

Weatherford International Ltd.

DIRECTIONAL REPORT

Company: CHESAPEAKE	Date: 9/5/2013	Time: 13:08:46	Page: 1
Field: OHIO COUNTY, WV (NAD 27)	Co-ordinate(NE) Reference: Well: 3H, Grid North		
Site: CLARENCE FARMER	Vertical (TVD) Reference: SITE 1352.0		
Well: 3H	Section (VS) Reference: Well (0.00N,0.00E,335.95Azi)		
Wellpath: HORIZONTAL	Survey Calculation Method: Minimum Curvature		Db: Sybase

Plan:	Date Composed:
Principal:	Version:
	Tied-to:

Field: OHIO COUNTY, WV (NAD 27)	
Map System: US State Plane Coordinate System 1927	Map Zone: West Virginia, Northern Zone
Geo Datum: NAD27 (Clarke 1866)	Coordinate System: Well Centre
Sys Datum: Mean Sea Level	Geomagnetic Model: IGRF2010

Site: CLARENCE FARMER	
Site Position:	Latitude: 40 8 49.298 N
From: Map	Longitude: 80 34 33.069 W
Position Uncertainty: 0.00 ft	North Reference: Grid
Ground Level: 1330.00 ft	Grid Convergence: -0.69 deg

Well: 3H	Slot Name:
Well Position: +N/-S 17.50 ft	Latitude: 40 8 49.472 N
+E/-W 9.70 ft	Longitude: 80 34 32.947 W
Position Uncertainty: 0.00 ft	

Wellpath: HORIZONTAL	Drilled From: Surface
Current Datum: SITE	Tie-on Depth: 0.00 ft
Magnetic Data: 5/21/2013	Above System Datum: Mean Sea Level
Field Strength: 52843 nT	Declination: -8.78 deg
Vertical Section: Depth From (TVD)	Mag Dip Angle: 67.55 deg
ft	ft
+N/-S	+E/-W
ft	ft
Direction	deg
0.00	0.00
0.00	0.00
0.00	335.95

Plan Section Information											
MD	Incl	Azim	TVD	+N/-S	+E/-W	DLS	Build	Turn	TFO	Target	

Survey											
MD	Incl	Azim	TVD	N/S	E/W	VS	DLS	MapN	MapE	Annotation	
ft	deg	deg	ft	ft	ft	ft	deg/100ft	ft	ft		
600.00	0.80	238.12	599.98	-1.98	-3.18	-0.51	0.00	601717.42	1699244.52		
824.00	0.25	212.95	823.97	-3.21	-4.78	-0.99	0.26	601716.19	1699242.92		
919.00	1.20	355.24	918.97	-2.40	-4.97	-0.16	1.48	601717.00	1699242.73		
1013.00	3.89	356.18	1012.87	1.77	-5.27	3.76	2.86	601721.17	1699242.43		
1108.00	4.37	350.39	1107.62	8.55	-6.09	10.29	0.67	601727.95	1699241.61		
1202.00	5.08	357.16	1201.30	16.24	-6.89	17.64	0.96	601735.64	1699240.81		
1297.00	5.07	4.64	1295.93	24.62	-6.76	25.24	0.70	601744.02	1699240.94		
1391.00	3.24	2.02	1389.68	31.42	-6.33	31.27	1.96	601750.82	1699241.37		
1486.00	1.18	342.25	1484.60	35.03	-6.53	34.65	2.28	601754.43	1699241.17		
1580.00	0.88	311.18	1578.59	36.43	-7.37	36.27	0.66	601755.83	1699240.33		
1674.00	0.67	213.20	1672.58	36.45	-8.22	36.63	1.25	601755.85	1699239.48		
1768.00	0.75	180.28	1766.58	35.37	-8.52	35.77	0.44	601754.77	1699239.18		
1862.00	0.30	26.86	1860.57	34.98	-8.41	35.37	1.09	601754.38	1699239.29		
1956.00	0.58	29.80	1954.57	35.61	-8.06	35.80	0.30	601755.01	1699239.64		
2012.00	0.50	15.92	2010.57	36.09	-7.86	36.16	0.27	601755.49	1699239.84		
2106.00	0.43	10.36	2104.57	36.83	-7.68	36.76	0.09	601756.23	1699240.02		
2201.00	0.70	298.86	2199.56	37.46	-8.12	37.52	0.73	601756.86	1699239.58		
2296.00	0.83	267.03	2294.55	37.71	-9.32	38.23	0.46	601757.11	1699238.38		
2390.00	0.74	270.62	2388.55	37.68	-10.61	38.73	0.11	601757.08	1699237.09		
2485.00	1.00	278.62	2483.53	37.81	-12.04	39.43	0.30	601757.21	1699235.66		

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Site: CLARENCE FARMER	Vertical (TVD) Reference: SITE 1352.0		
Well: 3H	Section (VS) Reference: Well (0.00N,0.00E,335.95Azi)		
Wellpath: HORIZONTAL	Survey Calculation Method: Minimum Curvature		Db: Sybase

Survey										
MD ft	Incl deg	Azim deg	TVD ft	N/S ft	E/W ft	VS ft	DLS deg/100ft	MapN ft	MapE ft	Annotation
2579.00	1.09	288.41	2577.52	38.21	-13.70	40.48	0.21	601757.61	1699234.00	
2674.00	1.14	278.78	2672.50	38.64	-15.49	41.60	0.20	601758.04	1699232.21	
2769.00	1.20	280.24	2767.48	38.96	-17.40	42.67	0.07	601758.36	1699230.30	
2863.00	1.34	288.75	2861.46	39.49	-19.41	43.97	0.25	601758.89	1699228.29	
2958.00	1.01	305.95	2956.44	40.34	-21.14	45.45	0.50	601759.74	1699226.56	
3053.00	1.09	298.26	3051.42	41.26	-22.62	46.89	0.17	601760.66	1699225.08	
3147.00	1.01	287.16	3145.41	41.93	-24.20	48.15	0.23	601761.33	1699223.50	
3242.00	0.86	302.01	3240.39	42.55	-25.60	49.29	0.30	601761.95	1699222.10	
3336.00	0.90	303.60	3334.38	43.33	-26.81	50.50	0.05	601762.73	1699220.89	
3429.00	0.75	292.36	3427.37	43.97	-27.98	51.56	0.24	601763.37	1699219.72	
3524.00	0.98	302.00	3522.36	44.64	-29.25	52.68	0.29	601764.04	1699218.45	
3618.00	1.04	290.43	3616.35	45.36	-30.73	53.95	0.23	601764.76	1699216.97	
3713.00	0.70	287.31	3711.34	45.83	-32.09	54.93	0.36	601765.23	1699215.61	
3807.00	0.70	311.64	3805.33	46.39	-33.07	55.84	0.31	601765.79	1699214.63	
3900.00	0.66	311.20	3898.32	47.12	-33.90	56.84	0.04	601766.52	1699213.80	
3995.00	0.65	297.88	3993.32	47.73	-34.78	57.76	0.16	601767.13	1699212.92	
4088.00	0.61	329.26	4086.31	48.40	-35.50	58.67	0.37	601767.80	1699212.20	
4182.00	0.65	307.07	4180.31	49.15	-36.18	59.63	0.26	601768.55	1699211.52	
4277.00	0.62	339.62	4275.30	49.96	-36.79	60.62	0.38	601769.36	1699210.91	
4369.00	0.60	339.50	4367.30	50.88	-37.14	61.60	0.02	601770.28	1699210.56	
4464.00	0.30	296.66	4462.29	51.46	-37.53	62.28	0.45	601770.86	1699210.17	
4558.00	0.45	314.86	4556.29	51.83	-38.01	62.82	0.20	601771.23	1699209.69	
4653.00	1.09	301.42	4651.28	52.56	-39.05	63.91	0.70	601771.96	1699208.65	
4747.00	1.51	310.54	4745.26	53.83	-40.75	65.77	0.50	601773.23	1699206.95	
4841.00	1.27	312.00	4839.23	55.33	-42.47	67.84	0.26	601774.73	1699205.23	
4936.00	1.23	310.59	4934.21	56.70	-44.03	69.72	0.05	601776.10	1699203.67	
5030.00	1.20	306.38	5028.19	57.94	-45.58	71.49	0.10	601777.34	1699202.12	
5125.00	1.19	315.97	5123.17	59.24	-47.07	73.28	0.21	601778.64	1699200.63	
5219.00	0.92	318.51	5217.15	60.51	-48.25	74.92	0.29	601779.91	1699199.45	
5313.00	0.89	315.81	5311.14	61.60	-49.26	76.32	0.06	601781.00	1699198.44	
5408.00	0.65	300.53	5406.13	62.40	-50.24	77.46	0.33	601781.80	1699197.46	
5499.00	0.67	306.97	5497.12	62.98	-51.11	78.34	0.08	601782.38	1699196.59	
5564.00	0.32	251.41	5562.12	63.15	-51.58	78.69	0.85	601782.55	1699196.12	
5659.00	0.74	225.68	5657.12	62.64	-52.27	78.50	0.50	601782.04	1699195.43	
5690.00	0.96	249.70	5688.11	62.41	-52.66	78.45	1.34	601781.81	1699195.04	
5722.00	1.16	261.79	5720.11	62.27	-53.23	78.56	0.93	601781.67	1699194.47	
5753.00	2.69	307.50	5751.09	62.67	-54.12	79.28	6.63	601782.07	1699193.58	
5784.00	5.61	331.40	5782.01	64.44	-55.42	81.43	10.75	601783.84	1699192.28	
5816.00	8.84	339.75	5813.75	68.12	-57.02	85.45	10.59	601787.52	1699190.68	
5847.00	11.88	345.76	5844.24	73.45	-58.63	90.97	10.39	601792.85	1699189.07	
5878.00	14.74	348.37	5874.41	80.41	-60.21	97.97	9.42	601799.81	1699187.49	
5910.00	17.24	349.46	5905.17	89.06	-61.90	106.55	7.87	601808.46	1699185.80	
5941.00	19.45	349.12	5934.59	98.65	-63.71	116.05	7.14	601818.05	1699183.99	
5973.00	22.42	349.38	5964.47	109.88	-65.85	127.17	9.29	601829.28	1699181.85	
6004.00	25.65	349.16	5992.78	122.28	-68.20	139.46	10.42	601841.68	1699179.50	
6036.00	28.66	347.46	6021.25	136.58	-71.17	153.72	9.71	601855.98	1699176.53	
6067.00	31.80	346.23	6048.03	151.77	-74.73	169.05	10.32	601871.17	1699172.97	
6099.00	34.98	346.14	6074.75	168.87	-78.93	186.38	9.94	601888.27	1699168.77	
6130.00	38.07	345.53	6099.66	186.76	-83.45	204.55	10.04	601906.16	1699164.25	
6161.00	40.56	345.76	6123.64	205.78	-88.32	223.91	8.05	601925.18	1699159.38	
6193.00	44.13	346.06	6147.29	226.69	-93.56	245.14	11.17	601946.09	1699154.14	
6225.00	46.22	347.00	6169.84	248.76	-98.85	267.45	6.86	601968.16	1699148.85	

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Well: 3H	Section (VS) Reference: Well (0.00N,0.00E,335.95Azi)		
Wellpath: HORIZONTAL	Survey Calculation Method: Minimum Curvature		Db: Sybase

Survey

MD ft	Incl deg	Azim deg	TVD ft	N/S ft	E/W ft	VS ft	DLS deg/100ft	MapN ft	MapE ft	Annotations
6256.00	48.71	347.29	6190.80	271.03	-103.93	289.85	8.06	601990.43	1699143.77	
6288.00	50.89	347.71	6211.45	294.89	-109.21	313.80	6.89	602014.29	1699138.49	
6320.00	54.13	347.44	6230.93	319.68	-114.68	338.66	10.15	602039.08	1699133.02	
6343.92	56.55	347.44	6244.53	338.89	-118.96	357.95	10.13	602058.29	1699128.74	3H PBHL P7
6351.00	57.27	347.44	6248.39	344.67	-120.25	363.76	10.13	602064.07	1699127.45	
6383.00	60.48	347.39	6264.93	371.40	-126.21	390.60	10.03	602090.80	1699121.49	
6414.00	62.86	347.67	6279.64	398.05	-132.11	417.33	7.72	602117.45	1699115.59	
6446.00	65.70	348.09	6293.53	426.23	-138.16	445.53	8.95	602145.63	1699109.54	
6477.00	69.11	348.81	6305.44	454.27	-143.88	473.47	11.21	602173.67	1699103.82	
6509.00	73.02	348.27	6315.82	483.93	-149.90	503.01	12.32	602203.33	1699097.80	
6540.00	74.51	347.55	6324.49	513.03	-156.13	532.12	5.30	602232.43	1699091.57	
6571.00	76.45	347.14	6332.26	542.31	-162.71	561.54	6.39	602261.71	1699084.99	
6602.00	79.58	345.96	6338.69	571.80	-169.76	591.34	10.76	602291.20	1699077.94	
6633.00	83.75	345.67	6343.19	601.53	-177.28	621.55	13.48	602320.93	1699070.42	
6664.00	85.21	345.34	6346.17	631.40	-185.00	651.98	4.83	602350.80	1699062.70	
6696.00	86.92	344.57	6348.36	662.23	-193.29	683.51	5.86	602381.63	1699054.41	
6728.00	87.83	343.70	6349.83	692.98	-202.02	715.15	3.93	602412.38	1699045.68	
6791.00	89.89	342.44	6351.08	753.23	-220.37	777.65	3.83	602472.63	1699027.33	
6885.00	91.40	341.71	6350.03	842.66	-249.29	871.10	1.78	602562.06	1698998.41	
6979.00	91.05	342.47	6348.02	932.08	-278.19	964.54	0.89	602651.48	1698969.51	
7074.00	90.53	339.81	6346.71	1021.96	-308.90	1059.13	2.85	602741.36	1698938.80	
7168.00	90.53	337.00	6345.84	1109.35	-343.49	1153.03	2.99	602828.75	1698904.21	
7262.00	91.09	335.82	6344.51	1195.49	-381.10	1247.02	1.39	602914.89	1698866.60	
7357.00	91.63	335.13	6342.25	1281.89	-420.52	1341.99	0.92	603001.29	1698827.18	
7453.00	91.82	335.07	6339.36	1368.93	-460.92	1437.94	0.21	603088.33	1698786.78	
7546.00	91.16	337.59	6336.94	1454.07	-498.25	1530.89	2.80	603173.47	1698749.45	
7641.00	91.26	338.68	6334.94	1542.21	-533.62	1625.80	1.15	603261.61	1698714.08	
7736.00	90.95	338.31	6333.11	1630.58	-568.44	1720.69	0.51	603349.98	1698679.26	
7831.00	91.52	338.73	6331.06	1718.97	-603.21	1815.57	0.75	603438.37	1698644.49	
7925.00	89.89	337.46	6329.90	1806.17	-638.28	1909.49	2.20	603525.57	1698609.42	
8020.00	90.89	336.38	6329.26	1893.56	-675.52	2004.48	1.55	603612.96	1698572.18	
8114.00	90.56	336.71	6328.07	1979.78	-712.93	2098.46	0.50	603699.18	1698534.77	
8209.00	92.78	334.74	6325.30	2066.34	-751.96	2193.41	3.12	603785.74	1698495.74	
8304.00	93.52	334.32	6320.08	2151.98	-792.76	2288.24	0.90	603871.38	1698454.94	
8399.00	91.87	334.44	6315.61	2237.54	-833.79	2383.09	1.74	603956.94	1698413.91	
8493.00	91.98	334.30	6312.45	2322.24	-874.42	2477.00	0.19	604041.64	1698373.28	
8588.00	91.12	336.04	6309.88	2408.42	-914.30	2571.96	2.04	604127.82	1698333.40	
8683.00	89.63	337.72	6309.26	2495.79	-951.60	2666.94	2.36	604215.19	1698296.10	Oil and
8777.00	90.32	338.45	6309.30	2582.99	-986.68	2760.87	1.07	604302.39	1698261.02	
8872.00	87.97	335.98	6310.72	2670.56	-1023.46	2855.82	3.59	604389.96	1698224.24	
8966.00	87.86	335.94	6314.14	2756.35	-1061.73	2949.76	0.12	604475.75	1698185.97	
9061.00	89.18	335.98	6316.59	2843.08	-1100.42	3044.73	1.39	604562.48	1698147.28	
9156.00	90.63	334.96	6316.75	2929.50	-1139.86	3139.72	1.87	604648.90	1698107.84	
9250.00	91.16	334.62	6315.28	3014.53	-1179.89	3233.69	0.67	604733.93	1698067.81	
9345.00	91.68	335.07	6312.93	3100.50	-1220.26	3328.64	0.72	604819.90	1698027.44	
9440.00	91.80	335.00	6310.04	3186.58	-1260.34	3423.58	0.15	604905.98	1697987.36	
9535.00	91.93	334.72	6306.95	3272.54	-1300.67	3518.52	0.32	604991.94	1697947.03	
9629.00	92.42	334.08	6303.38	3357.25	-1341.26	3612.41	0.86	605076.65	1697906.44	
9721.00	92.19	334.19	6299.68	3439.96	-1381.36	3704.29	0.28	605159.36	1697866.34	MWD TIE ON
9816.00	92.89	334.01	6295.47	3525.34	-1422.82	3799.15	0.76	605244.74	1697824.88	
9910.00	92.85	336.81	6290.77	3610.70	-1461.88	3893.02	2.98	605330.10	1697785.82	
10005.00	91.40	336.67	6287.24	3697.91	-1499.37	3987.94	1.53	605417.31	1697748.33	
10100.00	90.91	336.62	6285.33	3785.11	-1537.02	4082.91	0.52	605504.51	1697710.68	

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Site: CLARENCE FARMER	Vertical (TVD) Reference: SITE 1352.0		
Well: 3H	Section (VS) Reference: Well (0.00N,0.00E,335.95Azi)		
Wellpath: HORIZONTAL	Survey Calculation Method: Minimum Curvature		Db: Sybase

Survey

MD ft	Incl deg	Azim deg	TVD ft	N/S ft	E/W ft	VS ft	DLS deg/100ft	MapN ft	MapE ft	Annotation
10194.00	90.93	336.47	6283.82	3871.33	-1574.43	4176.90	0.16	605590.73	1697673.27	
10289.00	91.10	337.76	6282.14	3958.84	-1611.37	4271.86	1.37	605678.24	1697636.33	
10383.00	91.45	339.40	6280.05	4046.32	-1645.69	4365.73	1.78	605765.72	1697602.01	
10476.00	89.76	337.18	6279.06	4132.71	-1680.09	4458.64	3.00	605852.11	1697567.61	
10570.00	90.54	339.01	6278.82	4219.92	-1715.15	4552.57	2.12	605939.32	1697532.55	
10665.00	90.21	342.80	6278.20	4309.67	-1746.22	4647.20	4.00	606029.07	1697501.48	
10760.00	88.32	338.52	6279.41	4399.28	-1777.67	4741.84	4.92	606118.68	1697470.03	
10854.00	89.00	336.50	6281.61	4486.10	-1813.62	4835.78	2.27	606205.50	1697434.08	
10948.00	89.72	335.47	6282.66	4571.96	-1851.87	4929.77	1.34	606291.36	1697395.83	
11042.00	91.03	333.98	6282.05	4656.96	-1892.00	5023.74	2.11	606376.36	1697355.70	
11137.00	91.35	333.81	6280.07	4742.25	-1933.80	5118.66	0.38	606461.65	1697313.90	
11231.00	91.87	333.55	6277.43	4826.47	-1975.46	5212.55	0.62	606545.87	1697272.24	
11326.00	92.22	333.51	6274.04	4911.45	-2017.77	5307.40	0.37	606630.85	1697229.93	
11421.00	92.28	332.95	6270.31	4996.21	-2060.53	5402.22	0.59	606715.61	1697187.17	
11515.00	92.98	334.35	6266.00	5080.35	-2102.21	5496.04	1.66	606799.75	1697145.49	
11609.00	91.31	335.38	6262.48	5165.38	-2142.10	5589.96	2.09	606884.78	1697105.60	
11703.00	91.28	335.86	6260.36	5250.98	-2180.90	5683.93	0.51	606970.38	1697066.80	
11798.00	91.09	336.70	6258.39	5337.93	-2219.10	5778.91	0.91	607057.33	1697028.60	
11890.00	91.47	336.95	6256.34	5422.49	-2255.30	5870.87	0.49	607141.89	1696992.40	
11985.00	91.79	337.08	6253.64	5509.91	-2292.38	5965.82	0.36	607229.31	1696955.32	
12080.00	90.35	336.12	6251.86	5597.08	-2330.10	6060.79	1.82	607316.48	1696917.60	
12174.00	90.98	335.12	6250.77	5682.69	-2368.90	6154.78	1.26	607402.09	1696878.80	
12269.00	91.17	334.81	6248.99	5768.75	-2409.09	6249.75	0.38	607488.15	1696838.61	
12362.00	91.40	334.66	6246.90	5852.83	-2448.78	6342.71	0.30	607572.23	1696798.92	
12457.00	90.35	336.44	6245.45	5939.30	-2488.09	6437.69	2.18	607658.70	1696759.61	
12551.00	89.33	335.89	6245.71	6025.28	-2526.08	6531.69	1.23	607744.68	1696721.62	
12645.00	89.21	336.35	6246.91	6111.23	-2564.13	6625.68	0.51	607830.63	1696683.57	
12740.00	89.58	336.65	6247.91	6198.34	-2602.01	6720.67	0.50	607917.74	1696645.69	
12803.00	89.68	336.62	6248.32	6256.17	-2626.99	6783.66	0.17	607975.57	1696620.71	LAST MWD SVY
12860.00	89.68	336.62	6248.64	6308.49	-2649.61	6840.66	0.00	608027.89	1696598.09	PROJ TO BIT

Targets

Name	Description		TVD ft	+N-S ft	+E/-W ft	Map Northing ft	Map Easting ft	<--- Latitude --->			<--- Longitude --->		
	Dip.	Dir.						Deg	Min	Sec	Deg	Min	Sec
3H PBHL P7			6244.53	6308.30	-2649.90	608027.701696597.80		40	9	51.494 N	89	35	8.050 W

Casing Points

MD	TVD	Diameter	Hole Size	Name

Annotation

MD ft	TVD ft	Annotation
9721.00	6299.68	MWD TIE ON
12803.00	6248.32	LAST MWD SVY
12860.00	6248.64	PROJ TO BIT

Environmental Protection

Weatherford International Ltd.

DIRECTIONAL REPORT

Company: CHESAPEAKE	Date: 9/5/2013	Time: 13:08:46	Page: 5
Field: OHIO COUNTY, WV (NAD 27)	Co-ordinate(NE) Reference: Well: 3H, Grid North		
Site: CLARENCE FARMER	Vertical (TVD) Reference: SITE 1352.0		
Well: 3H	Section (VS) Reference: Well (0.00N,0.00E,335.95Azi)		
Wellpath: HORIZONTAL	Survey Calculation Method: Minimum Curvature		Db: Sybase

Formations

MD	TVD	Formations	Lithology	Dip Angle	Dip Direction

RECEIVED
Department of Environmental Protection
September 5, 2013