

Chesapeake Energy -Rockies District

Weld

State 8-60 16-1H

State 8-60 16-1H

State 8-60 16-1H

Survey: Gyro + MWD Surveys

Standard Survey Report

11 March, 2011

Chesapeake Operating

Survey Report

Company: Chesapeake Energy -Rockies District
 Project: Weld
 Site: State 8-60 16-1H
 Well: State 8-60 16-1H
 Wellbore: State 8-60 16-1H
 Design: State 8-60 16-1H

Local Co-ordinate Reference: Site State 8-60 16-1H
 TVD Reference: RKBL @ 4926.4usft (Original Well Elev)
 MD Reference: RKBL @ 4926.4usft (Original Well Elev)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: Drilling Database

Project	Weld		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	Colorado North 501		

Site	State 8-60 16-1H		
Site Position:		Northing:	489,255.77 ft
From:	Map	Easting:	2,390,264.12 ft
Position Uncertainty:	0.0 usft	Slot Radius:	0.000 in
		Latitude:	40° 40' 4.52777999 N
		Longitude:	104° 5' 35.44950096 W
		Grid Convergence:	0.91 °

Well	State 8-60 16-1H					
Well Position	+N/-S	0.0 usft	Northing:	489,255.77 ft	Latitude:	40° 40' 4.52777999 N
	+E/-W	0.0 usft	Easting:	2,390,264.12 ft	Longitude:	104° 5' 35.44950096 W
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,907.4 usft	

Wellbore	State 8-60 16-1H				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	11/19/2010	8.55	67.40	53,421

Design	State 8-60 16-1H				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	104.21	

Survey Program	Date	3/11/2011		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
89.0	10,080.0	Gyro + MWD Surveys (State 8-60 16-1H)		

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.33	100.87	100.0	-0.1	0.3	0.3	0.33	0.33	0.00
200.0	0.47	67.59	200.0	0.1	1.0	0.9	0.27	0.14	-33.28
300.0	0.48	89.59	300.0	0.2	1.8	1.7	0.18	0.00	22.00
400.0	0.37	82.58	400.0	0.3	2.6	2.5	0.12	-0.10	-7.01
500.0	0.14	108.81	500.0	0.2	3.0	2.8	0.25	-0.23	26.23
600.0	0.16	90.53	600.0	0.2	3.2	3.1	0.05	0.02	-18.27
700.0	0.18	102.39	700.0	0.2	3.5	3.4	0.04	0.02	11.86
800.0	0.21	100.62	800.0	0.1	3.9	3.7	0.03	0.03	-1.77
900.0	0.27	81.80	900.0	0.1	4.3	4.1	0.10	0.06	-18.82

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Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,000.0	0.30	76.64	1,000.0	0.2	4.8	4.6	0.04	0.03	-5.16
1,100.0	0.30	76.72	1,100.0	0.3	5.3	5.0	0.00	0.00	0.08
1,200.0	0.28	70.22	1,200.0	0.5	5.8	5.5	0.04	-0.02	-6.50
1,300.0	0.32	79.06	1,300.0	0.6	6.3	5.9	0.06	0.04	8.84
1,400.0	0.44	110.72	1,400.0	0.5	6.9	6.5	0.24	0.12	31.66
1,500.0	0.45	139.60	1,500.0	0.1	7.5	7.3	0.22	0.01	28.88
1,600.0	0.44	140.82	1,600.0	-0.5	8.0	7.9	0.01	-0.01	1.22
1,700.0	0.34	152.61	1,700.0	-1.1	8.4	8.4	0.13	-0.10	11.79
1,800.0	0.23	76.84	1,800.0	-1.3	8.7	8.8	0.36	-0.11	-75.76
1,900.0	0.25	54.44	1,900.0	-1.1	9.2	9.1	0.10	0.03	-22.40
2,000.0	0.15	322.01	2,000.0	-0.9	9.1	9.1	0.30	-0.10	-92.43
2,100.0	0.14	27.22	2,100.0	-0.6	9.2	9.1	0.16	-0.01	65.21
2,200.0	0.12	273.73	2,200.0	-0.5	9.1	9.0	0.22	-0.03	-113.48
2,300.0	0.30	243.02	2,300.0	-0.6	8.8	8.7	0.20	0.18	-30.71
2,400.0	0.46	241.47	2,400.0	-1.0	8.2	8.2	0.17	0.17	-1.55
2,500.0	0.51	242.46	2,500.0	-1.3	7.4	7.5	0.05	0.05	0.99
2,600.0	0.44	226.47	2,600.0	-1.8	6.7	7.0	0.15	-0.07	-15.99
2,700.0	0.21	184.22	2,699.9	-2.3	6.4	6.8	0.32	-0.23	-42.25
2,800.0	0.52	147.38	2,799.9	-2.7	6.6	7.1	0.37	0.31	-36.84
2,900.0	0.74	149.89	2,899.9	-3.7	7.3	8.0	0.23	0.23	2.51
3,000.0	0.78	160.54	2,999.9	-4.9	7.8	8.8	0.15	0.04	10.65
3,100.0	0.57	158.92	3,099.9	-6.1	8.2	9.5	0.21	-0.21	-1.62
3,200.0	0.41	151.91	3,199.9	-6.9	8.6	10.0	0.18	-0.17	-7.01
3,300.0	0.44	159.51	3,299.9	-7.5	8.9	10.5	0.07	0.04	7.60
3,400.0	0.34	150.04	3,399.9	-8.2	9.2	10.9	0.12	-0.10	-9.47
3,500.0	0.34	293.35	3,499.9	-8.3	9.1	10.8	0.65	-0.01	143.32
3,600.0	0.80	4.30	3,599.9	-7.5	8.9	10.4	0.76	0.46	70.95
3,700.0	1.29	359.87	3,699.9	-5.6	8.9	10.0	0.50	0.49	-4.43
3,800.0	1.40	351.49	3,799.9	-3.3	8.7	9.3	0.23	0.11	-8.38
3,900.0	1.68	345.73	3,899.8	-0.7	8.2	8.1	0.32	0.28	-5.77
4,000.0	1.62	348.01	3,999.8	2.2	7.5	6.7	0.09	-0.06	2.29
4,100.0	1.49	350.23	4,099.7	4.8	7.0	5.6	0.15	-0.14	2.21
4,200.0	1.43	356.78	4,199.7	7.4	6.6	4.6	0.18	-0.06	6.55
4,300.0	1.55	26.93	4,299.7	9.7	7.0	4.4	0.79	0.13	30.15
4,400.0	1.85	42.63	4,399.6	12.2	9.0	5.7	0.55	0.30	15.70
4,500.0	1.64	40.69	4,499.6	14.5	11.1	7.2	0.22	-0.21	-1.94
4,600.0	1.59	46.46	4,599.5	16.5	12.9	8.4	0.17	-0.05	5.77
4,700.0	2.37	48.30	4,699.5	18.6	15.3	10.3	0.78	0.78	1.84
4,800.0	3.07	51.93	4,799.4	21.8	19.0	13.1	0.72	0.70	3.63
4,900.0	2.92	53.10	4,899.2	25.1	23.3	16.5	0.16	-0.15	1.17
5,000.0	1.73	48.22	4,999.1	27.7	26.6	19.0	1.21	-1.19	-4.88
5,100.0	0.73	36.09	5,099.1	29.2	28.1	20.1	1.03	-1.00	-12.13
5,200.0	0.11	14.79	5,199.1	29.8	28.4	20.2	0.63	-0.62	-21.30
5,300.0	0.45	249.57	5,299.1	29.7	28.1	19.9	0.52	0.34	-125.21

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Survey

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5,400.0	1.29	231.34	5,399.1	28.9	26.8	18.9	0.87	0.84	-18.23
5,500.0	1.92	229.43	5,499.1	27.1	24.7	17.3	0.63	0.63	-1.91
5,600.0	1.94	229.45	5,599.0	24.9	22.1	15.3	0.02	0.02	0.02
5,700.0	3.72	200.19	5,698.9	22.0	19.6	13.6	2.24	1.78	-29.26
5,800.0	12.42	182.18	5,797.9	8.2	18.6	16.0	8.95	8.70	-18.01
5,900.0	21.38	182.32	5,893.2	-21.5	18.2	23.0	8.96	8.96	0.14
6,000.0	25.97	189.07	5,985.2	-60.6	14.0	28.5	5.32	4.59	6.75
6,100.0	35.75	186.73	6,071.2	-110.8	6.6	33.6	9.86	9.79	-2.34
6,200.0	47.89	181.77	6,145.4	-177.3	1.4	44.9	12.57	12.13	-4.97
6,300.0	54.95	182.47	6,206.3	-256.4	-0.9	62.1	7.09	7.07	0.71
6,400.0	65.64	180.91	6,257.3	-342.3	-3.8	80.3	10.77	10.68	-1.56
6,500.0	78.41	179.43	6,287.5	-437.3	-3.3	104.2	12.85	12.77	-1.49
6,600.0	91.74	179.06	6,296.8	-536.6	-2.2	129.6	13.33	13.33	-0.36
6,604.4	91.91	179.05	6,296.6	-541.1	-2.1	130.8	3.81	3.80	-0.35
Entry point									
6,700.0	95.53	178.71	6,289.2	-636.3	-0.4	155.8	3.81	3.80	-0.35
6,800.0	90.04	178.78	6,283.4	-736.0	3.2	183.8	5.50	-5.50	0.07
6,900.0	88.24	181.74	6,285.6	-836.0	1.7	206.9	3.46	-1.80	2.95
7,000.0	89.32	181.57	6,287.7	-935.9	-1.3	228.5	1.09	1.08	-0.17
7,100.0	89.10	182.30	6,288.8	-1,035.9	-4.3	250.1	0.76	-0.22	0.73
7,200.0	89.29	182.42	6,290.4	-1,135.8	-8.4	270.7	0.23	0.19	0.12
7,300.0	88.95	181.88	6,291.7	-1,235.7	-12.3	291.5	0.64	-0.35	-0.53
7,400.0	88.55	181.14	6,293.9	-1,335.6	-15.2	313.2	0.84	-0.40	-0.74
7,500.0	88.52	180.93	6,296.6	-1,435.6	-16.8	336.2	0.21	-0.03	-0.21
7,600.0	89.26	180.91	6,298.4	-1,535.5	-18.5	359.1	0.74	0.74	-0.02
7,700.0	90.48	181.05	6,298.8	-1,635.5	-20.2	381.9	1.22	1.21	0.14
7,800.0	91.71	181.27	6,296.8	-1,735.5	-22.2	404.6	1.25	1.23	0.22
7,900.0	90.34	181.03	6,294.1	-1,835.4	-23.8	427.5	1.39	-1.37	-0.25
8,000.0	88.73	181.19	6,295.4	-1,935.4	-25.8	450.2	1.62	-1.61	0.17
8,100.0	88.90	181.90	6,297.8	-2,035.3	-28.5	472.1	0.72	0.17	0.70
8,200.0	89.51	182.01	6,299.1	-2,135.2	-32.1	493.1	0.62	0.61	0.11
8,300.0	89.89	180.18	6,299.6	-2,235.2	-34.4	515.5	1.87	0.38	-1.84
8,400.0	89.65	179.35	6,300.1	-2,335.2	-33.7	540.7	0.86	-0.24	-0.82
8,500.0	88.26	178.47	6,301.6	-2,435.2	-32.0	566.9	1.66	-1.40	-0.89
8,600.0	88.17	178.06	6,305.0	-2,535.1	-28.9	594.4	0.41	-0.08	-0.40
8,700.0	89.04	178.28	6,307.5	-2,635.0	-25.6	622.1	0.90	0.87	0.22
8,800.0	90.46	178.84	6,307.9	-2,734.9	-23.1	649.1	1.52	1.42	0.56
8,900.0	91.65	179.07	6,306.3	-2,834.9	-21.2	675.5	1.21	1.19	0.23
9,000.0	89.50	177.90	6,303.9	-2,934.8	-19.1	702.0	2.44	-2.15	-1.17
9,100.0	88.13	178.51	6,306.2	-3,034.8	-16.1	729.5	1.50	-1.37	0.61
9,200.0	88.81	178.56	6,309.1	-3,134.7	-13.6	756.4	0.69	0.69	0.04
9,300.0	90.48	179.02	6,310.5	-3,234.7	-11.1	783.4	1.73	1.67	0.46
9,400.0	88.46	177.95	6,310.8	-3,334.6	-8.7	810.2	2.28	-2.02	-1.07

Chesapeake Operating

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9,500.0	87.64	177.95	6,314.4	-3,434.5	-4.8	838.5	0.82	-0.82	0.00
9,600.0	87.14	177.92	6,318.7	-3,534.3	-1.5	866.3	0.50	-0.50	-0.02
9,700.0	86.50	178.08	6,324.5	-3,634.1	2.3	894.4	0.66	-0.64	0.16
9,800.0	87.99	177.06	6,330.0	-3,733.8	6.4	922.9	1.80	1.48	-1.03
9,900.0	89.16	177.06	6,331.9	-3,833.7	11.8	952.6	1.18	1.18	0.01
10,000.0	88.80	176.63	6,333.7	-3,933.5	17.2	982.4	0.56	-0.36	-0.43
10,080.0	88.70	176.50	6,335.5	-4,013.4	22.1	1,006.7	0.21	-0.13	-0.17

State 8-60 16-1H_BHL_6300 @0.5 deg down

Checked By: _____ Approved By: _____ Date: _____

Chesapeake Energy

Weld County, CO
Sec. 16-T8N-R60W
State 8-60 16-1H

Plan F

Survey: Sperry MWD Surveys

Sperry Drilling Services Standard Report

14 March, 2011

Well Coordinates: 1,489,257.04 N, 3,390,113.74 E (40° 40' 04.49" N, 104° 05' 37.20" W)
Ground Level: 4,907.00 ft

Local Coordinate Origin:	Centered on Well State 8-60 16-1H
Viewing Datum:	RKB 19' @ 4926.00ft (DHS 19)
TVDs to System:	N
North Reference:	Grid
Unit System:	API - US Survey Feet - Custom
Geodetic Scale Factor Applied	
Version: 2003.16 Build: 431	

HALLIBURTON

HALLIBURTON**Survey Report for State 8-60 16-1H - Sperry MWD Surveys**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,591.80	1.92	229.74	5,590.82	25.07	22.33	-25.13	0.00
Tie on to Gyrodata Gryo Surveys at 5591.80 ft							
5,628.00	1.95	228.50	5,627.00	24.27	21.41	-24.33	0.14
First Sperry MWD Survey at 5628.00 ft							
5,660.00	1.91	226.67	5,658.98	23.55	20.61	-23.60	0.23
5,691.00	3.14	208.63	5,689.95	22.45	19.83	-22.50	4.68
5,723.00	5.51	187.97	5,721.86	20.15	19.20	-20.21	8.75
5,755.00	8.50	181.42	5,753.61	16.27	18.92	-16.32	9.65
5,787.00	11.16	183.16	5,785.14	10.81	18.69	-10.86	8.36
5,819.00	14.18	180.97	5,816.36	3.80	18.46	-3.85	9.56
5,850.00	17.43	179.77	5,846.18	-4.64	18.41	4.59	10.55
5,882.00	20.55	180.32	5,876.44	-15.05	18.40	15.00	9.75
5,914.00	22.03	183.76	5,906.26	-26.65	17.98	26.61	6.05
5,946.00	22.50	185.99	5,935.87	-38.73	16.94	38.69	3.02
5,977.00	24.12	187.64	5,964.34	-50.91	15.48	50.87	5.62
6,009.00	26.73	189.57	5,993.24	-64.49	13.42	64.45	8.58
6,041.00	29.39	189.49	6,021.48	-79.33	10.92	79.30	8.31
6,073.00	32.75	187.52	6,048.88	-95.66	8.50	95.64	10.97
6,105.00	36.27	186.57	6,075.25	-113.65	6.28	113.64	11.11
6,137.00	40.52	185.26	6,100.32	-133.42	4.24	133.40	13.53
6,169.00	44.36	183.86	6,123.93	-154.94	2.54	154.93	12.37
6,201.00	47.98	181.72	6,146.09	-177.99	1.42	177.99	12.29
6,232.00	51.74	180.81	6,166.07	-201.68	0.90	201.68	12.32
6,264.00	53.88	182.03	6,185.42	-227.16	0.27	227.16	7.34
6,296.00	54.82	182.45	6,204.07	-253.14	-0.75	253.14	3.13
6,327.00	55.96	182.32	6,221.68	-278.63	-1.81	278.64	3.69
6,359.00	60.10	181.96	6,238.62	-305.75	-2.83	305.76	12.98
6,391.00	64.40	181.22	6,253.51	-334.06	-3.61	334.06	13.58
6,423.00	68.79	180.16	6,266.22	-363.41	-3.95	363.42	14.06
6,470.00	75.15	179.04	6,280.76	-408.08	-3.63	408.09	13.72
6,527.00	81.30	179.83	6,292.39	-463.85	-3.09	463.86	10.88
6,558.00	85.25	179.19	6,296.02	-494.63	-2.82	494.63	12.90
6,590.00	90.83	178.96	6,297.12	-526.59	-2.31	526.60	17.46
6,622.00	93.79	179.24	6,295.82	-558.56	-1.80	558.56	9.31
6,653.00	94.68	178.86	6,293.53	-589.47	-1.29	589.47	3.12
6,685.00	95.31	178.90	6,290.74	-621.34	-0.67	621.34	1.97
6,717.00	95.80	178.48	6,287.65	-653.18	0.06	653.18	2.00
6,749.00	93.85	177.23	6,284.95	-685.04	1.25	685.04	7.22
6,781.00	90.71	177.70	6,283.68	-716.98	2.66	716.97	9.94
6,844.00	88.49	181.27	6,284.12	-779.97	3.23	779.95	6.67
6,908.00	88.21	181.82	6,285.96	-843.92	1.50	843.91	0.95
6,972.00	89.07	181.65	6,287.48	-907.87	-0.44	907.87	1.37
7,036.00	89.63	181.44	6,288.20	-971.84	-2.16	971.84	0.93
7,099.00	89.08	182.32	6,288.91	-1,034.80	-4.23	1,034.81	1.65
7,163.00	89.04	182.26	6,289.96	-1,098.74	-6.79	1,098.76	0.11
7,226.00	89.45	182.51	6,290.79	-1,161.68	-9.41	1,161.70	0.75
7,289.00	88.95	181.90	6,291.67	-1,224.63	-11.84	1,224.66	1.24
7,353.00	88.67	181.79	6,293.00	-1,288.58	-13.90	1,288.61	0.47
7,417.00	88.49	180.85	6,294.58	-1,352.54	-15.37	1,352.58	1.48
7,480.00	88.34	180.86	6,296.33	-1,415.51	-16.32	1,415.55	0.25

HALLIBURTON**Survey Report for State 8-60 16-1H - Sperry MWD Surveys**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
7,544.00	89.04	181.03	6,297.79	-1,479.49	-17.37	1,479.53	1.14
7,608.00	89.29	180.89	6,298.72	-1,543.47	-18.44	1,543.52	0.44
7,670.00	90.03	181.06	6,299.09	-1,605.46	-19.49	1,605.51	1.23
7,733.00	91.02	180.95	6,298.51	-1,668.45	-20.60	1,668.50	1.57
7,797.00	91.70	181.31	6,297.00	-1,732.42	-21.86	1,732.47	1.20
7,859.00	91.91	180.72	6,295.05	-1,794.38	-22.96	1,794.43	1.02
7,922.00	89.51	181.18	6,294.27	-1,857.36	-24.00	1,857.42	3.88
7,985.00	88.83	181.10	6,295.18	-1,920.34	-25.26	1,920.40	1.08
8,049.00	88.49	181.46	6,296.68	-1,984.30	-26.68	1,984.37	0.76
8,113.00	89.01	181.99	6,298.07	-2,048.26	-28.61	2,048.33	1.17
8,176.00	89.41	182.21	6,298.94	-2,111.21	-30.92	2,111.29	0.72
8,240.00	89.72	181.74	6,299.42	-2,175.17	-33.13	2,175.25	0.87
8,303.00	89.94	180.11	6,299.61	-2,238.16	-34.15	2,238.24	2.61
8,366.00	89.57	179.32	6,299.88	-2,301.16	-33.83	2,301.24	1.39
8,429.00	89.72	179.39	6,300.27	-2,364.15	-33.12	2,364.23	0.27
8,493.00	88.34	178.51	6,301.35	-2,428.13	-31.95	2,428.21	2.57
8,557.00	87.87	178.19	6,303.47	-2,492.07	-30.11	2,492.14	0.88
8,620.00	88.33	178.03	6,305.55	-2,555.00	-28.04	2,555.07	0.78
8,683.00	88.80	178.22	6,307.13	-2,617.95	-25.98	2,618.01	0.79
8,746.00	89.69	178.52	6,307.96	-2,680.92	-24.19	2,680.97	1.49
8,810.00	90.59	178.88	6,307.80	-2,744.90	-22.73	2,744.95	1.51
8,873.00	91.05	178.90	6,306.91	-2,807.88	-21.52	2,807.93	0.74
8,937.00	92.41	179.32	6,304.97	-2,871.84	-20.52	2,871.89	2.22
9,000.00	89.51	177.93	6,303.92	-2,934.81	-19.01	2,934.85	5.11
9,064.00	88.30	178.40	6,305.15	-2,998.76	-16.96	2,998.79	2.03
9,127.00	88.03	178.60	6,307.17	-3,061.71	-15.32	3,061.74	0.53
9,191.00	88.80	178.55	6,308.94	-3,125.66	-13.72	3,125.69	1.21
9,254.00	88.92	178.25	6,310.19	-3,188.62	-11.96	3,188.64	0.51
9,318.00	91.08	179.30	6,310.19	-3,252.60	-10.59	3,252.62	3.75
9,381.00	88.70	178.16	6,310.31	-3,315.58	-9.20	3,315.60	4.18
9,445.00	87.87	177.57	6,312.23	-3,379.51	-6.81	3,379.52	1.60
9,508.00	87.62	178.01	6,314.70	-3,442.41	-4.38	3,442.41	0.80
9,571.00	87.56	178.15	6,317.35	-3,505.32	-2.27	3,505.32	0.24
9,634.00	86.58	177.64	6,320.57	-3,568.20	0.04	3,568.18	1.76
9,698.00	86.48	178.06	6,324.44	-3,632.03	2.44	3,632.01	0.67
9,762.00	86.61	177.60	6,328.30	-3,695.87	4.86	3,695.84	0.75
9,825.00	88.89	176.72	6,330.77	-3,758.74	7.99	3,758.70	3.88
9,888.00	89.20	177.08	6,331.82	-3,821.64	11.40	3,821.59	0.75
9,952.00	88.98	176.89	6,332.84	-3,885.54	14.76	3,885.49	0.44
10,024.00	88.70	176.53	6,334.29	-3,957.41	18.89	3,957.34	0.64
Final Sperry MWD Survey at 10024.00 ft							
10,080.00	88.70	176.53	6,335.56	-4,013.29	22.28	4,013.22	0.01
Straight Line Projection to TD at 10080.00 ft							

HALLIBURTON**Survey Report for State 8-60 16-1H - Sperry MWD Surveys****Survey Annotations**

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
5,591.80	5,590.82	25.07	22.33	Tie on to Gyrodata Gryo Surveys at 5591.80 ft
5,628.00	5,627.00	24.27	21.41	First Sperry MWD Survey at 5628.00 ft
10,024.00	6,334.29	-3,957.41	18.89	Final Sperry MWD Survey at 10024.00 ft
10,080.00	6,335.56	-4,013.29	22.28	Straight Line Projection to TD at 10080.00 ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	State 8-60 16-1H Plan F BHL	180.16	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
5,628.00	10,080.00	Sperry MWD Surveys	MWD

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
State 8-60 16-1H Plan	0.00	0.00	6,306.00	-4,046.91	-11.01	1,485,210.19	3,390,102.73	40° 39' 24.505 N	104° 5' 38.180 W
- survey misses target center by 55.79ft at 10080.00ft MD (6335.56 TVD, -4013.29 N, 22.28 E)									
- Point									
State 8-60 16-1H Setb:	0.00	0.00	0.00	0.00	0.00	1,489,257.04	3,390,113.74	40° 40' 4.487 N	104° 5' 37.205 W
- survey misses target center by 5590.92ft at 5591.80ft MD (5590.82 TVD, 25.07 N, 22.33 E)									
- Polygon									
State 8-60 16-1H Secti	0.00	0.00	0.00	0.00	0.00	1,489,257.04	3,390,113.74	40° 40' 4.487 N	104° 5' 37.205 W
- survey misses target center by 5590.92ft at 5591.80ft MD (5590.82 TVD, 25.07 N, 22.33 E)									
- Polygon									

HALLIBURTON**North Reference Sheet for Sec. 16-T8N-R60W - State 8-60 16-1H - Plan F**

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.

Vertical Depths are relative to RKB 19' @ 4926.00ft (DHS 19). Northing and Easting are relative to State 8-60 16-1H

Coordinate System is US State Plane 1983, Colorado Northern Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is 105° 30' 0.000 W°, Longitude Origin: 0° 0' 0.000 E°, Latitude Origin: 40° 47' 0.000 N°

False Easting: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99998331

Grid Coordinates of Well: 1,489,257.04 ft N, 3,390,113.74 ft E

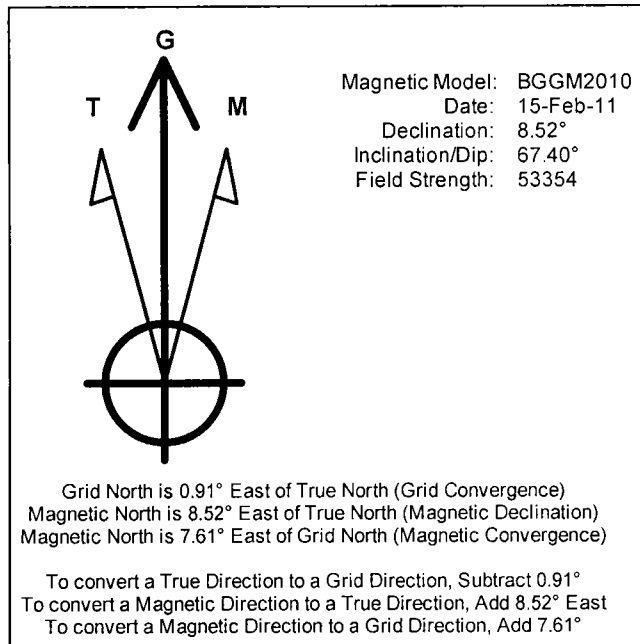
Geographical Coordinates of Well: 40° 40' 04.49" N, 104° 05' 37.20" W

Grid Convergence at Surface is: 0.91°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,080.00ft

the Bottom Hole Displacement is 4,013.35ft in the Direction of 179.68° (Grid).

Magnetic Convergence at surface is: -7.61° (15 February 2011, , BGGM2010)



Project: Weld County, CO
Site: Sec. 16-T8N-R60W
Well: State 8-60 16-1H

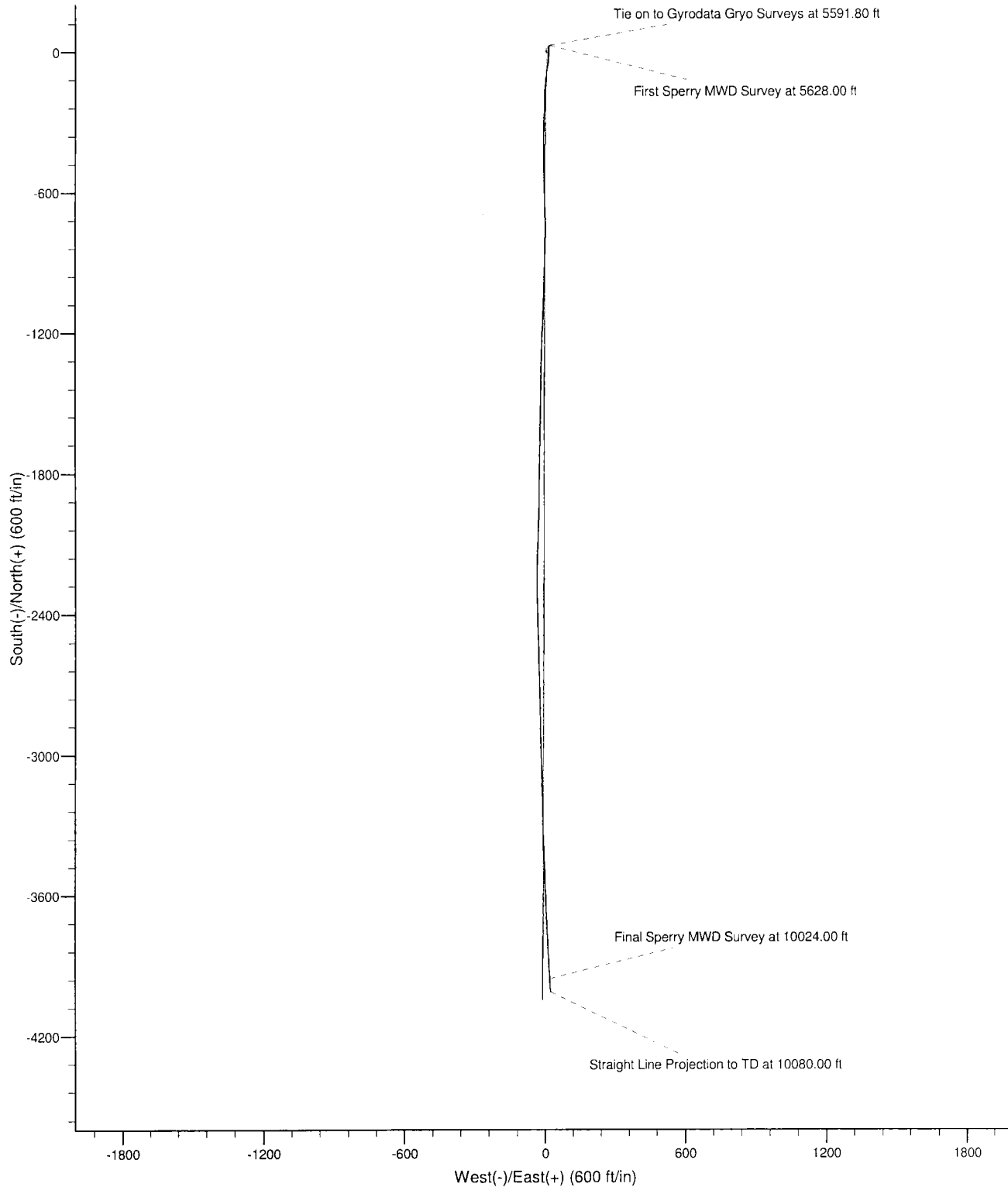
Chesapeake Energy

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LEGEND

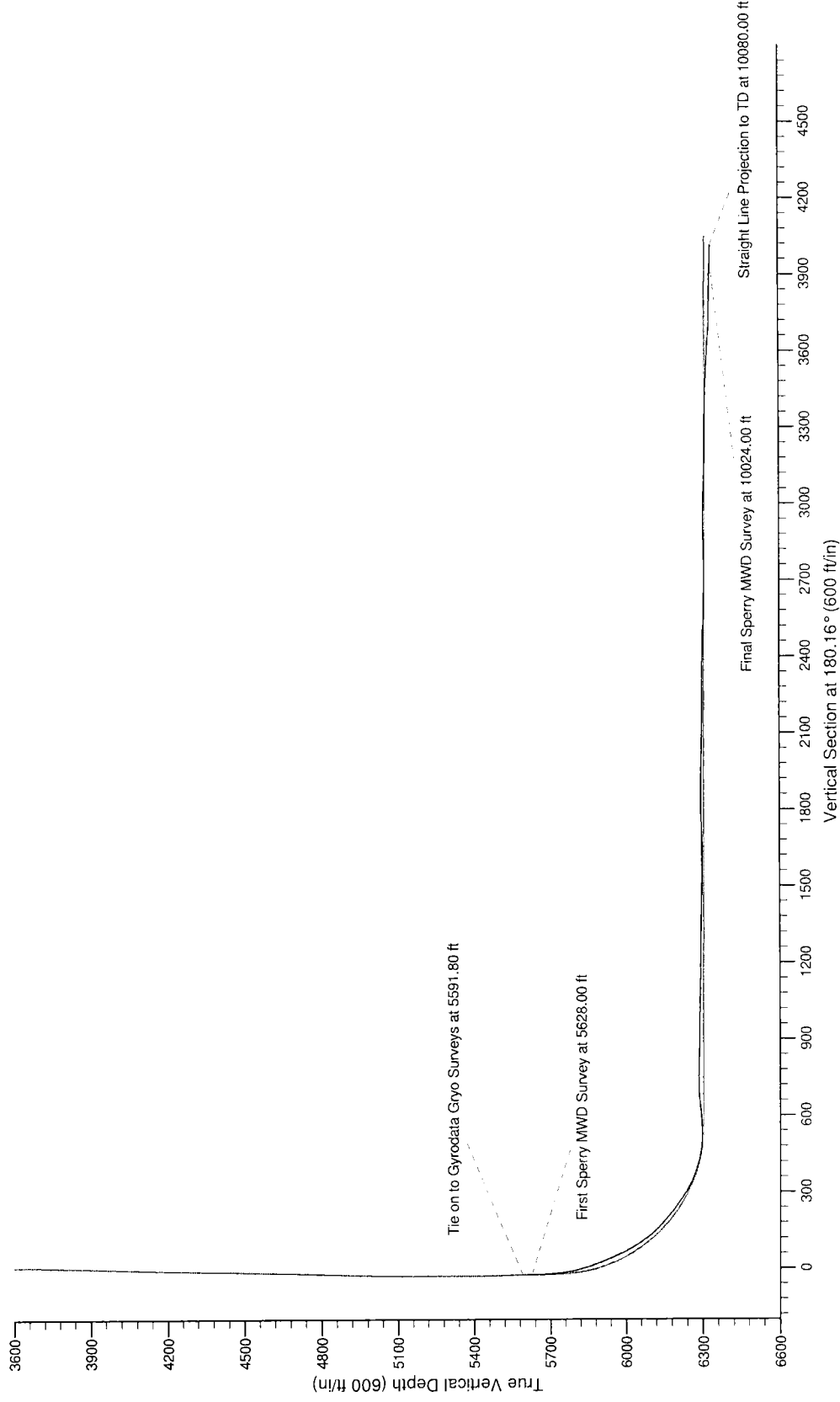
- State 8-60 16-1H, Original BHL Plan, Original BHL Plan #2 V0
- Sperry MWD Surveys



Project: Weld County, CO
Site: Sec. 16-T8N-R60W
Well: State 8-60 16-1H

Chesapeake Energy

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LEGEND

- State 8-60 16-1H, Original BHL Plan, Original BHL Plan #2 V0
- - - Sperry MWD Surveys