May 16, 2014

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-5101742, issued to GASTAR EXPLORATION USA, INC., is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

In addition to the applicable requirements of this permit, and the statutes and rules governing oil and gas activity in WV, this permit may contain specific conditions which must be followed. Permit conditions are attached to this cover letter.

Per 35CSR-4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926-0499 ext. 1654.

James Martin
Chief

Operator's Well No: SIMMS NO. U-4H
Farm Name: SIMMS, TERRY E. & DEBORAH
API Well Number: 47-5101742
Permit Type: Horizontal 6A Well
Date Issued: 05/16/2014

Promoting a healthy environment.
PERMIT CONDITIONS

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

CONDITIONS

1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.

2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than fifty (50) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.

3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95% compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.

4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.

5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled Water Well Regulations, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.

6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.

7. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.

8. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.

9. Operator shall provide the Office of Oil & Gas notification of the date that drilling commenced on this well. Such notice shall be provided by sending an email to DEPOOGNotify@wv.gov within 30 days of commencement of drilling.
May 6, 2014

Department of Environmental Protection
Office of Oil and Gas
Charleston, WV 25304

RE: Application for Deep Well Permit – API #47-051-01742

COMPANY: Gastar Exploration USA, Inc.

FARM: Simms #U-4H

COUNTY: Marshall DISTRICT: Franklin QUAD: New Martinsville

The deep well review of the application for the above company is APPROVED FOR P _OINT PLEASANT. If operator wishes to drill deeper than the Trenton, additional approval must be obtained from the OGCC.

The applicant has complied with the provision of Chapter 22C-9, of the Code of West Virginia, nineteen hundred and thirty-one (1931), as amended, Oil and Gas Conservation Commission as follows:

1. Provided a certified copy of duly acknowledged and recorded consent and easement form from all surface owners; Yes

2. Provided a tabulation of all deep wells within one mile of the proposed location, including the API number of all deep wells, well name, and the name and address of the operator; yes Per OGCC hearing Docket 227-219 Order 1

3. Provided a plat showing that the proposed location is a distance of _400+ top hole_ 400’ lateral, _400’ at bottom hole_ feet from the nearest lease line or unit boundary and showing the following wells drilled to or capable of producing from the objective formation within 3,000 feet of the proposed location.

Sincerely,

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

1) Well Operator: Gatar Exploration  
Operator ID: 494487685  
County: Marshall  
District: Franklin  
Quadrangle: New Martinsville 7.5' 

2) Operator’s Well Number: U-4H  
Well Pad Name: Simms  

3) Farm Name/Surface Owner: Simms, Terry E. & Deborah L.  
Public Road Access: County Route 76 (Rines Ridge Road)  

4) Elevation, current ground: 1220'  
Elevation, proposed post-construction: 1220'  

5) Well Type  
(a) Gas  
(b) If gas  
Shallow  
Deep  
Horizontal  

6) Existing Pad: Yes or No  
Yes  

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s):  
The Point Pleasant is the target formation at a depth of 11,080' (top of formation), an anticipated thickness of 100' and an estimated pressure of 7900 psi.  

8) Proposed Total Vertical Depth: 11,245'  

9) Formation at Total Vertical Depth: Trenton Limestone  

10) Proposed Total Measured Depth: 14,682'  

11) Proposed Horizontal Leg Length: 3100'  

12) Approximate Fresh Water Strata Depths: 60'  

13) Method to Determine Fresh Water Depths: Gatar has drilled several wells in this area  

14) Approximate Saltwater Depths: 2000'  

15) Approximate Coal Seam Depths: 848' & 1001'  

16) Approximate Depth to Possible Void (coal mine, karst, other): N/A  

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:  

RECEIVED  
Office of Oil and Gas  
FEB 27 2014  

WV Department of Environmental Protection  
05/16/2014
### CASING AND TUBING PROGRAM

<table>
<thead>
<tr>
<th>TYPE</th>
<th>Size</th>
<th>New or Used</th>
<th>Grade</th>
<th>Weight per ft. (lb/ft)</th>
<th>FOOTAGE: For Drilling</th>
<th>INTERVALS: Left in Well</th>
<th>CEMENT: Fill-up (Cu. Ft.)</th>
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<td>H-40</td>
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<td>61 #/ft</td>
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<td>New</td>
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<td>Production</td>
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<td>New</td>
<td>P-110</td>
<td>23 #/ft</td>
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<td>14,682'</td>
<td>1450 cu ft (outside of 9 5/8&quot;)</td>
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### TYPE

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<td>.33&quot;</td>
<td>1530 psi</td>
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<tr>
<td>Depths Set:</td>
<td>n/a</td>
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</table>
19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill through the Point Pleasant tagging less than One Hundred (100') feet from the top of the Trenton Limestone to get depths and log data. Then set a solid cement plug from TD (11,245') back to proposed kick off point (10,300'). Drill the curve and horizontal section to planned and proposed TD (14,682'). Run casing and cement. Run a bond log on part of the curve and vertical section, pressure test casing and set a master valve. Prep the well for stimulation.

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

Gastar Exploration plans to fracture the well using a typical slickwater fracture design. Gaster will pump roughly 7000 bbls of water and 400,000 lbs of sand per stage. There will be approximately 16 stages on the fracturing job.

Anticipated maximum surface pressure while fracturing will be approximately 12,500 psi with an anticipated maximum rate of 90 bbls/min.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 11.64

22) Area to be disturbed for well pad only, less access road (acres): 5.32

23) Describe centralizer placement for each casing string:

Gastar will run 3 Centralizers on the Surface casing (20' casing) at an equal distance apart. The Intermediate casing (13 3/8' casing) will have 7 Centralizers at 300' spacing. The second intermediate casing (9 5/8' casing) will have 40 Centralizers at 260' spacing. The production casing will have one centralizer every joint in the lateral, one centralizer per joint through the curve and one centralizer every other joint in the vertical section.

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

See attached.

25) Proposed borehole conditioning procedures:

Gastar will circulate the hole a minimum of 3 hours upon TD. We will then pull out to the bottom of the curve and circulate for another 2 hours. Then come out of the hole.

*Note: Attach additional sheets as needed.
#24. Conductor and Surface Casing Cement:  Class A + 2% CaCl
   -CaCl – Calcium Chloride

Intermediate Casing:  Class A + 1% EC-1 + .5% SMS + .55% BA-10A + .25#/sack Cello Flake + .75 gals/100 sacks FP-12L.
   -EC-1 – Bonding Agent
   -SMS – Sodium Metasilicate
   -BA-10A – Bonding Agent
   -Cello Flake – Cellophane Flakes
   -FP-12L – Foam Preventer

Intermediate Casing #2: Lead Cement – 50:50 (Poz:Class A) + .15% R-3 + 3.9% KCl + 1.5% FL-25 + .2% ASA-301 + .75 gals/100 sack FP-12L
   -R-3 – Retarder
   -KCl – Potassium Chloride
   -FL-25 – Fluid Loss
   -ASA-301 – Free Water Additive
   -FP-12L – Foam Preventer

Intermediate #2 Tail Cement – 50:50 (Poz:Class H) + .1% R-3 + .2% CD-32 + 1.2% FL-62 + .1% ASA-301 + .4% SMS
   -R-3 – Retarder
   -CD-32 – Cement Dispersant
   -FL-62 – Fluid Loss
   -ASA-301 – Free Water Additive
   -SMS – Sodium Metasilicate

Kick Off Plug Cement:  Class H + .3% R-3 + .7% SMS + 1% CD-32
   -R-3 – Retarder
   -SMS – Sodium Metasilicate
   -CD-32 – Cement Dispersant

Production Casing Cement:  50:50 (Poz:Class H) + .25% MPA-170 + 3 #/sack BA-90 + .35% R-3 + .75 gal/100 sacks FP-12L
   -BA-90 – Bonding Agent
   -R-3 – Retarder
   -FP-12L – Foam Preventer
Simms U-4H
Marshall County, WV

26" Set @ 120' MD

3 Centralizers Spaced Evenly
20" 9# H-40 LT&C @ 1060'

7 Centralizers @ 300' Spacing
13 3/8" 61.0# J-55 LT&C
Set @ 3000' MD

Freshwater
Pittsburgh Coal - 383' MD

Redrock Sect/Shallow Producing Zones
Gordon Sandstone @ 2834' MD

Marcellus @ 6545' MD
Orionaga Limestone @ 6545' MD
Bass Island Dolomitic @ 7667' MD

Salina Salt @ 7247' MD

Wellbore 12.375"
Wellbore 12.25"

40 Centralizers @ 260' Spacing
9 5/8" 47# HCP-110
Set @ 10,200' MD

KOP @ 10,500' MD
8 1/2" wellbore

Ulica @ 19,857' MD

Solid Cement plug - 11,245' to 16,300'

LP @ 11,552' MD
11,125' TVD
11,125' TVD

One Centralizer per joint from toe through to top of the curve and one Centralizer every other joint in the vertical section.
STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS
FLUIDS/CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name: Gastar Exploration USA, Inc.
OP Code: 494487685

Watershed (HUC 10): Fish Creek (Undefined)
Quadrangle: New Martinsville 7.5'

Elevation: 1220'  County: Marshall  District: Franklin

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes ☑ No ☐

Will a pit be used? Yes ☑ No ☐

If so, please describe anticipated pit waste: Fresh water for frac and flow back water

Will a synthetic liner be used in the pit? Yes ☑ No ☐

If so, what ml.? 60

Proposed Disposal Method For Treated Pit Wastes:
- Land Application
- Underground Injection (UIC Permit Numbers: UIC 359; UIC 2D0732540; UIC 2D0732523)
- Reuse (at API Number)
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain)

Will closed loop system be used? If so, describe: Yes, For Vertical and Horizontal Drilling

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. Air for vertical / Oil for Horizontal

Note on Vertical: If a pocket of gas is hit, the gas flow will be diverted to the flame and SORBM (that is previously prepared) will be pumped into the well to kill the well if necessary

- If oil based, what type? Synthetic, petroleum, etc. Synthetic oil base

Additives to be used in drilling medium? Barite for weight

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc.

- If left in pit and plan to solidify what medium will be used? (cement, lime, sawdust)
- Landfill or offsite name/permit number: Wetzel County Landfill (SWF-1021/PRW0102185)

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature: ____________________________
Company Official (Typed Name): Michael McCown
Company Official Title: Senior VP & COO

Subscribed and sworn before me this 12th day of February, 2014

My commission expires 06/11/2020

Notary Public
David W. Perkins

RECEIVED
Office of Oil and Gas
Department of Environmental Protection
05/16/2014
Form WW-9

Operator's Well No. U-4H

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Proposed Revegetation Treatment: Acres Disturbed 11.64
Prevegetation pH

<table>
<thead>
<tr>
<th>Lime</th>
<th>Tons/acre or to correct pH 6.5 to 7.0</th>
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<tr>
<td>3</td>
<td>10-20-20 or equivalent</td>
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<tr>
<td>Fertilizer type</td>
<td>1/3 ton lbs/acre</td>
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<tr>
<td>Fertilizer amount</td>
<td>2.5 Tons/acre</td>
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Seed Mixtures

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<th>Permanennt</th>
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<tbody>
<tr>
<td>Seed Type</td>
<td>Seed Type</td>
</tr>
<tr>
<td>Annual Ryegrass</td>
<td>Fox Tail / Grassy</td>
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<tr>
<td>40/acre</td>
<td>40/acre</td>
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</tbody>
</table>

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Attach:
Drawing(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided)

Photocopied section of involved 7.5' topographic sheet.

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Plan Approved by: [Signature]

Comments:

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Title: Oil + Gas Inspector Date: 2-20-14

Field Reviewed? ( ) Yes ( ) No