

*Revised*

JUN 26 2017

State of West Virginia  
Department of Environmental Protection - Office of Oil and Gas  
Well Operator's Report of Well Work

API 47-051-01744 County Marshall District Franklin  
Quad Powhatan Point Pad Name MND 06 Field/Pool Name N/A  
Farm name Consolidated Coal Company Well Number MND 06 BHS  
Operator (as registered with the OOG) Noble Energy, Inc.  
Address 1000 Noble Energy Drive City Canonsburg State PA Zip 15317

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 39.817722 Easting 80.791573  
Landing Point of Curve Northing 39.820199 Easting 80.790978  
Bottom Hole Northing 39.846889 Easting 80.815953

Elevation (ft) 722' GL Type of Well  New  Existing Type of Report  Interim  Final  
Permit Type  Deviated  Horizontal  Horizontal 6A  Vertical Depth Type  Deep  Shallow  
Type of Operation  Convert  Deepen  Drill  Plug Back  Redrilling  Rework  Stimulate  
Well Type  Brine Disposal  CBM  Gas  Oil  Secondary Recovery  Solution Mining  Storage  Other \_\_\_\_\_  
Type of Completion  Single  Multiple Fluids Produced  Brine  Gas  NGL  Oil  Other \_\_\_\_\_  
Drilled with  Cable  Rotary

Drilling Media Surface hole  Air  Mud  Fresh Water Intermediate hole  Air  Mud  Fresh Water  Brine  
Production hole  Air  Mud  Fresh Water  Brine  
Mud Type(s) and Additive(s)  
Synthetic Oil Based

Date permit issued 05/21/2014 Date drilling commenced 09/11/2014 Date drilling ceased 10/19/2014  
Date completion activities began Not completed Date completion activities ceased na  
Verbal plugging (Y/N) \_\_\_\_\_ Date permission granted \_\_\_\_\_ Granted by \_\_\_\_\_

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 128' and 265' Open mine(s) (Y/N) depths N  
Salt water depth(s) ft none noted for offsets Void(s) encountered (Y/N) depths N-drilled in pillar  
Coal depth(s) ft 284'-294' Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) No

**APPROVED**  
NAME: *Jim Anderson*  
DATE: *7/6/2017*

Reviewed by: *[Signature]* **09/15/2017**

API 47-051 - 01744 Farm name Consolidated Coal Company Well number MND 06 BHS

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	26"	20"	40'	New	DH-36		Y
Surface	18"	16"	110'	New	H-40		Y
Coal	17.5"	13 3/8"	711'	New	J-55		Y
Intermediate 1	12.38"	9 5/8"	2034'	New	HCK-55		Y
Intermediate 2							
Intermediate 3							
Production	8-3/4" & 8-1/2"	5 1/2"	18,368'	New	P-110		Y
Tubing							
Packer type and depth set							

Comment Details \_\_\_\_\_

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	CaCl 1.15					0	8
Surface	CaCl 1.15					0	8
Coal	Type 1 / Class A	482	15.6	1.39	669.98	0	8
Intermediate 1	Type 1 / Class A	684	15.6	1.19	813.96	0	8
Intermediate 2							
Intermediate 3							
Production	Type 1 / Class A	lead 627 tail 2536	14.8	Lead 1.54 tail 1.37	total 4,439.9	2465.0	8
Tubing							

Drillers TD (ft) 18,369' Loggers TD (ft) 18,343'  
 Deepest formation penetrated Marcellus Plug back to (ft) \_\_\_\_\_  
 Plug back procedure \_\_\_\_\_

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Kick off depth (ft) 4955

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Check all wireline logs run  caliper  density  deviated/directional  induction  
 neutron  resistivity  gamma ray  temperature  sonic

Well cored  Yes  No Conventional Sidewall Were cuttings collected  Yes  No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING No centralizers used on conductor.

17 Centralizers on Intermediate String (Bow string centralizers on first two joints then every third joint to 100' from surface).

332 Centralizers on Production String (rigid bow string every joint to KOP, rigid bow spring every third joint from KOP to top of cement).

WAS WELL COMPLETED AS SHOT HOLE  Yes  No DETAILS \_\_\_\_\_

WAS WELL COMPLETED OPEN HOLE?  Yes  No DETAILS \_\_\_\_\_

WERE TRACERS USED  Yes  No TYPE OF TRACER(S) USED \_\_\_\_\_

09/15/2017

API 47- 051 - 01744 Farm name Consolidated Coal Company Well number MND 06 BHS

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
	well not complete				See Attached

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
								See Attached

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Please insert additional pages as applicable.

Well Header  
API: 47-051-01744

Well Name: MND-6B-HS

WR-35 - Stimulation Information Per Stage							
Int Des	Start Date	Slurry Rate Avg (bbl/min)	P Treat Avg (psi)	P Breakdown (psi)	ISIP (psi)	Propant Deliver (lb)	Vol Slurry Total (gal)
STG #1 INJ TEST	5/14/2017	14	6,262.00	0	5,102.00	0	42,201.60
STG #1	5/15/2017	72	7,305.00	6,048.00	3,271.00	593,326.00	639,038.40
STG #2A	5/15/2017	88.7	10,420.00	6,427.00	4,541.00	4,130.00	133,841.40
STG #2B	5/15/2017	79.6	8,172.00	6,381.00	3,482.00	252,326.00	504,491.40
STG #3	5/15/2017	74.5	8,482.00	7,055.00	3,592.00	600,408.00	832,465.20
STG #4	5/16/2017	80.5	8,339.00	7,104.00	3,662.00	602,245.00	0
STG #5	5/16/2017	84.3	8,918.00	6,176.00	4,413.00	599,790.00	604,762.20
STG #6	5/16/2017	80.9	8,072.00	6,539.00	4,089.00	603,467.00	665,364.00
STG #7	5/17/2017	77.3	7,551.00	6,071.00	4,009.00	605,425.00	692,899.20
STG #8	5/17/2017	81	8,118.00	5,906.00	4,244.00	615,098.00	680,983.80
STG #9	5/18/2017	81.9	7,982.00	6,392.00	3,783.00	605,707.00	537,616.80
STG #10	5/18/2017	82.2	7,770.00	6,106.00	3,915.00	605,017.00	556,256.40
STG #11	5/18/2017	88.8	8,041.00	5,888.00	4,050.00	602,375.00	562,514.40
STG #12	5/18/2017	84.7	7,834.00	8,507.00	3,895.00	590,720.00	603,283.80
STG #13	5/19/2017	84.9	7,942.00	6,100.00	3,833.00	598,241.00	618,655.80
STG #14	5/19/2017	77.6	7,515.00	5,995.00	4,000.00	602,912.00	552,489.00
STG #15	5/19/2017	86.3	8,176.00	6,355.00	3,785.00	601,300.00	631,163.40
STG #16	5/20/2017	84.8	7,917.00	6,630.00	3,749.00	600,536.00	539,989.80
STG #17	5/20/2017	82.9	7,500.00	6,051.00	4,015.00	603,381.00	512,391.60
STG #18	5/20/2017	83.8	8,492.00	6,477.00	4,004.00	601,669.00	716,692.20
STG #19	5/21/2017	69.7	8,096.00	6,321.00	3,958.00	601,373.00	683,004.00
STG #20	5/21/2017	76.1	8,015.00	5,538.00	4,286.00	597,675.00	536,221.14
STG #21	5/21/2017	81.5	8,628.00	6,138.00	4,302.00	598,261.00	526,885.80
STG #22	5/22/2017	84.5	8,063.00	6,020.00	4,269.00	602,879.00	413,943.60
STG #23	5/22/2017	78.8	7,736.00	5,146.00	4,588.00	603,259.00	493,000.20
STG #24	5/22/2017	78.4	7,914.00	5,743.00	3,867.00	599,625.00	610,541.40
STG #25	5/22/2017	87.5	8,021.00	5,430.00	4,394.00	599,967.00	445,804.80
STG #26	5/23/2017	81.8	8,727.00	5,710.00	4,085.00	600,304.00	563,824.80
STG #27	5/23/2017	82.9	8,899.00	9,029.00	4,134.00	598,793.00	551,317.20
STG #28	5/23/2017	98.2	8,121.00	5,433.00	3,988.00	600,123.00	526,323.00
STG #29	5/23/2017	97.9	8,008.00	5,772.00	3,938.00	599,931.00	523,420.80
STG #30	5/24/2017	75.3	7,581.00	8,533.00	4,108.00	601,713.00	516,835.20
STG #31	5/24/2017	94.9	8,398.00	5,809.00	4,261.00	598,224.00	534,794.40
STG #32	5/24/2017	93	8,119.00	5,589.00	4,057.00	601,954.00	517,335.00
STG #33 INJ TEST	5/25/2017	17.1	6,633.00	7,003.00	3,397.00	0	19,450.20
STG #33	5/25/2017	80.7	7,429.00	6,047.00	4,016.00	596,854.00	518,784.00
STG #34A	5/25/2017	83	9,222.00	4,927.00	6,242.00	106,044.00	330,934.80
STG #34B	5/25/2017	78.7	8,265.00	6,418.00	4,655.00	551,644.00	470,572.20
STG #35	5/26/2017	86.4	7,768.00	5,727.00	4,169.00	601,197.00	545,655.60
STG #36	5/26/2017	78.6	7,240.00	5,716.00	4,068.00	600,705.00	571,242.00
STG #37	5/26/2017	94.3	8,074.00	5,797.00	4,039.00	598,924.00	502,269.60

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STG #38	5/27/2017	93.7	7,785.00	5,699.00	3,887.00	604,169.00	480,232.20
STG #39	5/27/2017	99.1	7,831.00	5,716.00	4,064.00	571,960.00	503,693.40
STG #40	5/27/2017	95.6	7,937.00	5,700.00	4,036.00	604,397.00	603,741.60
STG #41	5/27/2017	90.9	7,638.00	5,671.00	4,128.00	603,594.00	472,529.40
STG #42	5/27/2017	89.3	7,648.00	5,956.00	3,938.00	602,094.00	468,942.60
STG #43	5/28/2017	81	8,166.00	6,334.00	4,138.00	654,723.00	681,135.00
STG #44A	5/28/2017	60.9	9,706.00	5,836.00	6,467.00	7,580.00	146,223.00
STG 44B	5/28/2017	92.5	8,052.00	7,251.00	4,131.00	604,678.00	499,329.60
STG 45A	5/28/2017	59.8	8,935.00	6,215.00	6,283.00	55,810.00	137,877.60
STG 45B	5/28/2017	64.5	7,618.00	6,977.00	4,122.00	600,907.00	648,417.00
STG 46	5/29/2017	88.2	7,496.00	6,129.00	4,803.00	606,796.00	535,042.20
STG 47	5/30/2017	87.4	7,481.00	5,882.00	4,547.00	605,022.00	456,834.00
STG 48	5/30/2017	97.2	7,127.00	5,421.00	4,197.00	606,331.00	519,300.60
STG 49	5/30/2017	97.3	7,142.00	5,334.00	3,959.00	601,525.00	504,932.40
STG 50	5/30/2017	95.7	7,141.00	5,194.00	4,082.00	604,216.00	606,849.60
STG 51	5/31/2017	96.4	7,324.00	5,618.00	3,946.00	599,544.00	587,193.60
STG 52	5/31/2017	95	7,193.00	6,045.00	3,848.00	603,101.00	489,148.80
STG 53	5/31/2017	84.7	6,370.00	5,479.00	4,045.00	607,242.00	550,947.60
STG 54	5/31/2017	93.4	7,033.00	5,553.00	3,834.00	603,184.00	586,378.80
STG 55	6/1/2017	95.8	7,143.00	5,536.00	3,826.00	604,354.00	551,283.60
STG 56	6/1/2017	90.3	6,793.00	5,538.00	3,807.00	602,178.00	501,694.20
STG 57	6/1/2017	90.3	7,088.00	4,479.00	3,764.00	605,546.00	438,026.40
STG 58	6/1/2017	76.9	7,384.00	6,382.00	3,849.00	604,418.00	569,553.60
STG 59	6/2/2017	94.5	6,876.00	6,230.00	4,041.00	540,516.00	564,593.40
STG 60	6/2/2017	97.2	6,421.00	6,688.00	3,676.00	608,173.00	491,597.40

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Perforations

API	Well Name	Date	Top (ftKB)	Btm (ftKB)	Com	Entered Shot Total	Est Hole Dia (in)
47-051-01744	MND-6B-HS	6/2/2017	5,938.00	6,113.00	STG #60	60	
47-051-01744	MND-6B-HS	6/1/2017	6,138.00	6,311.00	STG #59	59	
47-051-01744	MND-6B-HS	6/1/2017	6,342.00	6,519.00	STG #58	58	
47-051-01744	MND-6B-HS	6/1/2017	6,544.00	6,718.00	STG #57	58	
47-051-01744	MND-6B-HS	6/1/2017	6,746.00	6,920.00	STG #56	58	
47-051-01744	MND-6B-HS	5/31/2017	6,948.00	7,124.00	STG #55	58	
47-051-01744	MND-6B-HS	5/31/2017	7,149.00	7,323.00	STG #54	58	
47-051-01744	MND-6B-HS	5/31/2017	7,352.00	7,529.00	STG #53	58	
47-051-01744	MND-6B-HS	5/31/2017	7,558.00	7,729.00	STG #52	58	
47-051-01744	MND-6B-HS	5/31/2017	7,754.00	7,927.00	STG #51	58	
47-051-01744	MND-6B-HS	5/30/2017	7,958.00	8,135.00	STG #50	58	
47-051-01744	MND-6B-HS	5/30/2017	8,160.00	8,337.00	STG #49	58	
47-051-01744	MND-6B-HS	5/30/2017	8,362.00	8,539.00	STG #48	58	
47-051-01744	MND-6B-HS	5/29/2017	8,564.00	8,741.00	STG #47	58	
47-051-01744	MND-6B-HS	5/29/2017	8,766.00	8,940.00	STG #46	58	
47-051-01744	MND-6B-HS	5/28/2017	8,968.00	9,010.00	STG #45B	28	
47-051-01744	MND-6B-HS	5/28/2017	9,028.00	9,205.00	STG #45	58	
47-051-01744	MND-6B-HS	5/28/2017	9,230.00	9,272.00	STG #44B	28	
47-051-01744	MND-6B-HS	5/28/2017	9,290.00	9,467.00	STG #44	58	
47-051-01744	MND-6B-HS	5/28/2017	9,492.00	9,665.00	STG #43	58	
47-051-01744	MND-6B-HS	5/27/2017	9,690.00	9,865.00	STG #42	58	
47-051-01744	MND-6B-HS	5/27/2017	9,896.00	10,073.00	STG #41	58	
47-051-01744	MND-6B-HS	5/27/2017	10,100.00	10,275.00	STG #40	58	
47-051-01744	MND-6B-HS	5/27/2017	10,306.00	10,474.00	STG #39	58	
47-051-01744	MND-6B-HS	5/26/2017	10,502.00	10,679.00	STG #38	58	
47-051-01744	MND-6B-HS	5/26/2017	10,704.00	10,878.00	STG #37	58	
47-051-01744	MND-6B-HS	5/26/2017	10,906.00	11,077.00	STG #36	58	
47-051-01744	MND-6B-HS	5/26/2017	11,108.00	11,285.00	STG #35	58	
47-051-01744	MND-6B-HS	5/25/2017	11,310.00	11,352.00	STG #34B	28	
47-051-01744	MND-6B-HS	5/25/2017	11,370.00	11,547.00	STG #34	58	
47-051-01744	MND-6B-HS	5/25/2017	11,577.00	11,752.00	STG #33	58	
47-051-01744	MND-6B-HS	5/24/2017	11,774.00	11,951.00	STG #32	58	
47-051-01744	MND-6B-HS	5/24/2017	11,976.00	12,153.00	STG #31	58	
47-051-01744	MND-6B-HS	5/24/2017	12,183.00	12,359.00	STG #30	58	
47-051-01744	MND-6B-HS	5/23/2017	12,380.00	12,557.00	STG #29	58	
47-051-01744	MND-6B-HS	5/23/2017	12,582.00	12,759.00	STG #28	58	
47-051-01744	MND-6B-HS	5/23/2017	12,784.00	12,961.00	STG #27	58	
47-051-01744	MND-6B-HS	5/23/2017	12,986.00	13,161.00	STG #26	58	
47-051-01744	MND-6B-HS	5/22/2017	13,188.00	13,365.00	STG #25	58	
47-051-01744	MND-6B-HS	5/22/2017	13,390.00	13,567.00	STG #24	58	
47-051-01744	MND-6B-HS	5/22/2017	13,588.00	13,767.00	STG #23	58	
47-051-01744	MND-6B-HS	5/22/2017	13,794.00	13,971.00	STG #22	58	
47-051-01744	MND-6B-HS	5/21/2017	13,996.00	14,157.00	STG #21	43	
47-051-01744	MND-6B-HS	5/21/2017	14,188.00	14,360.00	STG #20	58	
47-051-01744	MND-6B-HS	5/20/2017	14,392.00	14,567.00	STG #19	58	
47-051-01744	MND-6B-HS	5/20/2017	14,592.00	14,769.00	STG #18	58	
47-051-01744	MND-6B-HS	5/20/2017	14,794.00	14,971.00	STG #17	58	

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47-051-01744	MND-6B-HS	5/20/2017	14,996.00	15,173.00	STG #16	58
47-051-01744	MND-6B-HS	5/19/2017	15,198.00	15,379.00	STG #15	58
47-051-01744	MND-6B-HS	5/19/2017	15,400.00	15,577.00	STG #14	58
47-051-01744	MND-6B-HS	5/19/2017	15,602.00	15,779.00	STG #13	58
47-051-01744	MND-6B-HS	5/18/2017	15,808.00	15,927.00	STG #12	48
47-051-01744	MND-6B-HS	5/18/2017	15,956.00	16,130.00	STG #11	58
47-051-01744	MND-6B-HS	5/18/2017	16,158.00	16,332.00	STG #10	58
47-051-01744	MND-6B-HS	5/18/2017	16,357.00	16,532.00	STG #9	58
47-051-01744	MND-6B-HS	5/17/2017	16,562.00	16,739.00	STG #8	58
47-051-01744	MND-6B-HS	5/17/2017	16,765.00	16,941.00	STG #7	58
47-051-01744	MND-6B-HS	5/16/2017	17,143.00	16,966.00	STG #6	58
47-051-01744	MND-6B-HS	5/16/2017	17,168.00	17,345.00	STG #5	58
47-051-01744	MND-6B-HS	5/16/2017	17,370.00	17,547.00	STG #4	58
47-051-01744	MND-6B-HS	5/15/2017	17,572.00	17,749.00	STG #3	58
47-051-01744	MND-6B-HS	5/15/2017	17,774.00	17,811.00	STG #2B	28
47-051-01744	MND-6B-HS	5/15/2017	17,832.00	18,009.00	STG #2	58
47-051-01744	MND-6B-HS	5/15/2017	18,034.00	18,211.00	STG #1	58

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API 47- 051 - 01744

Farm name Consolidated Coal Company Well number MND 06 BHS

PRODUCING FORMATION(S)

DEPTHS

Marcellus 5940 TVD 18,369 MD

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump

SHUT-IN PRESSURE Surface \_\_\_\_\_ psi Bottom Hole \_\_\_\_\_ psi DURATION OF TEST \_\_\_\_\_ hrs

OPEN FLOW Gas 7596 mcfpd Oil 253.66 bpd NGL 474.76 bpd Water 332 bpd GAS MEASURED BY  Estimated  Orifice  Pilot

LITHOLOGY/ FORMATION	TOP DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H <sub>2</sub> S, ETC)
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	0		0		
					See Attached

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Please insert additional pages as applicable.

Drilling Contractor Nomac 79 Drilling  
Address 171 Locust Ave. Ext. City Mt. Morris State PA Zip 15349

Logging Company Baker Hughes  
Address 400 Technology Drive City Canonsburg State PA Zip 15317

Cementing Company Schlumberger  
Address 4600 J. Barry Ct., Suite 200 City Canonsburg State PA Zip 15317

Stimulating Company \_\_\_\_\_  
Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Please insert additional pages as applicable.

Completed by Regina Logue Telephone 724-820-3559  
Signature Regina Logue Title Regulatory Analyst Date 06/22/2017



**Hydraulic Fracturing Fluid Product Component Information Disclosure**

Fracture Data	
State:	West Virginia
County:	Marshall
API Number:	
Operator Name:	NOBLE ENERGY
Well Name and Number:	
Longitude:	0
Latitude:	0
Long/Lat Projection:	
Indian/Federal:	none
Production Type:	
True Vertical Depth (TVD):	
Total Water Volume (gal)*:	

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**Hydraulic Fracturing Fluid Composition:**

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Volume of Additive Pumped (gal)	Mass of additive pumped (lbs)	Density (lbs/gal)	Company	First Name	Last Name	Email	Phone
3C-39	Xchem	Scale Inhibitor	Water	7732-18-5	100%	#DIV/0!	0.00	0.00	9.0906					
			Neutralized polycarboxylic acid	903-04-7	20%	#DIV/0!								
			Sodium hydroxide	1310-73-2	1.5%	#DIV/0!								
3C-82	Xchem	Scale Inhibitor	Water	7732-18-5	100%	#DIV/0!	0.00	0.00	9.0072					
			Bis(hexamethylenetriamine) pentamethylene phosphonic acid	34690-00-1	30%	#DIV/0!								
			Sodium hydroxide	1310-73-2	5%	#DIV/0!								
			Sodium chloride	7647-14-5	1%	#DIV/0!								
B-84	Xchem	Biocide	Water	7732-18-5	45%	#DIV/0!	0.00	0.00	9.0906					
			Glutaraldehyde	111-30-8	30%	#DIV/0!								
			n-Alkyl (C12-C16) dimethyl benzyl ammonium chloride	68424-85-1	10%	#DIV/0!								
			Didecyl dimethyl ammonium chloride	7173-51-5	10%	#DIV/0!								
			Ethanol	64-17-5	5%	#DIV/0!								
<b>Total</b>						#DIV/0!	<b>0.00</b>	<b>0.00</b>						

\* Total Water Volume sources may include fresh water, produced water, and/or recycled water.

\*\* Information is based on the maximum potential for concentration and thus the total may be over 100%.

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided.

All component information listed was obtained from the supplier's Material Safety Data Sheets (MSDS). As such, the Operator is not responsible for inaccurate and/or incomplete information. Any questions regarding the content of the MSDS should be directed to the supplier who provided it. The Occupational Safety and Health Administration's (OSHA) regulations govern the criteria for the disclosure of this information. Please note that Federal Law protects "proprietary", "trade secret", and "confidential business information" and the criteria for how this information is reported on an MSDS is subject to 29 CFR 1910.1200(i) and Appendix D.

Formations	Top TVD	Base TVD	Top MD	Base MD	Fluid
Shale and Sandstone	0	284	0	284	
Pittsburgh Coal	284	294	284	294	
Shale and Sandstone	294	706	294	706	
Dunkard Sand	706	727	706	727	
Shale	727	876	727	876	
Gas Sand	876	947	876	5972	
Shale	947	1016	947	6191	
1st Salt Sand	1016	1032	1016	6313	
Shale	1032	1139	1032	6719	
2nd Salt Sand	1139	1168	1139	7118	
Shale and Sandstone	1168	1298	1168	7333	
Maxton Sand	1298	1345	1298	8194	
Shale	1345	1363	1345	8194	
Big Lime	1363	1435	1363	8541	
Big Injun	1435	1705	1435	8869	
Price	1705	1803	1705	8890	
Murrysville	1803	1910	1803	8983	
Shale and Sandstone	1910	2448	1910	8998	
Gordon	2448	2478	2448	9073	
Shale and Sandstone	2478	2999	2478	9179	
Fifth Sand	2999	3052	2999	9995	
Shale and Sandstone	3052	3854	3052	9179	
Warren Sand	3854	3863	3860	9995	
Shale	3863	4580	3869	10660	
Java Shale	4580	4664	4593	not encountered	
Pipe Creek Shale	4664	4739	4678	not encountered	
Angola Shale	4739	5323	4754	not encountered	
Rhinestreet	5323	5642	5344	not encountered	
Cashaqua	5642	5714	5666	not encountered	
Middlesex	5714	5737	5739	not encountered	
West River	5737	5798	5762	not encountered	
Burkett	5798	5822	5824	not encountered	
Tully Limestone	5822	5848	5848	not encountered	
Hamilton	5848	5883	5875	not encountered	
Marcellus	5883	5936	5910	not encountered	
Onondaga	5936	5944	5964	not encountered	
Huntersville	5944	6158	5972	6191	
Oriskany	6158	6270	6191	6313	
Helderburg	6270	6530	6313	6719	
Bass Island Dolomite	6530	6609	6719	7118	
Salina G Big Lime	6609	6809	7118	7333	
Salina F	6809	7608	7333	8194	
Lockport Dolomite	7608	7930	8194	8541	
Rochester Shale	7930	8235	8541	8869	
Dayton Fm/Packer Shell	8235	8254	8869	8890	

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09/15/2017



REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY	Slot	Slot B
Area	Marshall County, WV	Well	MND-6B-HS
Field	Marshall	Wellbore	MND-6B-HS AWB
Facility	MND-6 Pad		

REPORT SETUP INFORMATION			
Projection System	NAD27 / Lambert West Virginia SP, Northern Zone (4701), US feet	Software System	WellArchitect® 4.0.1
North Reference	Grid	User	Gutfral
Scale	0.999946	Report Generated	10/29/2014 at 1:54:42 PM
Convergence at slot	0.82° West	Database/Source file	WANorthEast/MND-6B-HS_AWB.xml

WELLPATH LOCATION	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	15.61	-19.68	1637158.10	482527.84	39°49'03.526"N	80°47'30.338"W
Facility Reference Pt			1637177.78	482512.23	39°49'03.375"N	80°47'30.083"W
Field Reference Pt			609601.22	0.00	38°23'48.753"N	84°21'09.765"W

WELLPATH DATUM			
Calculation method	Minimum curvature	Nomac 79 (RKB) to Facility Vertical Datum	746.97ft
Horizontal Reference Pt	Slot	Nomac 79 (RKB) to Mean Sea Level	746.97ft
Vertical Reference Pt	Nomac 79 (RKB)	Nomac 79 (RKB) to Mud Line at Slot (Slot B)	26.00ft
MD Reference Pt	Nomac 79 (RKB)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	325.00°

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REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY
Area	Marshall County, WV
Field	Marshall
Facility	MND-6B-PAID
Well	MND-6B-HS
Slot	Slot B

MD	Inch	Acctm	TVD	Vert Sect	North	East	Grid East	Grid North	Latitude	Longitude	Closeure Dist	Closeure Dir	DLS
[ft]	[ft]	[ft]	[ft]	[ft]	[ft]	[ft]	[US ft]	[US ft]			[ft]	[°]	[%/100ft]
0.00	0.00	331.260	26.00	0.00	0.00	0.00	1637158.10	482527.84	39°49'03.526"N	80°47'30.338"W	0.00	0.00	0.00
26.00	0.00	331.260	26.00	0.00	0.00	0.00	1637158.10	482527.84	39°49'03.526"N	80°47'30.338"W	0.00	0.00	0.00
50.00	0.00	331.260	50.00	0.08	0.07	-0.04	1637158.06	482527.91	39°49'03.527"N	80°47'30.339"W	0.08	331.260	1.67
100.00	0.60	283.180	100.00	0.41	0.27	-0.32	1637157.78	482528.11	39°49'03.529"N	80°47'30.342"W	0.42	310.424	0.71
150.00	0.80	287.290	150.00	0.72	0.38	-0.72	1637157.59	482528.22	39°49'03.530"N	80°47'30.347"W	0.81	298.005	0.08
200.00	0.50	300.220	199.99	1.10	0.56	-1.12	1637156.98	482528.40	39°49'03.532"N	80°47'30.353"W	1.23	296.639	0.26
250.00	0.810	310.890	249.99	1.66	0.91	-1.59	1637156.51	482528.75	39°49'03.535"N	80°47'30.359"W	1.83	299.822	0.59
300.00	0.690	294.370	274.99	1.69	-1.86	-1.86	1637156.24	482528.93	39°49'03.537"N	80°47'30.362"W	2.16	300.343	0.98
309.00	0.380	303.750	308.99	2.24	1.24	-2.14	1637155.96	482529.08	39°49'03.538"N	80°47'30.366"W	2.47	300.005	0.94
327.00	0.440	260.230	326.99	1.26	1.26	-2.26	1637155.84	482529.10	39°49'03.538"N	80°47'30.367"W	2.58	299.111	1.72
342.00	0.660	293.290	341.99	2.41	1.28	-1.28	1637155.72	482529.12	39°49'03.538"N	80°47'30.369"W	2.70	298.187	2.05
385.00	0.570	282.940	384.98	2.75	1.41	-2.78	1637155.32	482529.25	39°49'03.540"N	80°47'30.374"W	3.12	296.824	2.05
432.00	0.740	275.660	431.98	3.12	-3.31	-3.31	1637154.79	482529.33	39°49'03.540"N	80°47'30.381"W	3.63	294.210	0.40
484.00	1.150	279.100	483.97	3.70	-4.16	-4.16	1637153.94	482529.45	39°49'03.541"N	80°47'30.392"W	4.46	291.090	0.80
525.00	0.810	249.740	524.97	4.06	1.57	-4.84	1637153.26	482529.41	39°49'03.541"N	80°47'30.401"W	5.09	287.971	1.45
574.00	0.900	212.630	573.96	4.00	1.13	-5.37	1637152.73	482528.97	39°49'03.537"N	80°47'30.407"W	5.49	281.837	1.12
621.00	1.600	192.360	620.96	3.71	0.47	-5.79	1637152.31	482528.31	39°49'03.530"N	80°47'30.413"W	5.81	274.643	0.21
770.00	0.760	192.360	769.94	2.55	-1.59	-6.71	1637151.39	482526.25	39°49'03.510"N	80°47'30.424"W	6.90	256.693	0.26
805.00	0.440	161.750	804.94	2.26	-1.94	-6.72	1637151.38	482525.90	39°49'03.506"N	80°47'30.424"W	6.99	253.881	1.26
855.00	1.100	40.050	854.93	2.20	-1.76	-6.35	1637151.75	482526.08	39°49'03.508"N	80°47'30.419"W	6.59	254.536	2.77
900.00	2.500	29.050	899.91	2.74	-0.57	-5.60	1637152.51	482527.27	39°49'03.520"N	80°47'30.410"W	5.62	264.204	3.19
956.00	3.910	13.780	955.82	4.54	2.35	-4.55	1637153.55	482530.19	39°49'03.549"N	80°47'30.397"W	5.12	297.373	2.92
1091.00	5.450	8.360	1090.37	12.23	13.17	-2.52	1637155.58	482541.01	39°49'03.656"N	80°47'30.373"W	13.41	349.172	1.19
1184.00	4.690	10.050	1183.01	18.13	21.28	-1.21	1637156.89	482549.12	39°49'03.736"N	80°47'30.358"W	21.32	356.740	0.83
1278.00	5.400	5.380	1276.64	24.21	29.47	-0.13	1637157.97	482557.31	39°49'03.817"N	80°47'30.345"W	29.47	359.754	0.87
1374.00	5.340	1372.22	1371.58	31.26	38.43	0.39	1637158.49	482566.27	39°49'03.906"N	80°47'30.340"W	38.43	358.583	0.41
1466.00	3.290	353.690	1463.96	37.03	45.34	0.19	1637158.29	482573.17	39°49'03.974"N	80°47'30.344"W	45.34	0.240	2.31
1561.00	1.300	292.360	1558.89	40.33	48.46	-1.11	1637156.99	482576.29	39°49'04.005"N	80°47'30.361"W	48.47	358.692	3.05
1656.00	1.510	255.240	1653.86	41.67	48.55	-3.31	1637154.79	482576.39	39°49'04.005"N	80°47'30.390"W	48.66	356.096	0.96
1749.00	0.210	97.290	1746.85	41.98	48.21	-4.33	1637153.77	482576.05	39°49'04.002"N	80°47'30.403"W	48.41	354.869	1.85

WELLPATH DATA (216 Stations) † = Interpolated/Extrapolated Station

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REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY
Area	Marshall County, WY
Field	Marshall
Facility	MND-6 Pad
Well	MND-6B-HS
Slot	MND-6B-HS AWP

WELLPATH DATA (216 Stations)

MD	Inclination	Azimuth	TVD	Vert Sect	North	East	Grid East	Grid North	Longitude	Latitude	Closure Dist	Closure Dir	DLS
(ft)	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(US ft)	(US ft)			(ft)	(°)	(%/100ft)
1846.00	0.800	76.850	1843.84	48.35	48.35	-3.49	1637154.61	482576.18	80°47'30.392"W	39°49'04.003"N	48.47	355.867	0.63
1941.00	0.420	40.840	1938.84	48.76	-6.62	-6.62	1637155.48	482576.60	80°47'30.381"W	39°49'04.008"N	48.83	356.924	0.55
2021.00	0.510	27.550	2018.84	41.68	49.30	-2.26	1637155.84	482577.14	80°47'30.376"W	39°49'04.013"N	49.35	357.371	0.17
2135.00	0.340	27.220	2132.83	50.05	42.07	-1.87	1637156.23	482577.89	80°47'30.371"W	39°49'04.020"N	50.08	357.855	0.15
2230.00	0.170	331.520	2227.83	42.34	50.42	-1.81	1637156.29	482578.26	80°47'30.371"W	39°49'04.024"N	50.46	357.941	0.30
2324.00	0.440	321.490	2321.83	42.84	50.83	-2.10	1637156.00	482578.67	80°47'30.375"W	39°49'04.028"N	50.87	357.630	0.29
2419.00	0.430	338.660	2416.83	43.55	51.45	-2.46	1637155.64	482579.28	80°47'30.379"W	39°49'04.034"N	51.50	357.262	0.14
2514.00	0.690	316.370	2511.82	44.46	52.19	-2.98	1637155.12	482580.03	80°47'30.386"W	39°49'04.042"N	52.28	356.727	0.35
2608.00	0.620	314.200	2605.82	45.52	52.96	-3.74	1637154.36	482580.79	80°47'30.396"W	39°49'04.049"N	53.09	355.960	0.08
2703.00	0.620	340.550	2700.81	46.52	53.80	-4.28	1637153.82	482581.64	80°47'30.403"W	39°49'04.057"N	53.97	355.452	0.30
2798.00	0.560	336.450	2795.81	47.47	54.71	-4.64	1637153.46	482582.55	80°47'30.408"W	39°49'04.066"N	54.91	355.156	0.08
2892.00	1.010	9.250	2889.80	48.52	55.95	-4.69	1637153.41	482583.78	80°47'30.409"W	39°49'04.078"N	56.14	355.212	0.66
2988.00	6.030	36.890	2985.59	50.68	60.82	-1.52	1637156.58	482588.66	80°47'30.369"W	39°49'04.127"N	60.84	358.567	5.37
3082.00	8.050	40.510	3078.88	53.87	69.77	5.72	1637163.82	482597.61	80°47'30.278"W	39°49'04.216"N	70.01	4.685	2.20
3177.00	8.560	44.640	3172.88	56.81	79.86	15.01	1637173.11	482607.70	80°47'30.161"W	39°49'04.317"N	81.26	10.643	0.83
3271.00	9.520	50.110	3265.71	58.73	89.82	25.89	1637183.99	482617.66	80°47'30.017"W	39°49'04.417"N	93.48	16.077	1.37
3366.00	9.520	49.570	3359.41	60.14	99.96	37.90	1637195.99	482627.79	80°47'29.871"W	39°49'04.519"N	106.90	20.763	0.09
3461.00	12.980	54.760	3452.57	60.93	111.21	52.59	1637210.69	482639.05	80°47'29.685"W	39°49'04.633"N	123.02	25.310	3.79
3556.00	11.490	59.250	3544.91	60.11	123.32	71.32	1637229.41	482651.16	80°47'29.447"W	39°49'04.755"N	142.46	30.040	1.69
3651.00	11.420	56.820	3637.54	58.95	134.43	89.20	1637247.29	482662.26	80°47'29.220"W	39°49'04.867"N	161.33	33.566	2.97
3746.00	9.630	54.890	3730.94	58.67	144.14	103.57	1637261.67	482671.98	80°47'29.038"W	39°49'04.965"N	177.49	35.698	1.92
3841.00	9.850	54.580	3824.57	58.74	153.42	116.69	1637274.79	482681.25	80°47'28.871"W	39°49'05.059"N	192.76	37.257	0.24
3878.00	11.080	54.410	3860.95	58.80	157.32	122.17	1637280.26	482685.16	80°47'28.802"W	39°49'05.098"N	199.19	37.830	3.33
3907.00	11.500	58.730	3889.29	58.64	160.45	126.90	1637285.00	482688.28	80°47'28.742"W	39°49'05.130"N	204.57	38.342	3.21
4001.00	13.060	80.320	3981.29	53.49	167.10	145.39	1637303.48	482694.93	80°47'28.506"W	39°49'05.198"N	221.50	41.026	5.12
4096.00	13.140	72.160	4073.82	45.71	172.21	166.25	1637324.34	482700.04	80°47'28.240"W	39°49'05.252"N	239.37	43.991	1.95
4191.00	13.100	69.110	4166.55	39.90	179.36	186.59	1637344.68	482707.19	80°47'27.980"W	39°49'05.325"N	258.82	46.132	0.73
4286.00	13.140	64.250	4258.87	35.54	187.89	206.38	1637364.46	482715.72	80°47'27.728"W	39°49'05.412"N	279.10	47.684	1.16
4380.00	13.010	59.840	4350.43	32.93	197.85	225.15	1637383.24	482725.68	80°47'27.490"W	39°49'05.513"N	299.73	48.693	1.07
4475.00	13.100	57.550	4442.98	31.55	209.00	243.48	1637401.57	482736.83	80°47'27.257"W	39°49'05.626"N	320.88	49.358	0.55

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REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY
Area	Marshall County, WV
Field	Marshall
Facility	MND-6-Prod

WELLPATH DATA (216 Stations)

MID	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [ft]	Grid North [ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [ft/100ft]
4570.00	1.120	61.360	4555.50	29.87	219.94	262.03	1637420.11	482747.77	39°49'05.73"N	80°47'27.02"W	342.10	49.990	0.91
4664.00	13.020	68.600	4627.08	26.20	228.92	281.25	1637439.34	482756.75	39°49'05.82"N	80°47'26.77"W	362.61	50.857	1.74
4759.00	12.990	67.280	4719.64	21.41	236.95	301.06	1637459.15	482764.78	39°49'05.910"N	80°47'26.524"W	383.12	51.796	0.31
4853.00	13.030	67.980	4811.23	18.66	246.17	320.88	1637478.16	482774.00	39°49'06.004"N	80°47'26.282"W	403.99	52.136	1.51
4948.00	13.530	61.270	4903.69	15.73	256.71	339.19	1637497.27	482784.53	39°49'06.111"N	80°47'26.039"W	425.38	52.880	0.53
5043.00	13.550	64.310	4996.05	12.72	266.87	358.96	1637517.04	482794.70	39°49'06.214"N	80°47'25.788"W	447.30	53.371	0.75
5137.00	13.500	66.270	5087.44	8.79	276.06	378.93	1637537.01	482803.89	39°49'06.308"N	80°47'25.534"W	468.82	53.925	0.49
5232.00	13.560	64.760	5179.81	4.74	285.27	399.15	1637557.23	482813.10	39°49'06.402"N	80°47'25.276"W	490.62	54.447	0.38
5277.00	14.110	57.810	5233.51	3.58	290.45	408.57	1637566.64	482818.27	39°49'06.454"N	80°47'25.156"W	501.28	54.591	3.89
5326.00	15.570	52.240	5270.87	3.60	297.66	418.82	1637576.90	482825.48	39°49'06.527"N	80°47'25.026"W	513.82	54.599	4.16
5372.00	16.730	45.400	5315.06	5.00	306.09	428.42	1637586.49	482833.91	39°49'06.612"N	80°47'24.905"W	526.53	54.156	4.84
5421.00	18.180	29.040	5361.83	9.53	317.73	437.16	1637595.23	482843.55	39°49'06.728"N	80°47'24.795"W	540.42	53.990	10.41
5466.00	20.170	17.930	5404.35	17.28	331.25	442.95	1637601.03	482859.07	39°49'06.862"N	80°47'24.723"W	553.12	53.210	9.22
5516.00	20.340	7.580	5451.27	28.88	348.07	446.75	1637604.83	482875.89	39°49'07.029"N	80°47'24.678"W	566.34	52.077	7.17
5554.00	20.230	0.680	5486.92	39.08	361.19	447.70	1637605.78	482889.01	39°49'07.159"N	80°47'24.668"W	575.24	51.105	6.30
5610.00	25.9140	55.930	5539.03	55.89	381.68	447.66	1637605.50	482909.50	39°49'07.351"N	80°47'24.672"W	588.28	49.548	4.52
5705.00	30.620	352.130	5623.88	92.66	424.05	444.06	1637602.14	482951.87	39°49'07.780"N	80°47'24.726"W	614.01	46.320	8.96
5752.00	33.690	347.830	5665.68	115.34	448.66	439.67	1637597.75	482979.48	39°49'08.022"N	80°47'24.787"W	628.18	44.420	8.14
5800.00	38.130	341.610	5702.56	141.83	475.76	432.19	1637590.26	483003.57	39°49'08.289"N	80°47'24.888"W	642.75	42.252	11.96
5848.00	44.240	334.500	5738.68	172.59	504.98	420.28	1637578.36	483032.79	39°49'08.576"N	80°47'25.046"W	656.99	39.770	16.02
5894.00	49.030	331.900	5770.26	205.68	534.80	405.19	1637563.26	483062.61	39°49'08.869"N	80°47'25.245"W	670.96	37.149	11.19
5943.00	53.670	331.160	5800.86	243.69	568.43	386.94	1637545.02	483096.24	39°49'09.198"N	80°47'25.485"W	687.63	34.244	9.54
5989.00	58.910	329.920	5826.38	281.76	601.73	368.12	1637526.20	483129.53	39°49'09.525"N	80°47'25.732"W	705.40	31.457	11.61
6083.00	68.770	327.820	5857.77	365.83	673.82	324.50	1637482.58	483201.62	39°49'10.231"N	80°47'26.304"W	747.89	25.715	10.68
6178.00	78.540	326.890	5894.48	456.81	750.48	275.37	1637433.46	483278.27	39°49'10.981"N	80°47'26.948"W	799.40	20.150	10.33
6273.00	84.140	326.910	5908.78	550.63	829.12	224.10	1637382.19	483356.91	39°49'11.751"N	80°47'27.619"W	858.87	15.125	5.89
6347.00	90.580	326.130	5912.18	624.49	890.74	183.35	1637341.44	483418.53	39°49'12.554"N	80°47'28.153"W	909.42	11.631	8.77
6368.00	96.740	324.720	5911.94	645.49	908.03	171.43	1637329.52	483435.82	39°49'12.524"N	80°47'28.309"W	924.07	10.691	6.76
6462.00	90.770	323.350	5910.70	739.46	984.10	116.23	1637274.32	483511.89	39°49'13.267"N	80°47'29.030"W	990.95	6.736	1.46
6557.00	90.770	325.860	5909.43	834.45	1061.53	61.22	1637219.31	483589.31	39°49'14.025"N	80°47'29.749"W	1063.30	3.300	2.64

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# Actual Wellpath Report

MND-6B-HS AWP Proj: 18369

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## REFERENCE WELLPATH IDENTIFICATION

Operator	NORLE ENERGY
Area	Marshall County, WV
Field	Marshall
Facility	MND-6-Pad
Well	MND-6B-HS
Wellbore	MND-6B-HS AWB

## WELLPATH DATA (216 Stations)

MD	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [ft S.M]	Grid North [ft S.M]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [ft/100ft]
6652.00	90.770	326.440	5908.15	929.42	1140.42	8.30	1637166.40	483668.20	39°49'14.79"N	80°47'30.44"W	1140.45	0.417	0.61
6747.00	89.970	322.570	5907.53	1024.39	1217.74	-46.56	1637111.24	483745.51	39°49'15.55"N	80°47'31.16"W	1218.64	357.796	4.19
6842.00	90.800	322.080	5906.82	1119.28	1292.91	-104.94	1637053.16	483820.68	39°49'16.28"N	80°47'31.92"W	1297.16	355.560	1.08
6936.00	90.980	324.010	5905.99	1213.21	1368.01	-161.45	1636996.66	483895.78	39°49'17.02"N	80°47'32.65"W	1377.51	352.209	2.06
7031.00	91.110	326.060	5905.56	1308.19	1445.85	-215.88	1636942.24	483973.61	39°49'17.78"N	80°47'33.37"W	1461.88	348.664	2.16
7125.00	91.030	325.340	5904.78	1402.17	1523.49	-268.84	1636889.28	484051.24	39°49'18.54"N	80°47'34.06"W	1547.03	349.992	0.77
7220.00	91.080	327.620	5900.02	1497.11	1602.67	-321.29	1636836.83	484130.42	39°49'19.31"N	80°47'34.75"W	1634.56	348.664	2.40
7315.00	90.800	330.180	5898.38	1591.87	1684.00	-370.35	1636787.77	484211.74	39°49'20.11"N	80°47'35.39"W	1724.24	347.597	2.70
7410.00	90.770	329.060	5897.01	1686.55	1765.94	-418.39	1636739.74	484293.68	39°49'20.91"N	80°47'36.02"W	1814.83	346.671	1.19
7505.00	90.770	326.700	5895.73	1781.42	1846.59	-468.89	1636689.24	484374.13	39°49'21.70"N	80°47'36.68"W	1904.99	345.731	2.48
7599.00	90.710	325.590	5894.52	1875.39	1924.44	-521.25	1636636.88	484452.18	39°49'22.46"N	80°47'37.37"W	1993.79	344.845	1.18
7695.00	90.830	326.030	5893.23	1971.37	2003.84	-575.19	1636582.94	484531.57	39°49'23.24"N	80°47'38.07"W	2084.76	343.084	0.48
7789.00	90.770	326.100	5891.91	2065.34	2081.85	-627.66	1636530.47	484609.55	39°49'24.00"N	80°47'38.76"W	2174.39	341.232	0.10
7883.00	90.890	325.050	5890.55	2159.33	2159.33	-680.80	1636477.34	484687.07	39°49'24.76"N	80°47'39.46"W	2264.13	342.501	1.12
7978.00	90.770	325.360	5889.18	2254.32	2237.36	-735.00	1636423.14	484765.08	39°49'25.53"N	80°47'40.17"W	2355.00	341.814	0.35
8070.00	90.800	325.370	5887.88	2349.31	2315.52	-788.99	1636369.16	484843.23	39°49'26.29"N	80°47'40.87"W	2446.25	341.184	0.03
8168.00	90.680	324.740	5886.65	2444.30	2393.38	-843.40	1636314.75	484921.09	39°49'27.05"N	80°47'41.58"W	2537.64	340.588	0.68
8263.00	90.890	323.890	5885.35	2539.28	2470.54	-898.81	1636259.34	484998.24	39°49'27.81"N	80°47'42.31"W	2628.96	340.008	0.92
8358.00	90.740	325.550	5884.00	2634.27	2548.08	-953.67	1636204.48	485075.78	39°49'28.57"N	80°47'43.02"W	2720.70	339.481	1.75
8453.00	90.620	327.940	5882.87	2729.21	2627.51	-1005.76	1636152.40	485155.20	39°49'29.34"N	80°47'43.71"W	2813.42	339.054	2.52
8548.00	90.650	325.120	5881.81	2824.16	2706.74	-1058.14	1636100.02	485234.43	39°49'30.12"N	80°47'44.39"W	2906.22	338.648	2.97
8642.00	90.770	320.470	5880.72	2918.06	2781.59	-1114.96	1636043.20	485309.27	39°49'30.85"N	80°47'45.13"W	2996.73	338.157	4.95
8737.00	90.770	318.150	5879.52	3012.58	2853.61	-1176.89	1635981.28	485381.29	39°49'31.55"N	80°47'45.94"W	3086.77	337.588	2.44
8832.00	90.680	316.680	5878.32	3106.73	2923.55	-1241.17	1635917.00	485451.23	39°49'32.23"N	80°47'46.78"W	3176.10	336.997	1.55
8926.00	90.620	316.250	5877.25	3199.69	2991.69	-1305.91	1635852.26	485519.36	39°49'33.00"N	80°47'47.62"W	3264.29	336.418	0.46
9021.00	90.860	320.330	5876.02	3294.01	3062.59	-1369.10	1635789.08	485590.26	39°49'33.59"N	80°47'48.44"W	3354.68	335.913	4.30
9115.00	90.770	325.440	5874.69	3387.90	3137.51	-1425.80	1635732.38	485665.18	39°49'34.27"N	80°47'49.18"W	3446.29	335.561	5.44
9210.00	90.860	324.500	5873.34	3482.89	3215.30	-1480.32	1635677.86	485742.96	39°49'35.08"N	80°47'49.90"W	3539.70	335.279	0.99
9305.00	91.140	324.760	5871.68	3577.88	3292.75	-1535.30	1635622.88	485820.41	39°49'35.84"N	80°47'50.62"W	3633.09	335.002	0.40
9400.00	91.420	329.040	5869.55	3672.78	3372.29	-1587.16	1635571.03	485899.95	39°49'36.62"N	80°47'51.30"W	3727.12	334.796	4.51

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# Actual Wellpath Report

MND-6B-HS AWP Proj: 18369

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## REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY
Area	Marshall County, WV
Field	Wellbore
Facility	MND-6-PA0

## WELLPATH DATA (216 stations)

MD [ft]	Inclusion [ft]	Azimuth	TVP [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [ft US ft]	Grid North [ft US ft]	Longitude	Closure Dist [ft]	Closure Dir [ft]	DLS [ft/100ft]
9494.00	91290	331170	5867.33	3766.37	3453.76	-1633.99	1635524.20	485981.41	39°49'37.423"N	3820.78	334.681	2.27
9389.00	91510	329780	5865.01	3860.91	3336.40	-1680.80	1635417.40	486064.04	39°49'38.233"N	3915.50	334.579	1.48
9684.00	91390	328500	5862.61	3955.63	3617.92	-1729.51	1635428.69	486145.56	39°49'39.031"N	4010.05	334.450	1.35
9778.00	91260	326670	5860.43	4049.51	3697.25	-1779.88	1635378.22	486224.88	39°49'39.808"N	4103.37	334.294	1.95
9873.00	91110	323600	5858.47	4144.47	3775.05	-1834.33	1635323.87	486302.68	39°49'40.569"N	4197.12	334.084	3.49
9968.00	90950	320380	5856.76	4239.30	3849.76	-1892.97	1635265.23	486377.39	39°49'41.299"N	4289.99	333.816	3.14
10060.00	91050	319800	5855.10	4333.94	3922.62	-1953.91	1635204.30	486450.24	39°49'42.010"N	4382.32	333.521	0.63
10158.00	90990	318830	5853.41	4428.46	3994.65	-2015.83	1635142.38	486522.26	39°49'42.713"N	4474.46	333.223	1.02
10252.00	90980	320100	5851.79	4522.00	4066.08	-2076.91	1635081.30	486593.69	39°49'43.410"N	4565.80	332.942	1.35
10347.00	90920	324590	5850.22	4616.86	4141.26	-2134.93	1635023.29	486668.87	39°49'44.145"N	4659.18	332.728	4.73
10441.00	91080	329600	5848.58	4710.76	4220.14	-2183.97	1634972.25	486747.75	39°49'44.917"N	4752.69	332.617	5.33
10536.00	90520	334040	5847.25	4805.05	4303.85	-2230.82	1634927.41	486831.45	39°49'45.738"N	4847.65	332.601	4.71
10632.00	90740	332700	5846.19	4900.02	4389.66	-2273.84	1634884.38	486917.25	39°49'46.580"N	4943.63	332.616	1.41
10727.00	90920	330120	5844.82	4994.41	4473.06	-2319.30	1634838.93	487000.65	39°49'47.397"N	5038.59	332.593	2.72
10822.00	90580	329290	5843.57	5089.08	4555.08	-2367.21	1634791.02	487082.67	39°49'48.201"N	5133.46	332.540	0.94
10917.00	90800	325300	5842.43	5183.98	4635.00	-2418.53	1634739.71	487162.58	39°49'48.983"N	5228.05	332.445	4.21
11012.00	91110	323700	5840.85	5278.96	4712.32	-2473.69	1634684.55	487239.90	39°49'49.740"N	5322.13	332.303	1.72
11107.00	91020	323260	5839.08	5373.91	4788.66	-2530.21	1634628.03	487316.23	39°49'50.486"N	5416.01	332.149	0.47
11202.00	91080	323410	5837.34	5468.85	4864.85	-2586.93	1634571.31	487392.42	39°49'51.231"N	5509.90	331.998	0.17
11296.00	91420	323010	5835.29	5562.78	4940.11	-2643.21	1634515.04	487467.67	39°49'51.966"N	5602.79	331.851	0.56
11391.00	91420	324070	5832.93	5657.72	5016.49	-2699.65	1634458.60	487544.05	39°49'52.713"N	5696.78	331.713	1.12
11485.00	91290	322470	5830.71	5751.65	5091.80	-2755.85	1634402.41	487619.36	39°49'53.449"N	5789.74	331.576	1.71
11581.00	91110	323250	5828.70	5847.56	5168.31	-2813.79	1634344.46	487695.87	39°49'54.197"N	5884.63	331.435	0.83
11675.00	91140	326480	5826.85	5941.53	5245.16	-2871.87	1634290.39	487772.71	39°49'54.948"N	5977.99	331.332	3.44
11770.00	90740	327280	5825.30	6036.46	5324.71	-2919.77	1634238.49	487852.26	39°49'55.727"N	6072.70	331.262	0.94
11865.00	90650	327930	5824.14	6131.36	5404.92	-2970.67	1634187.60	487932.46	39°49'56.512"N	6167.50	331.206	0.69
11960.00	90800	328480	5822.94	6226.20	5485.66	-3020.72	1634137.55	488013.20	39°49'57.303"N	6262.36	331.160	0.60
12054.00	90740	329060	5821.68	6319.99	5566.03	-3069.45	1634088.82	488093.56	39°49'58.090"N	6356.28	331.125	0.62
12149.00	90770	328460	5820.43	6414.78	5647.25	-3118.71	1634039.56	488174.78	39°49'58.886"N	6451.19	331.090	0.63
12244.00	90890	325230	5819.05	6509.71	5726.76	-3170.66	1633987.62	488254.29	39°49'59.664"N	6545.91	331.029	3.40

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REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY
Area	Marshall County, WV
Field	Marshall
Facility	MND-6-Pad
Well	MND-6R-HS
Slot	MND-6R-HS AWP

MD (ft)	Inclusion (ft)	Azimuth (°)	TVD (ft)	Vert Sect (ft)	North (ft)	East (ft)	Grid East (ftUS)	Grid North (ftUS)	Latitude	Longitude	Close Dist (ft)	Close Dir (°)	DLS (%100ft)
1239.00	90.650	321.340	5817.77	6604.64	5802.90	-3227.44	1633930.84	488330.41	39°50'00.408"N	80°48'12.773"W	6640.03	330.918	4.10
1243.00	91.170	321.720	5816.28	6688.45	5876.48	-3285.91	1633872.38	488404.00	39°50'01.127"N	80°48'13.536"W	6732.77	330.788	0.69
1252.00	91.020	323.170	5814.46	6793.34	5951.78	-3343.80	1633814.49	488479.29	39°50'01.863"N	80°48'14.292"W	6826.76	330.672	1.53
1262.00	91.020	321.970	5812.77	6888.23	6027.21	-3401.53	1633756.76	488554.71	39°50'02.600"N	80°48'15.046"W	6920.81	330.561	1.26
1271.00	90.860	320.870	5811.23	6982.04	6100.68	-3460.14	1633698.15	488628.18	39°50'03.318"N	80°48'15.811"W	7013.62	330.439	1.18
1281.00	90.890	320.080	5809.80	7075.73	6173.18	-3519.93	1633638.34	488700.67	39°50'04.025"N	80°48'16.591"W	7106.21	330.308	0.84
1296.00	90.620	321.650	5808.54	7170.47	6246.86	-3579.91	1633578.39	488774.35	39°50'04.745"N	80°48'17.374"W	7199.93	330.184	1.68
1300.00	90.620	322.560	5807.52	7265.35	6321.82	-3638.25	1633520.05	488849.31	39°50'05.477"N	80°48'18.135"W	7293.99	330.079	0.96
1309.00	90.580	324.070	5806.33	7359.30	6397.19	-3694.40	1633463.90	488924.68	39°50'06.214"N	80°48'18.869"W	7387.33	329.993	1.61
1319.00	90.230	325.940	5805.03	7454.28	6475.00	-3748.88	1633409.43	489002.48	39°50'06.975"N	80°48'19.582"W	7481.96	329.930	2.08
1328.00	91.570	329.150	5802.71	7519.15	6555.13	-3799.84	1633358.47	489082.61	39°50'07.760"N	80°48'20.250"W	7576.84	329.900	3.40
1338.00	91.200	327.540	5800.41	7643.95	6635.97	-3849.68	1633308.64	489163.44	39°50'08.551"N	80°48'20.904"W	7671.77	329.881	1.74
1347.00	90.950	327.280	5798.65	7737.85	6715.16	-3900.30	1633258.02	489242.62	39°50'09.326"N	80°48'21.567"W	7765.67	329.851	0.38
1370.00	91.020	324.790	5797.00	7833.82	6794.76	-3953.92	1633204.40	489322.22	39°50'10.105"N	80°48'22.269"W	7861.44	329.805	2.59
1364.00	90.450	322.870	5795.81	7927.78	6870.63	-4009.39	1633148.93	489398.09	39°50'10.847"N	80°48'22.995"W	7954.92	329.734	2.14
1375.00	90.370	325.440	5795.15	8022.76	6947.63	-4055.02	1633093.31	489475.08	39°50'11.600"N	80°48'23.722"W	8049.47	329.668	2.71
1384.00	90.520	324.930	5794.41	8117.76	7025.62	-4119.25	1633039.08	489553.07	39°50'12.363"N	80°48'24.432"W	8144.18	329.616	0.56
1399.00	90.460	327.260	5793.60	8212.73	7104.46	-4172.24	1632986.09	489631.91	39°50'13.134"N	80°48'25.126"W	8238.99	329.576	2.45
1404.00	90.460	327.400	5792.84	8306.65	7183.59	-4222.98	1632935.36	489711.03	39°50'13.909"N	80°48'25.791"W	8332.92	329.550	0.15
1413.00	90.680	327.700	5791.90	8401.55	7263.75	-4273.95	1632884.39	489791.19	39°50'14.694"N	80°48'26.459"W	8427.85	329.528	0.39
1422.00	90.680	331.350	5790.78	8495.24	7344.75	-4321.61	1632836.73	489872.18	39°50'15.487"N	80°48'27.085"W	8521.83	329.528	3.88
1432.00	90.650	333.840	5789.68	8589.39	7429.07	-4365.33	1632793.01	489956.50	39°50'16.314"N	80°48'27.661"W	8616.68	329.561	4.68
1442.00	90.680	329.390	5788.57	8683.73	7512.62	-4410.48	1632747.87	490040.04	39°50'17.133"N	80°48'28.255"W	8711.59	329.584	4.68
1451.00	90.710	324.270	5787.43	8777.64	7591.27	-4461.89	1632696.46	490118.69	39°50'17.903"N	80°48'28.929"W	8805.45	329.534	5.45
1461.00	90.650	324.540	5786.31	8872.69	7668.52	-4517.18	1632641.17	490195.93	39°50'18.659"N	80°48'29.652"W	8900.06	329.500	0.29
1476.00	90.680	322.320	5785.20	8967.58	7744.81	-4573.77	1632584.58	490272.21	39°50'19.404"N	80°48'30.392"W	8994.52	329.436	2.34
1480.00	90.740	319.460	5784.04	9061.32	7817.73	-4633.06	1632525.30	490345.13	39°50'20.210"N	80°48'31.165"W	9087.47	329.348	3.04
1489.00	90.710	319.830	5782.84	9155.90	7890.12	-4694.57	1632463.79	490417.52	39°50'20.823"N	80°48'31.967"W	9181.12	329.248	0.29
1495.00	91.020	323.860	5781.42	9249.73	7964.01	-4752.62	1632405.74	490491.41	39°50'21.545"N	80°48'32.725"W	9274.31	329.173	4.30
1504.00	91.080	322.920	5779.68	9344.67	8040.26	-4809.27	1632349.10	490567.65	39°50'22.290"N	80°48'33.465"W	9368.82	329.114	0.99

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MND-6-Pad  
Marshall County, WV



REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY	Slot	Slot B
Area	Marshall County, WV	Well	MND-6B-HS
Field	Marshall	Wellbore	MND-6B-HS AWP
Facility	MND-6 Pad		

WELLPATH DATA (216 stations)													
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Seet [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS ["/1000]
15178.00	91.110	320.510	5777.88	9438.50	8114.02	-4867.49	1632290.88	490641.41	39°50'23.011"N	80°48'34.226"W	9462.02	329.041	2.56
15274.00	91.050	317.390	5776.07	9533.93	8186.40	-4930.52	1632227.86	490713.78	39°50'23.717"N	80°48'35.047"W	9556.52	328.940	3.25
15368.00	91.050	317.950	5774.35	9627.15	8255.88	-4993.81	1632164.57	490783.26	39°50'24.394"N	80°48'35.871"W	9648.71	328.831	0.60
15463.00	91.140	323.970	5772.53	9721.85	8329.62	-5053.60	1632104.78	490856.99	39°50'25.114"N	80°48'36.651"W	9742.76	328.755	6.34
15558.00	91.050	328.380	5770.71	9816.79	8408.50	-5106.46	1632051.92	490935.87	39°50'25.886"N	80°48'37.344"W	9837.63	328.730	4.64
15653.00	90.920	328.840	5769.08	9911.59	8489.59	-5155.94	1632002.45	491016.95	39°50'26.680"N	80°48'37.993"W	9932.61	328.729	0.50
15748.00	90.950	328.370	5767.53	10006.39	8570.67	-5205.42	1631952.97	491098.03	39°50'27.474"N	80°48'38.643"W	10027.60	328.727	0.50
15842.00	90.740	328.450	5766.14	10100.21	8650.73	-5254.66	1631903.74	491178.09	39°50'28.258"N	80°48'39.289"W	10121.59	328.725	0.24
15937.00	91.290	333.170	5764.46	10194.68	8733.63	-5300.97	1631857.43	491260.98	39°50'29.071"N	80°48'39.808"W	10216.48	328.744	5.00
16031.00	92.060	331.020	5761.71	10287.91	8816.66	-5344.94	1631813.46	491344.01	39°50'29.885"N	80°48'40.477"W	10310.28	328.774	2.43
16125.00	91.750	326.650	5758.58	10381.63	8897.03	-5393.55	1631764.85	491424.37	39°50'30.672"N	80°48'41.115"W	10404.20	328.775	4.66
16220.00	91.570	319.430	5755.83	10476.47	8972.85	-5450.60	1631707.80	491500.19	39°50'31.413"N	80°48'41.861"W	10498.63	328.723	7.60
16315.00	91.290	316.400	5753.46	10570.70	9043.33	-5514.25	1631644.16	491570.67	39°50'32.100"N	80°48'42.690"W	10591.92	328.627	3.20
16410.00	91.290	320.000	5751.32	10665.00	9114.12	-5577.54	1631580.87	491641.45	39°50'32.791"N	80°48'43.514"W	10685.32	328.535	3.79
16505.00	91.320	325.010	5749.15	10759.85	9189.45	-5635.34	1631523.08	491716.78	39°50'33.527"N	80°48'44.269"W	10779.75	328.482	5.27
16600.00	91.320	328.690	5746.96	10854.76	9268.95	-5687.26	1631471.16	491796.28	39°50'34.305"N	80°48'44.950"W	10874.67	328.467	3.87
16695.00	91.290	327.940	5744.80	10949.58	9349.77	-5737.15	1631421.27	491877.09	39°50'35.096"N	80°48'45.604"W	10969.64	328.466	0.79
16790.00	91.230	327.660	5742.71	11044.44	9430.14	-5787.76	1631370.66	491957.45	39°50'35.883"N	80°48'46.268"W	11064.61	328.460	0.30
16884.00	90.620	325.090	5741.19	11138.39	9508.39	-5839.80	1631318.63	492035.71	39°50'36.649"N	80°48'46.950"W	11158.53	328.443	2.81
16979.00	90.430	322.670	5740.32	11233.36	9585.12	-5895.79	1631262.63	492112.43	39°50'37.399"N	80°48'47.682"W	11253.22	328.404	2.56
17074.00	90.460	322.780	5739.59	11328.29	9660.72	-5953.33	1631205.10	492188.02	39°50'38.138"N	80°48'48.434"W	11347.76	328.357	0.12
17168.00	90.400	321.920	5738.88	11422.18	9735.14	-6010.74	1631147.69	492262.44	39°50'38.865"N	80°48'49.184"W	11441.24	328.308	0.92
17263.00	90.620	322.300	5738.03	11517.06	9810.11	-6069.09	1631089.35	492337.40	39°50'39.597"N	80°48'49.946"W	11535.69	328.257	0.46
17357.00	90.740	323.350	5736.92	11610.98	9885.00	-6125.88	1631032.56	492412.29	39°50'40.329"N	80°48'50.688"W	11629.26	328.213	1.12
17452.00	90.710	326.540	5735.72	11705.96	9962.75	-6180.43	1630978.01	492490.04	39°50'41.090"N	80°48'51.402"W	11724.09	328.186	3.36
17547.00	90.650	328.740	5734.59	11800.85	10042.99	-6231.27	1630927.17	492570.27	39°50'41.875"N	80°48'52.068"W	11819.07	328.182	2.32
17642.00	90.650	328.170	5733.51	11895.67	10123.95	-6280.97	1630877.48	492651.22	39°50'42.668"N	80°48'52.721"W	11914.06	328.184	0.60
17736.00	90.830	326.940	5732.30	11989.57	10203.26	-6331.40	1630827.06	492730.54	39°50'43.444"N	80°48'53.382"W	12008.05	328.179	1.32
17831.00	90.920	325.940	5730.85	12084.52	10282.42	-6383.91	1630774.55	492809.69	39°50'44.219"N	80°48'54.070"W	12102.99	328.166	1.06
17926.00	90.880	326.920	5729.35	12179.48	10361.56	-6436.43	1630722.03	492888.83	39°50'44.994"N	80°48'54.758"W	12197.94	328.152	1.03

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REFERENCE WELLPATH IDENTIFICATION

Operator	Area	Field	Facility	Slot	Slot B
NOBLE ENERGY	Marshall County, WV	Marshall	MND-6 Pad	Well	MND-6B-HS
				Wellbore	MND-6B-HS AWB

WELLPATH DATA (216 Stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [g/1000]
18021.60	90.920	323.770	5727.86	12274.45	10439.69	-6490.44	1630668.02	492966.95	39°50'45.758"N	80°48'55.465"W	12292.80	328.130	3.32
18116.00	90.920	324.700	5726.34	12369.43	10516.76	-6545.93	1630612.51	493044.02	39°50'46.511"N	80°48'56.191"W	12387.57	328.101	0.98
18211.00	90.740	323.080	5724.96	12464.42	10594.47	-6600.59	1630557.88	493121.72	39°50'47.271"N	80°48'56.906"W	12482.41	328.076	0.44
18305.00	90.650	324.210	5723.82	12558.41	10671.13	-6654.97	1630503.50	493198.37	39°50'48.021"N	80°48'57.618"W	12576.23	328.051	0.93
18348.00	90.680	324.480	5723.38	12596.41	10702.00	-6677.12	1630481.35	493229.25	39°50'48.323"N	80°48'57.907"W	12614.15	328.039	0.71
18369.00	90.680	324.480	5723.07	12622.41	10723.16	-6692.23	1630466.24	493250.41	39°50'48.530"N	80°48'58.103"W	12640.10	328.032	0.00

TARGETS

Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
MND-6B-HS BHL Rev-1		5728.67	10720.18	-6696.37	1630462.10	493247.42	39°50'48.500"N	80°48'58.158"W	point
MND-6B-HS LP Rev-1		5917.00	899.77	179.94	1637338.03	483427.56	39°49'12.443"N	80°47'28.198"W	point
MND-6 Pad LL		6499.99	3.66	14.56	1637172.66	482531.50	39°49'03.564"N	80°47'30.152"W	polygon

WELLPATH COMPOSITION - Ref Wellbore: MND-6B-HS AWB Ref Wellpath: MND-6B-HS AWP Proj: 18369

Start MID [ft]	End MID [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
26.00	275.00	Generic gyro - non-logging (Standard)	01 Gyro <14-3/4"> (30-275)	MND-6B-HS AWB
275.00	621.00	ISCWISA MWD, Rev 2 (Standard)	02 APS EM <14-3/4"> (275-309-621) Proj: 758"	MND-6B-HS AWB
621.00	2021.00	ISCWISA MWD, Rev 2 (Standard)	03 APS EM <12-1/4"> (621-1770-2021)	MND-6B-HS AWB
2021.00	3841.00	NavTrak (Mig4Cor)	04 BHL MWD <8-3/4"> (2021-162135-3841)	MND-6B-HS AWB
3841.00	18343.00	NavTrak (AT Curve Short Spaced)	05 BHL AT Curve <8-3/4"> (3841-18343)	MND-6B-HS AWB
18343.00	18369.00	Blind Drilling (std)	Projection to bit	MND-6B-HS AWB

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REFERENCE WELLPATH IDENTIFICATION

Operator	Area	Field	Facility	Slot	Slot B
NOBLE ENERGY	Marshall County, WV	Marshall	MND-6 Pad	Well	MND-6B-HS
				Wellbore	MND-6B-HS AWB

COMMENTS

Wellpath general comments  
 API: 47-051-01744-0000  
 BHI Job #: 6650146A  
 Rig: Nomac 79  
 Duration: 10/03/2014 - 10/15/2014  
 Gyro <14-3/4"> (50-275)  
 APS EM <14-3/4"> (275)(309-621)  
 APS EM <12-1/4"> (621)(770-2021)  
 BHI MWD <8-3/8"> (2021)(2135-3841)  
 BHI AT Curve <8-3/4"> (3841)(3878-18343)  
 Projected MD at TD: 18369'

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# NOBLE ENERGY

Location: Marshall County, WV  
 Field: Marshall  
 Facility: MND-6 Pad

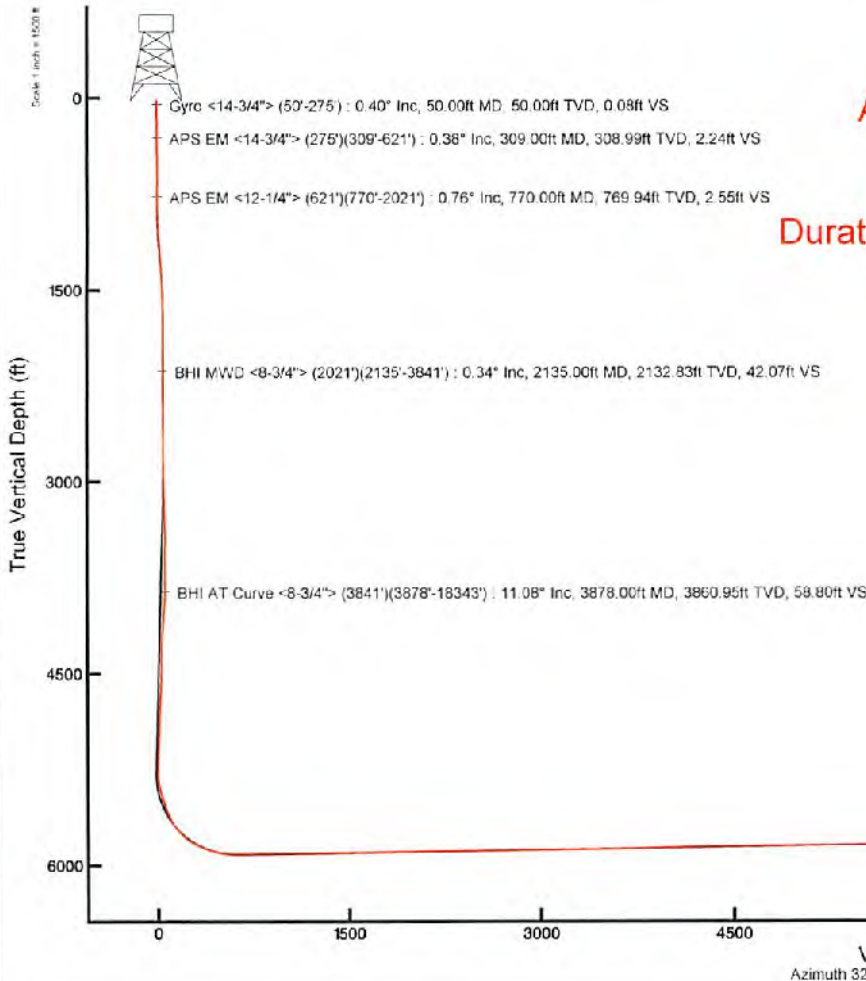
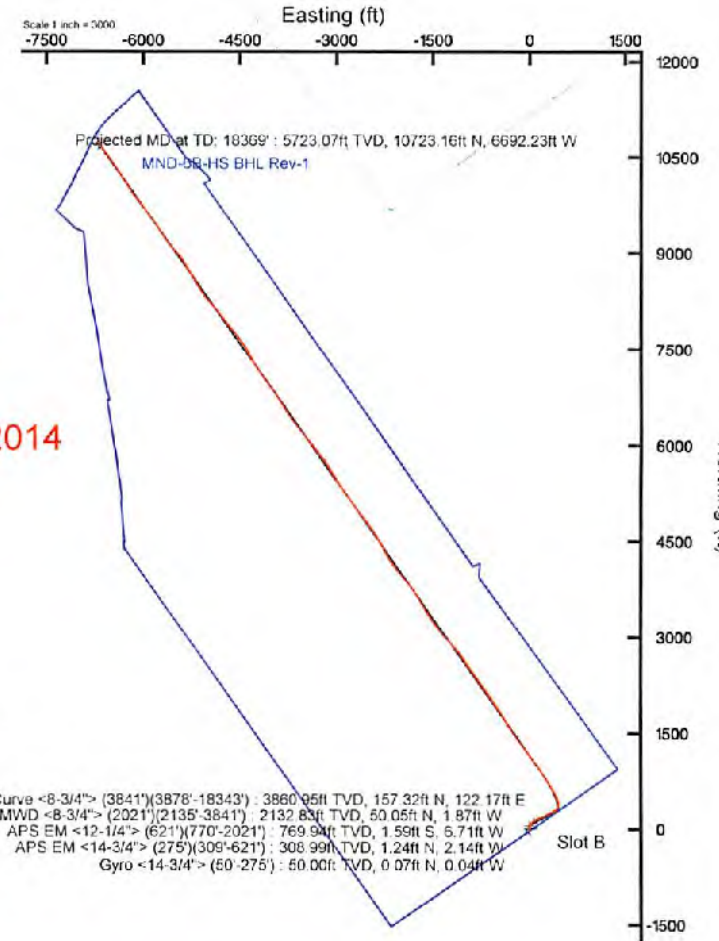
Slot: Slot B  
 Well: MND-6B-HS  
 Wellbore: MND-6B-HS PWB

Plot reference wellpath is MND-6B-HS PWB Rev-B 0	
True vertical depth are referenced to Nomac 79 (RKB)	Grid System: NAD27 / Lambert West Virginia SP, Northern Zone (4701), US feet
Measured depths are referenced to Nomac 79 (RKB)	North Reference: Grid north
Nomac 79 (RKB) to Mean Sea Level: 746.97 feet	Scale: True distance
Mean Sea Level to Mud line (At Slot: Slot B): -720.97 feet	Depths are in feet
Coordinates are in feet referenced to Slot	Created by: gdfbra on 10/29/2014

Location Information						
Facility Name		Grid East (US ft)	Grid North (US ft)	Latitude	Longitude	
MND-6 Pad		1637177.780	482512.230	39°49'03.375"N	80°47'30.083"W	
Slot	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
Slot B	15.61	-19.68	1637158.100	482527.840	39°49'03.526"N	80°47'30.338"W
Nomac 79 (RKB) to Mud line (At Slot: Slot B)				26ft		
Mean Sea Level to Mud line (At Slot: Slot B)				-720.97ft		
Nomac 79 (RKB) to Mean Sea Level				746.97ft		



User specified (HDGM) Dip: 67.25° Field: 52780 nT  
 Magnetic North is 7.51 degrees West of True North (at 9/29/2014)  
 Grid North is 0.82 degrees West of True North  
 To correct azimuth from True to Grid add 0.82 degrees  
 To correct azimuth from Magnetic to Grid subtract 0.69 degrees



BHI AT Curve <8-3/4"> (3841')(3878'-18343') : 3860.95ft TVD, 157.32ft N, 122.17ft E  
 BHI MWD <8-3/4"> (2021')(2135'-3841') : 2132.83ft TVD, 50.05ft N, 1.87ft W  
 APS EM <12-1/4"> (621')(770'-2021') : 769.94ft TVD, 1.59ft S, 5.71ft W  
 APS EM <14-3/4"> (275')(309'-621') : 308.99ft TVD, 1.24ft N, 2.14ft W  
 Gyro <14-3/4"> (50'-275') : 50.00ft TVD, 0.07ft N, 0.04ft W



