

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

API 47-051-01765 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 MHS  
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 39.817622 Easting 80.791759  
Landing Point of Curve Northing 39.815344 Easting 80.799604  
Bottom Hole Northing 39.830658 Easting 80.813932

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

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Date permit issued 07/02/2014 Date drilling commenced 08/03/2014 Date drilling ceased 12/23/2014  
Date completion activities began 04/04/2017 Date completion activities ceased 04/25/2017  
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  
2/7/18

Reviewed by:  
*[Signature]*  
03/02/2018

API 47-051 - 01765 Farm name Consolidated Coal Company Well number MND 06 MHS

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"	113'	New	H-40		Y
Coal	17.5"	13 3/8"	713'	New	J-55		N
Intermediate 1	12.38"	9 5/8"	2026'	New	HCK-55		Y
Intermediate 2							
Intermediate 3							
Production	8-3/4" & 8-1/2"	5 1/2"	13,727.3'	New	P-110	334.0	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 <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	192	15.6	1.20	230.4	0	8
Intermediate 1	Type 1 / Class A	728	15.6	1.18	859.04	0	8
Intermediate 2							
Intermediate 3							
Production	Type 1 / Class A	lead 700 tail 1983	14.8	Lead 1.54 tail 1.37	total 3794.71	1815.0	8
Tubing							

Drillers TD (ft) 13527 Loggers TD (ft) 13182  
 Deepest formation penetrated Marcellus Plug back to (ft) \_\_\_\_\_  
 Plug back procedure \_\_\_\_\_

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Kick off depth (ft) 2108

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).  
 219 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 - 01765 Farm name Consolidated Coal Company Well number MND 06 MHS

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>		
<u>Marcellus</u>	<u>5837</u>	<u>TVD</u>	<u>13527</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 \_\_\_\_\_ psi Bottom Hole \_\_\_\_\_ psi DURATION OF TEST \_\_\_\_\_ hrs

OPEN FLOW Gas 44500 mcfpd Oil 1485.99 bpd NGL 2781.24 bpd Water 392 bpd GAS MEASURED BY  Estimated  Orifice  Pilot

LITHOLOGY/ FORMATION	TOP	BOTTOM	TOP	BOTTOM	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H <sub>2</sub> S, ETC)
	DEPTH IN FT NAME TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	
	<u>0</u>		<u>0</u>		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 Schlumberger  
Address 4600 J. Barry Ct., Ste 200 City Canonsburg State PA Zip 15317

Please insert additional pages as applicable.

Completed by Logan Boughal Telephone 832-639-7447  
Signature [Signature] Title Regulatory Analyst II Date 12-11-2017

## 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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Shale	8254	8341	8890	8983	
Clinton Sand	8341	8355	8983	8998	
Shale	8355	8424	8998	9073	
Medina Sand	8424	8523	9073	9179	
Queenston Shale	8523	9280	9179	9995	
Reedsville Shale	9280	9898	9995	10660	Gas
Utica Shale	9898	10511	10660	not encountered	
Point Pleasant	10511	10631	not encountered	not encountered	
Trenton Limestone	10631		not encountered	not encountered	



Hydraulic Fracturing Fluid Product Component Information Disclosure

Fracture Date	2017-04-25
State	West Virginia
County	Marshall
API Number	4705101765
Operator Name	NOBLE ENERGY INC
Well Name and Number	MND 6 M
Longitude	-80.79
Latitude	39.82
Long/Lat Projection	NAD27
Indian/Federal	none
Production Type	Gas
True Vertical Depth (TVD):	5,837
Total Water Volume (gal):	19,118,826

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)**	Ingredient Mass lbs	Comments	Company	First Name	Last Name	Email	Phone
Fresh Water	Operator	Base Fluid	Water	7732-18-5	100.00%	88.29979%	15925292	Density = 8.330					
FE-1A ACIDIZING COMPOSITION	Halliburton	Additive	Listed Below	Listed Below			0	NA					
FR-76	Halliburton	Friction Reducer	Listed Below	Listed Below			0	NA					
HA-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor	Listed Below	Listed Below			0	NA					
HYDROCHLORIC ACID	Halliburton	Solvent	Listed Below	Listed Below			0	NA					
OILPERMA	Halliburton	Non-ionic Surfactant	Listed Below	Listed Below			0	NA					
SAND-COMMON WHITE-100 MESH, SSA-2, BULK	Halliburton	Proppant	Listed Below	Listed Below			0	NA					
1100009576 SAND-PREMIUM WHITE-4070, BULK	Halliburton	Proppant	Listed Below	Listed Below			0	NA					
SP BREAKER	Halliburton	Breaker	Listed Below	Listed Below			0	NA					
WG-38 GELLING AGENT	Halliburton	Gelling Agent	Listed Below	Listed Below			0	NA					
MSDS and Non-MSDS ingredients are listed below the green line													
Ingredients	Listed Above	Listed Above	1,2,4 Trimethylbenzene	95-63-6	1.00%	0.00001%	18						
			Acetic acid	64-19-7	60.00%	0.00171%	3092						
			Acetic anhydride	108-24-7	100.00%	0.00266%	5153						
			Acrylamide acrylate copolymer	Proprietary	30.00%	0.01723%	31094	Denise Tuck, Halliburton, 3000 N. Sam Houston Pkwy E., Houston, TX 77032, 281-871-6226	Halliburton	Denise	Tuck	Denise.Tuck@Halliburton.com	281-871-6226
			Crystalline silica, quartz	14808-60-7	100.00%	11.50691%	20754100						
			Ethanol	64-17-5	60.00%	0.00058%	1040						
			Ethoxylated alcohols	Proprietary	30.00%	0.00014%	256						
			Fatty acids, tall oil	Proprietary	0.0001%	0.00014%	256						
			Guar gum	5000-30-0	100.00%	0.00189%	1961						
			Heavy aromatic petroleum naphtha	54742-94-5	30.00%	0.00029%	500						
			Hydrochloric acid	7647-01-0	7.50%	0.00978%	17645.875						
			Hydrotreated light petroleum distillate	64742-47-8	30.00%	0.01723%	31094						
			Inorganic salt	Proprietary	30.00%	0.01723%	31094						
			Methanol	67-56-1	60.00%	0.00028%	512						
			Naphthalene	91-20-3	5.00%	0.00035%	87						
			Olefins	Proprietary	5.00%	0.00006%	104						
			Oxyalkylened phenolic resin	Proprietary	30.00%	0.00038%	694						
			Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-, branched	127087-87-0	5.00%	0.00005%	87						
			Propargyl alcohol	107-19-7	10.00%	0.00005%	86						

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# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	4/25/2017
Job End Date:	4/25/2017
State:	West Virginia
County:	Marshall
API Number:	47-051-01765-08-00
Operator Name:	Noble Energy, Inc.
Well Name and Number:	MND 6 M
Latitude:	39.81754694
Longitude:	-80.79194667
Datum:	NAD27
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	5,837
Total Base Water Volume (gal):	19,118,826
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	88.29979	Density = 8.330
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.16492	

SAND-COMMON WHITE-100 MESH, SSA-2, BULK (100003676)	Halliburton	Proppant					
				Listed Below			
HYDROCHLORI C ACID	Halliburton	Solvent					
				Listed Below			
SAND- PREMIUM WHITE-40/70, BULK	Halliburton	Proppant					
				Listed Below			
FR-76	Halliburton	Friction Reducer					
				Listed Below			
OILPERM A	Halliburton	Non-ionic Surfactant					
				Listed Below			
WG-36 GELLING AGENT	Halliburton	Gelling Agent					
				Listed Below			
FE-1A ACIDIZING COMPOSITION	Halliburton	Additive					
				Listed Below			
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor					

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				Listed Below			
SP BREAKER	Halliburton	Breaker					
				Listed Below			
SC-30	X-Chem	Scale Inhibitor					
				Listed Below			
B-84	X-Chem	Biocide					
				Listed Below			

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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	11.50691	
			Inorganic salt	Proprietary	30.00000	0.01723	
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.01723	
			Acrylamide acrylate copolymer	Proprietary	30.00000	0.01723	Denise Tuck, Halliburton, 3000 N. Sam Houston Pkwy E., Houston, TX 77032, 281-871-6226
			Hydrochloric acid	7647-01-0	7.50000	0.00978	
			Acetic anhydride	108-24-7	100.00000	0.00286	
			Acetic acid	64-19-7	60.00000	0.00171	
			Guar gum	9000-30-0	100.00000	0.00109	
			Ethanol	64-17-5	60.00000	0.00058	
			Oxyalkylated phenolic resin	Proprietary	30.00000	0.00038	
			Heavy aromatic petroleum naphtha	64742-94-5	30.00000	0.00029	
			Methanol	67-56-1	60.00000	0.00028	

			Reaction product of acetophenone, formaldehyde, thiourea and oleic acid in dimethyl formamide	68527-49-1	30.00000	0.00014	
			Ethoxylated alcohols	Proprietary	30.00000	0.00014	
			Fatty acids, tall oil	Proprietary	30.00000	0.00014	
			Olefins	Proprietary	5.00000	0.00006	
			Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-, branched	127087-87-0	5.00000	0.00005	
			Naphthalene	91-20-3	5.00000	0.00005	
			Propargyl alcohol	107-19-7	10.00000	0.00005	
			Sodium persulfate	7775-27-1	100.00000	0.00003	
			1,2,4 Trimethylbenzene	95-63-6	1.00000	0.00001	
			Sodium sulfate	7757-82-6	0.10000	0.00000	
			Sodium Hydroxide	1310-73-2	1.50000		
			Water	7732-18-5	100.00000		
			n-Alkyl dimethyl benzyl ammonium chloride	68424-85-1	10.00000		
			Ethanol	64-17-5	5.00000		
			Didecyl dimethyl ammonium chloride	7173-51-5	10.00000		
			Glutaraldehyde	111-30-8	30.00000		

\* Total Water Volume sources may include various types of water including fresh water, produced water, and recycled water

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

\*\*\* If you are calculating a percentage of total ingredients do not add the water volume below the green line to the water volume above the green line

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

Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)