02/10/2023

west virginia department of environmental protection

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

Harold D. Ward, Cabinet Secretary
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-4H
47-033-06011-00-00

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-4H
Farm Name: George and Roseanne Schoen
U.S. WELL NUMBER: 47-033-06011-00-00
Horizontal 6A New Drill
Date Modification Issued: 2/6/2023

WW-6B
(04/15)

API NO. 47- 033 - 02711 02/10/2023
OPERATOR WELL NO. Schoen 1205 N-4H
Well Pad Name: Schoen 1205

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 (Operator ID) | Harrison (County) | Grant (District) | Mount Clare 7.5' (Quadrangle)

2) Operator's Well Number: Schoen 1205 N-4H 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 x Oil _____ Underground Storage _____
Other _____
(b)If Gas Shallow x Deep _____
Horizontal x

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'

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 23,961'

11) Proposed Horizontal Leg Length: 15,945'

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 X

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

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(04/15)

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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	5350'	5350'	40% excess tail, CTS
Production	5 1/2"	NEW	P-110 HP	23	23961'	23961'	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 09:23:49 -05'00'

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
Intermediate1	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/ClassA	20% excess yield = 1.19, tail yield 1.94
Tubing							
Liners							

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PACKERS

Kind:				
Sizes:				
Depths Set:				

WW-6B
(10/14)

API NO. 47- 033 - 06611 02/10/2023
OPERATOR WELL NO. Schoen 1205 N-4H
Well Pad Name: Schoen 1205

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 15,945' lateral length, 23,961' 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, 40% Excess Yield = 1.20, CTS
Intermediate 1 - "Lead: 15.4 ppg PNE-1 + 2.5% bwoc CaCl40% 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 CaCl40% 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% ExcessLead Yield=1.19Tail Yield=1.94CTS"

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.

*Note: Attach additional sheets as needed.

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*** Storage String *** CTS ***
15.4 ppg Lead - Yield 1.24 - D896 Surface Set 100 lb / sack (Mix 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 BBL CemNET* - 60% Excess
15.9 ppg Tail - Yield 1.17 - D896 Surface Set 100 lb / sack (Mix of Class A and Gypsum to meet Dominion Requirements)
B160A - 0.15% BWOB Dispersant / B547 – 0.35% BWOB GasBLOK* / D013 – 0.3% BWOB Retarder / D047 – 0.02 gal / sack Anti Foam / D801 – 0.03 gal / sack Retarder - 0% Excess

1205 N-4H
Marcellus Shale Horizontal
Harrison County, WV

Ground Elevation	1407'	1205 N-4H SHL	14218761.17N 1824135.54E
Azm	333 / 338.59 / 341.115°	1205 N-4H LP	14219593.05N 1825493.98E
		1205 N-4H BHL	14234617.41N 1820184.2E

WELLBORE DIAGRAM	HOLE	CASING	GEOLOGY	TOP	BASE	MUD	CEMENT	CENTRALIZERS	CONDITIONING	COMMENTS
	30"	30" 157.5# LS	Conductor	0	120	AIR	N/A, Casing to be drilled in w/ Dual Rotary Rig	N/A	Ensure the hole is clean at TD.	Conductor casing = 0.5" wall thickness
	26"	20" 94# J-55	Fresh Water	0	135, 480, 640, 728	AIR	15.6 ppg PNE-1 + 3% bwoc CaCl 40% Excess Yield=1.20 / CTS	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
			Coals		736					
			Fresh Water Protection	**0**	**1200**					
	17.5"	13-3/8" 68# J-55 BTC	Little Lime	1467	1482	AIR / KCL - Salt Polymer	**See above (LEFT) for Storage String Cement Blend to Meet DTI Requirements for Gas Storage Field Isolation**	Bow Spring on every joint **will also be running ACP for isolating storage zone**	Once casing is at setting depth, Circulate and condition at TD. Circulate a minimum of one hole volume prior to pumping cement.	Intermediate casing = 0.480" wall thickness Burst=3450 psi
			Big Lime	1510	1556					
			Injun / Gantz (Storage)	1565 / 1900	1690 / 1970					
			Intermediate 1	**0**	**2100**					
	12.25"	9-5/8" 40# N-80 BTC	Fifty Foot / Thirty	1993 / 2112	2093 / 2147	AIR / KCL - Salt 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	Once casing is at setting depth, Circulate and condition mud at TD. Circulate a minimum of one hole volume prior to pumping cement.	Intermediate casing = 0.395" wall thickness Burst=5750 psi
			Gordon Stray / Gordon	2195 / 2250	2250 / 2310					
			5th Sand	2440	2468					
			Warren	2835	2860					
			Speechley	3028	3162					
			Bradford	3342	3367					
			Benson	4420	4455					
			Alexander	4590	4680					
						AIR / 9.0ppg SOBM				
			Intermediate 2	**0**	**TVD: 5200' MD: 5350' Inc: 21 deg.**					
	8.5" Curve	5-1/2" 23# P-110 HP CDC HTQ	Rhinestreet	5872	6420	11.5ppg-12.5ppg SOBM	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	Run 1 spiral centralizer every 3 joints from the 1st 5.5" long joint to the top of the curve.	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.	Production casing = 0.415" wall thickness Burst=16240 psi Note:Actual centralizer schedules may be changed due to hole conditions
			Cashaqua	6420	6740					
			Middlesex	6740	6870					
			West River	6870	7003					
			Burkett	7003	7048					
			Tully Limestone	7048	7149					
			Hamilton	7149	6753					
	8.5" Lateral		Marcellus	7214	7315	11.5ppg-12.5ppg SOBM				
			TMD / TVD (Production)	**23961**	**7305**					
			Onondaga	7315						

LP @ 7305' TVD / 8016' MD

8.5" Hole - Cemented Long String
5-1/2" 23# P-110 HP CDC HTQ

+/-15945' ft Lateral

TD @ +/-7305' TVD
+/-23961' MD

X=centralizers

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

02/10/2023

CK #034361
CK $ 5,000.00

January 31, 2023

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

RE: Schoen 1205 N-4H Permit Revision – (47-033-06011)
Grant District, Harrison County
West Virginia

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-4H well work permit. We request the permit be modified to revise the depth of the Intermediate 2 casing string from 2950 feet TVD to 5350 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.

Very truly yours,

Diane White

Diane C. White

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Enclosures

cc: Kenneth Greynolds – WV DEP State Inspector