



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

PERMIT MODIFICATION APPROVAL

October 08, 2013

GASTAR EXPLORATION USA, INC.
229 WEST MAIN STREET, SUITE 301
CLARKSBURG, WV 26301

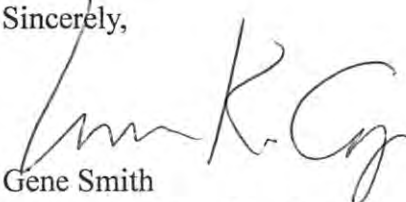
Re: Permit Modification Approval for API Number 5101568 , Well #: HOYT-NORTH NO. 1H
Extended lateral

Oil and Gas Operator:

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.

Please call James Martin at 304-926-0499, extension 1654 if you have any questions.

Sincerely,


Es Gene Smith
Regulatory/Compliance Manager
Office of Oil and Gas



August 12, 2013

WVDEP-Office of Oil & Gas
Attn: Laura Cooper
601 57th Street SE
Charleston, WV 25304

VIA: USPS

Re: Permit Modifications

Hoyt – North No. 1H (051-01568), Marshall County
Hoyt – North No. 2H (051-01567), Marshall County

Dear Laura:

Enclosed herein for your review and further handling, please find Permit Modifications, modifying the horizontal legs for the above referenced wells

If you have any questions or need additional information, please feel free to contact me at 304/966-0362.

Sincerely,

A handwritten signature in black ink, appearing to read "Dave Perkinson".

DAVE PERKINSON
Landman

Received

AUG 14 2013

Office of Oil and Gas
WV Dept. of Environmental Protection

Gastar Exploration LTD.

229 West Main Street, Suite 301 · Clarksburg, WV 26301

Phone: (304) 622-4796 · Fax: (304) 622-4824

10/11/2013

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
W.VA. CODE §22-6A - WELL WORK PERMIT APPLICATION

1) Well Operator: Gastar Exploration USA, Inc. 494487685 Marshall Franklin Powhatan Point 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Hoyt No. 1H Well Pad Name: Hoyt

3 Elevation, current ground: 1388' Elevation, proposed post-construction: 1364'

4) Well Type: (a) Gas Oil _____
Other _____
(b) If Gas: Shallow Deep _____
Horizontal

5) Existing Pad? Yes or No: No

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
The Marcellus is the target formation at a depth of 6600' (top of formation), an anticipated thickness of 50' and a pressure of 3000 psi.

7) Proposed Total Vertical Depth: 6642'

8) Formation at Total Vertical Depth: Marcellus

9) Proposed Total Measured Depth: 11,794'

10) Approximate Fresh Water Strata Depths: 50'

11) Method to Determine Fresh Water Depth: Gastar has drilled several wells in this area and we note where we pick up water.

12) Approximate Saltwater Depths: 1600'

13) Approximate Coal Seam Depths: 1000' & 1100'

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

15) Does land contain coal seams tributary or adjacent to, active mine? No

16) Describe proposed well work: Drill through the Marcellus tagging less than one hundred (100') feet from the top of the Onondaga to get depths and log data. Then plug the well back to proposed kick off point (TBD). Drill the horizontal section to planned and proposed TD. Run casing and cement back to surface. Run a bond log on part of the curve and vertical section, pressure test casing and set a master valve. Make a clean out run on the casing and perforate then stimulate.

17) Describe fracturing/stimulating methods in detail:
Gastar Exploration plans to fracture the well using a typical slickwater fracture design. Gastar will pump roughly 4500bbls of water and 250,000 lbs of sand per stage. There will be approximately 16 stages on the fracturing job.

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 26.92 Acres

19) Area to be disturbed for well pad only, less access road (acres): 5.77 Acres

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20)

CASING AND TUBING PROGRAM

| TYPE | Size | New or Used | Grade | Weight per ft. | FOOTAGE: For Drilling | INTERVALS: Left in Well | CEMENT: Fill -up (Cu. Ft.) |
|--------------|-------------|----------------------------|--------------|---------------------------|----------------------------------|------------------------------------|---------------------------------------|
| Conductor | 20" | New | PE | 54.5 #/ft | | 110' | Cement to Surface |
| Fresh Water | 13 3/8" | New | H-40 | 48 #/ft | | 1150' | Cement to Surface |
| Coal | | | | | | | |
| Intermediate | 9 5/8" | New | J-55 | 36 #/ft | | 2550' | Cement to Surface |
| Production | 5 1/2" | New | P-110 | 20 #/ft | | 11,794' | Cement to Surface |
| Tubing | 2 3/8" | New | N-80 | 4.7 #/ft | | 7200' | |
| Liners | | | | | | | |

| TYPE | Size | Wellbore Diameter | Wall Thickness | Burst Pressure | Cement Type | Cement Yield |
|--------------|-------------|------------------------------|---------------------------|---------------------------|------------------------|---------------------|
| Conductor | 20" | 26" | .25" | 880 psi | Type I + 3% CaCl | 1.2 cuft/sack |
| Fresh Water | 13 3/8" | 17" | .33" | 1730 psi | See # 22 | 1.2 cuft/sack |
| Coal | | | | | | |
| Intermediate | 9 5/8" | 12 1/4" | .352" | 3520 psi | See # 22 | 1.2 Cuft/sack |
| Production | 5 1/2" | 8 7/8" & 8 3/4" | .361" | 12,640 psi | See #22 | 1.18 Cuft/sack |
| Tubing | 2 3/8" | | .19" | 11,200 psi | | |
| Liners | | | | | | |

PACKERS

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

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GASTAR EXPLORATION USA, INC.

Location: Marshall County, WV
 Field: Marshall
 Facility: Hoyt

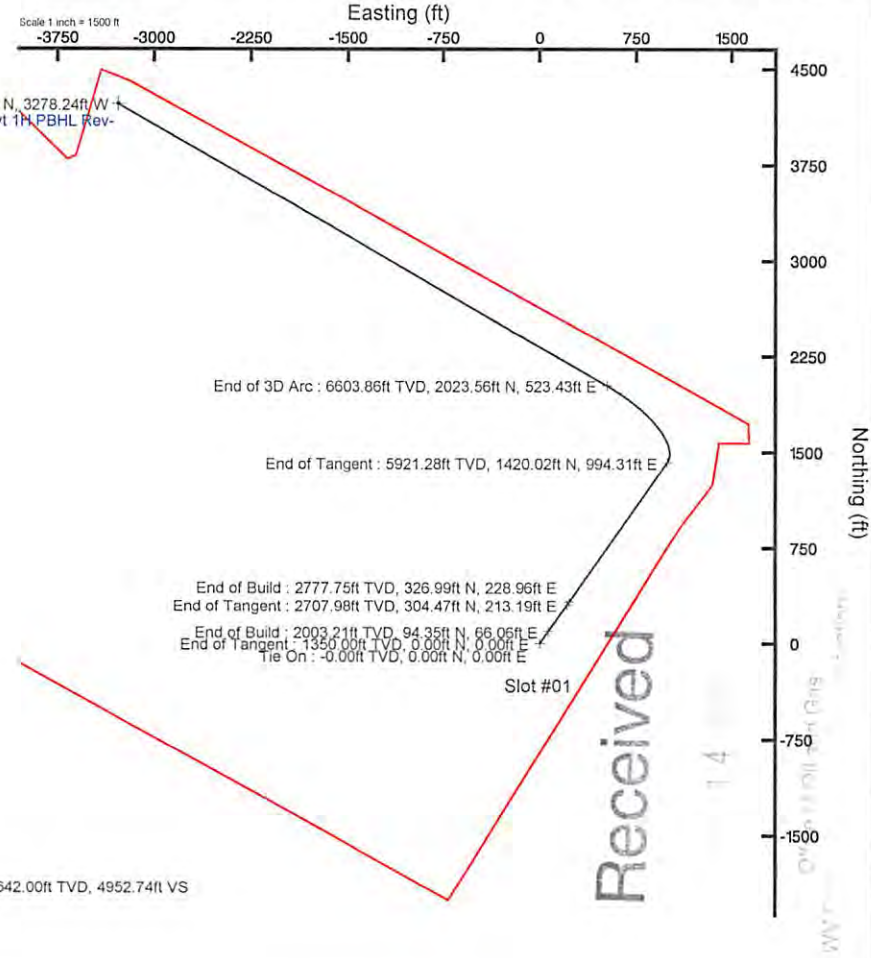
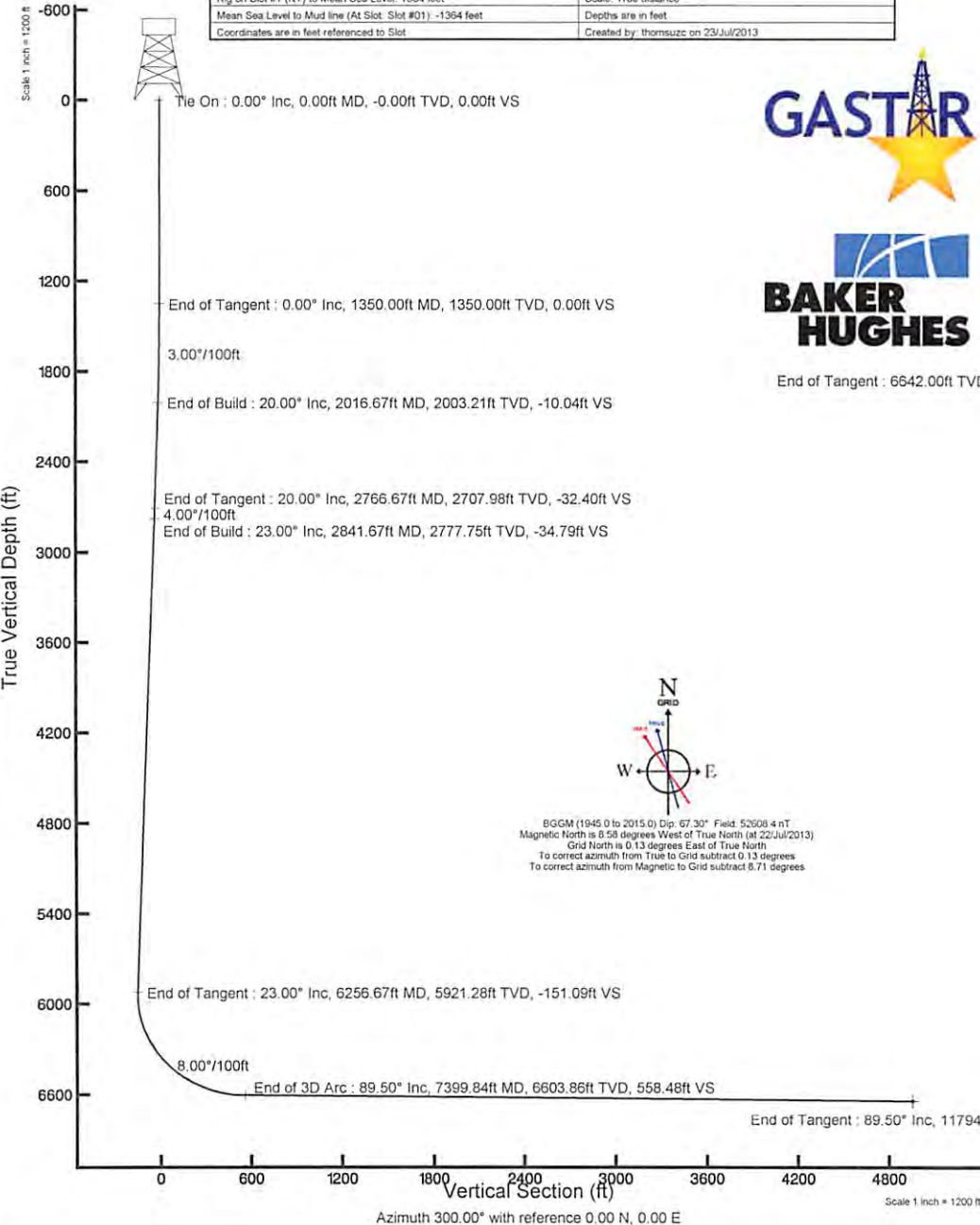
Slot: Slot #01
 Well: Hoyt-North 1H
 Wellbore: Hoyt-North 1H (PWB)

| | |
|--|---|
| Plot reference wellpath is Hoyt-North 1H Ex-03 (PWP) | |
| True vertical depths are referenced to Rig on Slot #1 (RT) | Grid System: NAD83 / UTM Zone 17 North, US feet |
| Measured depths are referenced to Rig on Slot #1 (RT) | North Reference: Grid north |
| Rig on Slot #1 (RT) to Mean Sea Level: 1364 feet | Scale: True distance |
| Mean Sea Level to Mud line (At Slot: Slot #01) -1364 feet | Depths are in feet |
| Coordinates are in feet referenced to Slot | Created by: thomsuzc on 23/Jul/2013 |

| Location Information | | | | | | |
|---|--------------|-------------------|--------------------|--------------------|----------------|----------------|
| Facility Name | | Grid East (US ft) | Grid North (US ft) | Latitude | Longitude | |
| Hoyt | | 1698619.380 | 14445001.440 | 39°46'31.292"N | 80°47'34.254"W | |
| Slot | Local N (ft) | Local E (ft) | Grid East (US ft) | Grid North (US ft) | Latitude | Longitude |
| Slot #01 | 35.14 | 48.64 | 1698668.000 | 14445036.570 | 39°46'31.638"N | 80°47'33.630"W |
| Rig on Slot #1 (RT) to Mud line (At Slot: Slot #01) | | | | | 0ft | |
| Mean Sea Level to Mud line (At Slot: Slot #01) | | | | | -1364ft | |
| Rig on Slot #1 (RT) to Mean Sea Level | | | | | 1364ft | |

| Targets | | | | | | | | |
|-------------------|----------|----------|--------------|--------------|-------------------|--------------------|----------------|----------------|
| Name | MD (ft) | TVD (ft) | Local N (ft) | Local E (ft) | Grid East (US ft) | Grid North (US ft) | Latitude | Longitude |
| Hoyt 1H LP Temp | | 6642.00 | 1756.87 | -1169.98 | 1699837.51 | 14446792.74 | 39°46'48.973"N | 80°47'18.592"W |
| Hoyt 1H PBHL Rev. | 11794.28 | 6642.00 | 4227.41 | -3278.24 | 1699391.07 | 14448262.30 | 39°47'13.489"N | 80°46'15.496"W |

| Well Profile Data | | | | | | | | |
|-------------------|----------|----------|---------|----------|--------------|--------------|---------------|---------|
| Design Comment | MD (ft) | Inc. (°) | Az. (°) | TVD (ft) | Local N (ft) | Local E (ft) | DLS (°/100ft) | VS (ft) |
| Tie On | 0.00 | 0.00 | 35.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| End of Tangent | 1350.00 | 0.00 | 35.00 | 1350.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| End of Build | 2016.67 | 20.00 | 35.00 | 2003.21 | 94.35 | 66.06 | 3.00 | -10.04 |
| End of Tangent | 2766.67 | 20.00 | 35.00 | 2707.98 | 304.47 | 213.19 | 0.00 | -32.40 |
| End of Build | 2841.67 | 23.00 | 35.00 | 2777.75 | 326.99 | 228.96 | 4.00 | -34.79 |
| End of Tangent | 6256.67 | 23.00 | 35.00 | 5921.28 | 1420.02 | 994.31 | 0.00 | -151.09 |
| End of 3D Arc | 7399.84 | 89.50 | 300.10 | 6603.86 | 2023.56 | 523.43 | 8.00 | 558.48 |
| End of Tangent | 11794.28 | 89.50 | 300.10 | 6642.00 | 4227.41 | -3278.24 | 0.00 | 4952.74 |



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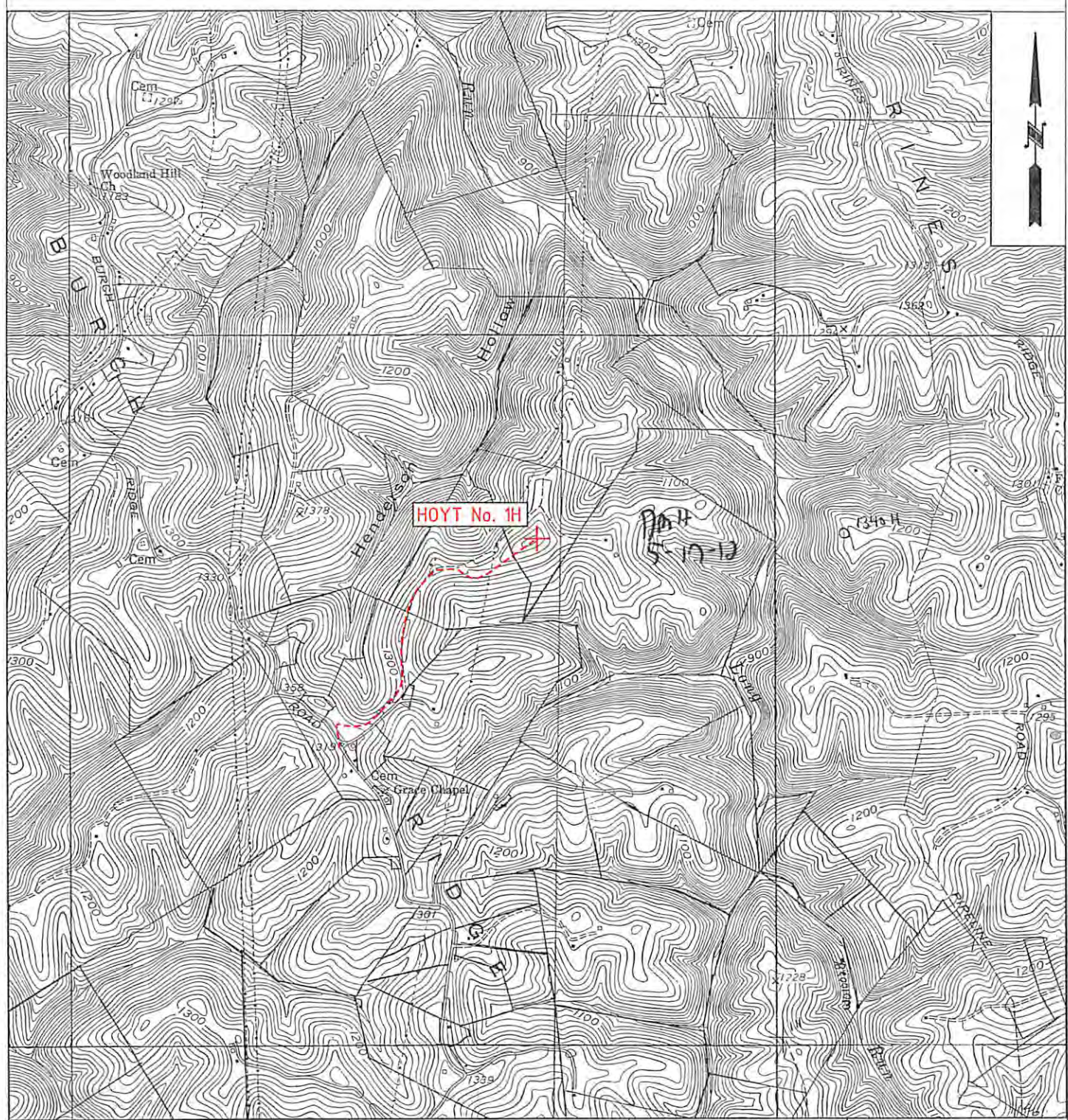
WV-01568MD

51-0568

WW-9

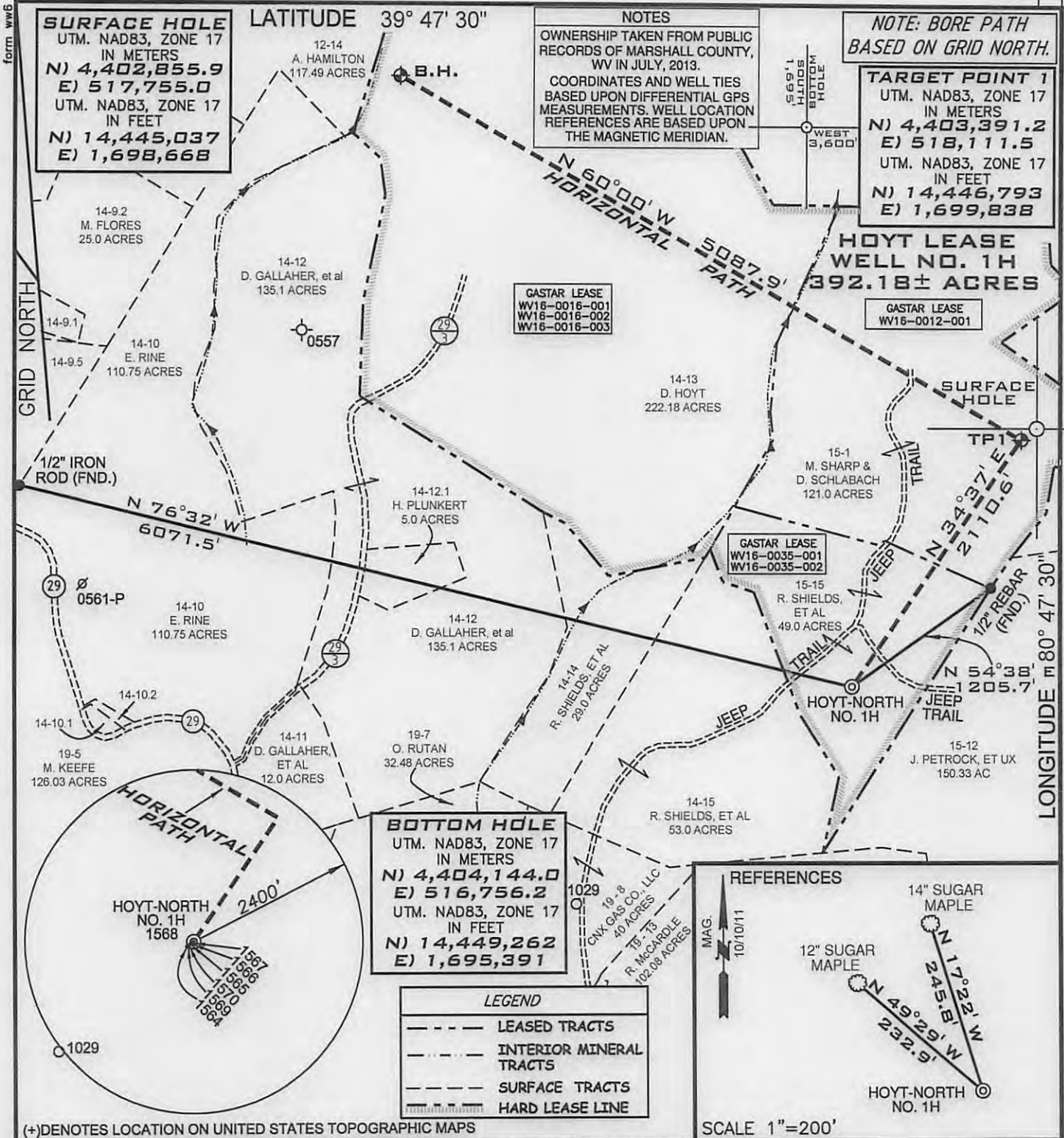
PROPOSED HOYT NORTH WELL No. 1H

SUPPLEMENT PG 4



| | | | |
|----------|--|--|--------------------------------|
| W0100283 | OPERATOR GASTAR EXPLORATION USA, Inc. 229 W Main Street, Suite 301 Clarksburg, WV 26301 | TOPO SECTION POWHATAN POINT 7.5' | LEASE NAME HOYT |
| | | SCALE: 1"=2000' | DATE: DATE: 03/16/12 |

10/11/2013



FILE NUMBER W0100283 (WB1-28)
DRAWING NUMBER HOYT_WP_1H_rev2
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: July 23, 2013
OPERATORS WELL NO. HOYT-NORTH NO. 1H
API WELL NO. MOD
47-051-01568 H6A
STATE COUNTY PERMIT

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X

LOCATION ELEVATION 1364' WATERSHED (HUC 10) FISH CREEK (UNDEFINED)

DISTRICT FRANKLIN COUNTY MARSHALL
QUADRANGLE POWHATAN POINT 7.5' LEASE NUMBER WV16-0012-001, WV16-0035-001, WV16-0035-002, WV16-0016-001, WV16-0016-002, WV16-0016-003

SURFACE OWNER ROBERT L. & REBECCA SHIELDS AND DONALD SHIELDS ACREAGE 49.0
OIL & GAS ROYALTY OWNER ROBERT L. & REBECCA SHIELDS AND DONALD SHIELDS LEASE ACREAGE 392.18

PROPOSED WORK: DRILL X CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION ___
PERFORATE NEW FORMATION ___ OTHER PHYSICAL CHANGE (SPECIFY) ___

TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6575' + 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

10/11/2013

COUNTY NAME PERMIT