



SYSDRILL
Well Design Combined Report
Wellbore: LITZENBERGER 18 (PWB)



Wellhead Details							
Name	Latitude	Longitude	Northing	Easting	North	East	Slot Elevation Above Ground
LITZENBERGER 18	40.24226000	-105.02167000	1331457.2611	3133529.1798	25.89S	72.45W	0.00

Declination		
Date	Source	Time
29-May-2015	IGRF Model [1900.0-2020.0]	11:25

Installation Details						
Name	Installation Position (Latitude)	Installation Position (Longitude)	Northing	Easting	Coord System Name	North Alignment
Litzenberger Pad - Finalized	40.24233000	-105.02141000	1331483.1524	3133601.6223	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
25.00	0.00	0.000	25.00	0.00N	0.00E		0.00	1331457.26	3133529.18
12163.29	90.34	269.440	7169.00	1957.58S	3658.09W	==>	4148.94	1329499.77	3129871.26

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
25.00	0.00	0.000	25.00	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	9 5/8in Surface Casing
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	0.50	146.260	900.00	0.09S	0.06E	2.00	-0.01	
1000.00	2.50	146.260	999.96	2.27S	1.51E	2.00	-0.27	
1100.00	4.50	146.260	1099.77	7.34S	4.90E	2.00	-0.86	
1200.00	6.50	146.260	1199.30	15.31S	10.23E	2.00	-1.79	
1300.00	8.50	146.260	1298.44	26.17S	17.48E	2.00	-3.06	
1400.00	10.50	146.260	1397.07	39.89S	26.64E	2.00	-4.67	
1500.00	12.50	146.260	1495.05	56.47S	37.71E	2.00	-6.61	
1600.00	14.50	146.260	1592.29	75.88S	50.68E	2.00	-8.88	
1700.00	16.50	146.260	1688.64	98.11S	65.52E	2.00	-11.48	
1800.00	18.50	146.260	1784.01	123.11S	82.22E	2.00	-14.41	
1900.00	20.50	146.260	1878.27	150.87S	100.76E	2.00	-17.65	
2000.00	21.68	146.260	1971.42	181.12S	120.96E	==>	-21.19	
2100.00	21.68	146.260	2064.34	211.84S	141.48E	==>	-24.79	
2200.00	21.68	146.260	2157.27	242.56S	162.00E	==>	-28.38	
2300.00	21.68	146.260	2250.19	273.29S	182.52E	==>	-31.98	
2400.00	21.68	146.260	2343.12	304.01S	203.03E	==>	-35.58	
2500.00	21.68	146.260	2436.04	334.73S	223.55E	==>	-39.17	
2600.00	21.68	146.260	2528.97	365.45S	244.07E	==>	-42.77	
2700.00	21.68	146.260	2621.89	396.18S	264.59E	==>	-46.36	
2800.00	21.68	146.260	2714.82	426.90S	285.11E	==>	-49.96	
2900.00	21.68	146.260	2807.75	457.62S	305.63E	==>	-53.55	
3000.00	21.68	146.260	2900.67	488.34S	326.14E	==>	-57.15	
3100.00	21.68	146.260	2993.60	519.06S	346.66E	==>	-60.74	
3200.00	21.68	146.260	3086.52	549.79S	367.18E	==>	-64.34	
3300.00	21.68	146.260	3179.45	580.51S	387.70E	==>	-67.93	
3400.00	21.68	146.260	3272.37	611.23S	408.22E	==>	-71.53	
3500.00	21.68	146.260	3365.30	641.95S	428.73E	==>	-75.12	

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 5106.0ft above Mean Sea Level)
Vertical Section is from 0.00N 0.00E on azimuth 241.850 degrees
Bottom hole distance is 4148.94 Feet on azimuth 241.85 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Integrated Petroleum Technologies, Inc.
Date Printed: 23-Jun-2015



SYSDRILL
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Wellbore: LITZENBERGER 18 (PWB)



Interpolated Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
3600.00	21.68	146.260	3458.22	672.68S	449.25E	==>	-78.72	
3700.00	21.68	146.260	3551.15	703.40S	469.77E	==>	-82.31	
3800.00	21.68	146.260	3644.07	734.12S	490.29E	==>	-85.91	
3900.00	21.68	146.260	3737.00	764.84S	510.81E	==>	-89.50	
4000.00	21.68	146.260	3829.93	795.57S	531.33E	==>	-93.10	
4100.00	21.68	146.260	3922.85	826.29S	551.84E	==>	-96.69	
4200.00	21.68	146.260	4015.78	857.01S	572.36E	==>	-100.29	
4300.00	21.68	146.260	4108.70	887.73S	592.88E	==>	-103.88	
4400.00	21.68	146.260	4201.63	918.46S	613.40E	==>	-107.48	
4500.00	21.68	146.260	4294.55	949.18S	633.92E	==>	-111.07	
4600.00	21.68	146.260	4387.48	979.90S	654.44E	==>	-114.67	
4700.00	21.68	146.260	4480.40	1010.62S	674.95E	==>	-118.26	
4800.00	21.68	146.260	4573.33	1041.35S	695.47E	==>	-121.86	
4900.00	21.68	146.260	4666.25	1072.07S	715.99E	==>	-125.45	
5000.00	21.68	146.260	4759.18	1102.79S	736.51E	==>	-129.05	
5100.00	21.68	146.260	4852.11	1133.51S	757.03E	==>	-132.64	
5200.00	21.68	146.260	4945.03	1164.23S	777.54E	==>	-136.24	
5300.00	21.68	146.260	5037.96	1194.96S	798.06E	==>	-139.83	
5400.00	21.68	146.260	5130.88	1225.68S	818.58E	==>	-143.43	
5500.00	21.68	146.260	5223.81	1256.40S	839.10E	==>	-147.02	
5600.00	21.68	146.260	5316.73	1287.12S	859.62E	==>	-150.62	
5700.00	21.68	146.260	5409.66	1317.85S	880.14E	==>	-154.21	
5800.00	21.68	146.260	5502.58	1348.57S	900.65E	==>	-157.81	
5900.00	21.68	146.260	5595.51	1379.29S	921.17E	==>	-161.40	
6000.00	21.68	146.260	5688.43	1410.01S	941.69E	==>	-165.00	
6100.00	21.68	146.260	5781.36	1440.74S	962.21E	==>	-168.60	
6200.00	21.68	146.260	5874.29	1471.46S	982.73E	==>	-172.19	
6300.00	21.68	146.260	5967.21	1502.18S	1003.24E	==>	-175.79	
6400.00	21.68	146.260	6060.14	1532.90S	1023.76E	==>	-179.38	
6500.00	21.68	146.260	6153.06	1563.63S	1044.28E	==>	-182.98	
6600.00	21.68	146.260	6245.99	1594.35S	1064.80E	==>	-186.57	
6700.00	21.68	146.260	6338.91	1625.07S	1085.32E	==>	-190.17	
6800.00	21.68	146.260	6431.84	1655.79S	1105.84E	==>	-193.76	
6900.00	21.68	146.260	6524.76	1686.52S	1126.35E	==>	-197.36	
7000.00	18.72	168.800	6618.56	1717.60S	1140.99E	10.00	-195.59	
7100.00	19.55	199.540	6713.27	1749.19S	1138.50E	10.00	-178.50	
7200.00	24.63	222.720	6806.08	1780.34S	1118.72E	10.00	-146.36	
7300.00	32.00	237.110	6894.15	1810.12S	1082.24E	10.00	-100.14	
7400.00	40.42	246.300	6974.82	1837.62S	1030.17E	10.00	-41.26	
7500.00	49.35	252.700	7045.63	1861.99S	964.10E	10.00	28.50	
7600.00	58.55	257.570	7104.44	1882.50S	886.02E	10.00	107.02	
7700.00	67.90	261.550	7149.45	1898.54S	798.32E	10.00	191.91	
7800.00	77.34	265.030	7179.30	1909.60S	703.65E	10.00	280.59	
7804.00	77.71	265.160	7180.16	1909.93S	699.76E	10.00	284.18	7.0in Intermediate Casing
7900.00	86.81	268.260	7193.08	1915.35S	604.90E	10.00	370.37	
8000.00	90.34	269.440	7193.63	1916.72S	504.93E	==>	459.16	
8100.00	90.34	269.440	7193.04	1917.70S	404.94E	==>	547.79	
8200.00	90.34	269.440	7192.45	1918.68S	304.94E	==>	636.41	
8300.00	90.34	269.440	7191.85	1919.66S	204.95E	==>	725.04	
8400.00	90.34	269.440	7191.26	1920.64S	104.96E	==>	813.67	
8500.00	90.34	269.440	7190.67	1921.62S	4.96E	==>	902.29	
8600.00	90.34	269.440	7190.08	1922.60S	95.03W	==>	990.92	
8700.00	90.34	269.440	7189.49	1923.59S	195.02W	==>	1079.55	
8800.00	90.34	269.440	7188.90	1924.57S	295.02W	==>	1168.17	
8900.00	90.34	269.440	7188.30	1925.55S	395.01W	==>	1256.80	
9000.00	90.34	269.440	7187.71	1926.53S	495.00W	==>	1345.43	
9100.00	90.34	269.440	7187.12	1927.51S	595.00W	==>	1434.05	
9200.00	90.34	269.440	7186.53	1928.49S	694.99W	==>	1522.68	
9300.00	90.34	269.440	7185.94	1929.47S	794.98W	==>	1611.30	
9400.00	90.34	269.440	7185.35	1930.46S	894.98W	==>	1699.93	

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Interpolated Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
9500.00	90.34	269.440	7184.75	1931.44S	994.97W	==>	1788.56	
9600.00	90.34	269.440	7184.16	1932.42S	1094.96W	==>	1877.18	
9700.00	90.34	269.440	7183.57	1933.40S	1194.96W	==>	1965.81	
9800.00	90.34	269.440	7182.98	1934.38S	1294.95W	==>	2054.44	
9900.00	90.34	269.440	7182.39	1935.36S	1394.94W	==>	2143.06	
10000.00	90.34	269.440	7181.80	1936.34S	1494.94W	==>	2231.69	
10100.00	90.34	269.440	7181.21	1937.33S	1594.93W	==>	2320.32	
10200.00	90.34	269.440	7180.61	1938.31S	1694.92W	==>	2408.94	
10300.00	90.34	269.440	7180.02	1939.29S	1794.92W	==>	2497.57	
10400.00	90.34	269.440	7179.43	1940.27S	1894.91W	==>	2586.20	
10500.00	90.34	269.440	7178.84	1941.25S	1994.90W	==>	2674.82	
10600.00	90.34	269.440	7178.25	1942.23S	2094.90W	==>	2763.45	
10700.00	90.34	269.440	7177.66	1943.21S	2194.89W	==>	2852.08	
10800.00	90.34	269.440	7177.06	1944.20S	2294.88W	==>	2940.70	
10900.00	90.34	269.440	7176.47	1945.18S	2394.88W	==>	3029.33	
11000.00	90.34	269.440	7175.88	1946.16S	2494.87W	==>	3117.96	
11100.00	90.34	269.440	7175.29	1947.14S	2594.86W	==>	3206.58	
11200.00	90.34	269.440	7174.70	1948.12S	2694.86W	==>	3295.21	
11300.00	90.34	269.440	7174.11	1949.10S	2794.85W	==>	3383.83	
11400.00	90.34	269.440	7173.52	1950.08S	2894.84W	==>	3472.46	
11500.00	90.34	269.440	7172.92	1951.07S	2994.84W	==>	3561.09	
11600.00	90.34	269.440	7172.33	1952.05S	3094.83W	==>	3649.71	
11700.00	90.34	269.440	7171.74	1953.03S	3194.83W	==>	3738.34	
11800.00	90.34	269.440	7171.15	1954.01S	3294.82W	==>	3826.97	
11900.00	90.34	269.440	7170.56	1954.99S	3394.81W	==>	3915.59	
12000.00	90.34	269.440	7169.97	1955.97S	3494.81W	==>	4004.22	
12100.00	90.34	269.440	7169.37	1956.95S	3594.80W	==>	4092.85	
12163.29	90.34	269.440	7169.00	1957.58S	3658.09W	==>	4148.94	4 1/2in Production Liner

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Bottom hole distance is 4148.94 Feet on azimuth 241.85 degrees from Wellhead
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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]
12 1/4	25.00	25.00	0.00N	0.00E	500.00	500.00	0.00N	0.00E
8 3/4	500.00	500.00	0.00N	0.00E	7804.00	7180.16	1909.93S	699.76E
6 1/8	7804.00	7180.16	1909.93S	699.76E	12163.29	7169.00	1957.58S	3658.09W

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	25.00	25.00	0.00N	0.00E	500.00	500.00	0.00N	0.00E
7.0in Intermediate Casing	25.00	25.00	0.00N	0.00E	7804.00	7180.16	1909.93S	699.76E
4 1/2in Production Liner	7038.00	6654.59	1729.59S	1142.10E	12163.29	7169.00	1957.58S	3658.09W

Targets							
Name	North[ft]	East[ft]	TVD[ft]	Latitude	Longitude	Northing	Easting
LITZENBERGER 18 LP	1916.10S	702.74E	7179.00	40.23699000	-105.01919000	1329541.25	3134231.89
LITZENBERGER 18 BH	1957.58S	3658.09W	7169.00	40.23694000	-105.03481000	1329499.77	3129871.26

Survey Tool Program						
Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool	Error Model	
391535	Planned	12163.29	7169.00	ISCWSA MWD	Rev 3 + Fixed Rig + Rotating	

Notes



SYSDRILL
Closest Approach + Clearance Factor Summary Report
Wellbore: LITZENBERGER 18 (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
LITZENBERGER 18 (PWB)	19-Jun-2015	19-Jun-2015

Well		
Name	Government ID	Last Revised
LITZENBERGER 18		16-Jun-2015

Slot						
Name	Latitude	Longitude	Grid Northing	Grid Easting	North	East
LITZENBERGER 18	40.24226000	-105.02167000	1331457.2611	3133529.1798	25.89S	72.45W

Installation						
Name	Installation Position (Latitude)	Installation Position (Longitude)	Easting	Northing	Coord System Name	North Alignment
Litzenberger Pad - Finalized	40.24233000	-105.02141000	3133601.6223	1331483.1524	CO83-NF on NORTH AMERICAN DATUM 1983 datum	Grid

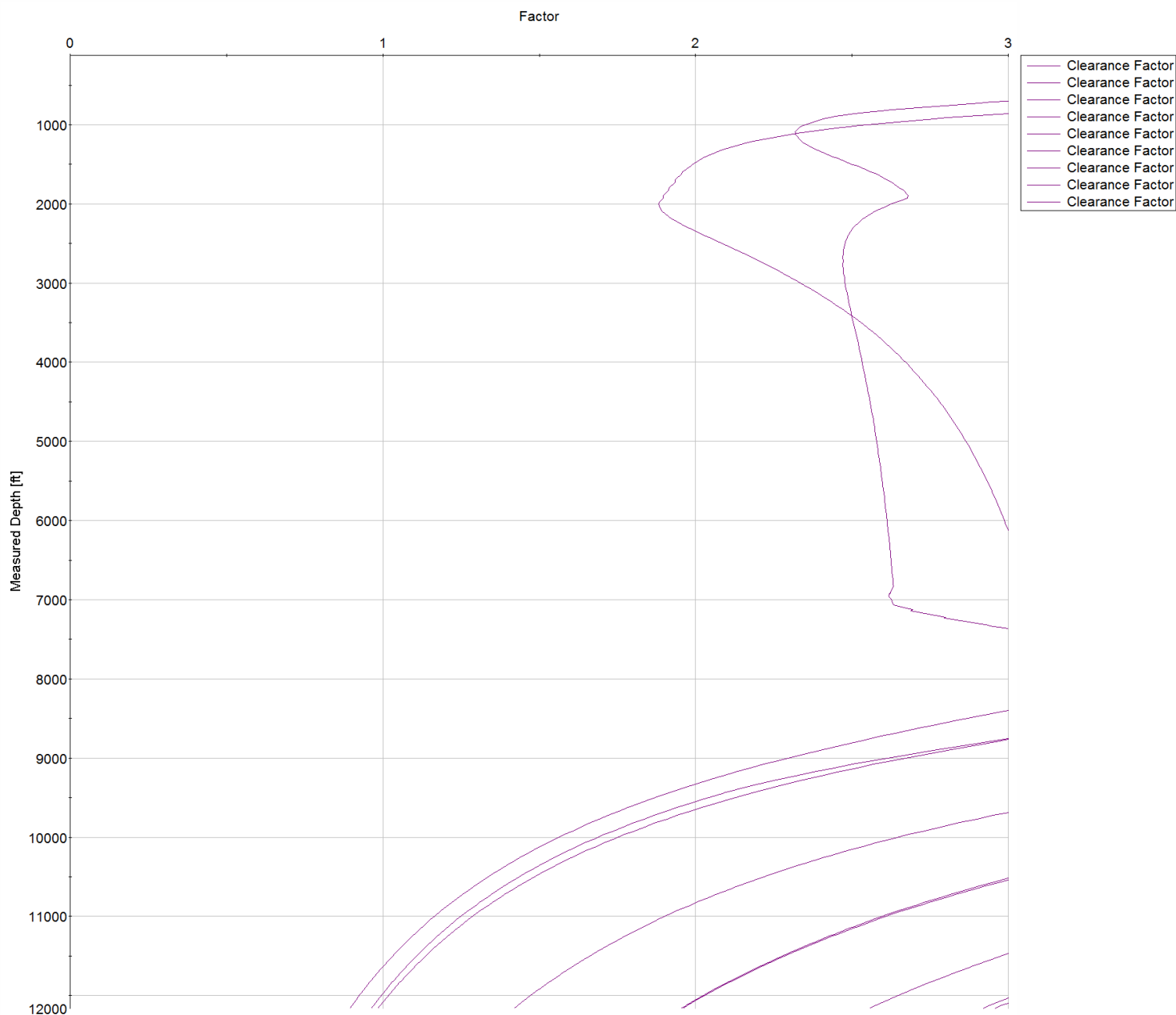
Clearance Summary							
Offset WellName	Separation [ft]	MD[ft]	Diverging From[ft]	Ellipse Separation [ft]	Ellipse MD[ft]	Clearance Factor	Clearance MD[ft]
LITZENBERGER 17	13.96	850.00	7937.19	-31.81	12163.29	0.90	12163.29
LITZENBERGER 19	16.33	1042.06	1042.06	-5.37	12163.29	0.98	12163.29
LITZENBERGER 16	24.48	1192.64	9435.65	-13.12	12163.29	0.96	12163.29
LITZENBERGER 7	25.50	878.02	878.02	19.76	894.42	4.31	960.04
LITZENBERGER 20	27.07	1107.68	12163.29	19.72	1189.70	1.42	12163.29
LITZENBERGER 8	29.07	878.02	878.02	23.31	894.42	4.87	960.04
LITZENBERGER 6	30.51	828.81	828.81	24.84	894.42	5.19	943.64
LITZENBERGER 9	37.81	650.00	12159.34	33.43	681.17	5.90	12163.29
LITZENBERGER 15	39.24	1226.81	12160.11	31.29	1271.72	1.96	12160.11
LITZENBERGER 5	39.40	894.42	12157.54	33.57	910.83	6.50	976.44
LITZENBERGER 21	40.74	1042.06	1042.06	33.90	1091.27	1.95	12163.29
LITZENBERGER 4	49.86	910.83	910.83	43.94	927.23	8.03	1009.25
LITZENBERGER 12	51.43	600.00	12159.73	47.29	625.00	3.93	12163.29
LITZENBERGER 14	52.86	1261.17	1261.17	44.85	1288.12	2.56	12163.29
LITZENBERGER 22	57.50	992.85	992.85	51.00	1025.66	2.96	12163.29
LITZENBERGER 11	63.93	550.00	550.00	60.12	582.74	4.40	12163.29
LITZENBERGER 3	64.22	910.83	910.83	58.29	927.23	9.90	12163.29
LITZENBERGER 23	67.71	981.41	7937.19	61.17	1009.25	3.16	12163.29
LITZENBERGER 13	68.38	1263.22	12131.30	60.31	1304.53	2.92	12163.29
LITZENBERGER 2	74.20	910.83	12157.29	68.21	927.23	10.01	12163.29
LITZENBERGER 10	76.93	500.72	500.72	73.28	484.32	4.92	12163.29



SYSDRILL
Closest Approach + Clearance Factor Summary Report
Wellbore: LITZENBERGER 18 (PWB)



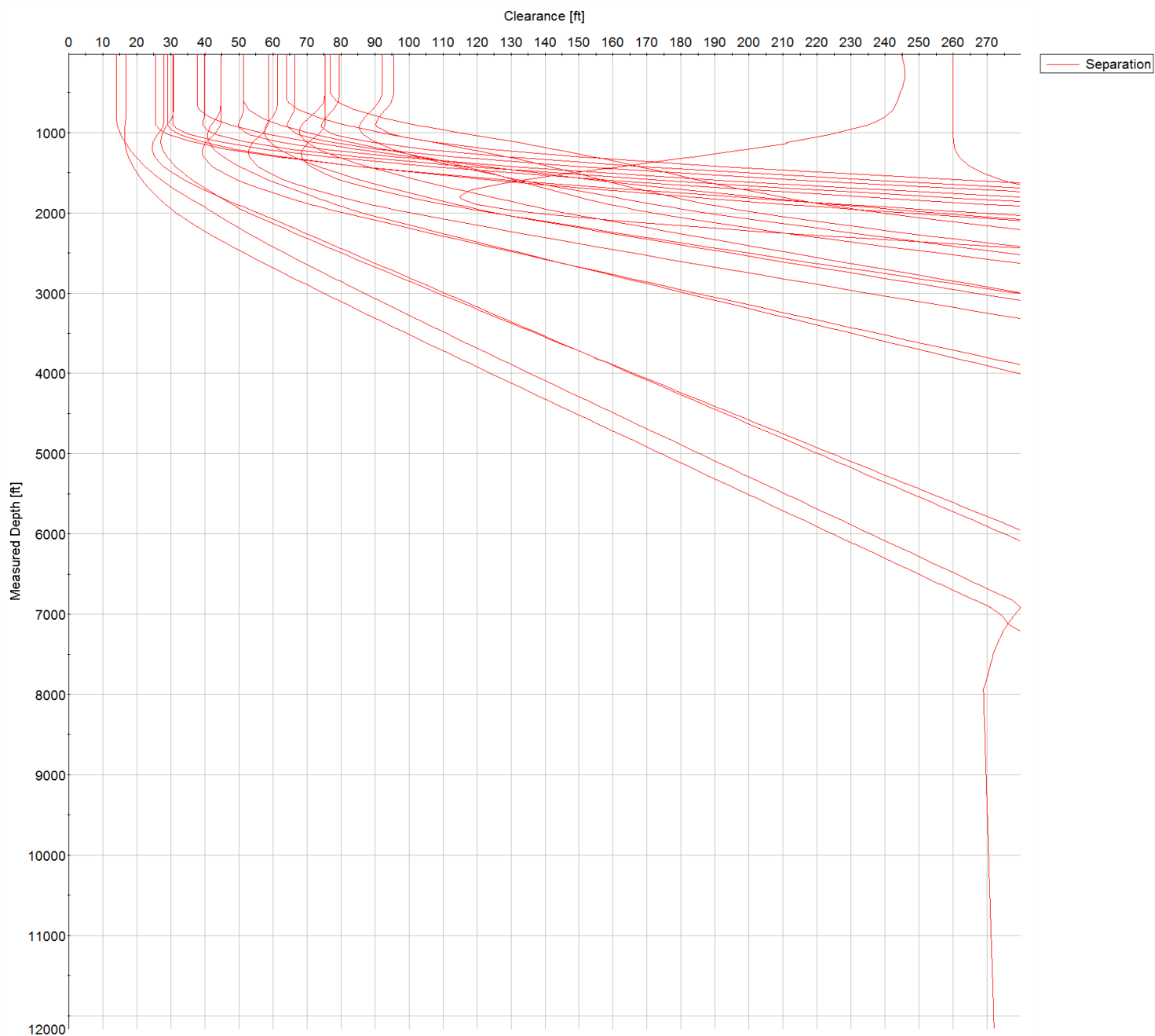
Clearance Summary							
Offset WellName	Separation [ft]	MD[ft]	Diverging From[ft]	Ellipse Separation [ft]	Ellipse MD[ft]	Clearance Factor	Clearance MD[ft]
LITZENBERGER 24	85.41	930.88	930.88	79.17	960.04	3.90	12163.29
LITZENBERGER 1	90.28	894.42	12156.98	84.35	910.83	10.85	12163.29
Kintz #2	115.03	1796.69	9368.08	102.56	1813.06	4.44	9325.00
Kintz #1	260.00	992.85	8267.72	246.95	1206.10	16.16	1763.85
Billings #2A-18H	1491.16	10397.57	10397.57	1095.03	10408.86	3.76	10408.86
Billings #2B-18H	1835.80	12163.29	12163.29	1442.30	12144.46	4.66	10424.60



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 5106.0ft above Mean Sea Level)
Vertical Section is from 0.00N 0.00E on azimuth 241.850 degrees
Prepared by Integrated Petroleum Technologies, Inc.
Date Printed: 23-Jun-2015



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