



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304
(304) 926-0450
(304) 926-0452 fax

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

PERMIT MODIFICATION APPROVAL

February 06, 2015

NOBLE ENERGY, INC.
333 TECHNOLOGY DRIVE, SUITE 116
CANONSBURG, PA 15317

Re: Permit Modification Approval for API Number 5101764 , Well #: MND 99 V
MODIFIED CASING PROGRAM

Oil and Gas Operator:

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

Please call James Martin at 304-926-0499, extension 1654 if you have any questions.

Sincerely,

Gene Smith *JMM*
Assistant Chief of Permitting
Office of Oil and Gas

MODIFIED

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator: Noble Energy, Inc. 494501907 Marshall Franklin Powhatan Point
333 Technology Drive Suite 116 Canonsburg, PA 15317 Operator ID County District Quadrangle

2) Operator's Well Number: MND 99 V (API 47-051-01764) 3) Elevation: 1192'

4) Well Type: (a) Oil _____ or Gas X _____
 (b) If Gas: Production X/Other / Underground Storage _____
 Deep _____ / Shallow X _____

5) Proposed Target Formation(s): Marcellus, Burkett Proposed Target Depth: Deepest 6237'

6) Proposed Total Depth: 6389'TVD 6825 MD Feet Formation at Proposed Total Depth: Huntersville Chert

7) Approximate fresh water strata depths: 518', 655'

8) Approximate salt water depths: None noted in offsets

9) Approximate coal seam depths: Sewickley 673', Pittsburgh 763'

10) Approximate void depths, (coal, Karst, other): None anticipated; drilling in Pillar-see attached map

11) Does land contain coal seams tributary to active mine? Yes, Ireland Mine

12) Describe proposed well work and fracturing methods in detail (attach additional sheets if needed)
Well is to be drilled at a slight deviation (schematic attached) to the Marcellus between two MND 3 laterals.
This well will be used to observe and measure fracturing data from the MND 3 laterals. Additional information is attached describing our proposed well work and data gathering.

13) **CASING AND TUBING PROGRAM** JIN 9/24/2014

TYPE	SPECIFICATIONS			FOOTAGE INTERVALS		CEMENT
	Size	Grade	Weight per ft	For Drilling	Left in Well	Fill -up (Cu. Ft.)
Conductor	20	New	94#	40	40	Stabilize surface fill/soil
Fresh Water	9 5/8	55	36#	1112	1112	casing stuck at 1112 perforated at 800' and cemented from there.
Coal	"	"	"	"	"	
Intermediate						
Production	4 1/2	P-110	11.6	6468	6468	TOC >=500' above 9.625 shoe Plus 30 % excess
Tubing						Received
Liners						SEP 26 2014

Packers: Kind: Please see well prognosis and procedure.
 Sizes: _____
 Depths Set _____

MODIFIED



DRILLING WELL PLAN
MND-99V
Marcellus Observation Well
Marshall County, WV

MND-99V SHL (Lat/Long) (491736.63N, 1638825.55E) (NAD27)

Ground Elevation 1192'
Azm 56°

MND-99V BHL (Lat/Long) (492004.45N, 1639222.41E) (NAD27)

WELLBORE DIAGRAM		HOLE CASING	GEOLOGY	Top	Base	MUD	CEMENT	CENTRALIZERS	CONDITIONING	COMMENTS
	26	20" 94#	Conductor	40	40	AIR	To Surface	N/A	Ensure the hole is clean at TD.	Stabilize surface fill/soil. Conductor casing = 0.438" wall thickness
	12-3/8"	9-5/8" 36# HCK-55 BTC	Pittsburgh Coal Surface/Coal Casing	714	722	AIR	15.6 ppg Class A to surface plus 50% Excess Yield = 1.18	Bow Spring on first 2 joints then every third joint to 100' form surface	Once casing is at setting depth, circulate a minimum of one hole volume prior to pumping cement.	Surface/Coal casing = 0.352" wall thickness Burst=3520psi Casing stuck at 1112', perforated at 800' and cemented from there.
				1112	1112					
	8-3/4"	4-1/2" 11.6# P-110 BTC	Price Formation Weir Sand Contingency Int. Casing KOP Speechley Drop to Vertical Angola Rheinstreet Sonyea Cashaqua Middlesex Burkett Tully Limestone Hamilton Marcellus Onondaga TD	2270	2270	AIR	14.8 ppg Class A TOC >= 500' above 9 625" shoe plus 30% Excess	Rigid Bow Spring centralizers every other joint to TOC	Once casing is at setting depth, circulate a minimum of two hole volumes prior to pumping cement.	6DLS build, Tangent @ 19°, 6DLS drop back to vertical Production casing = 0.25" wall thickness Burst=10690 psi
				2430	2430					
				2680	2680					
				2700 MD	2700 TVD					
				3586	3586					
				4170 MD	4100 TVD					
5094				5716						
5716				5987						
5987				5917						
5917				6068						
6068	6091									
6158	6176									
6176	6202									
6202	6237									
6237	6290									
6299	6299									
6397 TVD	6488' MD)									

4705101764M

JIN 9/24/2014

Received

SEP 26 2014

Office of Oil and Gas
 WV Dept. of Environmental Protection

5101764M



Dee Swiger
Regulatory Analyst III

September 24, 2014
West Virginia Department of Environmental Protection
Office of Oil and Gas,
601 57th Street, SE
Charleston, WV 25304

Re: Casing Modification for MND 99 V API# 47-051-01764

Dear Office of Oil and Gas

Enclosed please find a modification to the casing program for the above referenced well. Mr. Nicholson gave verbal approval to the rig to make the changes. This well is located in Marshall County, WV.

If any further information or correspondence is required, please contact me at Office (724)820-3061 Cell 412-310-8967 or Dswiger@nobleenergyinc.com.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Dee Swiger', written over the typed name.

Dee Swiger

DS/

Enclosure(s):

Received
SEP 26 2014
Office of Oil and Gas
WV Dept. of Environmental Protection