

Chesapeake Appalachia, LLC

Ohio County, WV
Valley Grove
Mason Cottrell OHI 1H

Wellbore #1

Design: Surveys

Sperry Drilling Services Combo Report

04 September, 2012

Well Coordinates: 575,885.02 N, 1,687,177.98 E (40° 04' 32.73" N, 080° 37' 04.22" W)
Ground Level: 1,300.00 ft

Local Coordinate Origin:	Centered on Well Mason Cottrell OHI 1H
Viewing Datum:	GL 1300' + KB 16' @ 1316.00ft (Nomac 25)
TVDs to System:	N
North Reference:	Grid
Unit System:	API-US Survey Feet

Version: 2003.16 Build: 431

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Office of Oil and Gas
APR 25 2014
West Virginia Department of
Environmental Protection
HALLIBURTON

Design Report for Mason Cottrell OHI 1H - Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	TVD below System (ft)	Vertical Depth (ft)	Local Coordinates (ft)		Map Coordinates (ft)		Dogleg Rate (°/100ft)	Vertical Section (ft)
					Northing	Easting	Northing	Easting		
0.00	0.00	0.00	-1,316.00	0.00	0.00 N	0.00 E	575,885.02	1,687,177.98	0.00	0.00
100.00	0.24	342.01	-1,216.00	100.00	0.20 N	0.06 W	575,885.22	1,687,177.91	0.24	0.21
200.00	0.14	294.27	-1,116.00	200.00	0.45 N	0.24 W	575,885.47	1,687,177.74	0.18	0.51
300.00	0.59	331.63	-1,016.00	300.00	0.95 N	0.60 W	575,885.98	1,687,177.38	0.49	1.12
400.00	0.27	12.57	-916.01	399.99	1.63 N	0.79 W	575,886.66	1,687,177.19	0.42	1.82
500.00	0.53	334.45	-816.01	499.99	2.28 N	0.94 W	575,887.31	1,687,177.04	0.36	2.46
600.00	0.23	328.90	-716.01	599.99	2.87 N	1.24 W	575,887.89	1,687,176.74	0.30	3.12
700.00	0.55	312.03	-616.01	699.99	3.36 N	1.70 W	575,888.39	1,687,176.28	0.34	3.77
800.00	0.25	323.02	-516.02	799.98	3.86 N	2.19 W	575,888.88	1,687,175.79	0.31	4.43
900.00	0.13	31.34	-416.02	899.98	4.13 N	2.26 W	575,889.15	1,687,175.72	0.24	4.71
1,000.00	0.30	14.58	-316.02	999.98	4.48 N	2.14 W	575,889.51	1,687,175.84	0.18	4.96
1,100.00	0.10	343.96	-216.02	1,099.98	4.82 N	2.09 W	575,889.84	1,687,175.88	0.22	5.25
1,200.00	0.33	33.11	-116.02	1,199.98	5.14 N	1.96 W	575,890.17	1,687,176.02	0.28	5.48
1,300.00	0.30	25.45	-16.02	1,299.98	5.62 N	1.69 W	575,890.65	1,687,176.29	0.05	5.79
1,400.00	0.32	304.21	83.98	1,399.98	6.01 N	1.81 W	575,891.04	1,687,176.17	0.40	6.19
1,500.00	0.16	19.75	183.98	1,499.98	6.30 N	1.99 W	575,891.33	1,687,175.98	0.32	6.53
1,600.00	0.13	69.38	283.98	1,599.98	6.47 N	1.84 W	575,891.50	1,687,176.14	0.12	6.62
1,700.00	0.12	238.49	383.98	1,699.98	6.46 N	1.82 W	575,891.48	1,687,176.15	0.25	6.60
1,800.00	0.19	339.74	483.98	1,799.98	6.56 N	1.97 W	575,891.58	1,687,176.01	0.24	6.75
1,900.00	0.14	71.09	583.98	1,899.98	6.76 N	1.91 W	575,891.78	1,687,176.07	0.24	6.90
2,000.00	0.13	83.61	683.98	1,999.98	6.81 N	1.68 W	575,891.83	1,687,176.29	0.03	6.85
2,100.00	0.32	7.96	783.98	2,099.98	7.10 N	1.53 W	575,892.12	1,687,176.45	0.31	7.04
2,153.00	0.52	341.00	836.98	2,152.98	7.47 N	1.59 W	575,892.49	1,687,176.39	0.52	7.40
2,216.00	0.52	245.32	899.97	2,215.97	7.62 N	1.94 W	575,892.65	1,687,176.03	1.22	7.69
2,279.00	3.01	259.25	962.94	2,278.94	7.19 N	3.83 W	575,892.22	1,687,174.15	3.98	8.15
2,342.00	4.88	256.57	1,025.79	2,341.79	6.26 N	8.06 W	575,891.29	1,687,169.92	2.98	9.19
2,405.00	6.16	258.67	1,088.49	2,404.49	4.98 N	13.98 W	575,890.00	1,687,164.00	2.06	10.66
2,468.00	6.04	259.16	1,151.14	2,467.14	3.69 N	20.55 W	575,888.71	1,687,157.43	0.21	12.42
2,531.00	3.75	252.90	1,213.90	2,529.90	2.46 N	25.78 W	575,887.48	1,687,152.20	3.73	13.64
2,594.00	5.75	260.84	1,276.68	2,592.68	1.35 N	30.86 W	575,886.38	1,687,147.12	3.33	14.90
2,657.00	6.95	250.78	1,339.30	2,655.30	0.41 S	37.58 W	575,884.62	1,687,140.40	2.59	16.31
2,721.00	6.44	232.77	1,402.87	2,718.87	3.85 S	44.09 W	575,881.17	1,687,133.89	3.36	16.11
2,846.00	10.89	233.02	1,526.41	2,842.41	15.20 S	59.11 W	575,869.82	1,687,118.87	3.56	12.60
2,909.00	12.55	237.24	1,588.10	2,904.10	22.49 S	69.62 W	575,862.54	1,687,108.35	2.96	10.74
2,971.00	13.10	240.73	1,648.55	2,964.55	29.57 S	81.42 W	575,855.46	1,687,096.56	1.53	9.63
3,035.00	14.66	235.76	1,710.68	3,026.68	37.67 S	94.44 W	575,847.35	1,687,083.54	3.07	8.14
3,097.00	16.49	233.62	1,770.40	3,086.40	47.30 S	108.01 W	575,837.72	1,687,069.97	3.09	5.53
3,162.00	17.81	239.12	1,832.52	3,148.52	57.88 S	123.97 W	575,827.14	1,687,054.01	3.21	3.14
3,221.00	18.77	246.75	1,888.54	3,204.54	66.26 S	140.44 W	575,818.76	1,687,037.54	4.37	2.93
3,285.00	19.22	246.94	1,949.06	3,265.06	74.45 S	159.59 W	575,810.57	1,687,018.38	0.71	4.09
3,348.00	19.41	248.29	2,008.51	3,324.51	82.38 S	178.86 W	575,802.64	1,686,999.12	0.77	5.53
3,411.00	20.17	244.27	2,067.79	3,383.79	90.97 S	198.37 W	575,794.05	1,686,979.61	2.47	6.49
3,474.00	19.79	238.50	2,127.01	3,443.01	101.26 S	217.25 W	575,783.76	1,686,960.73	3.19	5.65
3,536.00	19.19	243.65	2,185.46	3,501.46	111.27 S	235.33 W	575,773.76	1,686,942.64	2.93	4.70
3,600.00	20.13	249.53	2,245.73	3,561.73	119.79 S	255.08 W	575,765.23	1,686,922.90	3.42	5.83

Design Report for Mason Cottrell OHI 1H - Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	TVD below System (ft)	Vertical Depth (ft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100ft)	Vertical Section (ft)
					Northing (ft)	Easting (ft)	Northing (ft)	Easting (ft)		
3,662.00	19.74	248.71	2,304.02	3,620.02	127.32 S	274.83 W	575,757.70	1,686,903.15	0.77	7.84
3,724.00	18.52	248.33	2,362.59	3,678.59	134.76 S	293.74 W	575,750.26	1,686,884.24	1.98	9.56
3,787.00	18.65	253.84	2,422.31	3,738.31	141.26 S	312.71 W	575,743.76	1,686,865.27	2.79	12.16
3,850.00	17.90	254.44	2,482.14	3,798.14	146.66 S	331.72 W	575,738.36	1,686,846.26	1.23	15.75
3,913.00	15.61	252.06	2,542.46	3,858.46	151.87 S	349.11 W	575,733.16	1,686,828.87	3.79	18.80
3,976.00	16.90	251.90	2,602.94	3,918.94	157.32 S	365.88 W	575,727.70	1,686,812.10	2.05	21.35
4,039.00	18.49	252.56	2,662.96	3,978.96	163.16 S	384.11 W	575,721.86	1,686,793.86	2.54	24.21
4,102.00	20.19	252.30	2,722.40	4,038.40	169.46 S	404.00 W	575,715.56	1,686,773.98	2.70	27.39
4,164.00	18.85	249.47	2,780.83	4,096.83	176.23 S	423.58 W	575,708.79	1,686,754.40	2.64	30.01
4,227.00	19.04	243.99	2,840.43	4,156.43	184.31 S	442.34 W	575,700.72	1,686,735.63	2.84	31.10
4,289.00	18.26	244.49	2,899.17	4,215.17	192.92 S	460.20 W	575,692.10	1,686,717.78	1.28	31.30
4,352.00	18.81	244.27	2,958.90	4,274.90	201.58 S	478.26 W	575,683.44	1,686,699.72	0.88	31.55
4,415.00	17.73	242.63	3,018.73	4,334.73	210.40 S	495.93 W	575,674.62	1,686,682.05	1.90	31.48
4,478.00	17.51	243.58	3,078.77	4,394.77	219.03 S	512.93 W	575,665.99	1,686,665.05	0.57	31.30
4,541.00	18.44	240.28	3,138.70	4,454.70	228.19 S	530.07 W	575,656.84	1,686,647.90	2.19	30.70
4,606.00	19.39	245.58	3,200.19	4,516.19	237.75 S	548.83 W	575,647.28	1,686,629.15	3.02	30.45
4,669.00	18.86	247.25	3,259.71	4,575.71	246.01 S	567.74 W	575,639.02	1,686,610.24	1.21	31.44
4,732.00	17.51	245.29	3,319.57	4,635.57	253.91 S	585.74 W	575,631.12	1,686,592.24	2.35	32.35
4,794.00	16.18	245.87	3,378.90	4,694.90	261.34 S	602.10 W	575,623.69	1,686,575.88	2.16	32.94
4,857.00	16.96	249.35	3,439.29	4,755.29	268.17 S	618.71 W	575,616.86	1,686,559.27	2.00	34.19
4,920.00	16.36	248.92	3,499.64	4,815.64	274.60 S	635.59 W	575,610.42	1,686,542.39	0.97	35.92
4,983.00	18.82	244.38	3,559.70	4,875.70	282.19 S	653.03 W	575,602.84	1,686,524.95	4.47	36.86
5,046.00	17.51	243.71	3,619.56	4,935.56	290.78 S	670.69 W	575,594.25	1,686,507.29	2.11	37.00
5,109.00	17.03	244.57	3,679.72	4,995.72	298.94 S	687.52 W	575,586.09	1,686,490.46	0.86	37.15
5,171.00	18.39	247.91	3,738.78	5,054.78	306.51 S	704.78 W	575,578.51	1,686,473.19	2.74	38.02
5,237.00	16.87	243.46	3,801.68	5,117.68	314.71 S	723.00 W	575,570.31	1,686,454.98	3.08	38.76
5,299.00	18.28	246.08	3,860.78	5,176.78	322.67 S	739.94 W	575,562.35	1,686,438.04	2.61	39.14
5,362.00	18.17	249.32	3,920.63	5,236.63	330.15 S	758.16 W	575,554.88	1,686,419.82	1.62	40.52
5,425.00	18.90	246.99	3,980.36	5,296.36	337.60 S	776.74 W	575,547.42	1,686,401.24	1.65	42.08
5,488.00	17.89	248.75	4,040.14	5,356.14	345.10 S	795.15 W	575,539.92	1,686,382.82	1.83	43.54
5,552.00	19.23	247.80	4,100.81	5,416.81	352.65 S	814.07 W	575,532.38	1,686,363.90	2.15	45.17
5,615.00	18.95	246.95	4,160.34	5,476.34	360.57 S	833.09 W	575,524.45	1,686,344.89	0.63	46.51
5,677.00	19.18	245.93	4,218.94	5,534.94	368.67 S	851.66 W	575,516.36	1,686,326.32	0.65	47.49
5,740.00	20.57	251.78	4,278.20	5,594.20	376.35 S	871.62 W	575,508.67	1,686,306.36	3.85	49.46
5,803.00	19.35	248.77	4,337.41	5,653.41	383.59 S	891.86 W	575,501.43	1,686,286.12	2.53	51.95
5,867.00	18.80	248.51	4,397.90	5,713.90	391.21 S	911.34 W	575,493.82	1,686,266.64	0.87	53.77
5,893.00	19.06	248.66	4,422.49	5,738.49	394.29 S	919.19 W	575,490.74	1,686,258.78	1.02	54.49
5,901.00	18.90	248.53	4,430.06	5,746.06	395.24 S	921.62 W	575,489.79	1,686,256.36	2.07	54.72
5,932.00	19.22	248.40	4,459.36	5,775.36	398.95 S	931.03 W	575,486.07	1,686,246.95	1.04	55.56
5,964.00	19.37	256.37	4,489.56	5,805.56	402.14 S	941.09 W	575,482.88	1,686,236.89	8.24	57.17
5,996.00	19.44	271.57	4,519.77	5,835.77	403.25 S	951.58 W	575,481.78	1,686,226.40	15.74	60.83
6,027.00	20.38	281.01	4,548.92	5,864.92	402.07 S	962.03 W	575,482.95	1,686,215.94	10.79	66.52
6,059.00	21.39	288.10	4,578.82	5,894.82	399.20 S	973.05 W	575,485.83	1,686,204.93	8.50	73.99
6,090.00	22.47	294.33	4,607.58	5,923.58	395.00 S	983.83 W	575,490.02	1,686,194.15	8.27	82.53
6,122.00	23.89	298.54	4,637.00	5,953.00	389.38 S	995.09 W	575,495.64	1,686,182.89	6.82	92.56



Design Report for Mason Cottrell OHI 1H - Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	TVD below System (ft)	Vertical Depth (ft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100ft)	Vertical Section (ft)
					Northing (ft)	Easting (ft)	Northing (ft)	Easting (ft)		
6,153.00	25.54	301.87	4,665.16	5,981.16	382.86 S	1,006.28 W	575,502.17	1,686,171.70	6.96	103.38
6,184.00	28.75	305.74	4,692.75	6,008.75	374.97 S	1,018.01 W	575,510.05	1,686,159.97	11.81	115.65
6,216.00	33.09	309.27	4,720.19	6,036.19	364.94 S	1,031.03 W	575,520.08	1,686,146.95	14.69	130.41
6,248.00	36.40	311.87	4,746.49	6,062.49	353.07 S	1,044.87 W	575,531.95	1,686,133.11	11.33	147.19
6,278.00	38.34	313.31	4,770.33	6,086.33	340.74 S	1,058.27 W	575,544.28	1,686,119.71	7.09	164.18
6,310.00	40.67	313.59	4,795.02	6,111.02	326.74 S	1,073.04 W	575,558.28	1,686,104.93	7.30	183.29
6,341.00	44.49	313.99	4,817.84	6,133.84	312.23 S	1,088.18 W	575,572.79	1,686,089.80	12.35	203.01
6,372.00	48.38	317.00	4,839.20	6,155.20	296.20 S	1,103.91 W	575,588.82	1,686,074.07	14.38	224.35
6,403.00	51.64	318.29	4,859.12	6,175.12	278.65 S	1,119.90 W	575,606.37	1,686,058.08	10.99	247.18
6,435.00	52.14	317.88	4,878.87	6,194.87	259.91 S	1,136.72 W	575,625.11	1,686,041.26	1.86	271.43
6,467.00	54.25	319.03	4,898.04	6,214.04	240.74 S	1,153.71 W	575,644.29	1,686,024.27	7.19	296.15
6,498.00	58.26	318.91	4,915.26	6,231.26	221.30 S	1,170.63 W	575,663.73	1,686,007.35	12.94	321.08
6,530.00	61.53	320.95	4,931.31	6,247.31	200.11 S	1,188.44 W	575,684.91	1,685,989.54	11.61	347.97
6,561.00	63.85	321.45	4,945.53	6,261.53	178.65 S	1,205.70 W	575,706.38	1,685,972.28	7.62	374.87
6,592.00	65.20	322.77	4,958.86	6,274.86	156.56 S	1,222.88 W	575,728.46	1,685,955.10	5.81	402.28
6,623.00	68.17	323.68	4,971.13	6,287.13	133.76 S	1,239.92 W	575,751.27	1,685,938.06	9.95	430.28
6,654.00	70.83	326.94	4,981.99	6,297.99	109.88 S	1,256.44 W	575,775.14	1,685,921.54	13.06	459.00
6,686.00	72.21	328.64	4,992.13	6,308.13	84.21 S	1,272.61 W	575,800.82	1,685,905.37	6.63	489.19
6,716.00	72.92	328.57	5,001.12	6,317.12	59.77 S	1,287.52 W	575,825.25	1,685,890.46	2.38	517.70
6,748.00	76.16	329.97	5,009.65	6,325.65	33.27 S	1,303.28 W	575,851.76	1,685,874.70	10.97	548.45
6,779.00	78.68	332.21	5,016.40	6,332.40	6.78 S	1,317.90 W	575,878.24	1,685,860.08	10.76	578.67
6,811.00	80.96	333.13	5,022.06	6,338.06	21.20 N	1,332.36 W	575,906.22	1,685,845.62	7.67	610.16
6,842.00	85.55	334.18	5,025.70	6,341.70	48.78 N	1,346.01 W	575,933.80	1,685,831.97	15.18	640.93
6,873.00	88.32	337.25	5,027.36	6,343.36	76.99 N	1,358.74 W	575,962.01	1,685,819.24	13.33	671.86
6,905.00	91.28	337.47	5,027.47	6,343.47	106.52 N	1,371.06 W	575,991.54	1,685,806.92	9.28	703.79
6,937.00	93.03	337.01	5,026.27	6,342.27	136.00 N	1,383.43 W	576,021.03	1,685,794.55	5.65	735.71
6,968.00	93.40	337.27	5,024.53	6,340.53	164.52 N	1,395.45 W	576,049.55	1,685,782.53	1.46	766.60
6,999.00	95.25	334.94	5,022.19	6,338.19	192.78 N	1,407.97 W	576,077.81	1,685,770.01	9.58	797.48
7,031.00	95.70	335.15	5,019.14	6,335.14	221.66 N	1,421.41 W	576,106.69	1,685,756.57	1.55	829.32
7,062.00	96.24	333.03	5,015.91	6,331.91	249.39 N	1,434.88 W	576,134.42	1,685,743.10	7.02	860.15
7,093.00	96.57	332.77	5,012.45	6,328.45	276.82 N	1,448.91 W	576,161.84	1,685,729.06	1.35	890.96
7,125.00	95.19	330.60	5,009.17	6,325.17	304.84 N	1,464.01 W	576,189.86	1,685,713.97	8.01	922.77
7,157.00	93.47	329.03	5,006.76	6,322.76	332.42 N	1,480.05 W	576,217.44	1,685,697.92	7.27	954.60
7,188.00	93.29	328.52	5,004.93	6,320.93	358.88 N	1,496.10 W	576,243.91	1,685,681.88	1.74	985.44
7,220.00	91.18	328.54	5,003.68	6,319.68	386.15 N	1,512.79 W	576,271.18	1,685,665.19	6.59	1,017.28
7,251.00	88.55	328.09	5,003.76	6,319.76	412.53 N	1,529.07 W	576,297.55	1,685,648.91	8.61	1,048.14
7,283.00	88.65	327.61	5,004.54	6,320.54	439.61 N	1,546.09 W	576,324.64	1,685,631.88	1.53	1,079.97
7,314.00	88.75	329.37	5,005.24	6,321.24	466.04 N	1,562.29 W	576,351.06	1,685,615.69	5.69	1,110.83
7,346.00	88.79	331.14	5,005.93	6,321.93	493.81 N	1,578.16 W	576,378.84	1,685,599.82	5.53	1,142.77
7,378.00	89.02	331.62	5,006.54	6,322.54	521.90 N	1,593.49 W	576,406.92	1,685,584.49	1.66	1,174.74
7,409.00	90.40	334.23	5,006.70	6,322.70	549.50 N	1,607.60 W	576,434.52	1,685,570.38	9.52	1,205.73
7,440.00	91.11	335.61	5,006.29	6,322.29	577.57 N	1,620.74 W	576,462.59	1,685,557.24	5.01	1,236.72
7,472.00	91.35	335.16	5,005.60	6,321.60	606.66 N	1,634.06 W	576,491.68	1,685,543.92	1.59	1,268.70
7,535.00	92.25	334.57	5,003.62	6,319.62	663.66 N	1,660.81 W	576,548.68	1,685,517.17	1.71	1,331.65
7,598.00	92.82	334.75	5,000.84	6,316.84	720.54 N	1,687.74 W	576,605.57	1,685,490.24	0.95	1,394.58

Design Report for Mason Cottrell OHI 1H - Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	TVD below System (ft)	Vertical Depth (ft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100ft)	Vertical Section (ft)
					Northing (ft)	Easting (ft)	Northing (ft)	Easting (ft)		
7,660.00	88.05	335.42	5,000.36	6,316.36	776.76 N	1,713.85 W	576,661.78	1,685,464.12	7.77	1,456.54
7,723.00	87.30	335.16	5,002.92	6,318.92	833.94 N	1,740.17 W	576,718.96	1,685,437.81	1.26	1,519.46
7,786.00	90.74	336.11	5,004.00	6,320.00	891.31 N	1,766.15 W	576,776.33	1,685,411.83	5.66	1,582.41
7,849.00	92.26	336.90	5,002.35	6,318.35	949.07 N	1,791.26 W	576,834.09	1,685,386.72	2.72	1,645.31
7,912.00	91.25	335.32	5,000.42	6,316.42	1,006.64 N	1,816.76 W	576,891.66	1,685,361.22	2.98	1,708.22
7,975.00	91.62	335.23	4,998.84	6,314.84	1,063.84 N	1,843.10 W	576,948.87	1,685,334.88	0.60	1,771.17
8,035.00	91.99	335.05	4,996.95	6,312.95	1,118.26 N	1,868.31 W	577,003.28	1,685,309.67	0.69	1,831.12
8,098.00	91.48	333.55	4,995.04	6,311.04	1,175.00 N	1,895.62 W	577,060.02	1,685,282.36	2.51	1,894.09
8,160.00	91.28	331.76	4,993.55	6,309.55	1,230.05 N	1,924.09 W	577,115.08	1,685,253.89	2.90	1,956.06
8,223.00	91.88	331.39	4,991.81	6,307.81	1,285.44 N	1,954.07 W	577,170.46	1,685,223.91	1.12	2,018.99
8,285.00	92.73	331.77	4,989.32	6,305.32	1,339.92 N	1,983.55 W	577,224.94	1,685,194.43	1.50	2,080.90
8,348.00	91.82	330.75	4,986.82	6,302.82	1,395.11 N	2,013.82 W	577,280.14	1,685,164.16	2.17	2,143.79
8,411.00	89.66	329.82	4,986.01	6,302.01	1,449.82 N	2,045.04 W	577,334.84	1,685,132.94	3.73	2,206.67
8,475.00	90.20	329.94	4,986.08	6,302.08	1,505.18 N	2,077.16 W	577,390.20	1,685,100.82	0.86	2,270.53
8,538.00	88.95	332.11	4,986.55	6,302.55	1,560.29 N	2,107.67 W	577,445.31	1,685,070.31	3.97	2,333.46
8,601.00	88.79	332.28	4,987.79	6,303.79	1,616.00 N	2,137.05 W	577,501.02	1,685,040.92	0.37	2,396.43
8,663.00	89.26	332.30	4,988.85	6,304.85	1,670.88 N	2,165.88 W	577,555.91	1,685,012.10	0.76	2,458.40
8,726.00	89.09	333.25	4,989.76	6,305.76	1,726.90 N	2,194.70 W	577,611.92	1,684,983.28	1.53	2,521.39
8,789.00	90.30	335.10	4,990.09	6,306.09	1,783.60 N	2,222.14 W	577,668.62	1,684,955.84	3.51	2,584.38
8,851.00	93.00	335.90	4,988.31	6,304.31	1,839.99 N	2,247.84 W	577,725.01	1,684,930.14	4.54	2,646.31
8,914.00	91.85	334.35	4,985.64	6,301.64	1,897.09 N	2,274.31 W	577,782.11	1,684,903.66	3.06	2,709.23
8,977.00	92.12	333.92	4,983.46	6,299.46	1,953.75 N	2,301.78 W	577,838.77	1,684,876.20	0.81	2,772.19
9,039.00	92.70	333.85	4,980.85	6,296.85	2,009.37 N	2,329.05 W	577,894.39	1,684,848.93	0.94	2,834.14
9,102.00	93.03	333.33	4,977.70	6,293.70	2,065.72 N	2,357.03 W	577,950.74	1,684,820.94	0.98	2,897.06
9,165.00	92.66	332.97	4,974.58	6,290.58	2,121.86 N	2,385.45 W	578,006.88	1,684,792.52	0.82	2,959.98
9,228.00	91.51	333.30	4,972.28	6,288.28	2,178.02 N	2,413.90 W	578,063.04	1,684,764.08	1.90	3,022.93
9,291.00	90.78	330.90	4,971.02	6,287.02	2,233.68 N	2,443.37 W	578,118.71	1,684,734.60	3.98	3,085.89
9,352.00	88.86	330.53	4,971.22	6,287.22	2,286.88 N	2,473.21 W	578,171.91	1,684,704.77	3.21	3,146.81
9,415.00	88.79	332.23	4,972.51	6,288.51	2,342.17 N	2,503.38 W	578,227.20	1,684,674.60	2.70	3,209.74
9,477.00	89.09	333.95	4,973.65	6,289.65	2,397.45 N	2,531.44 W	578,282.47	1,684,646.54	2.82	3,271.73
9,540.00	89.76	333.95	4,974.29	6,290.29	2,454.04 N	2,559.10 W	578,339.07	1,684,618.88	1.06	3,334.72
9,602.00	90.40	332.49	4,974.20	6,290.20	2,509.39 N	2,587.03 W	578,394.42	1,684,590.94	2.57	3,396.72
9,665.00	88.58	333.53	4,974.76	6,290.76	2,565.53 N	2,615.62 W	578,450.55	1,684,562.35	3.33	3,459.71
9,729.00	88.82	335.76	4,976.21	6,292.21	2,623.34 N	2,643.02 W	578,508.37	1,684,534.96	3.50	3,523.68
9,791.00	89.22	335.74	4,977.27	6,293.27	2,679.86 N	2,668.48 W	578,564.89	1,684,509.50	0.65	3,585.63
9,855.00	89.80	336.12	4,977.82	6,293.82	2,738.30 N	2,694.58 W	578,623.32	1,684,483.39	1.08	3,649.58
9,918.00	90.27	335.97	4,977.78	6,293.78	2,795.87 N	2,720.16 W	578,680.89	1,684,457.82	0.78	3,712.52
9,981.00	91.01	335.71	4,977.08	6,293.08	2,853.35 N	2,745.95 W	578,738.37	1,684,432.03	1.24	3,775.47
10,044.00	91.58	335.62	4,975.66	6,291.66	2,910.73 N	2,771.90 W	578,795.76	1,684,406.08	0.92	3,838.42
10,107.00	92.50	335.36	4,973.41	6,289.41	2,968.02 N	2,798.02 W	578,853.04	1,684,379.96	1.52	3,901.34
10,169.00	93.24	335.67	4,970.31	6,286.31	3,024.37 N	2,823.68 W	578,909.40	1,684,354.30	1.29	3,963.23
10,232.00	93.95	335.79	4,966.36	6,282.36	3,081.69 N	2,849.53 W	578,966.72	1,684,328.45	1.14	4,026.07
10,294.00	92.83	333.47	4,962.69	6,278.69	3,137.61 N	2,876.04 W	579,022.63	1,684,301.94	4.15	4,087.94
10,357.00	91.65	332.30	4,960.23	6,276.23	3,193.64 N	2,904.73 W	579,078.66	1,684,273.24	2.64	4,150.89
10,419.00	92.42	332.67	4,958.03	6,274.03	3,248.59 N	2,933.36 W	579,133.62	1,684,244.62	1.38	4,212.84

Design Report for Mason Cottrell OHI 1H - Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	TVD below System (ft)	Vertical Depth (ft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100ft)	Vertical Section (ft)
					Northing (ft)	Easting (ft)	Northing (ft)	Easting (ft)		
10,482.00	92.67	333.04	4,955.23	6,271.23	3,304.60 N	2,962.07 W	579,189.62	1,684,215.90	0.71	4,275.77
10,545.00	93.00	333.16	4,952.11	6,268.11	3,360.71 N	2,990.54 W	579,245.74	1,684,187.44	0.56	4,338.69
10,608.00	93.37	333.19	4,948.61	6,264.61	3,416.85 N	3,018.93 W	579,301.87	1,684,159.05	0.59	4,401.59
10,670.00	91.34	332.77	4,946.07	6,262.07	3,472.03 N	3,047.07 W	579,357.05	1,684,130.91	3.34	4,463.53
10,733.00	88.25	333.06	4,946.29	6,262.29	3,528.11 N	3,075.75 W	579,413.14	1,684,102.23	4.93	4,526.51
10,795.00	88.45	333.58	4,948.08	6,264.08	3,583.49 N	3,103.58 W	579,468.51	1,684,074.40	0.90	4,588.49
10,858.00	89.13	333.29	4,949.41	6,265.41	3,639.82 N	3,131.75 W	579,524.85	1,684,046.23	1.17	4,651.47
10,921.00	90.13	333.77	4,949.81	6,265.81	3,696.22 N	3,159.83 W	579,581.24	1,684,018.15	1.76	4,714.47
10,983.00	90.71	333.80	4,949.36	6,265.36	3,751.84 N	3,187.21 W	579,636.86	1,683,990.77	0.94	4,776.47
11,046.00	91.38	333.99	4,948.21	6,264.21	3,808.40 N	3,214.93 W	579,693.43	1,683,963.05	1.11	4,839.46
11,108.00	91.92	333.71	4,946.43	6,262.43	3,864.03 N	3,242.24 W	579,749.06	1,683,935.74	0.98	4,901.43
11,171.00	92.59	333.76	4,943.95	6,259.95	3,920.48 N	3,270.10 W	579,805.51	1,683,907.88	1.07	4,964.38
11,234.00	92.29	333.65	4,941.26	6,257.26	3,976.91 N	3,297.98 W	579,861.94	1,683,880.00	0.51	5,027.32
11,296.00	92.87	333.23	4,938.47	6,254.47	4,032.31 N	3,325.68 W	579,917.34	1,683,852.30	1.15	5,089.26
11,359.00	93.00	333.67	4,935.25	6,251.25	4,088.60 N	3,353.80 W	579,973.62	1,683,824.18	0.73	5,152.18
11,422.00	93.02	332.18	4,931.94	6,247.94	4,144.61 N	3,382.43 W	580,029.64	1,683,795.54	2.36	5,215.08
11,484.00	94.15	332.61	4,928.06	6,244.06	4,199.45 N	3,411.11 W	580,084.47	1,683,766.87	1.95	5,276.94
11,513.00	94.09	332.60	4,925.98	6,241.98	4,225.13 N	3,424.42 W	580,110.15	1,683,753.56	0.21	5,305.86
Last MWD Survey at 11558' MD										
11,558.00	94.09	332.60	4,922.77	6,238.77	4,264.98 N	3,445.07 W	580,150.00	1,683,732.91	0.00	5,350.74
Projection to TD at 11558' MD										

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
11,513.00	6,241.98	4,225.13	-3,424.42	Last MWD Survey at 11558' MD
11,558.00	6,238.77	4,264.98	-3,445.07	Projection to TD at 11558' MD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
User	No Target (Freehand)	333.66	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
100.00	2,100.00	VES Gyro	NS-Gyro-MS
2,153.00	11,558.00	Sperry MWD	MWD

HALLIBURTON

Design Report for Mason Cottrell OHI 1H - Surveys

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Mason Cottrell OHI	0.00	0.00	6,260.29	4,269.99	-3,434.35	580,155.01	1,683,743.63	40° 5' 14.496 N	80° 37' 49.087 W
- actual wellpath misses target center by 24.48ft at 11555.98ft MD (6238.91 TVD, 4263.19 N, -3444.15 E)									
- Point									

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COMPASS