

Chesapeake Appalachia, LLC

Ohio County, WV

Bethany

Thelma Hays OHI 5H

Wellbore #1

Design: Surveys

Sperry Drilling Services

Combo Report

08 February, 2012

Well Coordinates: 603,176.67 N, 1,705,248.90 E (40° 09' 04.58" N, 080° 33' 15.89" W)
Ground Level: 1,250.00 ft

Local Coordinate Origin:	Centered on Well Thelma Hays OHI 5H
Viewing Datum:	GL 1250' + KB 15' @ 1265.00ft (Nomac 25)
TVDs to System:	N
North Reference:	Grid
Unit System:	API-US Survey Feet

Version: 2003.16 Build: 43I

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Office of Oil and Gas

APR 25 2014

WV Department of
Environmental Protection
HALLIBURTON

Design Report for Thelma Hays OHI 5H - 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)		
0.00	0.00	0.00	-1,265.00	0.00	0.00 N	0.00 E	603,176.67	1,705,248.90	0.00	0.00
100.00	0.04	23.68	-1,165.00	100.00	0.03 N	0.01 E	603,176.70	1,705,248.92	0.04	0.02
200.00	0.03	32.40	-1,065.00	200.00	0.09 N	0.04 E	603,176.76	1,705,248.94	0.01	0.05
300.00	0.10	131.58	-965.00	300.00	0.05 N	0.12 E	603,176.72	1,705,249.02	0.11	-0.02
400.00	0.03	64.31	-865.00	400.00	0.00 N	0.21 E	603,176.68	1,705,249.11	0.09	-0.11
500.00	0.03	84.30	-765.00	500.00	0.02 N	0.26 E	603,176.69	1,705,249.16	0.01	-0.13
600.00	0.03	71.84	-665.00	600.00	0.03 N	0.31 E	603,176.70	1,705,249.21	0.01	-0.15
700.00	0.08	87.14	-565.00	700.00	0.04 N	0.41 E	603,176.71	1,705,249.31	0.05	-0.19
800.00	0.08	112.37	-465.00	800.00	0.02 N	0.54 E	603,176.69	1,705,249.44	0.03	-0.28
900.00	0.15	43.79	-365.00	900.00	0.08 N	0.69 E	603,176.76	1,705,249.60	0.14	-0.31
1,000.00	0.18	359.58	-265.00	1,000.00	0.34 N	0.78 E	603,177.01	1,705,249.69	0.13	-0.15
1,100.00	0.12	306.66	-165.00	1,100.00	0.56 N	0.70 E	603,177.23	1,705,249.60	0.14	0.08
1,200.00	0.12	307.54	-65.00	1,200.00	0.68 N	0.53 E	603,177.36	1,705,249.43	0.00	0.28
1,300.00	0.07	261.64	35.00	1,300.00	0.74 N	0.39 E	603,177.41	1,705,249.29	0.09	0.40
1,400.00	0.07	280.83	135.00	1,400.00	0.74 N	0.27 E	603,177.41	1,705,249.17	0.02	0.47
1,500.00	0.07	235.54	235.00	1,500.00	0.72 N	0.16 E	603,177.39	1,705,249.06	0.05	0.51
1,600.00	0.07	171.73	335.00	1,600.00	0.62 N	0.12 E	603,177.29	1,705,249.02	0.07	0.45
1,700.00	0.07	142.45	435.00	1,700.00	0.51 N	0.16 E	603,177.19	1,705,249.07	0.04	0.34
1,800.00	0.08	136.40	535.00	1,800.00	0.41 N	0.25 E	603,177.09	1,705,249.15	0.01	0.21
1,900.00	0.07	156.80	635.00	1,900.00	0.31 N	0.32 E	603,176.98	1,705,249.22	0.03	0.08
2,000.00	0.32	142.61	735.00	2,000.00	0.03 N	0.51 E	603,176.70	1,705,249.42	0.25	-0.26
2,012.00	0.33	141.46	747.00	2,012.00	0.02 S	0.56 E	603,176.65	1,705,249.46	0.10	-0.33
2,061.00	0.36	118.57	796.00	2,061.00	0.21 S	0.78 E	603,176.46	1,705,249.68	0.29	-0.60
2,092.00	0.24	92.88	827.00	2,092.00	0.26 S	0.93 E	603,176.41	1,705,249.83	0.57	-0.73
2,123.00	0.27	117.91	858.00	2,123.00	0.30 S	1.06 E	603,176.38	1,705,249.96	0.37	-0.83
2,154.00	0.29	120.31	889.00	2,154.00	0.37 S	1.19 E	603,176.30	1,705,250.09	0.07	-0.96
2,217.00	0.75	185.66	951.99	2,216.99	0.86 S	1.29 E	603,175.81	1,705,250.19	1.08	-1.43
2,280.00	0.17	53.67	1,014.99	2,279.99	1.22 S	1.32 E	603,175.46	1,705,250.22	1.39	-1.74
2,342.00	0.26	64.40	1,076.99	2,341.99	1.10 S	1.52 E	603,175.57	1,705,250.43	0.16	-1.76
2,405.00	0.68	298.97	1,139.99	2,404.99	0.86 S	1.32 E	603,175.82	1,705,250.23	1.36	-1.45
2,468.00	0.64	88.88	1,202.99	2,467.99	0.67 S	1.35 E	603,176.00	1,705,250.25	2.02	-1.30
2,531.00	3.09	83.49	1,265.95	2,530.95	0.47 S	3.39 E	603,176.20	1,705,252.29	3.89	-2.26
2,594.00	3.22	90.10	1,328.85	2,593.85	0.28 S	6.85 E	603,176.39	1,705,255.75	0.61	-4.01
2,656.00	3.60	95.85	1,390.74	2,655.74	0.48 S	10.52 E	603,176.19	1,705,259.43	0.82	-6.20
2,717.00	5.14	91.16	1,451.57	2,716.57	0.73 S	15.16 E	603,175.94	1,705,264.06	2.59	-8.96
2,780.00	7.75	94.48	1,514.16	2,779.16	1.12 S	22.22 E	603,175.55	1,705,271.12	4.18	-13.18
2,844.00	8.69	94.38	1,577.50	2,842.50	1.83 S	31.34 E	603,174.85	1,705,280.24	1.47	-18.79
2,905.00	9.66	93.06	1,637.72	2,902.72	2.45 S	41.05 E	603,174.22	1,705,289.95	1.63	-24.66
2,968.00	11.29	88.92	1,699.67	2,964.67	2.62 S	52.49 E	603,174.05	1,705,301.39	2.85	-31.10
3,030.00	13.37	88.01	1,760.24	3,025.24	2.26 S	65.72 E	603,174.42	1,705,314.63	3.37	-38.09
3,093.00	13.20	87.62	1,821.55	3,086.55	1.70 S	80.19 E	603,174.97	1,705,329.09	0.31	-45.60
3,156.00	13.72	85.94	1,882.82	3,147.82	0.88 S	94.83 E	603,175.80	1,705,343.73	1.03	-52.97
3,218.00	13.66	86.44	1,943.06	3,208.06	0.10 N	109.47 E	603,176.77	1,705,358.37	0.21	-60.23
3,281.00	14.72	84.86	2,004.14	3,269.14	1.28 N	124.87 E	603,177.95	1,705,373.77	1.79	-67.73
3,344.00	14.05	81.40	2,065.16	3,330.16	3.14 N	140.40 E	603,179.81	1,705,389.30	1.73	-74.73

Design Report for Thelma Hays OHI 5H - 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)		
3,407.00	14.32	83.60	2,126.24	3,391.24	5.15 N	155.71 E	603,181.82	1,705,404.61	0.96	-81.48
3,469.00	16.64	84.28	2,185.99	3,450.99	6.89 N	172.16 E	603,183.56	1,705,421.06	3.75	-89.10
3,532.00	16.63	83.49	2,246.35	3,511.35	8.81 N	190.09 E	603,185.48	1,705,439.00	0.36	-97.37
3,594.00	16.48	82.29	2,305.78	3,570.78	11.00 N	207.62 E	603,187.67	1,705,456.53	0.60	-105.20
3,657.00	17.58	86.19	2,366.02	3,631.02	12.83 N	225.97 E	603,189.50	1,705,474.87	2.52	-113.79
3,719.00	18.63	85.14	2,424.95	3,689.95	14.29 N	245.18 E	603,190.96	1,705,494.09	1.77	-123.15
3,781.00	18.14	85.05	2,483.79	3,748.79	15.96 N	264.67 E	603,192.63	1,705,513.57	0.79	-132.49
3,844.00	17.87	83.62	2,543.70	3,808.70	17.88 N	284.04 E	603,194.55	1,705,532.95	0.82	-141.56
3,907.00	18.45	84.12	2,603.56	3,868.56	19.98 N	303.57 E	603,196.65	1,705,552.47	0.95	-150.57
3,971.00	18.83	84.88	2,664.21	3,929.21	21.94 N	323.93 E	603,198.61	1,705,572.83	0.70	-160.15
4,034.00	19.19	84.75	2,723.77	3,988.77	23.79 N	344.36 E	603,200.46	1,705,593.27	0.58	-169.86
4,096.00	19.91	85.53	2,782.20	4,047.20	25.55 N	365.04 E	603,202.22	1,705,613.94	1.24	-179.78
4,159.00	20.15	84.35	2,841.39	4,106.39	27.45 N	386.53 E	603,204.12	1,705,635.43	0.75	-190.04
4,222.00	19.02	84.01	2,900.74	4,165.74	29.59 N	407.54 E	603,206.26	1,705,656.44	1.80	-199.82
4,284.00	18.88	84.14	2,959.38	4,224.38	31.67 N	427.56 E	603,208.34	1,705,676.47	0.24	-209.12
4,347.00	19.91	84.54	3,018.80	4,283.80	33.73 N	448.38 E	603,210.40	1,705,697.29	1.65	-218.87
4,410.00	20.06	84.25	3,078.01	4,343.01	35.83 N	469.81 E	603,212.51	1,705,718.71	0.29	-228.92
4,473.00	20.16	82.87	3,137.17	4,402.17	38.26 N	491.33 E	603,214.94	1,705,740.24	0.77	-238.75
4,536.00	20.19	82.79	3,196.30	4,461.30	40.98 N	512.89 E	603,217.65	1,705,761.80	0.06	-248.37
4,599.00	19.71	82.40	3,255.52	4,520.52	43.74 N	534.21 E	603,220.42	1,705,783.11	0.79	-257.80
4,662.00	20.70	85.37	3,314.65	4,579.65	46.05 N	555.84 E	603,222.72	1,705,804.74	2.26	-267.79
4,723.00	20.72	86.17	3,371.71	4,636.71	47.64 N	577.35 E	603,224.31	1,705,826.25	0.46	-278.31
4,786.00	19.88	85.29	3,430.79	4,695.79	49.26 N	599.15 E	603,225.94	1,705,848.05	1.42	-288.97
4,849.00	19.69	84.63	3,490.07	4,755.07	51.14 N	620.39 E	603,227.81	1,705,869.29	0.47	-299.11
4,912.00	20.10	83.78	3,549.31	4,814.31	53.30 N	641.72 E	603,229.98	1,705,890.62	0.80	-309.05
4,975.00	19.29	81.95	3,608.63	4,873.63	55.93 N	662.78 E	603,232.61	1,705,911.69	1.62	-318.46
5,038.00	19.36	82.72	3,668.08	4,933.08	58.71 N	683.44 E	603,235.39	1,705,932.35	0.42	-327.52
5,101.00	19.71	86.73	3,727.45	4,992.45	60.64 N	704.41 E	603,237.32	1,705,953.31	2.20	-337.46
5,164.00	19.41	84.38	3,786.82	5,051.82	62.27 N	725.43 E	603,238.95	1,705,974.34	1.34	-347.68
5,226.00	19.26	83.58	3,879.29	5,144.29	65.68 N	757.70 E	603,242.35	1,706,006.60	0.31	-362.62
5,324.00	18.05	82.11	3,938.03	5,203.03	68.14 N	777.38 E	603,244.81	1,706,026.28	2.09	-371.41
5,387.00	17.32	81.38	3,998.06	5,263.06	70.88 N	796.32 E	603,247.56	1,706,045.22	1.21	-379.55
5,451.00	19.05	83.32	4,058.86	5,323.86	73.53 N	816.11 E	603,250.20	1,706,065.02	2.86	-388.25
5,514.00	17.59	80.20	4,118.67	5,383.67	76.34 N	835.71 E	603,253.02	1,706,084.61	2.79	-396.69
5,577.00	16.08	81.48	4,178.96	5,443.96	79.26 N	853.72 E	603,255.93	1,706,102.62	2.47	-404.18
5,640.00	18.34	83.96	4,239.14	5,504.14	81.59 N	872.20 E	603,258.26	1,706,121.11	3.77	-412.42
5,660.00	19.02	84.34	4,258.09	5,523.09	82.24 N	878.58 E	603,258.92	1,706,127.48	3.45	-415.39
5,702.00	19.21	85.03	4,297.77	5,562.77	83.52 N	892.27 E	603,260.19	1,706,141.17	0.70	-421.87
5,765.00	19.98	85.06	4,357.12	5,622.12	85.34 N	913.32 E	603,262.02	1,706,162.22	1.22	-431.94
5,828.00	19.27	81.97	4,416.46	5,681.46	87.72 N	934.34 E	603,264.39	1,706,183.24	2.00	-441.53
5,891.00	18.26	79.94	4,476.11	5,741.11	90.90 N	954.35 E	603,267.57	1,706,203.25	1.91	-449.91
5,954.00	18.63	84.92	4,535.88	5,800.88	93.51 N	974.09 E	603,270.19	1,706,223.00	2.57	-458.60
5,986.00	17.40	77.21	4,566.32	5,831.32	95.03 N	983.85 E	603,271.70	1,706,232.76	8.38	-462.72
6,017.00	16.68	63.14	4,595.97	5,860.97	98.06 N	992.35 E	603,274.74	1,706,241.25	13.47	-464.86
6,048.00	17.35	48.74	4,625.62	5,890.62	103.12 N	999.79 E	603,279.80	1,706,248.69	13.73	-464.74

Design Report for Thelma Hays OHI 5H - 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)		
6,080.00	18.60	37.70	4,656.07	5,921.07	110.31 N	1,006.50 E	603,286.98	1,706,255.40	11.32	-462.44
6,112.00	19.96	30.11	4,686.28	5,951.28	119.08 N	1,012.36 E	603,295.75	1,706,261.27	8.90	-458.35
6,143.00	20.12	24.39	4,715.41	5,980.41	128.51 N	1,017.22 E	603,305.18	1,706,266.12	6.34	-453.16
6,175.00	21.24	17.78	4,745.35	6,010.35	139.04 N	1,021.26 E	603,315.72	1,706,270.17	8.09	-446.59
6,206.00	22.46	13.66	4,774.12	6,039.12	150.15 N	1,024.38 E	603,326.82	1,706,273.28	6.32	-439.04
6,237.00	25.32	3.65	4,802.48	6,067.48	162.52 N	1,026.20 E	603,339.20	1,706,275.10	15.97	-429.72
6,269.00	28.14	1.56	4,831.05	6,096.05	176.90 N	1,026.84 E	603,353.57	1,706,275.74	9.29	-418.07
6,300.00	31.70	356.41	4,857.92	6,122.92	192.34 N	1,026.53 E	603,369.01	1,706,275.43	14.15	-405.01
6,331.00	35.10	351.72	4,883.80	6,148.80	209.30 N	1,024.73 E	603,385.97	1,706,273.64	13.76	-389.87
6,363.00	37.08	349.98	4,909.66	6,174.66	227.90 N	1,021.73 E	603,404.58	1,706,270.63	6.97	-372.69
6,395.00	40.54	347.39	4,934.59	6,199.59	247.56 N	1,017.78 E	603,424.23	1,706,266.68	11.94	-354.11
6,426.00	44.13	345.15	4,957.51	6,222.51	267.83 N	1,012.81 E	603,444.50	1,706,261.72	12.56	-334.46
6,457.00	47.12	344.49	4,979.19	6,244.19	289.21 N	1,007.01 E	603,465.89	1,706,255.91	9.76	-313.41
6,488.00	50.97	342.58	4,999.50	6,264.50	311.66 N	1,000.36 E	603,488.33	1,706,249.27	13.26	-291.02
6,520.00	52.35	340.70	5,019.35	6,284.35	335.47 N	992.46 E	603,512.15	1,706,241.36	6.31	-266.79
6,551.00	55.26	343.90	5,037.66	6,302.66	359.30 N	984.86 E	603,535.98	1,706,233.77	12.55	-242.72
6,583.00	56.82	344.82	5,055.54	6,320.54	384.86 N	977.71 E	603,561.53	1,706,226.61	5.43	-217.45
6,614.00	59.23	343.79	5,071.95	6,336.95	410.17 N	970.59 E	603,586.85	1,706,219.50	8.27	-192.40
6,646.00	64.23	342.16	5,087.10	6,352.10	437.11 N	962.34 E	603,613.78	1,706,211.24	16.26	-165.37
6,677.00	69.48	341.08	5,099.28	6,364.28	464.15 N	953.35 E	603,640.82	1,706,202.25	17.24	-137.86
6,708.00	74.51	340.06	5,108.86	6,373.86	491.94 N	943.54 E	603,668.61	1,706,192.44	16.52	-109.26
6,739.00	79.51	337.98	5,115.83	6,380.83	520.13 N	932.72 E	603,696.81	1,706,181.63	17.40	-79.77
6,771.00	84.32	338.12	5,120.33	6,385.33	549.51 N	920.88 E	603,726.18	1,706,169.79	15.04	-48.73
6,802.00	88.62	336.39	5,122.24	6,387.24	578.04 N	908.92 E	603,754.71	1,706,157.83	14.95	-18.34
6,833.00	92.18	333.90	5,122.02	6,387.02	606.16 N	895.90 E	603,782.83	1,706,144.80	14.01	12.31
6,896.00	95.35	330.55	5,117.88	6,382.88	661.76 N	866.61 E	603,838.44	1,706,115.52	7.31	74.85
6,959.00	93.59	330.08	5,112.97	6,377.97	716.33 N	835.51 E	603,893.00	1,706,084.41	2.89	137.52
7,023.00	91.14	330.10	5,110.33	6,375.33	771.75 N	803.63 E	603,948.43	1,706,052.53	3.83	201.34
7,086.00	90.34	329.67	5,109.52	6,374.52	826.24 N	772.02 E	604,002.92	1,706,020.92	1.44	264.23
7,149.00	89.87	329.37	5,109.40	6,374.40	880.54 N	740.06 E	604,057.21	1,705,988.97	0.89	327.15
7,211.00	89.36	329.30	5,109.82	6,374.82	933.87 N	708.44 E	604,110.54	1,705,957.35	0.83	389.07
7,274.00	90.71	331.63	5,109.78	6,374.78	988.67 N	677.39 E	604,165.35	1,705,926.29	4.27	451.92
7,337.00	91.04	333.17	5,108.82	6,373.82	1,044.50 N	648.21 E	604,221.17	1,705,897.11	2.50	514.59
7,397.00	90.57	333.14	5,107.98	6,372.98	1,098.03 N	621.12 E	604,274.70	1,705,870.02	0.78	574.18
7,460.00	90.77	334.67	5,107.24	6,372.24	1,154.60 N	593.41 E	604,331.27	1,705,842.31	2.45	636.66
7,523.00	91.08	334.72	5,106.22	6,371.22	1,211.55 N	566.48 E	604,388.22	1,705,815.39	0.50	699.02
7,585.00	90.77	334.35	5,105.22	6,370.22	1,267.51 N	539.83 E	604,444.19	1,705,788.73	0.78	760.41
7,648.00	89.70	332.39	5,104.96	6,369.96	1,323.83 N	511.59 E	604,500.50	1,705,760.49	3.54	822.97
7,711.00	88.56	328.49	5,105.92	6,370.92	1,378.61 N	480.52 E	604,555.28	1,705,729.43	6.45	885.80
7,774.00	88.59	326.67	5,107.49	6,372.49	1,431.77 N	446.76 E	604,608.44	1,705,695.66	2.89	948.77
7,837.00	88.92	324.22	5,108.86	6,373.86	1,483.64 N	411.04 E	604,660.31	1,705,659.94	3.92	1,011.74
7,901.00	91.01	324.37	5,108.90	6,373.90	1,535.61 N	373.69 E	604,712.28	1,705,622.59	3.27	1,075.69
7,964.00	91.78	323.98	5,107.36	6,372.36	1,586.67 N	336.82 E	604,763.35	1,705,585.73	1.37	1,138.61
8,028.00	90.00	322.28	5,106.37	6,371.37	1,637.86 N	298.43 E	604,814.54	1,705,547.33	3.85	1,202.48
8,090.00	90.67	322.25	5,106.01	6,371.01	1,686.89 N	260.49 E	604,863.57	1,705,509.39	1.08	1,264.31

Design Report for Thelma Hays OHI 5H - 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)		
8,153.00	90.27	320.11	5,105.49	6,370.49	1,735.97 N	221.00 E	604,912.65	1,705,469.90	3.46	1,327.02
8,216.00	91.01	316.64	5,104.78	6,369.78	1,783.06 N	179.16 E	604,959.73	1,705,428.06	5.63	1,389.37
8,278.00	90.44	314.60	5,104.00	6,369.00	1,827.36 N	135.80 E	605,004.04	1,705,384.70	3.42	1,450.23
8,341.00	90.50	316.74	5,103.48	6,368.48	1,872.42 N	91.78 E	605,049.10	1,705,340.68	3.40	1,512.09
8,405.00	91.44	316.41	5,102.40	6,367.40	1,918.90 N	47.79 E	605,095.57	1,705,296.70	1.56	1,575.10
8,467.00	91.31	315.13	5,100.91	6,365.91	1,963.31 N	4.56 E	605,139.98	1,705,253.46	2.07	1,635.99
8,529.00	92.12	316.00	5,099.06	6,364.06	2,007.56 N	38.83 W	605,184.23	1,705,210.08	1.92	1,696.82
8,591.00	93.60	319.16	5,095.96	6,360.96	2,053.27 N	80.59 W	605,229.94	1,705,168.31	5.62	1,757.97
8,655.00	93.36	318.49	5,092.08	6,357.08	2,101.35 N	122.65 W	605,278.02	1,705,126.26	1.11	1,821.27
8,717.00	94.47	319.92	5,087.84	6,352.84	2,148.18 N	163.06 W	605,324.85	1,705,085.84	2.92	1,882.61
8,780.00	95.38	322.23	5,082.43	6,347.43	2,197.00 N	202.49 W	605,373.67	1,705,046.41	3.93	1,945.09
8,843.00	93.80	323.23	5,077.39	6,342.39	2,246.97 N	240.52 W	605,423.65	1,705,008.38	2.97	2,007.74
8,906.00	91.84	325.20	5,074.29	6,339.29	2,298.01 N	277.31 W	605,474.69	1,704,971.59	4.41	2,070.61
8,968.00	91.71	324.98	5,072.37	6,337.37	2,348.83 N	312.78 W	605,525.51	1,704,936.13	0.41	2,132.55
9,032.00	91.58	325.75	5,070.54	6,335.54	2,401.47 N	349.13 W	605,578.14	1,704,899.77	1.22	2,196.51
9,094.00	91.28	325.47	5,068.99	6,333.99	2,452.62 N	384.14 W	605,629.29	1,704,864.76	0.66	2,258.49
9,157.00	90.94	325.40	5,067.77	6,332.77	2,504.49 N	419.88 W	605,681.16	1,704,829.02	0.55	2,321.46
9,220.00	90.87	324.82	5,066.77	6,331.77	2,556.16 N	455.91 W	605,732.83	1,704,792.99	0.93	2,384.43
9,283.00	90.84	325.30	5,065.83	6,330.83	2,607.79 N	491.99 W	605,784.47	1,704,756.92	0.76	2,447.40
9,346.00	91.85	326.87	5,064.35	6,329.35	2,660.06 N	527.13 W	605,836.73	1,704,721.78	2.96	2,510.38
9,409.00	91.61	328.34	5,062.45	6,327.45	2,713.23 N	560.86 W	605,889.90	1,704,688.04	2.36	2,573.34
9,472.00	91.11	327.91	5,060.96	6,325.96	2,766.71 N	594.12 W	605,943.39	1,704,654.78	1.05	2,636.30
9,535.00	91.95	327.75	5,059.27	6,324.27	2,820.02 N	627.65 W	605,996.69	1,704,621.25	1.36	2,699.26
9,598.00	92.52	327.52	5,056.82	6,321.82	2,873.19 N	661.35 W	606,049.87	1,704,587.55	0.98	2,762.20
9,661.00	92.52	328.04	5,054.05	6,319.05	2,926.44 N	694.91 W	606,103.11	1,704,553.99	0.82	2,825.13
9,724.00	92.52	329.23	5,051.28	6,316.28	2,980.18 N	727.67 W	606,156.85	1,704,521.24	1.89	2,888.02
9,787.00	92.08	328.66	5,048.75	6,313.75	3,034.11 N	760.14 W	606,210.78	1,704,488.76	1.14	2,950.92
9,850.00	92.65	329.31	5,046.15	6,311.15	3,088.05 N	792.57 W	606,264.73	1,704,456.33	1.37	3,013.81
9,914.00	92.65	329.63	5,043.19	6,308.19	3,143.12 N	825.05 W	606,319.80	1,704,423.85	0.50	3,077.66
9,976.00	92.22	329.84	5,040.56	6,305.56	3,196.62 N	856.27 W	606,373.30	1,704,392.63	0.77	3,139.51
10,039.00	91.78	330.28	5,038.36	6,303.36	3,251.18 N	887.69 W	606,427.86	1,704,361.21	0.99	3,202.35
10,102.00	92.02	329.85	5,036.27	6,301.27	3,305.75 N	919.11 W	606,482.42	1,704,329.79	0.78	3,265.20
10,165.00	92.15	329.70	5,033.98	6,298.98	3,360.15 N	950.81 W	606,536.82	1,704,298.10	0.31	3,328.06
10,228.00	92.02	329.13	5,031.69	6,296.69	3,414.35 N	982.84 W	606,591.02	1,704,266.06	0.93	3,390.94
10,291.00	91.64	327.51	5,029.67	6,294.67	3,467.93 N	1,015.91 W	606,644.60	1,704,232.99	2.64	3,453.88
10,354.00	91.48	327.35	5,027.96	6,292.96	3,521.00 N	1,049.81 W	606,697.68	1,704,199.09	0.36	3,516.85
10,417.00	91.41	327.30	5,026.37	6,291.37	3,574.02 N	1,083.81 W	606,750.69	1,704,165.09	0.14	3,579.82
10,480.00	91.75	326.96	5,024.63	6,289.63	3,626.91 N	1,117.99 W	606,803.58	1,704,130.91	0.76	3,642.79
10,542.00	90.84	326.12	5,023.23	6,288.23	3,678.62 N	1,152.17 W	606,855.29	1,704,096.74	2.00	3,704.78
10,606.00	91.45	325.51	5,021.95	6,286.95	3,731.55 N	1,188.12 W	606,908.22	1,704,060.78	1.35	3,768.76
10,669.00	91.84	325.96	5,020.14	6,285.14	3,783.60 N	1,223.57 W	606,960.27	1,704,025.33	0.94	3,831.72
10,732.00	91.91	326.37	5,018.08	6,283.08	3,835.90 N	1,258.63 W	607,012.57	1,703,990.27	0.66	3,894.69
10,794.00	92.05	325.90	5,015.94	6,280.94	3,887.35 N	1,293.16 W	607,064.02	1,703,955.74	0.79	3,956.65
10,857.00	91.98	326.03	5,013.72	6,278.72	3,939.52 N	1,328.40 W	607,116.20	1,703,920.50	0.23	4,019.61
10,920.00	92.22	325.48	5,011.42	6,276.42	3,991.57 N	1,363.83 W	607,168.24	1,703,885.07	0.95	4,082.56

Design Report for Thelma Hays OHI 5H - 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)		
10,983.00	92.32	325.82	5,008.92	6,273.92	4,043.54 N	1,399.35 W	607,220.21	1,703,849.55	0.56	4,145.50
11,045.00	92.28	325.95	5,006.43	6,271.43	4,094.83 N	1,434.09 W	607,271.50	1,703,814.81	0.22	4,207.45
11,108.00	92.15	325.41	5,004.00	6,269.00	4,146.82 N	1,469.59 W	607,323.49	1,703,779.32	0.88	4,270.39
11,171.00	92.02	324.38	5,001.71	6,266.71	4,198.33 N	1,505.79 W	607,375.00	1,703,743.11	1.65	4,333.32
11,233.00	94.00	323.89	4,998.45	6,263.45	4,248.50 N	1,542.07 W	607,425.17	1,703,706.84	3.29	4,395.18
11,295.00	93.87	323.54	4,994.20	6,259.20	4,298.36 N	1,578.67 W	607,475.03	1,703,670.23	0.60	4,456.95
11,358.00	94.71	324.29	4,989.48	6,254.48	4,349.13 N	1,615.67 W	607,525.80	1,703,633.23	1.79	4,519.71
11,421.00	94.34	325.13	4,984.51	6,249.51	4,400.39 N	1,651.95 W	607,577.06	1,703,596.95	1.45	4,582.48
11,483.00	94.84	325.65	4,979.55	6,244.55	4,451.26 N	1,687.06 W	607,627.93	1,703,561.85	1.16	4,644.27
11,546.00	94.54	328.44	4,974.40	6,239.40	4,503.94 N	1,721.21 W	607,680.61	1,703,527.69	4.44	4,707.05
11,577.00	93.97	328.75	4,972.10	6,237.10	4,530.32 N	1,737.32 W	607,706.99	1,703,511.59	2.09	4,737.94
11,609.00	93.67	327.99	4,969.97	6,234.97	4,557.51 N	1,754.06 W	607,734.18	1,703,494.84	2.55	4,769.86
11,640.00	93.67	327.95	4,967.98	6,232.98	4,583.73 N	1,770.47 W	607,760.41	1,703,478.43	0.13	4,800.78
11,672.00	93.96	328.36	4,965.85	6,230.85	4,610.86 N	1,787.32 W	607,787.53	1,703,461.59	1.57	4,832.70
11,704.00	94.14	328.53	4,963.59	6,228.59	4,638.06 N	1,804.02 W	607,814.73	1,703,444.88	0.77	4,864.60
11,735.00	94.37	328.49	4,961.29	6,226.29	4,664.42 N	1,820.17 W	607,841.09	1,703,428.73	0.75	4,895.50
11,766.00	93.19	328.89	4,959.25	6,224.25	4,690.85 N	1,836.24 W	607,867.52	1,703,412.66	4.02	4,926.41
11,798.00	90.74	329.08	4,958.15	6,223.15	4,718.25 N	1,852.72 W	607,894.93	1,703,396.18	7.68	4,958.36
11,829.00	90.81	330.01	4,957.73	6,222.73	4,744.97 N	1,868.43 W	607,921.65	1,703,380.47	3.01	4,989.32
11,860.00	90.84	330.09	4,957.29	6,222.29	4,771.83 N	1,883.91 W	607,948.50	1,703,365.00	0.28	5,020.25
11,892.00	90.74	329.98	4,956.85	6,221.85	4,799.55 N	1,899.89 W	607,976.22	1,703,349.01	0.46	5,052.19
11,923.00	90.64	329.88	4,956.47	6,221.47	4,826.38 N	1,915.42 W	608,003.05	1,703,333.48	0.46	5,083.14
11,955.00	90.77	330.22	4,956.08	6,221.08	4,854.10 N	1,931.39 W	608,030.77	1,703,317.51	1.14	5,115.08
11,987.00	90.91	330.75	4,955.61	6,220.61	4,881.95 N	1,947.16 W	608,058.62	1,703,301.75	1.71	5,147.00
12,019.00	91.18	331.54	4,955.03	6,220.03	4,909.97 N	1,962.60 W	608,086.64	1,703,286.31	2.61	5,178.89
12,051.00	91.24	331.77	4,954.35	6,219.35	4,938.13 N	1,977.79 W	608,114.80	1,703,271.12	0.74	5,210.76
12,083.00	90.87	332.77	4,953.76	6,218.76	4,966.44 N	1,992.67 W	608,143.12	1,703,256.23	3.33	5,242.59
12,114.00	90.87	332.11	4,953.29	6,218.29	4,993.92 N	2,007.02 W	608,170.60	1,703,241.89	2.13	5,273.43
12,146.00	90.54	331.64	4,952.90	6,217.90	5,022.14 N	2,022.10 W	608,198.82	1,703,226.80	1.79	5,305.29
12,178.00	90.47	331.36	4,952.61	6,217.61	5,050.26 N	2,037.37 W	608,226.94	1,703,211.54	0.90	5,337.17
12,209.00	90.64	330.97	4,952.31	6,217.31	5,077.42 N	2,052.32 W	608,254.09	1,703,196.59	1.37	5,368.07
12,241.00	90.47	330.98	4,952.00	6,217.00	5,105.40 N	2,067.84 W	608,282.07	1,703,181.06	0.53	5,399.97
12,272.00	90.87	330.54	4,951.64	6,216.64	5,132.45 N	2,082.98 W	608,309.12	1,703,165.92	1.92	5,430.89
12,304.00	90.71	330.86	4,951.20	6,216.20	5,160.35 N	2,098.64 W	608,337.02	1,703,150.26	1.12	5,462.80
12,336.00	90.77	331.02	4,950.79	6,215.79	5,188.32 N	2,114.18 W	608,364.99	1,703,134.72	0.53	5,494.70
12,367.00	91.61	331.82	4,950.14	6,215.14	5,215.54 N	2,129.01 W	608,392.21	1,703,119.89	3.74	5,525.59
12,399.00	91.95	332.38	4,949.15	6,214.15	5,243.80 N	2,143.98 W	608,420.48	1,703,104.92	2.05	5,557.42
12,431.00	91.88	332.22	4,948.08	6,213.08	5,272.12 N	2,158.84 W	608,448.79	1,703,090.06	0.55	5,589.24
12,462.00	92.41	332.72	4,946.92	6,211.92	5,299.59 N	2,173.16 W	608,476.26	1,703,075.74	2.35	5,620.06
12,493.00	91.34	334.06	4,945.91	6,210.91	5,327.29 N	2,187.04 W	608,503.96	1,703,061.86	5.53	5,650.82
12,525.00	90.70	334.93	4,945.34	6,210.34	5,356.17 N	2,200.82 W	608,532.84	1,703,048.09	3.37	5,682.51
12,556.00	90.64	334.98	4,944.97	6,209.97	5,384.25 N	2,213.94 W	608,560.92	1,703,034.96	0.25	5,713.18
12,588.00	91.45	335.60	4,944.39	6,209.39	5,413.31 N	2,227.31 W	608,589.99	1,703,021.59	3.19	5,744.80
12,619.00	91.95	336.71	4,943.47	6,208.47	5,441.66 N	2,239.84 W	608,618.33	1,703,009.06	3.93	5,775.35
12,651.00	92.18	336.87	4,942.32	6,207.32	5,471.05 N	2,252.44 W	608,647.72	1,702,996.46	0.88	5,806.83

Last MWD Survey at 12651' MD

Design Report for Thelma Hays OHI 5H - 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)		
12,703.00	92.18	336.87	4,940.34	6,205.34	5,518.83 N	2,272.85 W	608,695.50	1,702,976.05	0.00	5,857.95
Projection to TD at 12703' MD										

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
12,651.00	6,207.32	5,471.05	-2,252.44	Last MWD Survey at 12651' MD
12,703.00	6,205.34	5,518.83	-2,272.85	Projection to TD at 12703' MD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/_S (ft)	+E/-W (ft)	
User	No Target (Freehand)	326.57	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
100.00	2,012.00	MS Gyro Surveys	NS-GYRO-MS
2,061.00	12,703.00	Sperry MWD	MWD

Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Thelma Hays OHI 5i	0.00	0.00	6,208.95	5,692.57	-2,492.03	608,869.24	1,702,756.87	40° 10' 0.538 N	80° 33' 48.852 W
- hit/miss target									
- Shape									
- actual wellpath misses target center by 279.71ft at 12703.00ft MD (6205.34 TVD, 5518.83 N, -2272.85 E)									
- Point									