

Revised

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

RECEIVED
Office of Oil and Gas

JUN 26 2017

WV Department of
Environmental Protection

API 47-051-01763 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 FHS
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 39.817676 Easting 80.791779
Landing Point of Curve Northing 39.816473 Easting 80.798056
Bottom Hole Northing 39.834082 Easting 80.814544

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 06/10/2014 Date drilling commenced 08/28/2014 Date drilling ceased 12/11/2014
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) _____

APPROVED

NAME: *Jim Unholtz*

DATE: 7/4/2017

Reviewed by:

Jim Unholtz
09/15/2017

API 47- 051 - 01763 Farm name Consolidated Coal Company Well number MND 06 FHS

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"	135'	New	H-40		Y
Coal	17.5"	13 3/8"	726'	New	J-55		N
Intermediate 1	12.38"	9 5/8"	2033'	New	HCK-55		Y
Intermediate 2							
Intermediate 3							
Production	8-3/4" & 8-1/2"	5 1/2"	14,634.9'	New	P-110		Y
Tubing							
Packer type and depth set							

Comment Details was unable to displace cement out of the hole do to pressure exceeding 1000 psi and pumping casing up hole 3".

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor	CaCl 1.15					0	8
Surface	CaCl 1.15					0	8
Coal	Type 1 / Class A	490	15.6	1.39	681.1	0	8
Intermediate 1	Type 1 / Class A	745	15.6	1.18	879.1	0	8
Intermediate 2							
Intermediate 3							
Production	Type 1 / Class A	lead 718 tail 2250	14.8	Lead 1.54 tail 1.37	total 4,490.99	1815.0	8
Tubing							

Drillers TD (ft) 14650.00 Loggers TD (ft) 14,627.00
 Deepest formation penetrated Marcellus Plug back to (ft) _____
 Plug back procedure _____

Kick off depth (ft) 5500

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.

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

248 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 _____

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WERE TRACERS USED Yes No TYPE OF TRACER(S) USED _____

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API 47- 051 - 01763 Farm name Consolidated Coal Company Well number MND 06 FHS

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

Please insert additional pages as applicable.

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SURFACE LOCATION (SHL)
UTM 17 NAD 83
N) 4,407,542.08m
E) 517,820.94m
NAD 27 WV NORTH
N) 482,511.8'
E) 1,637,100.2'
NAD 83
DEC. LAT.) 39.817676°
DEC. LONG.) 80.791778°

PERMITTED LANDING POINT (LP)
UTM 17 NAD 83
N) 4,407,391.31m
E) 517,297.27m
NAD 27 WV NORTH
N) 482,045.8'
E) 1,635,373.5'
NAD 83
DEC. LAT.) 39.816328°
DEC. LONG.) 80.797901°

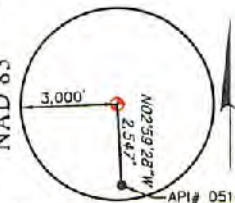
AS DRILLED PLAT
BOTTOM HOLE LOCATION (BHL)
UTM 17 NAD 83
N) 4,409,359.50m
E) 515,869.57m
NAD 27 WV NORTH
N) 488,582.8'
E) 1,630,796.4'
NAD 83
DEC. LAT.) 39.834090°
DEC. LONG.) 80.814534°

AS DRILLED
SURFACE LOCATION (SHL)
UTM 17 NAD 83
N) 4,407,542.14m
E) 517,820.90m
NAD 27 WV NORTH
N) 482,512.0'
E) 1,637,100.0'
NAD 83
DEC. LAT.) 39.817676°
DEC. LONG.) 80.791779°

AS DRILLED
LANDING POINT (LP)
UTM 17 NAD 83
N) 4,407,407.35m
E) 517,283.96m
NAD 27 WV NORTH
N) 482,099.2'
E) 1,635,330.7'
NAD 83
DEC. LAT.) 39.816473°
DEC. LONG.) 80.798056°

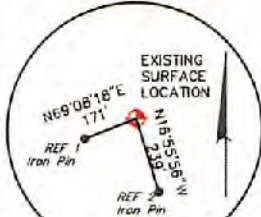
AS DRILLED
BOTTOM HOLE LOCATION (BHL)
UTM 17 NAD 83
N) 4,409,358.63m
E) 515,868.69m
NAD 27 WV NORTH
N) 488,580.0'
E) 1,630,793.5'
NAD 83
DEC. LAT.) 39.834082°
DEC. LONG.) 80.814544°

GRID NORTH
NAD 83

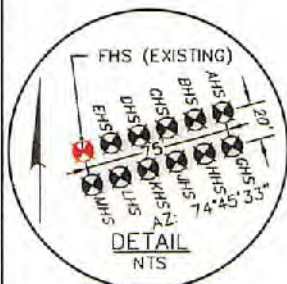


N14°26'13"W
671'
S01°14'41"W
596'

CONSOLIDATION COAL COMPANY
TMP # 05-06-05

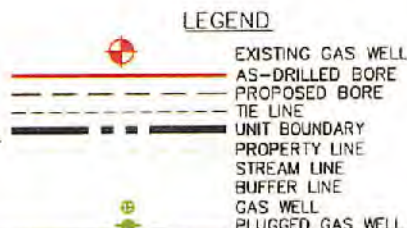


REFERENCES
NTS
STATE OF WEST VIRGINIA
TMP # 05-07-9999
CONSOLIDATION COAL COMPANY
TMP # 05-07-04



GENERAL NOTES:

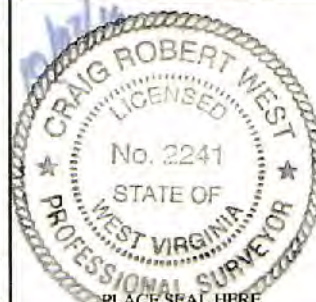
1. THE LOCATION OF BOUNDARY LINES SHOWN HEREON ARE BASED ON RECORD DEED, PLATS, AND TAX MAPS BEST FIT TO FOUND FIELD EVIDENCE AND AERIAL PHOTOS, UNLESS OTHERWISE NOTED.
2. THIS PLAT DOES NOT REPRESENT AN ACTUAL BOUNDARY SURVEY OF THE INDIVIDUAL PARCELS.
3. THERE ARE NO EXISTING WATER WELLS OR DEVELOPED SPRINGS WITHIN 250' OF PROPOSED WELL.
4. PROPOSED WELL IS GREATER THAN 100' FROM PERENNIAL STREAM, WETLAND, POND, RESERVOIR OR LAKE.
5. THERE ARE NO NATIVE TROUT STREAMS WITHIN 300' OF PROPOSED WELL.
6. THERE ARE TWO DWELLINGS LOCATED WITHIN 650' OF PROPOSED WELLBORE.
7. THE SURROUNDING LANDS ARE BEING SERVED BY PUBLIC WATER BY THE GRAND VIEW DOOLIN WATER SYSTEM PROVIDED BY MARSHALL COUNTY PUBLIC HEALTH AND SANITATION DIVISION.



FILE #: **093842010**
DRAWING #: **093842010_SV-Plat**
SCALE: **PLAT & TICK: 1" = 2,000'**
MINIMUM DEGREE OF ACCURACY: **1/200**
PROVEN SOURCE OF ELEVATION: **NGS (CORS)**

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

SIGNED: *[Signature]*
R.P.E.: _____ L.L.S.: **2241**



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS
WVDEP
OFFICE OF OIL & GAS
601 57TH STREET
CHARLESTON, WV 25304



DATE: **OCTOBER 7, 2016**
OPERATOR'S WELL #: **MND 6 FHS**
API WELL #: **47 051 01763**
STATE COUNTY PERMIT

WELL TYPE: OIL GAS WASTE DISPOSAL LIQUID INJECTION PRODUCTION STORAGE DEEP SHALLOW

WATERSHED: **FISH CREEK**
COUNTY/DISTRICT: **MARSHALL / FRANKLIN**
SURFACE OWNER: **CONSOLIDATION COAL COMPANY**
OIL & GAS ROYALTY OWNER: **CNX GAS COMPANY LLC and NOBLE ENERGY, INC.**

CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PERFORATE NEW FORMATION PLUG & ABANDON
 DRILL PLUG OFF OLD FORMATION CLEAN OUT & REPLUG OTHER CHANGE (SPECIFY): _____

TARGET FORMATION: **MARCELLUS**
WELL OPERATOR: **NOBLE ENERGY, INC.**
ADDRESS: **333 TECHNOLOGY DRIVE, SUITE 116**
CITY: **CANONSBURG** STATE: **PA** ZIP CODE: **15317**

ESTIMATED DEPTH: **TVD: 5,940± TMD: 14,859±**
DESIGNATED AGENT: **STEVEN GREEN**
ADDRESS: **1000 NOBLE ENERGY DRIVE**
CITY: **CANONSBURG** STATE: **PA** ZIP CODE: **15317**

00115/2017

Well Header

API: 47-051-01763	Well Name: MND-6D-HS						
WR-35 - Stimulation Information Per Stage							
Int Des	Start Date	Slurry Rate Avg (bb/min)	P Treat Avg (psi)	P Breakdown (psi)	ISIP (psi)	Propant Deliver (lb)	Vol Slurry Total (gal)
STG #1 INJ TEST	4/29/2017	11	6,733.00	6,853.00	5,533.00	0	31,634.40
STG #1	4/29/2017	85.9	8,471.00	6,232.00	3,183.00	600,785.00	607,756.80
STG #2	4/29/2017	83.8	8,154.00	5,850.00	3,112.00	601,919.00	640,491.60
STG #3	4/30/2017	86.3	9,082.00	5,328.00	3,604.00	598,757.00	631,276.80
STG #4	4/30/2017	87.7	8,279.00	5,824.00	3,698.00	600,005.00	656,161.80
STG #5	4/30/2017	88.2	8,368.00	5,349.00	3,847.00	599,446.00	581,658.00
STG #6	5/1/2017	88.2	8,130.00	5,985.00	4,184.00	600,956.00	581,830.20
STG #7	5/1/2017	93.4	8,195.00	5,019.00	4,303.00	601,229.00	564,958.80
STG #8	5/1/2017	94.7	8,339.00	5,453.00	3,945.00	605,206.00	602,632.80
STG #9	5/1/2017	86.9	8,185.00	5,766.00	4,103.00	600,965.00	573,963.60
STG #10	5/2/2017	88.8	8,557.00	5,553.00	4,191.00	601,671.00	570,133.20
STG #11	5/2/2017	93.3	8,459.00	5,775.00	4,488.00	603,476.00	616,207.20
STG #12	5/2/2017	90.1	8,210.00	5,739.00	4,759.00	601,745.00	579,293.40
STG #13	5/2/2017	89.1	8,401.00	5,729.00	4,631.00	606,955.00	576,063.60
STG #14	5/3/2017	88.5	8,173.00	5,161.00	4,241.00	602,407.00	596,282.40
STG #15	5/3/2017	92.9	8,416.00	5,313.00	4,182.00	603,260.00	565,202.40
STG #16	5/3/2017	93.4	8,472.00	5,705.00	4,174.00	604,938.00	516,579.00
STG #17	5/3/2017	90.5	8,256.00	5,563.00	4,371.00	607,249.00	564,614.40
STG #18	5/4/2017	91.9	8,531.00	5,884.00	4,313.00	602,807.00	554,547.00
STG #19	5/4/2017	93.1	8,452.00	5,690.00	4,656.00	604,669.00	508,284.00
STG #20	5/4/2017	95.4	8,575.00	5,607.00	4,574.00	603,992.00	510,174.00
STG #21	5/4/2017	96.2	8,539.00	5,700.00	4,225.00	604,380.00	499,493.40
STG #22	5/4/2017	89.9	7,845.00	5,963.00	4,302.00	602,012.00	510,405.00
STG #23	5/5/2017	95.2	8,253.00	5,484.00	4,269.00	608,498.00	518,889.00
STG #24	5/5/2017	91.4	7,952.00	5,399.00	4,230.00	600,380.00	540,687.00
STG #25	5/5/2017	89.1	7,580.00	5,831.00	4,158.00	598,630.00	644,985.60
STG #26	5/7/2017	93.1	8,390.00	6,126.00	4,081.00	599,697.00	577,752.00
STG #27	5/7/2017	90.4	8,218.00	6,401.00	4,160.00	601,096.00	509,531.40
STG #28	5/7/2017	93.4	8,306.00	6,193.00	4,283.00	601,402.00	525,462.00
STG #29	5/7/2017	88.6	7,725.00	5,509.00	4,484.00	603,585.00	494,529.00
STG #30	5/8/2017	89.5	7,592.00	5,875.00	4,249.00	612,159.00	500,047.80
STG #31	5/8/2017	96.1	7,977.00	5,499.00	4,168.00	603,291.00	565,790.40
STG #32	5/8/2017	98.1	7,930.00	5,322.00	4,070.00	605,419.00	579,188.82
STG #33	5/8/2017	97.8	8,012.00	5,519.00	4,277.00	607,801.00	544,790.40
STG #34	5/9/2017	98.2	8,014.00	5,480.00	4,543.00	599,541.00	586,920.60
STG #35	5/9/2017	94.8	7,672.00	5,168.00	4,170.00	603,113.00	549,389.40
STG #36	5/9/2017	97.8	7,868.00	5,201.00	4,607.00	606,500.00	515,684.40
STG #37	5/9/2017	98	7,923.00	5,345.00	4,273.00	604,748.00	484,306.20
STG #38	5/10/2017	95.8	7,659.00	5,230.00	4,580.00	603,120.00	621,616.80
STG #39	5/11/2017	94.4	7,590.00	5,724.00	4,612.00	603,368.00	505,764.00
STG #40	5/11/2017	98.2	7,416.00	4,971.00	4,467.00	601,905.00	544,756.80
STG #41	5/11/2017	97.6	7,393.00	5,186.00	4,238.00	600,843.00	573,589.80
STG #42	5/11/2017	94.7	7,332.00	5,342.00	4,753.00	601,963.00	480,526.20
STG #43	5/11/2017	98.1	7,469.00	5,522.00	4,746.00	601,903.00	460,080.60
STG #44	5/12/2017	97.3	7,268.00	5,409.00	4,388.00	600,531.00	482,584.20
STG #45	5/12/2017	98.6	7,195.00	5,316.00	4,509.00	599,953.00	521,194.80
STG #46	5/12/2017	96.6	7,035.00	5,327.00	4,350.00	602,874.00	520,909.20
STG #47	5/12/2017	93.2	6,969.00	5,201.00	4,258.00	604,409.00	436,695.00
STG #48	5/13/2017	95.3	6,964.00	5,388.00	4,508.00	540,000.00	412,872.60
STG #49	5/13/2017	98.5	6,923.00	5,222.00	4,238.00	601,686.00	514,495.80
STG #50	5/13/2017	96.9	6,901.00	5,509.00	5,509.00	605,005.00	412,889.40
STG #51	5/13/2017	96.2	6,922.00	5,463.00	4,874.00	606,191.00	393,405.60
STG #52	5/14/2017	95.9	6,922.00	5,824.00	4,426.00	604,314.00	376,353.60

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WV Department of
Environmental Protection

Perforations

API	Well Name	Date	Top (ftKB)	Btm (ftKB)	Com	Entered Shot Total	Est Hole Dia (in)
47-051-01763	MND-6D-HS	5/14/2017	6,120.00	6,292.00	STG #52	58	
47-051-01763	MND-6D-HS	5/13/2017	6,322.00	6,499.00	STG #51	58	
47-051-01763	MND-6D-HS	5/13/2017	6,526.00	6,701.00	STG #50	58	
47-051-01763	MND-6D-HS	5/13/2017	6,729.00	6,903.00	STG #49	58	
47-051-01763	MND-6D-HS	5/13/2017	6,930.00	7,105.00	STG #48	58	
47-051-01763	MND-6D-HS	5/12/2017	7,130.00	7,307.00	STG #47	58	
47-051-01763	MND-6D-HS	5/12/2017	7,332.00	7,509.00	STG #46	58	
47-051-01763	MND-6D-HS	5/12/2017	7,536.00	7,711.00	STG #45	58	
47-051-01763	MND-6D-HS	5/12/2017	7,736.00	7,909.00	STG #44	58	
47-051-01763	MND-6D-HS	5/11/2017	7,938.00	8,115.00	STG #43	58	
47-051-01763	MND-6D-HS	5/11/2017	8,140.00	8,317.00	STG #42	58	
47-051-01763	MND-6D-HS	5/11/2017	8,345.00	8,519.00	STG #41	58	
47-051-01763	MND-6D-HS	5/11/2017	8,544.00	8,719.00	STG #40	58	
47-051-01763	MND-6D-HS	5/10/2017	8,746.00	8,918.00	STG #39	58	
47-051-01763	MND-6D-HS	5/10/2017	8,948.00	9,122.00	STG #38	58	
47-051-01763	MND-6D-HS	5/9/2017	9,147.00	9,330.00	STG #37	58	
47-051-01763	MND-6D-HS	5/9/2017	9,352.00	9,529.00	STG #36	58	
47-051-01763	MND-6D-HS	5/9/2017	9,554.00	9,731.00	STG #35	58	
47-051-01763	MND-6D-HS	5/9/2017	9,758.00	9,933.00	STG #34	58	
47-051-01763	MND-6D-HS	5/8/2017	9,958.00	10,132.00	STG #33	58	
47-051-01763	MND-6D-HS	5/8/2017	10,160.00	10,333.00	STG #32	58	
47-051-01763	MND-6D-HS	5/8/2017	10,358.00	10,539.00	STG #31	58	
47-051-01763	MND-6D-HS	5/7/2017	10,564.00	10,741.00	STG #30	58	
47-051-01763	MND-6D-HS	5/7/2017	10,766.00	10,943.00	STG #29	58	
47-051-01763	MND-6D-HS	5/7/2017	10,968.00	11,145.00	STG #28	58	
47-051-01763	MND-6D-HS	5/7/2017	11,173.00	11,347.00	STG #27	58	
47-051-01763	MND-6D-HS	5/7/2017	11,372.00	11,550.00	STG #26	58	
47-051-01763	MND-6D-HS	5/5/2017	11,574.00	11,751.00	STG #25	58	
47-051-01763	MND-6D-HS	5/5/2017	11,776.00	11,953.00	STG #24	58	
47-051-01763	MND-6D-HS	5/5/2017	11,978.00	12,155.00	STG #23	58	
47-051-01763	MND-6D-HS	5/4/2017	12,178.00	12,352.00	STG #22	58	
47-051-01763	MND-6D-HS	5/4/2017	12,382.00	12,559.00	STG #21	58	
47-051-01763	MND-6D-HS	5/4/2017	12,584.00	12,761.00	STG #20	58	
47-051-01763	MND-6D-HS	5/4/2017	12,790.00	12,965.00	STG #19	58	
47-051-01763	MND-6D-HS	5/4/2017	12,988.00	13,165.00	STG #18	58	
47-051-01763	MND-6D-HS	5/3/2017	13,190.00	13,367.00	STG #17	58	
47-051-01763	MND-6D-HS	5/3/2017	13,392.00	13,571.00	STG #16	58	
47-051-01763	MND-6D-HS	5/3/2017	13,594.00	13,771.00	STG #15	58	
47-051-01763	MND-6D-HS	5/3/2017	13,796.00	13,973.00	STG #14	58	
47-051-01763	MND-6D-HS	5/2/2017	14,003.00	14,175.00	STG #13	58	
47-051-01763	MND-6D-HS	5/2/2017	14,200.00	14,377.00	STG #12	58	
47-051-01763	MND-6D-HS	5/2/2017	14,402.00	14,574.00	STG #11	58	
47-051-01763	MND-6D-HS	5/1/2017	14,604.00	14,781.00	STG #10	58	
47-051-01763	MND-6D-HS	5/1/2017	14,806.00	14,983.00	STG #9	58	
47-051-01763	MND-6D-HS	5/1/2017	15,008.00	15,181.00	STG #8	58	
47-051-01763	MND-6D-HS	5/1/2017	15,211.00	15,383.00	STG #7	58	
47-051-01763	MND-6D-HS	4/30/2017	15,412.00	15,589.00	STG #6	58	
47-051-01763	MND-6D-HS	4/30/2017	15,614.00	15,791.00	STG #5	58	
47-051-01763	MND-6D-HS	4/30/2017	15,816.00	15,989.00	STG #4	58	
47-051-01763	MND-6D-HS	4/30/2017	16,018.00	16,195.00	STG #3	58	
47-051-01763	MND-6D-HS	4/29/2017	16,220.00	16,397.00	STG #2	58	
47-051-01763	MND-6D-HS	4/29/2017	16,422.00	16,599.00	STG #1	58	

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API 47- 051 - 01762 Farm name Consolidated Coal Company Well number MND 06 DHS

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>		
Marcellus	5940	TVD	16756 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 6609 mcfpd Oil 220.69 bpd NGL 413.05 bpd Water 331 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 ₂ S, ETC)
	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

MND 6

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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Actual Wellpath Report

MND-6D-HS AWP Proj: 16755'

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REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY	Slot	Slot D
Area	Marshall County, WV	Well	MND-6D-HS
Field	Marshall	Wellbore	MND-6D-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	Kroschr
Scale	0.999946	Report Generated	12/30/2014 at 8:27:55 AM
Convergence at slot	0.82° West	Database/Source file	WA_NorthEast/MND-6D-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	7.65	-48.71	1637129.07	482519.88	39°49'03.443"N	80°47'30.709"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	746.94ft
Horizontal Reference Pt	Slot	Nomac 79 (RKB) to Mean Sea Level	746.94ft
Vertical Reference Pt	Nomac 79 (RKB)	Nomac 79 (RKB) to Mud Line at Slot (Slot D)	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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Actual Wellpath Report

MND-6D-HS AWP Proj: 16755'

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REFERENCE WELLPATH IDENTIFICATION

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

WELLPATH DATA (208 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Closure Dist [ft]	Closure Dir [°]	DLS [%/100ft]	Comments
0.00†	0.000	294.870	0.00	0.00	0.00	0.00	1637129.07	482519.88	0.00	0.000	0.00	
26.00	0.000	294.870	26.00	0.00	0.00	0.00	1637129.07	482519.88	0.00	0.000	0.00	
100.00	0.340	294.870	100.00	0.19	0.09	-0.20	1637128.87	482519.97	0.22	294.870	0.46	
151.00	0.400	186.030	151.00	0.19	-0.02	-0.36	1637128.71	482519.86	0.36	266.607	1.18	
200.00	0.470	216.080	200.00	-0.01	-0.35	-0.49	1637128.58	482519.53	0.61	234.270	0.48	
217.00	0.780	214.260	217.00	-0.07	-0.51	-0.60	1637128.47	482519.37	0.78	229.774	1.83	
243.00	0.540	218.870	242.99	-0.17	-0.75	-0.77	1637128.30	482519.13	1.08	226.017	0.94	
250.00	0.610	242.510	249.99	-0.17	-0.79	-0.83	1637128.24	482519.09	1.14	226.341	3.50	
265.00	1.040	230.180	264.99	-0.17	-0.91	-1.00	1637128.07	482518.97	1.36	227.664	3.09	
300.00	0.410	120.850	299.99	-0.31	-1.18	-1.14	1637127.93	482518.70	1.64	223.965	3.54	
311.00	0.510	98.120	310.99	-0.38	-1.21	-1.06	1637128.01	482518.67	1.61	221.181	1.87	
329.00	0.610	90.290	328.99	-0.49	-1.22	-0.88	1637128.19	482518.66	1.51	215.864	0.70	
400.00	0.960	76.590	399.98	-0.93	-1.08	0.07	1637129.14	482518.80	1.09	176.094	0.56	
431.00	0.980	77.700	430.98	-1.13	-0.97	0.59	1637129.66	482518.91	1.13	148.823	0.09	
500.00	1.180	75.140	499.97	-1.60	-0.66	1.85	1637130.92	482519.22	1.96	109.645	0.30	
525.00	1.650	74.650	524.96	-1.81	-0.50	2.44	1637131.51	482519.38	2.50	101.530	1.88	
600.00	1.720	77.480	599.93	-2.60	0.03	4.58	1637133.65	482519.91	4.58	89.611	0.14	
621.00	2.220	83.200	620.91	-2.92	0.15	5.30	1637134.37	482520.03	5.30	88.404	2.56	
665.00	1.730	83.990	664.89	-3.64	0.32	6.80	1637135.87	482520.20	6.81	87.324	1.12	
675.00	1.550	81.640	674.88	-3.78	0.35	7.09	1637136.16	482520.23	7.10	87.145	1.92	
700.00	1.150	80.250	699.88	-4.03	0.45	7.67	1637136.74	482520.33	7.68	86.678	1.61	
703.00	1.210	83.220	702.88	-4.06	0.45	7.73	1637136.80	482520.33	7.74	86.639	2.86	
725.00	0.960	77.840	724.87	-4.24	0.52	8.14	1637137.21	482520.40	8.16	86.344	1.23	
750.00	0.910	76.930	749.87	-4.40	0.61	8.54	1637137.61	482520.49	8.56	85.919	0.21	
766.00	0.520	148.210	765.87	-4.52	0.58	8.70	1637137.77	482520.46	8.72	86.211	5.57	
861.00	0.610	194.290	860.86	-5.28	-0.28	8.80	1637137.87	482519.60	8.81	91.823	0.47	
955.00	0.780	197.630	954.86	-5.99	-1.37	8.49	1637137.56	482518.51	8.60	99.203	0.19	
1090.00	0.730	201.090	1089.84	-7.03	-3.05	7.90	1637136.97	482516.83	8.47	111.134	0.05	
1188.00	0.690	198.250	1187.84	-7.73	-4.20	7.49	1637136.56	482515.68	8.58	119.261	0.05	
1282.00	0.560	207.300	1281.83	-8.28	-5.14	7.10	1637136.17	482514.74	8.77	125.908	0.17	

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Actual Wellpath Report

MND-6D-IIS AWP Proj: 16755'

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

WELLPATH DATA (208 stations)												
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Closure Dist [ft]	Closure Dir [°]	DLS [%/100ft]	Comments
1313.00	0.470	198.950	1312.83	-8.43	-5.40	6.99	1637136.06	482514.48	8.83	127.669	0.38	
1376.00	0.460	44.950	1375.83	-8.54	-5.46	7.08	1637136.15	482514.42	8.95	127.630	1.44	
1471.00	1.280	41.660	1470.82	-8.23	-4.40	8.06	1637137.13	482515.48	9.18	118.628	0.86	
1564.00	0.270	319.240	1563.81	-7.77	-3.46	8.61	1637137.68	482516.42	9.28	111.884	1.37	
1659.00	0.370	264.900	1658.81	-7.39	-3.31	8.16	1637137.22	482516.57	8.80	112.120	0.32	
1754.00	0.340	277.070	1753.81	-7.05	-3.31	7.57	1637136.64	482516.57	8.26	113.601	0.09	
1848.00	0.340	268.830	1847.80	-6.71	-3.28	7.01	1637136.08	482516.60	7.74	115.054	0.05	
1943.00	1.160	36.080	1942.80	-6.24	-2.51	7.30	1637136.37	482517.37	7.72	108.959	1.47	
2012.00	1.250	34.750	2011.78	-5.75	-1.32	8.14	1637137.21	482518.56	8.25	99.243	0.14	
2143.00	0.830	21.500	2142.76	-4.74	0.73	9.30	1637138.37	482520.61	9.33	85.498	0.37	
2238.00	0.530	346.820	2237.76	-3.95	1.80	9.45	1637138.52	482521.68	9.62	79.218	0.52	
2332.00	0.520	331.430	2331.75	-3.12	2.60	9.15	1637138.22	482522.48	9.51	74.148	0.15	
2427.00	0.770	311.930	2426.75	-2.07	3.40	8.47	1637137.54	482523.28	9.13	68.107	0.35	
2521.00	0.930	308.040	2520.74	-0.72	4.30	7.40	1637136.47	482524.18	8.56	59.861	0.18	
2617.00	0.630	320.780	2616.73	0.55	5.18	6.45	1637135.52	482525.06	8.28	51.213	0.36	
2711.00	0.560	313.440	2710.72	1.51	5.90	5.79	1637134.86	482525.78	8.27	44.462	0.11	
2806.00	0.480	311.720	2805.72	2.35	6.48	5.16	1637134.23	482526.36	8.29	38.493	0.09	
2901.00	0.700	307.570	2900.71	3.30	7.10	4.40	1637133.47	482526.98	8.36	31.774	0.24	
2995.00	0.650	297.240	2994.71	4.31	7.70	3.47	1637132.54	482527.58	8.44	24.270	0.14	
3090.00	0.650	289.780	3089.70	5.23	8.13	2.48	1637131.55	482528.01	8.50	17.000	0.09	
3185.00	1.120	293.870	3184.69	6.47	8.68	1.13	1637130.20	482528.56	8.76	7.403	0.50	
3280.00	0.950	271.800	3279.67	7.73	9.09	-0.51	1637128.56	482528.96	9.10	356.801	0.45	
3375.00	0.920	275.840	3374.66	8.70	9.19	-2.05	1637127.02	482529.07	9.41	347.400	0.08	
3470.00	0.720	280.320	3469.65	9.63	9.37	-3.40	1637125.67	482529.25	9.97	340.062	0.22	
3564.00	0.680	260.540	3563.64	10.29	9.39	-4.53	1637124.54	482529.27	10.42	334.232	0.26	
3659.00	0.780	263.970	3658.64	10.84	9.23	-5.73	1637123.34	482529.10	10.86	328.155	0.11	
3754.00	0.790	261.860	3753.63	11.45	9.06	-7.02	1637122.05	482528.94	11.47	322.240	0.03	
3849.00	2.630	219.540	3848.58	11.17	7.29	-9.06	1637120.01	482527.17	11.63	308.833	2.23	
3944.00	4.530	217.310	3943.39	9.45	2.63	-12.72	1637116.35	482522.51	12.99	281.665	2.00	
4039.00	5.650	235.850	4038.02	8.38	-2.98	-18.86	1637110.21	482516.90	19.10	261.012	2.08	

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Actual Wellpath Report

MND-6D-HS AWP Proj: 16755'

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REFERENCE WELLPATH IDENTIFICATION

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

WELLPATH DATA (208 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]	Comments
4081.00	5.450	246.220	4079.83	8.79	-4.95	-22.40	1637106.67	482514.93	22.94	257.542	2.43	
4107.00	5.430	252.760	4105.71	9.41	-5.81	-24.71	1637104.37	482514.07	25.38	256.763	2.38	
4196.00	11.100	242.990	4193.75	11.89	-10.95	-36.37	1637092.70	482508.93	37.98	253.238	6.54	
4244.00	15.550	240.450	4240.45	13.14	-16.23	-46.09	1637082.98	482503.65	48.86	250.602	9.35	
4291.00	16.920	235.300	4285.58	13.78	-23.23	-57.19	1637071.88	482496.65	61.73	247.895	4.23	
4339.00	16.130	227.610	4331.60	12.95	-31.70	-67.86	1637061.21	482488.18	74.90	244.960	4.84	
4386.00	15.530	220.300	4376.82	10.52	-40.90	-76.75	1637052.32	482478.98	86.97	241.946	4.43	
4480.00	15.900	220.610	4467.31	4.12	-60.28	-93.27	1637035.80	482459.61	111.06	237.128	0.40	
4575.00	15.920	230.520	4558.69	-0.13	-78.44	-111.80	1637017.27	482441.44	136.58	234.946	2.86	
4670.00	15.830	230.280	4650.06	-2.21	-95.01	-131.83	1636997.25	482424.88	162.49	234.220	0.12	
4764.00	15.880	229.940	4740.49	-4.40	-111.48	-151.53	1636977.55	482408.41	188.12	233.659	0.11	
4859.00	15.810	232.830	4831.88	-6.04	-127.66	-171.79	1636957.29	482392.23	214.03	233.384	0.83	
4954.00	15.810	234.740	4923.29	-6.59	-142.95	-192.67	1636936.41	482376.94	239.91	233.427	0.55	
5048.00	15.630	236.370	5013.77	-6.34	-157.36	-213.67	1636915.41	482362.53	265.36	233.631	0.51	
5143.00	15.240	239.030	5105.35	-5.16	-170.87	-235.03	1636894.05	482349.02	290.58	233.983	0.85	
5237.00	15.400	237.240	5196.01	-3.80	-183.98	-256.12	1636872.96	482335.91	315.35	234.309	0.53	
5332.00	15.500	243.980	5287.58	-1.33	-196.38	-278.14	1636850.95	482323.52	340.48	234.777	1.89	
5379.00	14.700	261.630	5332.98	2.33	-200.00	-289.69	1636839.40	482319.89	352.02	235.379	9.89	
5426.00	17.330	277.040	5378.17	9.69	-200.01	-302.54	1636826.54	482319.88	362.68	236.531	10.59	
5478.00	20.450	282.860	5427.37	21.62	-197.04	-319.09	1636810.00	482322.85	375.02	238.305	7.00	
5521.00	22.980	274.640	5467.33	32.55	-194.69	-334.79	1636794.30	482325.20	387.28	239.821	9.19	
5569.00	25.800	271.440	5511.04	44.73	-193.67	-354.57	1636774.52	482326.23	404.02	241.357	6.49	
5616.00	27.060	282.230	5553.15	58.67	-191.14	-375.26	1636753.83	482328.75	421.14	243.008	10.55	
5663.00	28.650	294.150	5594.74	76.20	-184.26	-396.01	1636733.09	482335.63	436.78	245.047	12.30	
5710.00	32.300	302.090	5635.25	97.46	-172.97	-416.94	1636712.15	482346.92	451.40	247.468	11.55	
5758.00	36.420	306.190	5674.87	122.77	-157.74	-439.32	1636689.78	482362.15	466.78	250.249	9.84	
5805.00	42.240	310.120	5711.22	151.28	-139.30	-462.68	1636666.41	482380.59	483.20	253.244	13.46	
5852.00	47.350	312.960	5744.56	183.47	-117.33	-487.43	1636641.67	482402.56	501.35	256.466	11.67	
5900.00	52.290	314.190	5775.52	219.41	-92.04	-513.98	1636615.12	482427.84	522.16	259.847	10.48	
5947.00	57.070	314.600	5802.69	257.09	-65.22	-541.37	1636587.73	482454.66	545.29	263.131	10.20	

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Actual Wellpath Report

MND-6D-HS AWP Proj: 16755'

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

WELLPATH DATA (208 stations)												
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]	Comments
5994.00	62.660	314.920	5826.28	297.08	-36.61	-570.22	1636558.88	482483.27	571.39	266.327	11.91	
6040.00	67.780	315.560	5845.55	338.22	-6.96	-599.62	1636529.49	482512.92	599.66	269.335	11.20	
6089.00	72.260	318.310	5862.29	383.80	26.68	-631.04	1636498.07	482546.56	631.60	272.421	10.55	
6135.00	74.770	321.180	5875.35	427.72	60.34	-659.53	1636469.58	482580.22	662.28	275.228	8.10	
6184.00	78.920	322.700	5886.50	475.35	97.91	-688.93	1636440.18	482617.78	695.85	278.088	8.99	
6278.00	87.660	324.460	5897.47	568.59	172.96	-744.29	1636384.82	482692.83	764.12	283.082	9.48	
6336.00	90.770	324.640	5898.26	626.57	220.20	-777.92	1636351.19	482740.07	808.49	285.805	5.37	
6373.00	90.580	324.880	5897.83	663.57	250.41	-799.27	1636329.84	482770.28	837.58	287.396	0.83	
6468.00	90.460	324.550	5896.97	758.57	327.96	-854.15	1636274.97	482847.82	914.94	291.005	0.37	
6563.00	90.520	322.910	5896.15	853.54	404.55	-910.34	1636218.78	482924.40	996.18	293.960	1.73	
6658.00	90.490	322.640	5895.32	948.46	480.19	-967.81	1636161.31	483000.04	1080.39	296.389	0.29	
6753.00	90.370	327.290	5894.60	1043.43	557.95	-1022.33	1636106.80	483077.80	1164.68	298.624	4.90	
6847.00	90.550	329.710	5893.85	1137.25	638.09	-1071.44	1636057.69	483157.94	1247.05	300.776	2.58	
6942.00	90.490	329.130	5892.99	1231.96	719.87	-1119.77	1636009.36	483239.71	1331.20	302.736	0.61	
7037.00	90.460	328.330	5892.20	1326.75	801.07	-1169.08	1635960.06	483320.91	1417.20	304.420	0.84	
7131.00	90.520	324.390	5891.39	1420.71	879.31	-1221.14	1635908.00	483399.14	1504.78	305.757	4.19	
7225.00	90.520	321.460	5890.54	1514.63	954.30	-1277.80	1635851.34	483474.12	1594.82	306.753	3.12	
7320.00	90.430	320.140	5889.75	1609.37	1027.91	-1337.84	1635791.31	483547.74	1687.13	307.536	1.39	
7415.00	91.050	321.260	5888.53	1704.09	1101.42	-1398.00	1635731.14	483621.24	1779.76	308.233	1.35	
7510.00	90.830	321.610	5886.97	1798.90	1175.69	-1457.22	1635671.93	483695.50	1872.36	308.897	0.44	
7605.00	90.950	320.810	5885.49	1893.68	1249.73	-1516.73	1635612.43	483769.54	1965.27	309.487	0.85	
7700.00	90.680	323.540	5884.14	1988.54	1324.75	-1574.97	1635554.18	483844.56	2058.04	310.068	2.89	
7795.00	90.800	327.870	5882.91	2083.50	1403.21	-1628.48	1635500.68	483923.01	2149.64	310.750	4.56	
7889.00	91.290	325.280	5881.20	2177.44	1481.64	-1680.25	1635448.91	484001.44	2240.20	311.406	2.80	
7984.00	90.550	323.610	5879.67	2272.42	1558.92	-1735.48	1635393.68	484078.71	2332.84	311.932	1.92	
8079.00	90.860	325.360	5878.50	2367.41	1636.24	-1790.66	1635338.51	484156.03	2425.64	312.420	1.87	
8174.00	90.890	326.290	5877.05	2462.39	1714.82	-1844.02	1635285.15	484234.61	2518.14	312.921	0.98	
8268.00	90.770	327.360	5875.69	2556.33	1793.49	-1895.45	1635233.73	484313.27	2609.47	313.417	1.15	
8363.00	90.740	330.780	5874.44	2651.07	1874.96	-1944.27	1635184.91	484394.74	2701.05	313.960	3.60	
8458.00	90.950	333.700	5873.04	2745.29	1959.01	-1988.51	1635140.67	484478.78	2791.39	314.572	3.08	

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Actual Wellpath Report

MND-6D-HS AWP Proj: 16755'

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

WELLPATH DATA (208 stations)												
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Closure Dist [ft]	Closure Dir [°]	DLS [%/100ft]	Comments
8553.00	90.860	331.110	5871.54	2839.48	2043.19	-2032.50	1635096.68	484562.95	2881.96	315.150	2.73	
8648.00	91.230	327.200	5869.80	2934.19	2124.72	-2081.19	1635047.99	484644.48	2974.19	315.593	4.13	
8742.00	90.430	323.420	5868.44	3028.16	2201.99	-2134.68	1634994.51	484721.75	3066.85	315.889	4.11	
8837.00	90.550	322.640	5867.63	3123.10	2277.88	-2191.81	1634937.39	484797.64	3161.13	316.103	0.83	
8932.00	90.430	322.040	5866.82	3218.00	2353.09	-2249.85	1634879.35	484872.84	3255.59	316.285	0.64	
9026.00	90.520	324.760	5866.04	3311.95	2428.54	-2305.88	1634823.31	484948.29	3348.87	316.484	2.90	
9121.00	90.680	323.400	5865.04	3406.93	2505.47	-2361.61	1634767.59	485025.21	3443.05	316.693	1.44	
9216.00	90.860	321.130	5863.77	3501.80	2580.59	-2419.74	1634709.46	485100.33	3537.60	316.842	2.40	
9310.00	90.800	320.490	5862.40	3595.54	2653.44	-2479.14	1634650.07	485173.17	3631.37	316.945	0.68	
9405.00	90.860	320.450	5861.03	3690.24	2726.70	-2539.60	1634589.62	485246.43	3726.18	317.035	0.08	
9499.00	90.650	320.770	5859.79	3783.95	2799.34	-2599.24	1634529.97	485319.07	3820.00	317.123	0.41	
9594.00	90.520	323.830	5858.82	3878.83	2874.50	-2657.33	1634471.89	485394.22	3914.60	317.248	3.22	
9689.00	91.420	328.060	5857.21	3973.78	2953.17	-2710.51	1634418.71	485472.89	4008.50	317.453	4.55	
9784.00	91.080	326.480	5855.14	4068.68	3033.07	-2761.86	1634367.37	485552.78	4102.12	317.680	1.70	
9879.00	91.170	328.210	5853.27	4163.58	3113.03	-2813.11	1634316.12	485632.74	4195.78	317.897	1.82	
9974.00	91.080	329.870	5851.41	4258.32	3194.48	-2861.97	1634267.26	485714.18	4289.00	318.143	1.75	
10068.00	90.950	327.780	5849.74	4352.09	3274.89	-2910.61	1634218.62	485794.59	4381.39	318.370	2.23	
10163.00	90.920	324.600	5848.19	4447.05	3353.80	-2963.46	1634165.77	485873.50	4475.50	318.536	3.35	
10257.00	90.950	320.060	5846.66	4540.91	3428.18	-3020.88	1634108.35	485947.87	4569.26	318.614	4.83	
10352.00	90.740	322.570	5845.26	4635.69	3502.32	-3080.25	1634048.99	486022.01	4664.14	318.669	2.65	
10447.00	90.650	322.650	5844.10	4730.60	3577.80	-3137.94	1633991.31	486097.48	4758.91	318.747	0.13	
10541.00	90.650	320.790	5843.04	4824.44	3651.58	-3196.16	1633933.09	486171.25	4852.78	318.805	1.98	
10637.00	90.620	321.380	5841.97	4920.21	3726.27	-3256.46	1633872.79	486245.94	4948.70	318.849	0.62	
10732.00	90.740	321.100	5840.84	5015.00	3800.34	-3315.93	1633813.32	486320.01	5043.61	318.894	0.32	
10827.00	90.650	324.840	5839.69	5109.91	3876.16	-3373.13	1633756.13	486395.83	5138.35	318.969	3.94	
10922.00	91.020	327.940	5838.31	5204.87	3955.26	-3425.71	1633703.55	486474.92	5232.55	319.104	3.29	
11017.00	90.990	327.660	5836.64	5299.74	4035.64	-3476.32	1633652.94	486555.29	5326.46	319.258	0.30	
11112.00	91.080	326.100	5834.92	5394.67	4115.19	-3528.22	1633601.05	486634.84	5420.62	319.391	1.64	
11207.00	91.140	325.020	5833.08	5489.64	4193.52	-3581.93	1633547.34	486713.17	5515.06	319.497	1.14	
11302.00	91.050	323.630	5831.27	5584.62	4270.68	-3637.33	1633491.95	486790.32	5609.71	319.579	1.47	

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

WELLPATH DATA (208 stations)												
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]	Comments
11396.00	91.020	323.900	5829.57	5678.58	4346.48	-3692.88	1633436.40	486866.12	5703.45	319.648	0.29	
11491.00	91.110	324.050	5827.81	5773.55	4423.30	-3748.74	1633380.54	486942.94	5798.16	319.719	0.18	
11586.00	91.020	323.580	5826.04	5868.51	4499.97	-3804.82	1633324.46	487019.60	5892.91	319.785	0.50	
11681.00	91.140	323.270	5824.25	5963.46	4576.24	-3861.42	1633267.87	487095.87	5987.70	319.842	0.35	
11775.00	91.050	324.930	5822.45	6057.43	4652.37	-3916.53	1633212.76	487171.99	6081.43	319.908	1.77	
11870.00	91.140	326.480	5820.64	6152.40	4730.84	-3970.04	1633159.25	487250.46	6175.93	319.997	1.63	
11965.00	91.230	330.490	5818.67	6247.18	4811.79	-4019.68	1633109.61	487331.40	6269.86	320.125	4.22	
12060.00	91.200	333.780	5816.66	6341.41	4895.75	-4064.07	1633065.23	487415.35	6362.78	320.303	3.46	
12155.00	91.230	332.180	5814.64	6435.47	4980.36	-4107.21	1633022.08	487499.96	6455.47	320.488	1.68	
12249.00	91.230	329.540	5812.62	6528.95	5062.43	-4152.97	1632976.33	487582.03	6547.93	320.636	2.81	
12344.00	91.570	325.480	5810.30	6623.81	5142.52	-4203.98	1632925.33	487662.12	6642.21	320.734	4.29	
12439.00	91.450	320.750	5807.80	6718.70	5218.46	-4260.96	1632868.35	487738.05	6737.07	320.768	4.98	
12533.00	90.620	318.640	5806.10	6812.27	5290.13	-4321.75	1632807.56	487809.71	6831.03	320.753	2.41	
12628.00	90.280	320.160	5805.35	6906.81	5362.26	-4383.57	1632745.74	487881.84	6926.00	320.734	1.64	
12723.00	90.400	322.010	5804.79	7001.59	5436.17	-4443.24	1632686.08	487955.75	7020.99	320.739	1.95	
12817.00	90.370	323.690	5804.16	7095.52	5511.09	-4500.01	1632629.31	488030.66	7114.92	320.767	1.79	
12911.00	90.340	324.530	5803.57	7189.50	5587.24	-4555.11	1632574.21	488106.81	7208.76	320.811	0.89	
13006.00	90.430	328.270	5802.94	7284.45	5666.35	-4607.67	1632521.66	488185.91	7303.30	320.883	3.94	
13101.00	90.800	326.910	5801.92	7379.35	5746.55	-4658.58	1632470.74	488266.11	7397.65	320.969	1.48	
13196.00	91.140	325.660	5800.31	7474.31	5825.55	-4711.31	1632418.03	488345.11	7492.23	321.036	1.36	
13291.00	91.290	328.790	5798.29	7569.20	5905.40	-4762.72	1632366.62	488424.95	7586.65	321.114	3.30	
13385.00	91.050	327.590	5796.37	7663.04	5985.27	-4812.25	1632317.08	488504.81	7679.92	321.200	1.30	
13480.00	91.170	327.460	5794.53	7757.93	6065.40	-4863.25	1632266.09	488584.94	7774.33	321.277	0.19	
13575.00	90.800	327.720	5792.90	7852.82	6145.59	-4914.16	1632215.18	488665.12	7868.75	321.353	0.48	
13670.00	90.990	328.150	5791.42	7947.68	6226.08	-4964.59	1632164.76	488745.62	7963.12	321.432	0.49	
13764.00	90.520	327.140	5790.18	8041.57	6305.48	-5014.89	1632114.46	488825.01	8056.56	321.504	1.19	
13859.00	90.400	324.600	5789.42	8136.55	6384.11	-5068.19	1632061.17	488903.63	8151.28	321.555	2.68	
13954.00	90.430	323.990	5788.73	8231.54	6461.25	-5123.63	1632005.73	488980.77	8246.17	321.586	0.64	
14049.00	90.650	323.400	5787.83	8326.51	6537.81	-5179.87	1631949.49	489057.32	8341.10	321.610	0.66	
14143.00	90.650	323.890	5786.77	8420.48	6613.50	-5235.59	1631893.77	489133.02	8435.04	321.633	0.52	



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

WELLPATH DATA (208 stations)												
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Closure Dist [ft]	Closure Dir [°]	DLS [°/1000ft]	Comments
14238.00	91.020	321.370	5785.38	8515.38	6688.99	-5293.24	1631836.12	489208.50	8530.00	321.644	2.68	
14332.00	91.080	323.320	5783.66	8609.26	6763.39	-5350.65	1631778.71	489282.90	8623.98	321.652	2.08	
14427.00	91.080	325.370	5781.87	8704.23	6840.57	-5406.02	1631723.35	489360.07	8718.85	321.681	2.16	
14522.00	91.080	326.150	5780.08	8799.20	6919.09	-5459.46	1631669.92	489438.58	8813.60	321.725	0.82	
14616.00	91.110	327.280	5778.28	8893.14	6997.65	-5511.04	1631618.34	489517.14	8907.22	321.778	1.20	
14711.00	91.050	326.710	5776.49	8988.07	7077.31	-5562.77	1631566.61	489596.79	9001.82	321.833	0.60	
14806.00	91.140	324.890	5774.67	9083.04	7155.86	-5616.16	1631513.22	489675.34	9096.57	321.874	1.92	
14900.00	91.200	321.660	5772.75	9176.96	7231.18	-5672.35	1631457.04	489750.66	9190.51	321.888	3.44	
14994.00	91.170	322.470	5770.81	9270.82	7305.30	-5730.13	1631399.26	489824.77	9284.49	321.890	0.86	
15089.00	91.080	325.390	5768.94	9365.77	7382.07	-5786.04	1631343.35	489901.53	9379.40	321.911	3.07	
15184.00	90.800	325.280	5767.39	9460.76	7460.19	-5840.07	1631289.33	489979.66	9474.22	321.945	0.32	
15279.00	90.740	325.040	5766.11	9555.75	7538.16	-5894.34	1631235.06	490057.62	9569.06	321.977	0.26	
15374.00	90.800	325.320	5764.83	9650.74	7616.14	-5948.58	1631180.82	490135.59	9663.91	322.008	0.30	
15469.00	90.920	323.250	5763.41	9745.72	7693.26	-6004.02	1631125.38	490212.71	9758.82	322.031	2.18	
15564.00	90.890	320.870	5761.91	9840.57	7768.17	-6062.42	1631066.99	490287.61	9853.80	322.031	2.51	
15658.00	91.080	321.810	5760.29	9934.37	7841.56	-6121.13	1631008.28	490361.00	9947.78	322.024	1.02	
15753.00	91.020	324.900	5758.55	10029.30	7917.76	-6177.82	1630951.60	490437.20	10042.73	322.037	3.25	
15848.00	91.110	326.840	5756.78	10124.27	7996.38	-6231.11	1630898.31	490515.81	10137.49	322.073	2.04	
15942.00	91.050	325.820	5755.01	10218.22	8074.59	-6283.21	1630846.21	490594.02	10231.22	322.112	1.09	
16037.00	90.990	325.420	5753.32	10313.20	8152.99	-6336.85	1630792.57	490672.41	10326.03	322.144	0.43	
16131.00	91.140	324.810	5751.57	10407.19	8230.08	-6390.60	1630738.82	490749.50	10419.89	322.171	0.67	
16225.00	91.050	324.950	5749.78	10501.17	8306.95	-6444.67	1630684.76	490826.37	10513.76	322.195	0.18	
16320.00	91.050	325.840	5748.04	10596.15	8385.13	-6498.61	1630630.82	490904.55	10608.60	322.224	0.94	
16415.00	91.080	326.540	5746.27	10691.11	8464.05	-6551.46	1630577.97	490983.46	10703.36	322.259	0.74	
16510.00	91.140	327.630	5744.43	10786.03	8543.79	-6603.08	1630526.26	491063.19	10798.01	322.301	1.15	
16605.00	91.110	327.160	5742.56	10880.93	8623.80	-6654.26	1630475.18	491143.20	10892.61	322.346	0.50	
16732.00	91.080	324.610	5740.14	11007.88	8728.92	-6725.47	1630403.98	491248.31	11019.34	322.386	2.01	
16755.00	91.080	324.610	5739.70	11030.87	8747.66	-6738.78	1630390.66	491267.06	11042.32	322.391	0.00	

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

TARGETS									
Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
MND-6D-HS BHL Rev-2		5736.77	8744.03	-6744.17	1630385.28	491263.42	39°50'28.882"N	80°48'58.770"W	point
MND-6D-HS LP Rev-2		5900.00	232.63	-784.42	1636344.69	482752.50	39°49'05.631"N	80°47'40.803"W	point
MND-6 Pad LL		6499.96	11.62	43.59	1637172.66	482531.50	39°49'03.564"N	80°47'30.152"W	polygon

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Actual Wellpath Report

MND-6D-HS AWP Proj: 16755'

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REFERENCE WELLPATH IDENTIFICATION

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

WELLPATH COMPOSITION - Ref Wellbore: MND-6D-HS AWB Ref Wellpath: MND-6D-HS AWP Proj: 16755'

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
26.00	100.00	Generic gyro - northseeking (Standard)	02_MS Gyro <14-3/4"> (100'-665')	MND-6D-HS AWB
100.00	151.00	ISCWSA MWD, Rev. 2 (Standard)	01_APS EM <14-3/4"> (151'-703') Proj: 760'	MND-6D-HS AWB
151.00	200.00	Generic gyro - northseeking (Standard)	02_MS Gyro <14-3/4"> (100'-665')	MND-6D-HS AWB
200.00	265.00	ISCWSA MWD, Rev. 2 (Standard)	01_APS EM <14-3/4"> (151'-703') Proj: 760'	MND-6D-HS AWB
265.00	300.00	Generic gyro - northseeking (Standard)	02_MS Gyro <14-3/4"> (100'-665')	MND-6D-HS AWB
300.00	329.00	ISCWSA MWD, Rev. 2 (Standard)	01_APS EM <14-3/4"> (151'-703') Proj: 760'	MND-6D-HS AWB
329.00	400.00	Generic gyro - northseeking (Standard)	02_MS Gyro <14-3/4"> (100'-665')	MND-6D-HS AWB
400.00	431.00	ISCWSA MWD, Rev. 2 (Standard)	01_APS EM <14-3/4"> (151'-703') Proj: 760'	MND-6D-HS AWB
431.00	500.00	Generic gyro - northseeking (Standard)	02_MS Gyro <14-3/4"> (100'-665')	MND-6D-HS AWB
500.00	525.00	ISCWSA MWD, Rev. 2 (Standard)	01_APS EM <14-3/4"> (151'-703') Proj: 760'	MND-6D-HS AWB
525.00	600.00	Generic gyro - northseeking (Standard)	02_MS Gyro <14-3/4"> (100'-665')	MND-6D-HS AWB
600.00	621.00	ISCWSA MWD, Rev. 2 (Standard)	01_APS EM <14-3/4"> (151'-703') Proj: 760'	MND-6D-HS AWB
621.00	665.00	Generic gyro - northseeking (Standard)	02_MS Gyro <14-3/4"> (100'-665')	MND-6D-HS AWB
665.00	700.00	Generic gyro - northseeking (Standard)	03_MS Gyro GWD <12-1/4"> (675'-955')	MND-6D-HS AWB
700.00	703.00	ISCWSA MWD, Rev. 2 (Standard)	01_APS EM <14-3/4"> (151'-703') Proj: 760'	MND-6D-HS AWB
703.00	2012.00	ISCWSA MWD, Rev. 2 (Standard)	03_APS EM <12-1/4"> (703')(725'-2012')	MND-6D-HS AWB
2012.00	4081.00	NaviTrak (MagCorr)	04_BHII MWD <8-3/4"> (2012')(2143'-4081')	MND-6D-HS AWB
4081.00	16732.00	NaviTrak (AT Curve Short Spaced)	05_BHII AT Curve <8-3/4"> (4081')(4107'-16732')	MND-6D-HS AWB
16732.00	16755.00	Blind Drilling (std)	Projection to bit	MND-6D-HS AWB

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Actual Wellpath Report

MND-6D-IIS AWP Proj: 16755'

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REFERENCE WELLPATH IDENTIFICATION

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

COMMENTS

Wellpath general comments

API: 47-051-01763-0000

BHI Job #: 6650024

Rig: Nomac 79

Duration: 11.06.2014 - 11.13.2014

MS Gyro <14-3/4"> (100'-665')

APS EM <14-3/4"> (151'-703')

APS EM <12-1/4"> (703')(725'-2012')

BHI MWD <8-3/4"> (2012')(2143'-4081')

BHI AT Curve <8-3/4"> (4081')(4107'-16732')

MD Projected to TD: 16755'

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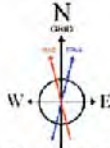
WV Department of
Environmental Protection

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

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

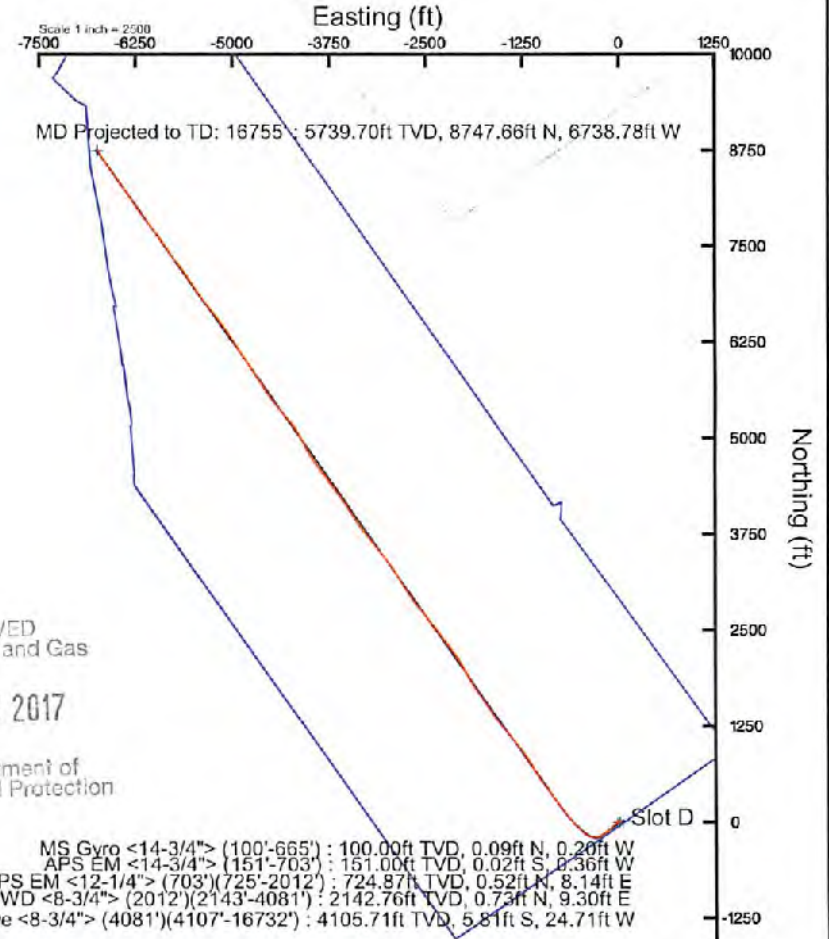
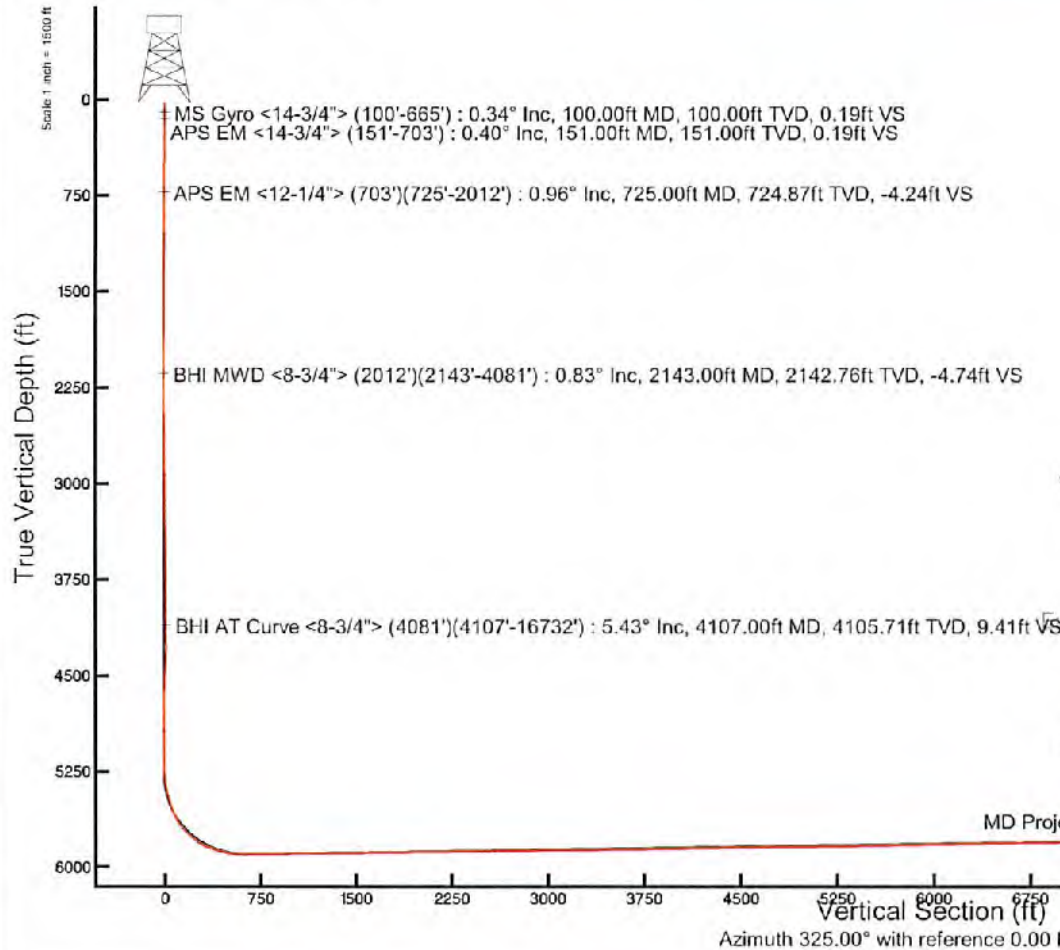
Plot reference wellpath is MND-6D-HS PWB Rev-B.0	
True vertical depths are referenced to Nomac 79 (RKB)	Grid System: NAD27 / Lambert West Virginia SP, Northern Zone (4701), US feet
Measured depths are referenced to Nomac 79 (RKB)	North Reference: Grid north
Nomac 79 (RKB) to Mean Sea Level: 746.94 feet	Scale: True distance
Mean Sea Level to Mud line (At Slot: Slot D): -720.94 feet	Depths are in feet
Coordinates are in feet referenced to Slot	Created by: kroschr on 12/30/2014

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)
Slot D	7.65	-48.71	1637129.070	482519.880
			39°49'03.443"N	80°47'30.709"W
Comment	Cluster			
Nomac 79 (RKB) to Mud line (At Slot: Slot D)			26ft	
Mean Sea Level to Mud line (At Slot: Slot D)			-720.94ft	
Nomac 79 (RKB) to Mean Sea Level			746.94ft	



API: 47-051-01763-0000
 Rig: Nomac 79
 BHI Job #: 6650024
 Duration: 11.06.2014 – 11.13.2014

User specified (HGM) Dip: 67.26° Field: 52754 nT
 Magnetic North is 7.55 degrees West of True North (at 10/30/2014)
 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 6.73 degrees



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MS Gyro <14-3/4"> (100'-665') : 100.00ft TVD, 0.09ft N, 0.20ft W
 APS EM <14-3/4"> (151'-703') : 151.00ft TVD, 0.02ft S, 0.36ft W
 APS EM <12-1/4"> (703')(725'-2012') : 724.87ft TVD, 0.52ft N, 8.14ft E
 BHI MWD <8-3/4"> (2012')(2143'-4081') : 2142.76ft TVD, 0.73ft N, 9.30ft E
 BHI AT Curve <8-3/4"> (4081')(4107'-16732') : 4105.71ft TVD, 5.81ft S, 24.71ft W