

02/10/2023



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west virginia department of environmental protection

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Office of Oil and Gas  
601 57<sup>th</sup> Street, S.E.  
Charleston, WV 25304  
(304) 926-0450  
fax: (304) 926-0452

Harold D. Ward, Cabinet Secretary  
[www.dep.wv.gov](http://www.dep.wv.gov)

Monday, February 6, 2023  
PERMIT MODIFICATION APPROVAL  
Horizontal 6A / New Drill

HG ENERGY II APPALACHIA, LLC  
5260 DUPONT ROAD

PARKERSBURG, WV 26101

Re: Permit Modification Approval for SCHOEN 1205 N-2H  
47-033-06000-00-00

**Extend Intermediate 2 Casing**

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: SCHOEN 1205 N-2H  
Farm Name: GEORGE & ROSEANNE SCHOEN  
U.S. WELL NUMBER: 47-033-06000-00-00  
Horizontal 6A New Drill  
Date Modification Issued: 2/6/2023

Promoting a healthy environment.

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.P. 494519932 Harrison Grant Mount Clare 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Schoen 1205 N-2H Well Pad Name: Schoen 1205

3) Farm Name/Surface Owner: George Schoen Public Road Access: McWhorter Road / SR25

4) Elevation, current ground: 1410' Elevation, proposed post-construction: 1407'

5) Well Type (a) Gas  Oil \_\_\_\_\_ Underground Storage \_\_\_\_\_

Other \_\_\_\_\_

(b) If Gas Shallow  Deep \_\_\_\_\_

Horizontal  \_\_\_\_\_

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus at 7214' / 7315' and 101' in thickness. Anticipated pressure at 4314#.

8) Proposed Total Vertical Depth: 7305'

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9) Formation at Total Vertical Depth: Marcellus

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10) Proposed Total Measured Depth: 25,056'

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11) Proposed Horizontal Leg Length: 17,039'

12) Approximate Fresh Water Strata Depths: 135', 480', 640', 728'

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

14) Approximate Saltwater Depths: 1730, 1780, 2010

15) Approximate Coal Seam Depths: 501, 650', 730', 736' (Surface casing is being extended to cover the coal in the DTI Storage Field)

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

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

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/Coal	20"	NEW	J-55	94	1200'	1200'	40% excess, CTS
Intermediate 1	13 3/8"	NEW	J-55 BTC	68	2100'	2100'	40% excess, CTS
Intermediate 2	9 5/8"	NEW	N-80 BTC	40	5320'	5320'	40% excess tail, CTS
Production	5 1/2"	NEW	P-110 HP	23	25056'	25056'	20% excess tail, CTS
Tubing							
Liners							

Kenneth Greynolds  
Digitally signed by Kenneth Greynolds  
 DN: cn = Kenneth Greynolds email = Kenneth.L.Greynolds@wv.gov c = AD O = WVDEP OU = Oil and Gas  
 Date: 2023.02.02 09:26:12 -0500

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/Coal	20"	24"	.438	2110	1200	Type 1, Class A	40 % excess yield = 1.20, CTS
Intermediate 1	13 3/8"	17 1/2"	.480	3450		Type 1/Class A	Lead 40% excess, Tail 0% excess
Intermediate 2	9 5/8"	12 1/4"	.395	5750		Type 1/Class A	Lead 40% excess, Tail 0% Excess
Production	5 1/2"	8 1/2"	.415	16240	12500	Type 1/Class A	20% excess yield = 1.19, tail yield 1.04
Tubing							
Liners							

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**PACKERS**

Kind:				
Sizes:				
Depths Set:				

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 7305 feet. Drill horizontal leg to estimated 17,039' lateral length, 25,056' 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 ACP 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): 29.485 acres

22) Area to be disturbed for well pad only, less access road (acres): 9.246 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 ACP 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.

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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<sub>2</sub> 40% Excess Yield = 1.20, CTS  
Intermediate 1 - "Lead: 15.4 ppg PNE-1 + 2.5% bwoc CaCl<sub>4</sub>0% Excess / Tail: 15.9 ppg PNE-1 + 2.5% bwoc CaCl zero% Excess. CTS"  
Intermediate 2 - "Lead: 15.4 ppg PNE-1 + 2.5% bwoc CaCl<sub>4</sub>0% 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 MPA170Tail: 14.8 ppg PNE-1 + 0.35% bwoc R3 + 0.75 gal/sk FP13L + 50% bwoc ASCA1 + 0.5% bwoc MPA17020% 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 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.

\*Note: Attach additional sheets as needed.

02/10/2023

\*\*\* Storage String \*\*\* CTS \*\*\*  
 15.4 ppg Lead - Yield 1.24 - D886 Surface Seal/100 lb / sack (Mlx of Class A and Gypsum to meet Dominion Requirements)  
 B348 - 0.5% BWOB Fluid Loss / D013 - 0.75% BWOB Retarder / D47 - 0.02 gal / sack VBWOB Anti Foam / D202 - 0.15% BWOB  
 Dispersant / D095 1.5 lb per B/L Cement - 60% Excess  
 15.9 ppg Tail - Yield 1.17 - D896 Surface Seal / 100 lb / sack (Mlx of Class A and Gypsum to meet Dominion Requirements)  
 B160A - 0.15% BWOB Dispersant / B547 - 0.35% BWOB Gas/LC / D013 - 0.3% BWOB Retarder / D047 - 0.02 gal / sack Anti Foam /  
 D801 - 0.03 gal / sack Retarder - 0% Excess

1205 N-2H  
 Marcellus Shale Horizontal  
 Harrison County, WV



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Ground Elevation	1407'	1205 N-2H SHL	1205 N-2H LP	1205 N-2H BHL	14218776.04N 1824137.36E			
<b>Azin</b>	<b>340.538°</b>				14218601.45N 1822657.1E			
<b>WELLBORE DIAGRAM</b>					14234661.18N 1816982.19E			
<b>HOLE</b>	<b>CASING</b>	<b>GEOLOGY</b>	<b>TOP</b>	<b>BASE</b>	<b>MUD</b>	<b>CENTRALIZERS</b>	<b>CONDITIONING</b>	<b>COMMENTS</b>
30"	30" 157 5# LS	Conductor	0	120	AIR	N/A	Ensure the hole is clean at TD.	Conductor casing = 0.5" wall thickness
26"	20" 94# J-55	Fresh Water Coals Fresh Water Protection	0	135.480 640, 728 736	AIR	Centralized every 3 joints to surface	Once casing is at setting depth, circulate a minimum of one hole volume with Fresh Water prior to pumping cement.	Surface casing = 0.438" wall thickness Burst=2110 psi
17.5"	13-3/8" 68# J-55 BTC	Little Lime Big Lime Injun / Gantz (Storage)	1467 1510 1565 / 1900	1482 1556 1690 / 1970	AIR / KCL - Sail Polymer	See above (LEFT) for Storage String Cement Blend to Meet DRI Requirements for Gas Storage Field Isolation	Bow Spring on every joint *will also be running ACP for isolating storage zone*	Intermediate casing = 0.480" wall thickness Burst=3450 psi
12.25"	9-5/8" 40# N-80 BTC	Intermediate 1	0	2100	AIR / KCL - Sail Polymer	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	Bow Spring on first 2 joints then every third joint to 100' form surface	Intermediate casing = 0.395" wall thickness Burst=5750 psi
		Intermediate 2	0	0	AIR / 9.0ppg SOBM		Once casing is at setting depth, Circulate and condition mud at TD. Circulate a minimum of one hole volume prior to pumping cement.	
		Rhinesteeel	5872	6420				
		Cashqua	6420	6740				
		Middlesex	6740	6870				
		West River	6870	7003				
		Burkett	7003	7048				
		Tully Limestone	7048	7149				
		Hamilton	7149	6753				
		Marcellus	7214	7315				
		TMD / TVD (Production)	25056	7305				
		Onondaga	7315					
		8.5" Curve						
		5-1/2" 23# P-110 HP CDC HTQ						
		8.5" Lateral						

LP @ 7305' TVD / 8017'  
 MD  
 8.5" Hole - Cemented Long String  
 5-1/2" 23# P-110 HP CDC HTQ  
 +/-17039' ft Lateral  
 TD @ +/-7305' TVD  
 +/-25056' MD  
 X=Cemented  
 X=Centralizers



**HG Energy, LLC**  
5260 Dupont Road  
Parkersburg, WV 26101  
(304) 420-1100 - Office  
(304) 863-3172 - Fax

CK# 034359  
02/10/2023  
CK \$ 5,000.00

January 31, 2023

WV DEP  
Division of Oil & Gas  
Attn: Cragin Blevins  
601 57<sup>th</sup> Street  
Charleston, West Virginia 25304

RE: Schoen 1205 N-2H Permit Revision – (47-033-06000)  
Grant District, Harrison County  
West Virginia

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Dear Mr. Blevins -

Per our discussions, enclosed are revised forms (WW-6B and casing schematic) and a check for expedited service for the 1205 N-2H well work permit. We request the permit be modified to revise the depth of the Intermediate 2 casing string from 2950 feet TVD to 5320 feet TMD.

Please let me know if you have any questions or require additional information. I can be reached at (304) 420-1119 or [dwhite@hgenergyllc.com](mailto:dwhite@hgenergyllc.com).

Very truly yours,

*Diane White*

Diane C. White

Enclosures

cc: Kenneth Greynolds – WV DEP State Inspector