



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

May 16, 2014

WELL WORK PERMIT

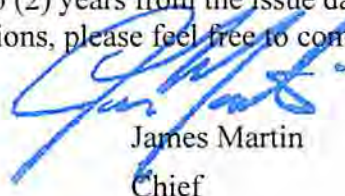
Horizontal 6A Well

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.

05/16/2014

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.



west virginia department of environmental protection

Oil and Gas Conservation Commission
601 57th Street, SE Charleston, WV 25304
(304)926-0499, Ext 1656

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

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 POINT 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

51 03 509

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

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 Oil Underground Storage
Other

(b) If Gas Shallow Deep
Horizontal

6) Existing Pad: Yes or No Yes

*Dm 4
2-20-14*

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s):
The Point Pleasant is the target formation at at depth of 11,060' (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: Gastar 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: _____

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WW-6B
(9/13)

18)

CASING AND TUBING PROGRAM

TYPE	Size	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill-up (Cu. Ft.)
Conductor	26"	New	PE/A252	85.68 #/ft		120'	Cement to Surface
Fresh Water	20"	New	H-40	94 #/ft		1060'	Cement to Surface
Coal	13 3/8"	New	J-55	61 #/ft		3000'	Cement to Surface
Intermediate	9 5/8"	New	HCP-110	47 #/ft		10,200'	Cement to Surface
Production	5 1/2"	New	P-110	23 #/ft		14,682'	1400 cuft(1500' inside of 9 5/8)
Tubing	2 3/8"	New	N-80	4.7 #/ft		11,482'	
Liners							

*DM4
2-20-14*

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./k)
Conductor	26"	30"	.312"	740 psi	See #24	1.21
Fresh Water	20"	24"	.33"	1530 psi	See #24	1.21
Coal	13 3/8"	17 1/2"	.4285"	3090 psi	See #24	1.2
Intermediate	9 5/8"	12 3/8" & 12 1/4"	.472"	9440 psi	See #24	1.32 & 1.18
Production	5 1/2"	8 1/2"	.4775"	12,360 psi	See #24	1.21
Tubing	2 3/8"		.19"	11,200 psi		
Liners						

PACKERS

Kind:	n/a			
Sizes:	n/a			
Depths Set:	n/a			

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WW-6B
(9/13)

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. Gastar will pump roughly 7000bbls 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 fracing 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 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 minnimum 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.

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Environmental Protection

DMH
2-2-14

*Note: Attach additional sheets as needed.

WW6B Attachment (2nd Revision for #24)

#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:ClassH) + .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

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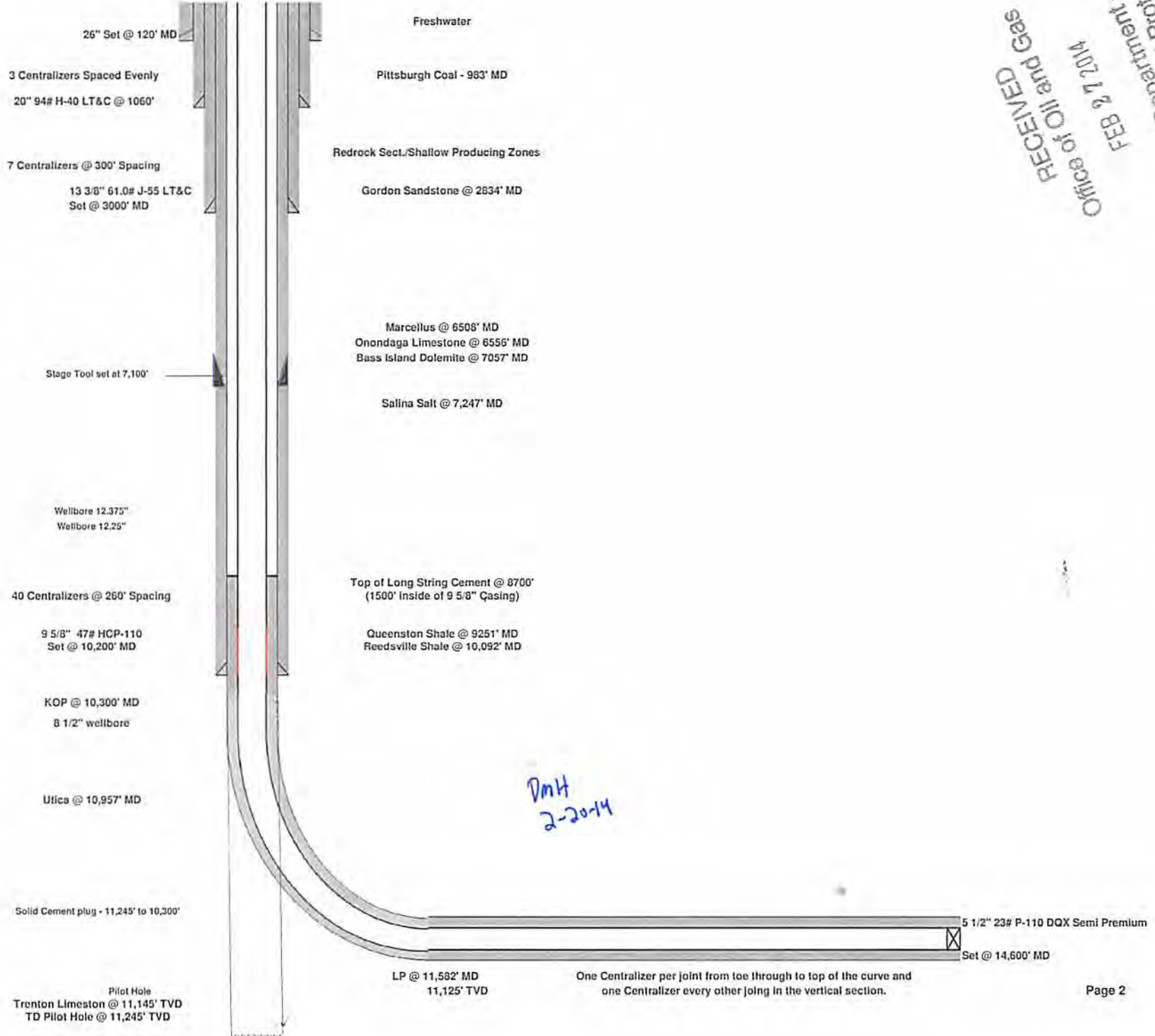
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05/16/2014

51-01742

Simms U-4H
Marshall County, WV



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2-2014

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Pilot Hole
Trenton Limestone @ 11,145' TVD
TD Pilot Hole @ 11,245' TVD

WW-9
(9/13)

API Number 47 - 051 - 01742
Operator's Well No. U-4H

**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 Number UIC 359; UIC 2D0732540; UIC 2D0732523)
- Reuse (at API Number _____)
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain _____)

*DmH
2-20-14*

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 flare and SOBMs (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. All drill cuttings will be disposed of in Wetzel County Landfill (Permit SWF-1021/WV0109185)

-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/WV0109185)

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 *Michael McCown*

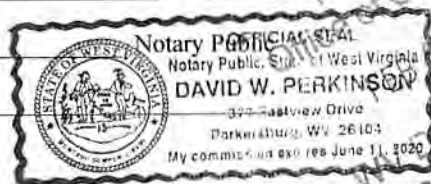
Company Official (Typed Name) Michael McCown

Company Official Title Senior VP & COO

Subscribed and sworn before me this 12th day of February, 20 14

[Signature]

My commission expires 06/11/2020



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05/16/2014

51-01742

Form WW-9

Operator's Well No. U-4H

Proposed Revegetation Treatment: Acres Disturbed 11.64 Prevegetation pH _____

Lime 3 Tons/acre or to correct to pH 6.5 to 7.0

Fertilizer type 10-20-20 or equivalent

Fertilizer amount 1/3 ton lbs/acre

Mulch 2.5 Tons/acre

Seed Mixtures

Temporary

Permanent

Seed Type lbs/acre
Annual Ryegrass 40/acre

Seed Type lbs/acre
Fox Tail / Grassy 40/acre

Perennial Rye 30/acre

Crown Vetch 20/acre

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.

Plan Approved by: [Signature]

Comments: _____

Title: Oil + Gas Inspector

Date: 2-20-14

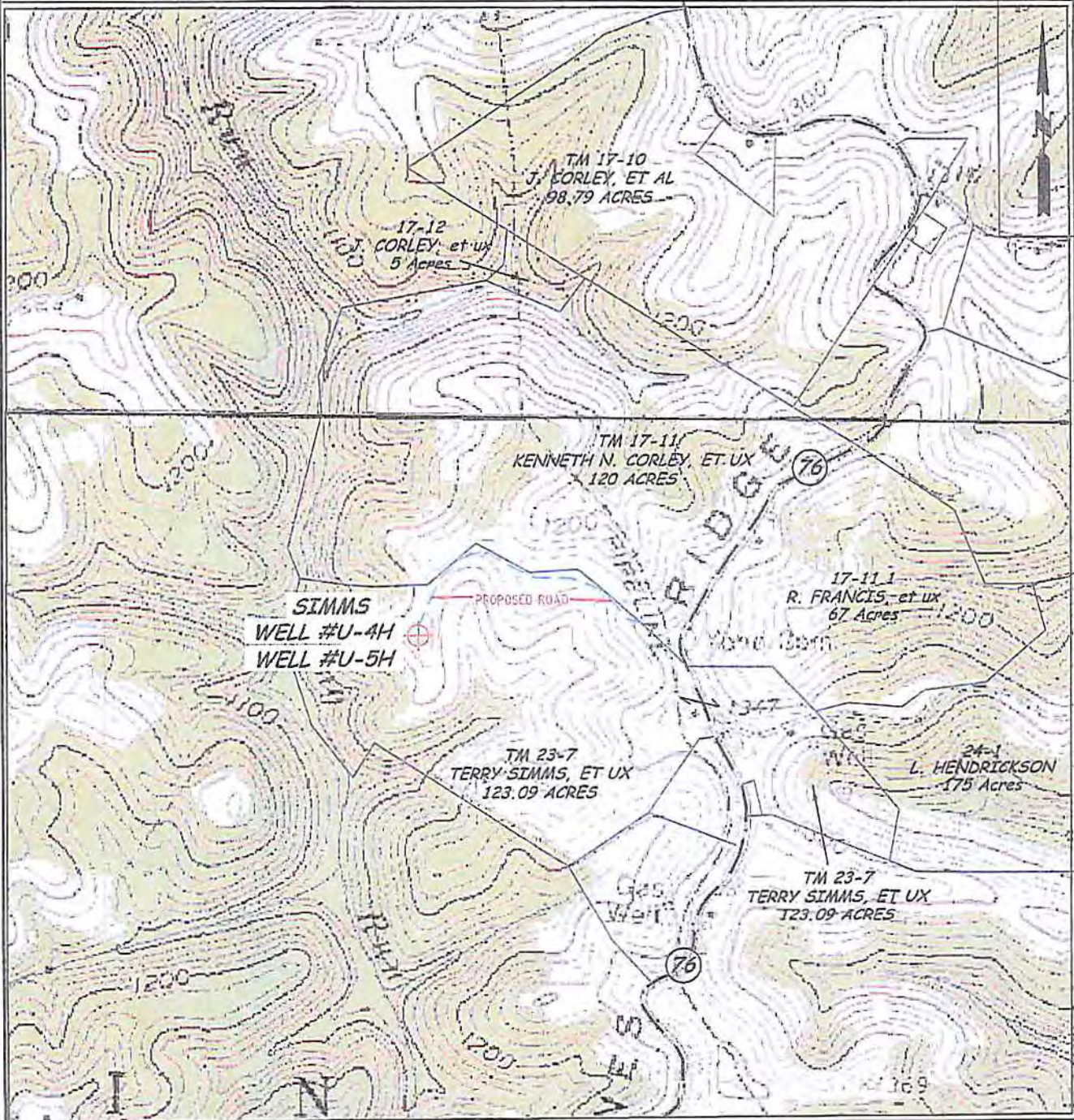
Field Reviewed? () Yes () No

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EXHIBIT "B"

PROPOSED SIMMS U-4H AND U-5H



W110295	OPERATOR	TOPO SECTION	WELL NAME
	GASTAR EXPLORATION USA, Inc. 1331 Lamar, Suite 1080 Houston, TX 77010	NEW MARTINSVILLE 7.5'	SIMMS NO. U-4H SIMMS NO. U-5H
		SCALE:	DATE:
		1"=1000'	10/23/13

STATE OF WEST VIRGINIA, MARSHALL COUNTY, SCT.:

I, **IAN PEST**, Clerk of the County Commission of said County, do hereby certify that the annexed writing, bearing date on the 30th day of October 2013, was presented for and by me, admitted to record in my office upon the above certificate as to the parties therein named this 6th day of Nov. 2013 at 2:09 o'clock P.M.

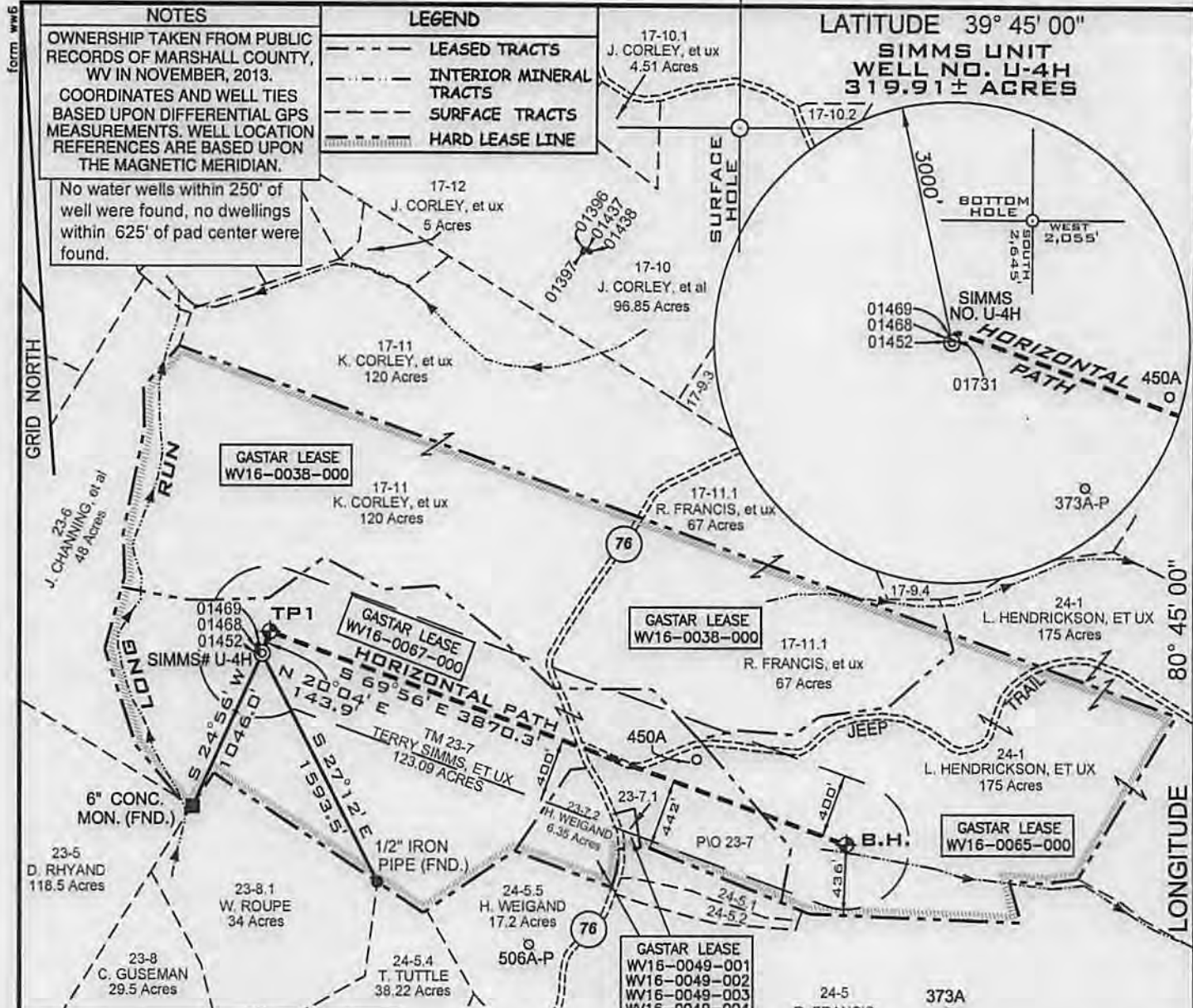
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FEB 27 2014

WV Department of
Environmental Protection

TESTE: Ian Pest Clerk.



FILE NUMBER W0110295 (WB5-54)
 DRAWING NUMBER SIMMS_U-4H_WP REV1
 SCALE 1" = 1000'
 MINIMUM DEGREE OF ACCURACY 1/200
 PROVEN SOURCE OF ELEVATION SUBMETER MAPPING
GRADE GPS

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.S. Jonathan N. White
 2122



WVDEP
 OFFICE OF OIL & GAS
 601 57TH STREET
 CHARLESTON, WV 25304

DATE: NOVEMBER 18, 2013
 DATE REV: MARCH 18, 2014
 OPERATORS WELL NO. SIMMS NO. U-4H
 API WELL NO. 47-051-01742
 STATE COUNTY PERMIT

LOCATION ELEVATION 1220' WATERSHED (HUC 10) FISH CREEK - (UNDEFINED)
 DISTRICT FRANKLIN COUNTY MARSHALL
 QUADRANGLE NEW MARTINSVILLE 7.5' LEASE NUMBER WV16-0067-000, WV16-0049-003, WV16-049-004, WV16-0065-000, WV16-038-000, WV16-0049-001, WV16-0049-002, WV16-0049-003, WV16-0049-004
 SURFACE OWNER TERRY E. & DEBORAH SIMMS ACREAGE 123.09
 OIL & GAS ROYALTY OWNER TERRY E. & DEBORAH L. SIMMS, ET AL LEASE ACREAGE 319.91
 PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE (SPECIFY)
 PLUG & ABANDON CLEAN OUT & REPLUG
 TARGET FORMATION POINT PLEASANT ESTIMATED DEPTH 11245' + Horizontal Leg
 WELL OPERATOR GASTAR EXPLORATION USA, INC. DESIGNATED AGENT MICHAEL McCOWN
 ADDRESS 229 W MAIN STREET, SUITE 301 CLARKSBURG WV, 26301 ADDRESS 229 W MAIN STREET, SUITE 301 CLARKSBURG WV, 26301

06/16/2014

COUNTY NAME
 PERMIT