



Chief Oil & Gas - AP

Marshall County, WV (NAD 27)

McLain

McLain 1H

Wellbore #1

Survey: MWD Surveys

DDC Survey Report

06 May, 2010





I **Larry Wright**, certify that I am employed by **The Appalachian Directional Company (ADC)**. That I did on the day(s) of **04/19/10** thru **05/02/10** conduct or supervise the taking of a **MWD Survey(s)** from a depth of **3200** feet to a depth of **10231** feet, that the data is true, correct, complete and within the limitations of the tool as set forth by **The Appalachian Directional Company (ADC)**.; that I am authorized and qualified to make this report; that this survey was conducted at the request of **Chief Oil and Gas** for the **McLain #1H Well in Marshall County, WV**; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by **The Appalachian Directional Company (ADC)**.

Larry Wright

Digitally signed by Larry
Wright
DN: cn=Larry Wright, o, ou,
email=larryw@directionaldril
lers.com, c=US
Date: 2010.05.07 11:24:49
-05'00'

• 1200 Heavy Haul Road • *Morgan Town, WV 26501* •
• PH 304-777-2310 • FAX 304-777-2317 •

MAY 27 2011



DDC
Survey Report



Company:	Chief Oil & Gas - AP	Local Co-ordinate Reference:	Well McLain 1H
Project:	Marshall County, WV (NAD 27)	TVD Reference:	WELL @ 1306.4usft (Union 43)
Site:	McLain	MD Reference:	WELL @ 1306.4usft (Union 43)
Well:	McLain 1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Project	Marshall County, WV (NAD 27)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	West Virginia North 4701		

Site	McLain				
Site Position:	Northing:	521,990.57 usft	Latitude:	39° 55' 37.247 N	
From: Map	Easting:	1,664,474.12 usft	Longitude:	80° 41' 47.023 W	
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.76 °

Well	McLain 1H					
Well Position	+N/-S	0.0 usft	Northing:	521,990.57 usft	Latitude:	39° 55' 37.247 N
	+E/-W	0.0 usft	Easting:	1,664,474.12 usft	Longitude:	80° 41' 47.023 W
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft	Ground Level:	1,288.4 usft	

Wellbore	Wellbore #1		
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2/18/2010	-8.52	67.71	53,133

Design	Wellbore #1		
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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	155.13

Survey Program	Date	5/6/2010		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
3,278.0	10,231.0	MWD Surveys (Wellbore #1)	MWD default	MWD - Standard

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)
First MWD Surveys									
3,200.0	0.14	310.56	3,199.9	8.1	-12.6	-12.6	0.00	0.00	0.00
3,278.0	2.50	255.70	3,277.9	7.7	-14.4	-13.0	3.11	3.03	-70.33
3,341.0	3.90	245.60	3,340.8	6.5	-17.6	-13.3	2.39	2.22	-16.03
3,405.0	4.10	246.50	3,404.6	4.7	-21.7	-13.4	0.33	0.31	1.41
3,468.0	4.70	240.70	3,467.5	2.5	-26.0	-13.2	1.18	0.95	-9.21
3,531.0	6.30	240.40	3,530.2	-0.5	-31.3	-12.7	2.54	2.54	-0.48
3,595.0	7.70	238.70	3,593.7	-4.4	-38.0	-12.0	2.21	2.19	-2.66
3,658.0	7.10	236.80	3,656.2	-8.7	-44.9	-10.9	1.03	-0.95	-3.02
3,720.0	8.30	235.20	3,717.6	-13.4	-51.7	-9.6	1.97	1.94	-2.58
3,785.0	8.50	237.20	3,781.9	-18.7	-59.6	-8.1	0.54	0.31	3.08



DDC
Survey Report



Company: Chief Oil & Gas - AP
 Project: Marshall County, WV (NAD 27)
 Site: McLain
 Well: McLain 1H
 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well McLain 1H
 TVD Reference: WELL @ 1306.4usft (Union 43)
 MD Reference: WELL @ 1306.4usft (Union 43)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM 5000.1 Single User Db

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)
3,847.0	10.10	236.00	3,843.1	-24.2	-68.0	-6.6	2.60	2.58	-1.94
3,911.0	12.00	235.60	3,905.9	-31.1	-78.1	-4.7	2.97	2.97	-0.63
3,974.0	12.20	233.50	3,967.5	-38.8	-88.9	-2.2	0.77	0.32	-3.33
4,038.0	13.20	233.50	4,029.9	-47.1	-100.2	0.6	1.56	1.56	0.00
4,102.0	14.20	235.70	4,092.1	-55.9	-112.6	3.4	1.76	1.56	3.44
4,165.0	16.00	236.00	4,152.9	-65.1	-126.1	6.0	2.86	2.86	0.48
4,229.0	15.60	235.40	4,214.5	-74.9	-140.5	8.9	0.68	-0.63	-0.94
4,292.0	14.40	235.60	4,275.4	-84.2	-154.0	11.6	1.91	-1.90	0.32
4,356.0	15.30	233.80	4,337.2	-93.6	-167.4	14.6	1.58	1.41	-2.81
4,419.0	14.70	233.70	4,398.1	-103.3	-180.5	17.8	0.95	-0.95	-0.16
4,482.0	14.90	233.90	4,459.0	-112.8	-193.5	21.0	0.33	0.32	0.32
4,546.0	14.50	234.90	4,520.9	-122.2	-206.7	24.0	0.74	-0.63	1.56
4,609.0	14.70	234.90	4,581.9	-131.4	-219.7	26.8	0.32	0.32	0.00
4,673.0	14.50	237.30	4,643.8	-140.4	-233.1	29.3	1.00	-0.31	3.75
4,724.0	14.50	235.50	4,693.2	-147.4	-243.7	31.3	0.88	0.00	-3.53
4,788.0	15.10	234.80	4,755.1	-156.8	-257.1	34.1	0.98	0.94	-1.09
4,851.0	13.60	237.00	4,816.1	-165.5	-270.0	36.6	2.53	-2.38	3.49
4,915.0	13.90	235.50	4,878.3	-174.0	-282.7	39.0	0.73	0.47	-2.34
4,978.0	14.90	237.60	4,939.3	-182.6	-295.8	41.3	1.79	1.59	3.33
5,042.0	14.50	239.10	5,001.2	-191.1	-309.6	43.2	0.86	-0.63	2.34
5,105.0	15.10	237.80	5,062.1	-199.6	-323.3	45.1	1.09	0.95	-2.06
5,169.0	16.20	235.70	5,123.7	-209.0	-337.7	47.6	1.93	1.72	-3.28
5,232.0	15.10	235.40	5,184.4	-218.7	-351.7	50.4	1.75	-1.75	-0.48
5,296.0	15.40	234.70	5,246.1	-228.3	-365.5	53.4	0.55	0.47	-1.09
5,359.0	14.90	234.30	5,306.9	-237.9	-379.0	56.4	0.81	-0.79	-0.63
5,423.0	14.90	236.10	5,368.8	-247.3	-392.5	59.3	0.72	0.00	2.81
5,486.0	14.80	236.30	5,429.7	-256.2	-405.9	61.8	0.18	-0.16	0.32
5,550.0	14.80	233.70	5,491.6	-265.6	-419.3	64.7	1.04	0.00	-4.06
5,613.0	13.90	234.10	5,552.6	-274.8	-431.9	67.7	1.44	-1.43	0.63
5,677.0	13.60	233.80	5,614.8	-283.8	-444.2	70.6	0.48	-0.47	-0.47
5,740.0	13.80	233.20	5,676.0	-292.6	-456.2	73.7	0.39	0.32	-0.95
5,803.0	14.00	232.10	5,737.1	-301.8	-468.2	76.9	0.53	0.32	-1.75
5,866.0	14.20	229.50	5,798.2	-311.5	-480.1	80.7	1.05	0.32	-4.13
5,940.0	15.60	213.70	5,869.8	-325.7	-492.5	88.4	5.79	1.89	-21.35
6,004.0	17.70	201.50	5,931.1	-341.9	-500.9	99.6	6.35	3.28	-19.06
6,067.0	17.90	193.20	5,991.1	-360.3	-506.6	113.8	4.04	0.32	-13.17
6,130.0	18.10	184.50	6,051.0	-379.4	-509.6	130.0	4.28	0.32	-13.81
6,182.0	18.20	182.00	6,081.4	-389.4	-510.1	138.7	2.45	0.31	-7.81
6,193.0	20.10	175.20	6,110.7	-399.5	-509.9	148.1	9.44	6.13	-21.94
6,225.0	23.30	167.90	6,140.4	-411.2	-508.1	159.4	13.07	10.00	-22.81
6,257.0	26.70	163.70	6,169.4	-424.3	-504.7	172.7	11.98	10.63	-13.13
6,289.0	30.10	160.20	6,197.6	-438.8	-500.0	187.8	11.83	10.63	-10.94
6,320.0	33.90	158.20	6,223.9	-454.1	-494.1	204.2	12.72	12.26	-6.45

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DDC
Survey Report



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 Wellbore: Wellbore #1
 Design: Wellbore #1

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Survey

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6,352.0	38.30	156.70	6,249.7	-471.5	-486.9	223.0	14.02	13.75	-4.69
6,384.0	43.20	155.10	6,274.0	-490.6	-478.4	243.9	15.66	15.31	-5.00
6,416.0	47.40	153.80	6,296.5	-511.1	-468.5	266.6	13.44	13.13	-4.06
6,448.0	52.10	153.40	6,317.1	-532.9	-457.7	291.0	14.72	14.69	-1.25
6,479.0	57.10	151.70	6,335.1	-555.4	-446.0	316.3	16.74	16.13	-5.48
6,511.0	61.60	150.70	6,351.4	-579.5	-432.8	343.7	14.32	14.06	-3.13
6,543.0	65.90	151.60	6,365.5	-604.6	-418.9	372.4	13.67	13.44	2.81
6,574.0	69.80	152.00	6,377.2	-629.9	-405.4	401.0	12.64	12.58	1.29
6,606.0	74.20	152.50	6,387.1	-656.8	-391.2	431.4	13.83	13.75	1.56
6,638.0	77.30	151.80	6,395.0	-684.3	-376.7	462.4	9.92	9.69	-2.19
6,670.0	80.70	151.70	6,401.1	-711.9	-361.8	493.7	10.63	10.63	-0.31
6,701.0	83.00	151.70	6,405.5	-738.9	-347.3	524.4	7.42	7.42	0.00
6,733.0	85.40	151.60	6,408.7	-767.0	-332.2	556.1	7.51	7.50	-0.31
6,765.0	87.40	151.10	6,410.7	-795.0	-316.9	588.0	6.44	6.25	-1.56
6,829.0	88.20	150.80	6,413.2	-850.9	-285.8	651.8	1.33	1.25	-0.47
6,892.0	89.00	150.40	6,414.7	-905.8	-254.9	714.6	1.42	1.27	-0.63
6,955.0	89.80	149.70	6,415.4	-960.3	-223.4	777.3	1.69	1.27	-1.11
7,018.0	90.50	149.00	6,415.2	-1,014.5	-191.3	840.0	1.57	1.11	-1.11
7,081.0	90.90	149.00	6,414.5	-1,068.5	-158.9	902.6	0.63	0.63	0.00
7,145.0	91.30	148.20	6,413.2	-1,123.1	-125.5	966.2	1.40	0.63	-1.25
7,208.0	91.80	147.10	6,411.5	-1,176.3	-91.8	1,028.6	1.92	0.79	-1.75
7,271.0	90.80	146.20	6,410.1	-1,229.0	-57.2	1,090.9	2.14	-1.59	-1.43
7,334.0	90.70	146.00	6,409.3	-1,281.2	-22.1	1,153.1	0.35	-0.16	-0.32
7,398.0	91.40	146.10	6,408.1	-1,334.3	13.6	1,216.3	1.10	1.09	0.16
7,461.0	91.30	145.80	6,406.6	-1,386.5	48.9	1,278.5	0.50	-0.16	-0.48
7,525.0	89.50	144.70	6,406.2	-1,439.1	85.4	1,341.5	3.30	-2.81	-1.72
7,588.0	89.70	145.10	6,406.6	-1,490.6	121.6	1,403.5	0.71	0.32	0.63
7,650.0	90.30	143.90	6,406.6	-1,541.1	157.6	1,464.5	2.16	0.97	-1.94
7,713.0	90.20	142.90	6,406.3	-1,591.7	195.2	1,526.2	1.60	-0.16	-1.59
7,776.0	88.00	142.00	6,407.3	-1,641.6	233.6	1,587.6	3.77	-3.49	-1.43
7,839.0	88.10	141.80	6,409.5	-1,691.2	272.4	1,648.9	0.35	0.16	-0.32
7,902.0	89.60	143.00	6,410.7	-1,741.1	310.8	1,710.3	3.05	2.38	1.90
7,965.0	90.40	142.80	6,410.7	-1,791.3	348.8	1,771.9	1.31	1.27	-0.32
8,028.0	90.10	142.70	6,410.5	-1,841.5	387.0	1,833.4	0.50	-0.48	-0.16
8,091.0	89.80	142.30	6,410.5	-1,891.4	425.3	1,894.9	0.79	-0.48	-0.63
8,154.0	89.80	141.90	6,410.7	-1,941.2	464.0	1,956.3	0.63	0.00	-0.63
8,218.0	89.90	141.90	6,410.9	-1,991.5	503.5	2,018.6	0.16	0.16	0.00
8,281.0	89.50	140.30	6,411.2	-2,040.6	543.1	2,079.7	2.62	-0.63	-2.54
8,345.0	88.40	138.50	6,412.4	-2,089.1	584.7	2,141.3	3.30	-1.72	-2.81
8,408.0	87.30	138.10	6,414.8	-2,136.1	626.6	2,201.6	1.86	-1.75	-0.63
8,470.0	87.00	138.60	6,417.8	-2,182.4	667.8	2,260.9	0.94	-0.48	0.81
8,533.0	88.20	140.00	6,420.5	-2,230.1	708.8	2,321.4	2.93	1.90	2.22
8,597.0	88.60	140.90	6,422.3	-2,279.5	749.5	2,383.3	1.54	0.63	1.41



DDC
Survey Report



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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

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)
8,660.0	88.70	142.50	6,423.8	-2,328.9	788.6	2,444.6	2.54	0.16	2.54
8,724.0	90.50	144.10	6,424.2	-2,380.2	826.8	2,507.2	3.76	2.81	2.50
8,788.0	89.70	144.20	6,424.1	-2,432.1	864.3	2,570.0	1.26	-1.25	0.16
8,851.0	88.80	143.30	6,424.9	-2,482.9	901.5	2,631.8	2.02	-1.43	-1.43
8,915.0	89.00	143.00	6,426.1	-2,534.1	939.9	2,694.4	0.56	0.31	-0.47
8,978.0	89.90	142.60	6,426.8	-2,584.2	978.0	2,755.9	1.56	1.43	-0.63
9,042.0	89.20	141.80	6,427.3	-2,634.8	1,017.2	2,818.3	1.66	-1.09	-1.25
9,105.0	88.30	141.20	6,428.6	-2,684.1	1,056.4	2,879.5	1.72	-1.43	-0.95
9,168.0	90.50	142.70	6,429.3	-2,733.7	1,095.3	2,940.8	4.23	3.49	2.38
9,232.0	89.70	143.00	6,429.2	-2,784.7	1,133.9	3,003.4	1.33	-1.25	0.47
9,295.0	88.80	142.90	6,430.1	-2,835.0	1,171.9	3,064.9	1.75	-1.75	-0.16
9,359.0	88.70	143.40	6,431.6	-2,886.2	1,210.2	3,127.5	0.80	0.16	0.78
9,421.0	88.00	143.30	6,433.4	-2,935.9	1,247.2	3,188.2	1.14	-1.13	-0.16
9,485.0	88.40	143.60	6,435.4	-2,987.3	1,285.3	3,250.8	0.78	0.63	0.47
9,548.0	88.80	144.00	6,437.0	-3,038.1	1,322.5	3,312.6	0.90	0.63	0.63
9,612.0	89.10	143.60	6,438.1	-3,089.8	1,360.3	3,375.3	0.78	0.47	-0.63
9,676.0	89.20	144.30	6,439.1	-3,141.5	1,398.0	3,438.1	1.10	0.16	1.09
9,739.0	89.40	144.70	6,439.8	-3,192.8	1,434.6	3,500.0	0.71	0.32	0.63
9,803.0	89.80	144.70	6,440.3	-3,245.0	1,471.5	3,563.0	0.63	0.63	0.00
9,867.0	90.20	144.40	6,440.3	-3,297.2	1,508.7	3,625.9	0.78	0.63	-0.47
9,930.0	90.80	144.00	6,439.7	-3,348.3	1,545.5	3,687.7	1.14	0.95	-0.63
9,994.0	89.80	144.60	6,439.4	-3,400.2	1,582.9	3,750.6	1.82	-1.56	0.94
10,056.0	89.70	144.60	6,439.7	-3,450.8	1,618.8	3,811.5	0.16	-0.16	0.00
10,119.0	89.30	143.60	6,440.2	-3,501.8	1,655.7	3,873.4	1.71	-0.63	-1.59
TD @ 10231' MD / 6442' TVD									
10,231.0	89.30	143.60	6,441.6	-3,591.9	1,722.2	3,983.1	0.00	0.00	0.00

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
3,200.0	3,199.9	8.1	-12.6	First MWD Surveys
10,231.0	6,441.6	-3,591.9	1,722.2	TD @ 10231' MD / 6442' TVD

Checked By: _____ Approved By: _____ Date: _____

MAY 27 2011