west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
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Austin Caperton, Cabinet Secretary
www.dep.wv.gov

Monday, June 24, 2019
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

HG ENERGY II APPALACHIA, LLC
5260 DUPONT ROAD

PARKERSBURG, WV 26101

Re: Permit Modification Approval for 1208 N-4H
47-033-05954-00-00

Elevation change

HG ENERGY II APPALACHIA, LLC

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.

If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin
Chief

Operator's Well Number: 1208 N-4H
Farm Name: LINDA & WILLIAM W. BRODWATER III
U.S. WELL NUMBER: 47-033-05954-00-00
Horizontal 6A New Drill
Date Modification Issued: June 24, 2019

WW-6B
(04/15)

API NO. 47- 033 - 05954
OPERATOR WELL NO. Nutter 1208 N-4H
Well Pad Name: Nutter 1208

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

1) Well Operator: HG Energy II Appalachia, L	494519932	Harrison	Union	West Milford 7.5'
	Operator ID	County	District	Quadrangle

2) Operator's Well Number: Nutter 1208 N-4H Well Pad Name: Nutter 1208

3) Farm Name/Surface Owner: Nutter Public Road Access: SR 19

4) Elevation, current ground: 1162' Elevation, proposed post-construction: 1147'

5) Well Type (a) Gas x Oil _____ Underground Storage _____
Other _____
(b)If Gas Shallow x Deep _____
Horizontal x

SDW
6/11/2019

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus at 7013'/7064' and 51' in thickness. Anticipated pressure at 4314#.

8) Proposed Total Vertical Depth: 7050'

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 19,223'

11) Proposed Horizontal Leg Length: 11,652'

12) Approximate Fresh Water Strata Depths: 135', 500'

13) Method to Determine Fresh Water Depths: Nearest offset well data

14) Approximate Saltwater Depths: 1299', 1675'

15) Approximate Coal Seam Depths: 810' to 815'

16) Approximate Depth to Possible Void (coal mine, karst, other): None

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes _____ No X

(a) If Yes, provide Mine Info: Name: _____
Depth: _____
Seam: _____
Owner: _____

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API NO. 47-_____-_____
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Well Pad Name: Nutter 1208

18) **CASING AND TUBING PROGRAM**

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	30"	New	LS	157.5	120'	120'	Drilled In
Fresh Water	20"	NEW	J-55	94	650'	650'	CTS
Coal/Storage	13 3/8"	NEW	J-55	68	1890'	1890'	CTS
Intermediate	9 5/8"	NEW	J-55	40	2700'	2700'	CTS
Production	5 1/2"	NEW	P-110	23	19,223'	19223'	CTS
Tubing							
Liners							

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6/11/2019

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	30"	30"	.500				Drilled In
Fresh Water	20"	26"	.438	2110	1200	Type 1, Class A	40 % excess yield = 1.20, CTS
Coal/Storage	13 3/8"	17 1/2"	.480	3450		Type 1/Class A	Lead 40% excess, Tail 0% excess
Intermediate	9 5/8"	12 1/4"	.395	3950		Type 1/Class A	Lead 40% excess, Tail 0% Excess
Production	5 1/2"	8 1/2"	.415	14520	12000	Type 1/ClassA	20% excess yield = 1.19, tail yield 1.94
Tubing							
Liners							

PACKERS

Kind:				
Sizes:				
Depths Set:				

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Well Pad Name: Nutter 1208

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill the vertical depth to the Marcellus at an estimated total vertical depth of approximately 7050 feet. Drill horizontal leg to estimated 11652 lateral length, 19223 TMD. Hydraulically fracture stimulate and be capable of producing from the Marcellus Formation. Should we encounter an unanticipated void in the coal, we will install a minimum of 20' of casing below the void but not more than 100' below the void, set a basket and grout to surface. We plan to run an ECP above the Gantz/Dominion Storage interval to aid in sealing off and isolating the storage interval.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

The stimulation will be completed with multiple stages divided over the lateral length of the well. Stage spacing is dependent upon engineering design. Slickwater fracturing technique will be utilized on each stage using sand, water, and chemicals. See attached list. Maximum pressure not to exceed 12,500 psi.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 22.420 acres

22) Area to be disturbed for well pad only, less access road (acres): 15.399 acres

23) Describe centralizer placement for each casing string:

No centralizers will be used with conductor casing.
Freshwater - centralized every 3 joints to surface.
Coal - Bow Spring on every joint, will also be running ECP for isolating storage zone
Intermediate - Bow Spring on first 2 joints then every third joint to 100' from surface.
Production - Run 1 spiral centralizer every 5 joints from the top of the curve to surface. Run 1 spiral centralizer every 3 joints from the 1st 5.5" long joint to the top of the curve.

24) Describe all cement additives associated with each cement type:

Conductor -N/A, Casing to be drilled in w/ Dual Rotary Rig.
Fresh Water - 15.6 ppg PNE-1 + 3% bwoc CaCl, 40% Excess Yield = 1.20, CTS
Coal - Lead: 15.4 ppg PNE-1 + 2.5% bwoc CaCl, 40% Excess / Tail: 15.9 ppg PNE-1 + 2.5% bwoc CaCl zero% Excess. CTS
Intermediate - Lead: 15.4 ppg PNE-1 + 2.5% bwoc CaCl, 40% Excess, Tail: 15.9 ppg, PNE-1 + 2.5% bwoc CaCl, zero% Excess, CTS
Production - Lead: 14.5 ppg POZ:PNE-1 + 0.3% bwoc R3 + 1% bwoc EC1 + 0.75 gal/sk FP13L + 0.3% bwoc MPA170, Tail: 14.8 ppg PNE-1 + 0.35% bwoc R3 + 0.75 gal/sk FP13L + 50% bwoc ASCA1 + 0.5% bwoc MPA170 20% Excess, Lead Yield=1.19, Tail Yield=1.94, CTS

25) Proposed borehole conditioning procedures:

Conductor - Ensure the hole is clean at TD.
Fresh Water - Once casing is at setting depth, circulate a minimum of one hole volume with Fresh Water prior to pumping cement.
Coal - Once casing is at setting depth, Circulate and condition at TD. Circulate a minimum of one hole volume prior to pumping cement.
Intermediate - Once casing is at setting depth, Circulate and condition mud at TD. Circulate a minimum of one hole volume prior to pumping cement.
Production - Once on bottom/TD with casing, circulate at max allowable pump rate for at least 2x bottoms up, or until returns and pump pressures indicate the hole is clean. Circulate a minimum of one hole volume prior to pumping cement.

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*Note: Attach additional sheets as needed.