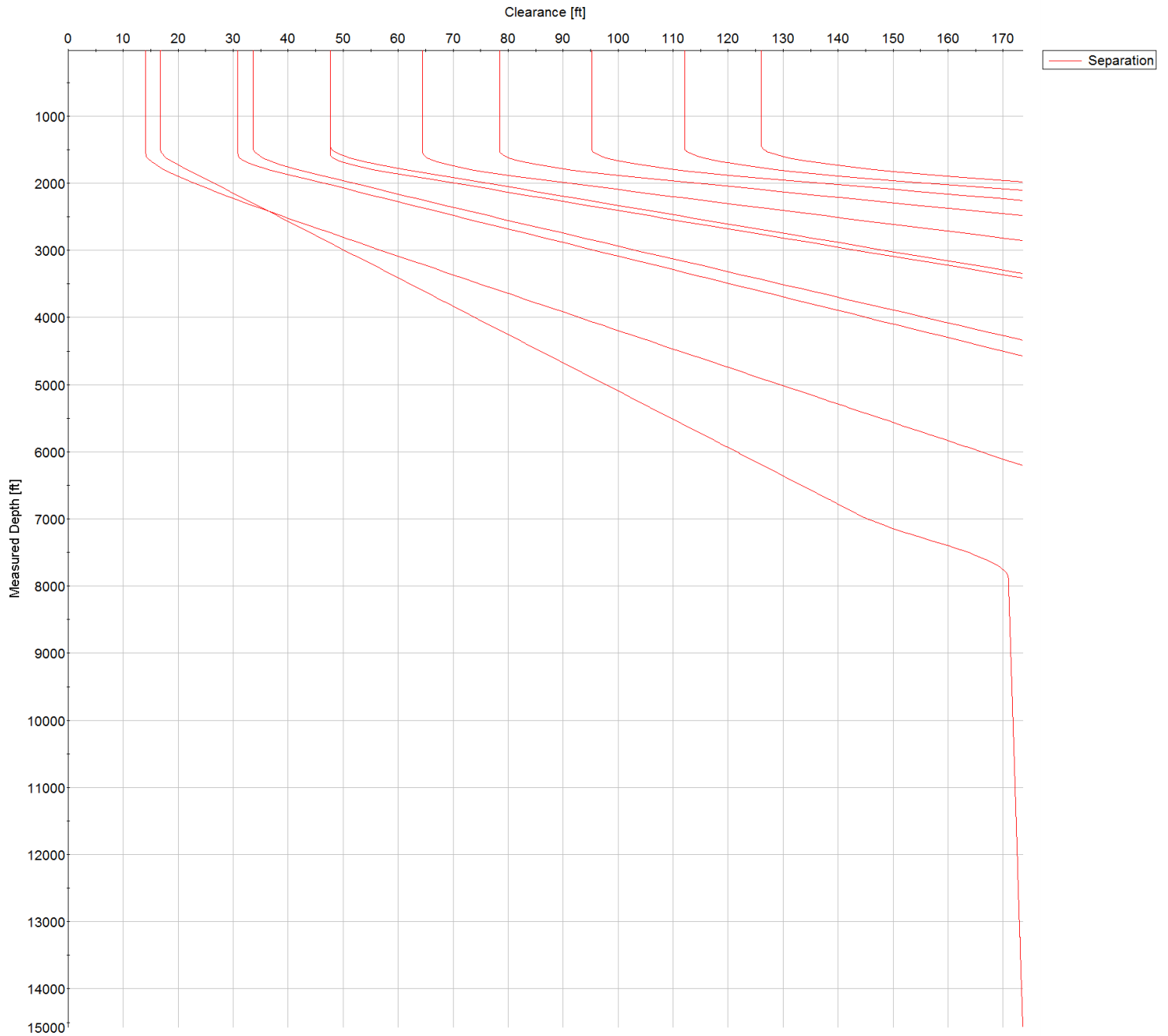
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