

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

API 47-051-01746 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 AHS  
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 39.817733 Easting 80.791521  
Landing Point of Curve Northing 39.821217 Easting 80.789294  
Bottom Hole Northing 39.848214 Easting 80.814545

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 09/15/2014 Date drilling ceased 10/02/2014  
Date completion activities began 06/20/2017 Date completion activities ceased 07/09/2017  
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

Reviewed by: \_\_\_\_\_

API 47-051 - 01746 Farm name Consolidated Coal Company Well number MND 06 AHS

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"	719'	New	J-55		Y
Intermediate 1	12.38"	9 5/8"	1993'	New	HCK-55		Y
Intermediate 2							
Intermediate 3							
Production	8-3/4" & 8-1/2"	5 1/2"	18,674'	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	481	15.6	1.39	668.59	0	8
Intermediate 1	Type 1 / Class A	691	15.6	1.18	815.38	0	8
Intermediate 2							
Intermediate 3							
Production	Type 1 / Class A	lead 685 tail 2475	14.8	Lead 1.54 tail 1.37	total 4,445.65	855	9
Tubing							

Drillers TD (ft) 18,674' Loggers TD (ft) 18,515.76

Deepest formation penetrated Marcellus Plug back to (ft) \_\_\_\_\_

Plug back procedure \_\_\_\_\_

Kick off depth (ft) 4125'

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).

320 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 \_\_\_\_\_



API 47- 051 - 01746 Farm name Consolidated Coal Company Well number MND 06 AHS

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>		
<u>Marcellus</u>	<u>6,160'</u>	<u>TVD</u>	<u>18,498'</u> <u>MD</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump

SHUT-IN PRESSURE Surface na-frac only not tested        psi Bottom Hole        psi DURATION OF TEST        hrs

OPEN FLOW Gas        mcfpd Oil        bpd NGL        bpd Water        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)
	0		0		

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 Haliburton Energy Services  
Address 121 Champion Way, Suite 110 City Canonsburg State PA Zip 15317

Please insert additional pages as applicable.

Completed by Dee Swiger Telephone 724-820-3061  
Signature  Title Regulatory Analyst, III Date 07/20/2017

## Perforations

API	Well Name	Date	Top (ftKB)	Btm (ftKB)	Bnch/Stg	Enter ed Shot Total	Est Hole Dia (in)
47-051-01746	MND-6A-HS	7/9/2017	6,160.00	6,342.00	59	58	
47-051-01746	MND-6A-HS	7/9/2017	6,367.00	6,544.00	58	58	
47-051-01746	MND-6A-HS	7/8/2017	6,571.00	6,746.00	57	58	
47-051-01746	MND-6A-HS	7/8/2017	6,771.00	6,948.00	56	58	
47-051-01746	MND-6A-HS	7/8/2017	6,973.00	7,150.00	55	58	
47-051-01746	MND-6A-HS	7/8/2017	7,175.00	7,352.00	54	58	
47-051-01746	MND-6A-HS	7/7/2017	7,377.00	7,554.00	53	58	
47-051-01746	MND-6A-HS	7/7/2017	7,579.00	7,756.00	52	58	
47-051-01746	MND-6A-HS	7/7/2017	7,784.00	7,956.00	51	58	
47-051-01746	MND-6A-HS	7/7/2017	7,983.00	8,158.00	50	58	
47-051-01746	MND-6A-HS	7/6/2017	8,377.00	8,379.00	49	58	
47-051-01746	MND-6A-HS	7/6/2017	8,387.00	8,564.00	48	58	
47-051-01746	MND-6A-HS	7/6/2017	8,589.00	8,764.00	47	58	
47-051-01746	MND-6A-HS	7/5/2017	8,792.00	8,968.00	46	58	
47-051-01746	MND-6A-HS	7/5/2017	8,993.00	9,168.00	45	58	
47-051-01746	MND-6A-HS	7/5/2017	9,195.00	9,372.00	44	58	
47-051-01746	MND-6A-HS	7/4/2017	9,397.00	9,544.00	43	58	
47-051-01746	MND-6A-HS	7/4/2017	9,569.00	9,716.00	42	58	
47-051-01746	MND-6A-HS	7/4/2017	9,741.00	9,783.00	41B	28	
47-051-01746	MND-6A-HS	7/3/2017	9,801.00	9,978.00	41A	58	
47-051-01746	MND-6A-HS	7/3/2017	10,004.00	10,180.00	40	58	
47-051-01746	MND-6A-HS	7/3/2017	10,205.00	10,379.00	39	58	
47-051-01746	MND-6A-HS	7/3/2017	10,407.00	10,579.00	38	58	
47-051-01746	MND-6A-HS	7/3/2017	10,609.00	10,786.00	37	58	
47-051-01746	MND-6A-HS	7/2/2017	10,811.00	10,988.00	36	58	
47-051-01746	MND-6A-HS	7/2/2017	11,013.00	11,190.00	35	58	
47-051-01746	MND-6A-HS	7/2/2017	11,215.00	11,392.00	34	58	
47-051-01746	MND-6A-HS	7/1/2017	11,417.00	11,589.00	33	58	
47-051-01746	MND-6A-HS	7/1/2017	11,619.00	11,796.00	32	58	
47-051-01746	MND-6A-HS	7/1/2017	11,819.00	11,998.00	31	58	
47-051-01746	MND-6A-HS	7/1/2017	12,023.00	12,200.00	30	58	
47-051-01746	MND-6A-HS	6/30/2017	12,225.00	12,398.00	29	58	
47-051-01746	MND-6A-HS	6/30/2017	12,427.00	12,604.00	28	58	
47-051-01746	MND-6A-HS	6/30/2017	12,629.00	12,806.00	27	58	
47-051-01746	MND-6A-HS	6/30/2017	12,831.00	13,008.00	26	58	
47-051-01746	MND-6A-HS	6/29/2017	13,033.00	13,210.00	25	58	
47-051-01746	MND-6A-HS	6/29/2017	13,239.00	13,412.00	24	58	
47-051-01746	MND-6A-HS	6/29/2017	13,442.00	13,614.00	23	58	
47-051-01746	MND-6A-HS	6/29/2017	13,639.00	13,681.00	22B	28	
47-051-01746	MND-6A-HS	6/29/2017	13,699.00	13,872.00	22A	58	
47-051-01746	MND-6A-HS	6/28/2017	13,897.00	14,074.00	21	58	
47-051-01746	MND-6A-HS	6/28/2017	14,099.00	14,276.00	20	58	
47-051-01746	MND-6A-HS	6/28/2017	14,307.00	14,437.00	19C	58	
47-051-01746	MND-6A-HS	6/27/2017	14,453.00	14,495.00	19B	28	
47-051-01746	MND-6A-HS	6/27/2017	14,513.00	14,686.00	19A	58	
47-051-01746	MND-6A-HS	6/27/2017	14,711.00	14,888.00	18	58	
47-051-01746	MND-6A-HS	6/27/2017	14,913.00	15,090.00	17	58	
47-051-01746	MND-6A-HS	6/26/2017	15,115.00	15,292.00	16	58	
47-051-01746	MND-6A-HS	6/26/2017	15,317.00	15,492.00	15	58	
47-051-01746	MND-6A-HS	6/26/2017	15,519.00	15,696.00	14	58	
47-051-01746	MND-6A-HS	6/25/2017	15,721.00	15,894.00	13	58	
47-051-01746	MND-6A-HS	6/25/2017	15,923.00	16,100.00	12	58	
47-051-01746	MND-6A-HS	6/25/2017	16,125.00	16,297.00	11	58	
47-051-01746	MND-6A-HS	6/23/2017	16,327.00	16,504.00	10	58	
47-051-01746	MND-6A-HS	6/23/2017	16,529.00	16,705.00	9	58	
47-051-01746	MND-6A-HS	6/23/2017	16,731.00	16,908.00	8	58	
47-051-01746	MND-6A-HS	6/22/2017	16,932.00	17,112.00	7	58	
47-051-01746	MND-6A-HS	6/22/2017	17,137.00	17,312.00	6	58	
47-051-01746	MND-6A-HS	6/21/2017	17,337.00	17,512.00	5	58	
47-051-01746	MND-6A-HS	6/21/2017	17,539.00	17,671.00	4C	53	

## Perforations

API	Well Name	Date	Top (ftKB)	Btm (ftKB)	Bnch/Stg	Enter ed Shot Total	Est Hole Dia (in)
47-051-01746	MND-6A-HS	6/21/2017	17,681.00	17,723.00	4B	28	
47-051-01746	MND-6A-HS	6/21/2017	17,741.00	17,912.00	4A	58	
47-051-01746	MND-6A-HS	6/20/2017	17,943.00	18,120.00	3	58	
47-051-01746	MND-6A-HS	6/20/2017	18,145.00	18,322.00	2	58	
47-051-01746	MND-6A-HS	6/20/2017	18,347.00	18,498.00	1	58	

**Well Header**

API  
47-051-01746

Well Name  
MND-6A-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)	Proppant Deliver (lb)	Vol Slurry Total (gal)
1 Inj Test	6/20/2017	21.4	7,985.0		5,994.0	0.0	37,926.00
STG #1	6/20/2017	84.0	8,396.0		3,339.0	601,398.0	666,960.00
STG #2	6/21/2017	89.2	8,314.0		3,753.0	599,638.0	682,458.00
STG #3	6/22/2017	86.9	8,367.0		4,112.0	596,442.0	629,370.00
STG #4A	6/22/2017	73.3	9,516.0		4,880.0	106,318.0	281,190.00
STG #4B	6/22/2017	73.0	8,545.0		3,933.0	236,214.0	497,196.00
STG #4C	6/22/2017	85.5	8,276.0		4,182.0	840,892.0	713,874.00
STG #5	6/23/2017	83.7	8,384.0		4,209.0	593,618.0	658,602.00
STG #6	6/23/2017	82.9	8,161.0		4,166.0	602,901.0	792,204.00
STG #7	6/23/2017	78.9	7,990.0		4,355.0	601,499.0	686,238.00
STG #8	6/24/2017	83.0	8,507.0		4,433.0	616,907.0	620,592.00
STG #9	6/24/2017	87.0	8,587.0		4,034.0	600,287.0	572,754.00
STG #10	6/24/2017	87.9	8,725.0		4,847.0	602,201.0	765,744.00
STG #11	6/24/2017	86.2	8,538.0		4,367.0	601,394.0	574,014.00
STG #12	6/26/2017	85.5	8,417.0		4,321.0	601,442.0	569,562.00
STG #13	6/26/2017	80.7	7,921.0		4,550.0	559,530.0	556,248.00
STG #14	6/27/2017	81.9	8,056.0		4,317.0	601,431.0	561,204.00
STG #15	6/27/2017	89.1	8,195.0		4,476.0	600,010.0	668,514.00
STG #16	6/27/2017	82.5	7,703.0		4,363.0	600,630.0	571,200.00
STG #17	6/27/2017	88.2	8,003.0		4,229.0	599,804.0	566,790.00
STG #18	6/28/2017	91.5	8,322.0		4,456.0	600,140.0	547,386.00
STG #19 A	6/28/2017	51.5	9,623.0		5,912.0	6,460.0	192,192.00
STG #19 B	6/28/2017	71.0	8,307.0		4,547.0	99,382.0	349,818.00
STG #19 C	6/29/2017	82.0	8,419.0		4,531.0	1,050,250.0	907,368.00
STG #20	6/29/2017	91.5	8,213.0		4,285.0	601,590.0	562,002.00
STG #21	6/29/2017	89.4	8,160.0		4,320.0	601,651.0	581,028.00
STG #22A	7/1/2017	70.9	9,326.0		4,699.0	9,102.0	160,146.00
STG #22 B	7/1/2017	90.0	7,975.0		4,384.0	782,020.0	705,096.00
STG #23	7/1/2017	89.9	8,503.0		4,469.0	602,400.0	561,036.00
STG #24	7/1/2017	81.3	7,983.0		4,140.0	602,034.0	573,804.00
STG #25	7/2/2017	85.3	7,833.0		4,532.0	600,067.0	513,366.00
STG #26	7/2/2017	88.5	7,985.0		4,384.0	601,930.0	517,524.00
STG #27	7/2/2017	89.8	8,352.0		4,296.0	601,510.0	516,978.00
STG #28	7/2/2017	85.6	7,913.0		4,655.0	409,244.0	452,046.00
STG #29	7/3/2017	82.5	7,389.0		4,682.0	595,890.0	596,400.00
STG #30	7/3/2017	86.7	7,593.0		4,335.0	702,180.0	631,092.00
STG #31	7/3/2017	92.7	8,487.0		4,876.0	609,024.0	538,566.00
STG #32	7/3/2017	76.4	8,729.0		4,761.0	659,403.0	753,858.00
STG #33	7/3/2017	97.0	8,332.0		4,662.0	638,735.0	524,160.00
STG #34	7/3/2017	94.3	8,355.0		4,327.0	602,945.0	517,020.00
STG #35	7/3/2017	98.4	8,422.0		4,398.0	603,424.0	571,914.00
STG #36	7/3/2017	98.4	8,112.0		4,281.0	602,527.0	517,062.00
STG #37	7/4/2017	88.9	7,914.0		4,504.0	554,734.0	534,744.00
STG #38	7/4/2017	95.6	8,143.0		4,228.0	649,037.0	22,496,418.00
STG #39	7/4/2017	94.3	8,680.0		4,363.0	600,672.0	23,143,302.00
STG #40	7/4/2017	89.3	8,062.0		4,347.0	601,595.0	21,923,076.00
STG #41A	7/5/2017	81.3	9,024.0		4,604.0	103,022.0	15,431,766.00
STG #41B	7/5/2017	89.3	7,743.0		4,670.0	659,239.0	28,010,514.00
STG #42	7/5/2017	74.2	8,758.0		4,191.0	629,115.0	31,847,046.00
STG #43	7/5/2017	78.5	8,572.0		4,519.0	601,247.0	27,226,290.00
STG #44	7/6/2017	85.4	8,156.0		4,741.0	601,461.0	30,281,748.00

## WR-35 - Stimulation Information Per Stage

Int Des	Start Date	Slurry Rate Avg (bbl/min)	P Treat Avg (psi)	P Breakdown (psi)	ISIP (psi)	Propan Deliver (lb)	Vol Slurry Total (gal)
STG #45	7/6/2017	97.0	8,374.0		4,856.0	488,976.0	25,548,768.00
STG #46	7/6/2017	92.9	7,754.0		4,158.0	713,008.0	26,080,362.00
STG #47	7/6/2017	95.2	8,134.0		4,308.0	601,679.0	24,051,132.00
STG #48	7/6/2017	83.2	7,338.0		4,495.0	596,953.0	24,403,218.00
STG #49	7/6/2017	90.5	7,296.0		4,807.0	600,544.0	36,172,458.00
STG #50	7/7/2017	93.8	7,697.0		4,783.0	599,104.0	20,629,392.00
STG #51	7/7/2017	91.8	7,712.0		4,237.0	598,979.0	21,444,234.00
STG #52	7/7/2017	89.6	7,807.0		4,588.0	572,545.0	26,816,958.00
STG #53	7/7/2017	88.2	7,164.0		4,046.0	626,020.0	26,214,762.00
STG #54	7/8/2017	97.4	7,438.0		4,231.0	600,896.0	19,749,744.00
STG #55	7/8/2017	92.8	7,036.0		4,234.0	598,691.0	20,395,116.00
STG #56	7/8/2017	90.5	6,747.0		4,328.0	597,710.0	19,891,326.00
STG #57	7/8/2017	93.4	6,842.0		4,125.0	599,264.0	18,542,160.00
STG #58	7/9/2017	87.1	6,422.0		4,362.0	615,102.0	19,195,092.00
STG #59	7/9/2017	92.6	6,716.0		4,072.0	608,959.0	18,471,180.00



# Hydraulic Fracturing Fluid Product Component Information Disclosure



Job Start Date:	6/20/2017
Job End Date:	7/9/2017
State:	West Virginia
County:	Marshall
API Number:	47-051-01746-00-00
Operator Name:	Noble Energy, Inc.
Well Name and Number:	MND 6 A
Latitude:	39.81773333
Longitude:	-80.79152194
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	5,911
Total Base Water Volume (gal):	35,771,233
Total Base Non Water Volume:	0

## 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)**	Comments
Fresh Water	Operator	Base Fluid					
			Water	7732-18-5	100.00000	88.70086	Density = 8.340
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.29197	



HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor			Listed Below				
B-84	X-Chem	Biocide			Listed Below				
SC-30	X-Chem	Scale Inhibitor			Listed Below				
Items above are Trade Names with the exception of Base Water. Items below are the individual ingredients.									
			Crystalline silica, quartz	14808-60-7	100.00000	10.98998			
			Hydrochloric acid	7647-01-0	7.50000	0.02190			
			Guar gum	9000-30-0	100.00000	0.01242			
			Acetic anhydride	108-24-7	100.00000	0.00304			
			Acetic acid	64-19-7	60.00000	0.00182			
			Ethanol	64-17-5	60.00000	0.00061			
			Oxyalkylated phenolic resin	Proprietary	30.00000	0.00041			
			Heavy aromatic petroleum naphtha	64742-94-5	30.00000	0.00031			
			Methanol	67-56-1	60.00000	0.00030			
			Sodium persulfate	7775-27-1	100.00000	0.00021			
			Ethoxylated alcohols	Proprietary	30.00000	0.00015			
			Reaction product of acetophenone, formaldehyde, thiourea and oleic acid in dimethyl formamide	68527-49-1	30.00000	0.00015			
			Fatty acids, tall oil	Proprietary	30.00000	0.00015			
			Olefins	Proprietary	5.00000	0.00006			

