



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

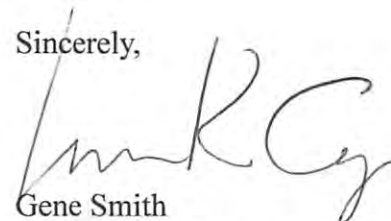
Re: Permit Modification Approval for API Number 5101567 , Well #: HOYT-NORTH NO. 2H
Extended lateral

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,


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 7.7'
Operator ID County District Quadrangle

2) Operator's Well Number: Hoyt No. 2H 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 6691' (top of formation), an anticipated thickness of 50' and a pressure of 3000 psi.

7) Proposed Total Vertical Depth: 6601'

8) Formation at Total Vertical Depth: Marcellus

9) Proposed Total Measured Depth: 11,941'

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 17 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

Received

14 2013

20)

CASING AND TUBING PROGRAM

LKC 10/8/13

<u>TYPE</u>	<u>Size</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft.</u>	<u>FOOTAGE: For Drilling</u>	<u>INTERVALS: Left in Well</u>	<u>CEMENT: Fill -up (Cu. Ft.)</u>
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		11,941'	Cement to Surface
Tubing	2 3/8"	New	N-80	4.7 #/ft		7200'	
Liners							

<u>TYPE</u>	<u>Size</u>	<u>Wellbore Diameter</u>	<u>Wall Thickness</u>	<u>Burst Pressure</u>	<u>Cement Type</u>	<u>Cement Yield</u>
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

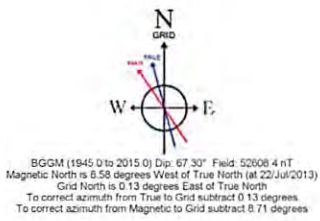
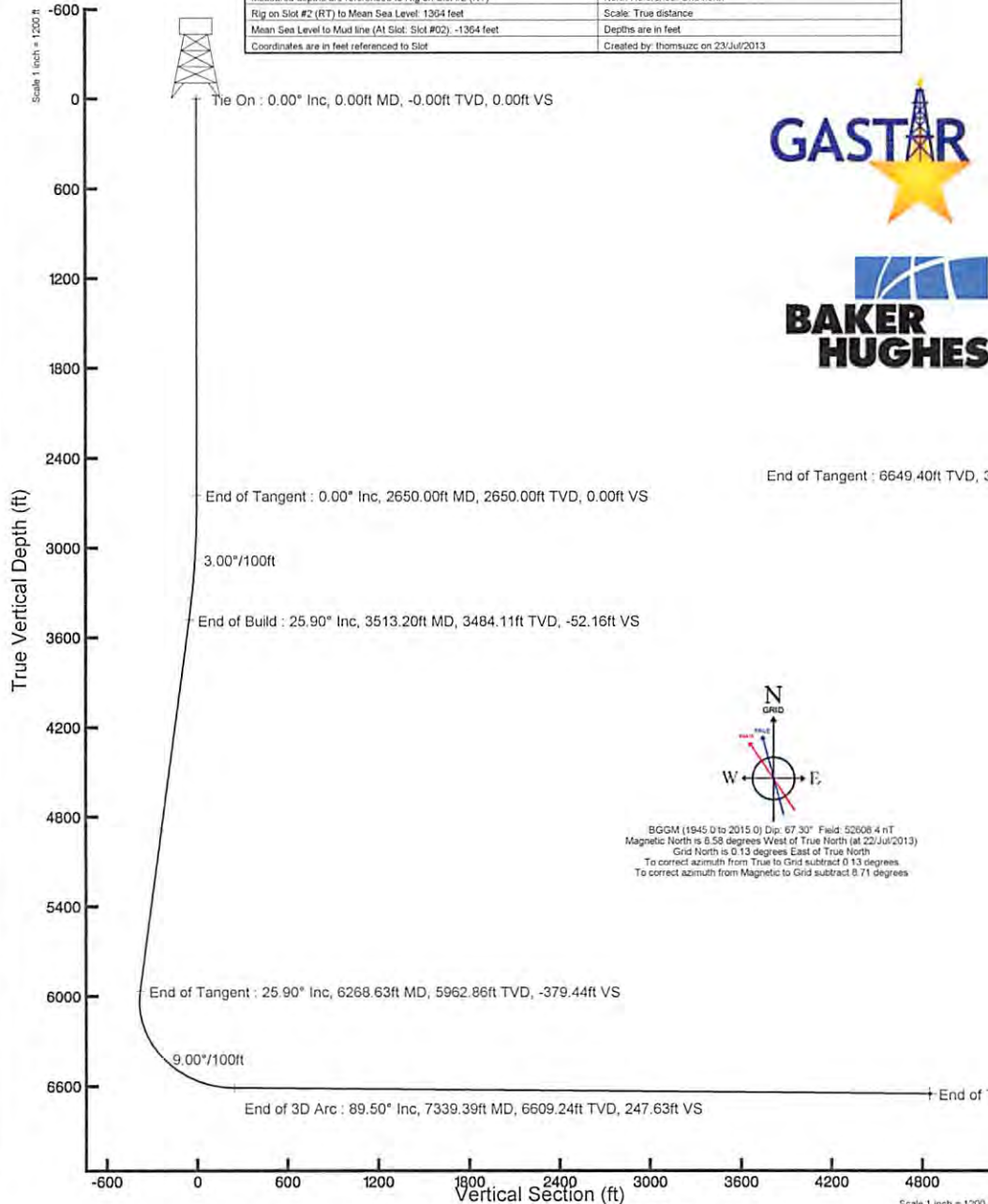
Kind:	n/a			
Sizes:	n/a			
Depths Set:	n/a			Received

GASTAR EXPLORATION USA, INC.

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

Slot: Slot #02
 Well: Hoyt-North 2H
 Wellbore: Hoyt-North 2H (PWB)

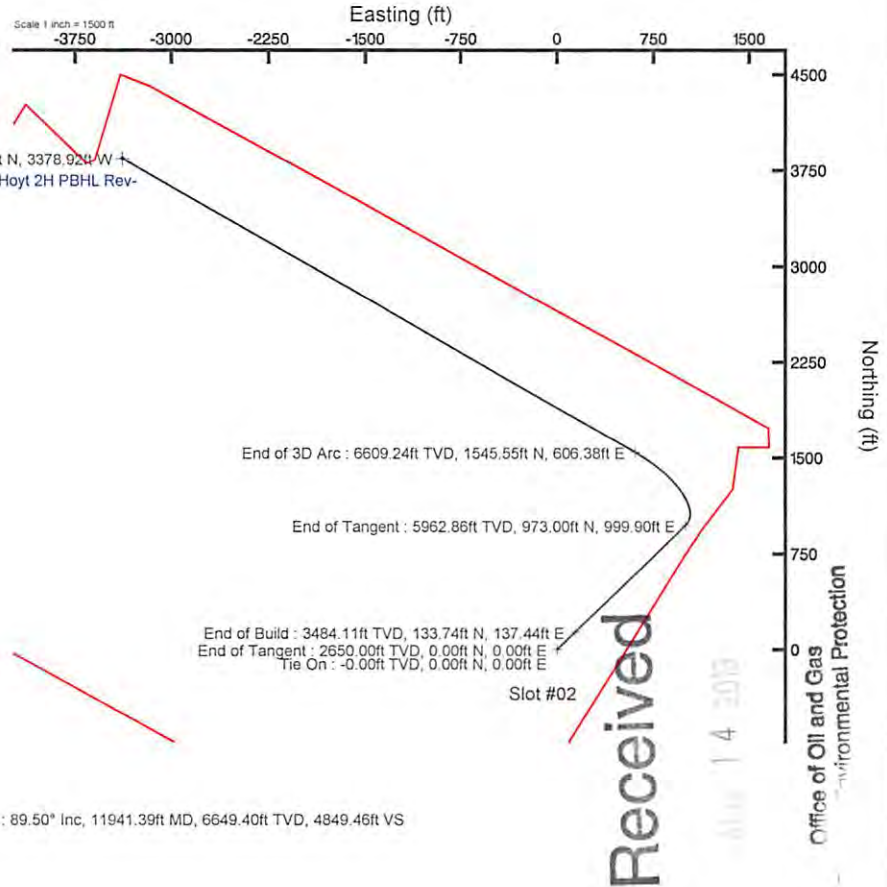
Plot reference wellpath is Hoyt-North 2H Ex-01 (PWP)	
True vertical depths are referenced to Rig on Slot #2 (RT)	Grid System: NAD83 / UTM Zone 17 North, US feet
Measured depths are referenced to Rig on Slot #2 (RT)	North Reference: Grid north
Rig on Slot #2 (RT) to Mean Sea Level 1364 feet	Scale: True distance
Mean Sea Level to Mud line (At Slot: Slot #02) -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 #02	23.43	32.42	1698651.790	14445024.860	39°46'31.522"N	80°47'33.838"W
Rig on Slot #2 (RT) to Mud line (At Slot: Slot #02)					0ft	
Mean Sea Level to Mud line (At Slot: Slot #02)					-1364ft	
Rig on Slot #2 (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 2H LP TEMP	6604.00	1320.43	1169.22	169820.54	14446344.76	14446344.76	39°46'44.5457N	80°47'18.823W
Hoyt 2H PBHL Rev-	11941.39	6649.40	3846.46	-3378.92	1699274.22	14448869.79	39°47'09.6117N	80°48'17.007W

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	0.000	45.781	0.00	0.00	0.00	0.00	0.00
End of Tangent	2650.00	0.000	45.781	2650.00	0.00	0.00	0.00	0.00
End of Build	3513.20	25.896	45.781	3484.11	133.74	137.44	3.00	-52.16
End of Tangent	6268.63	25.896	45.781	5962.86	973.00	999.90	0.00	-379.44
End of 3D Arc	7339.39	89.500	300.000	6609.24	1545.55	606.38	9.00	247.63
End of Tangent	11941.39	89.500	300.000	6649.40	3846.46	-3378.92	0.00	4849.46



Received
 Nov 14 2013
 Office of Oil and Gas
 Environmental Protection

51-011567 MOD

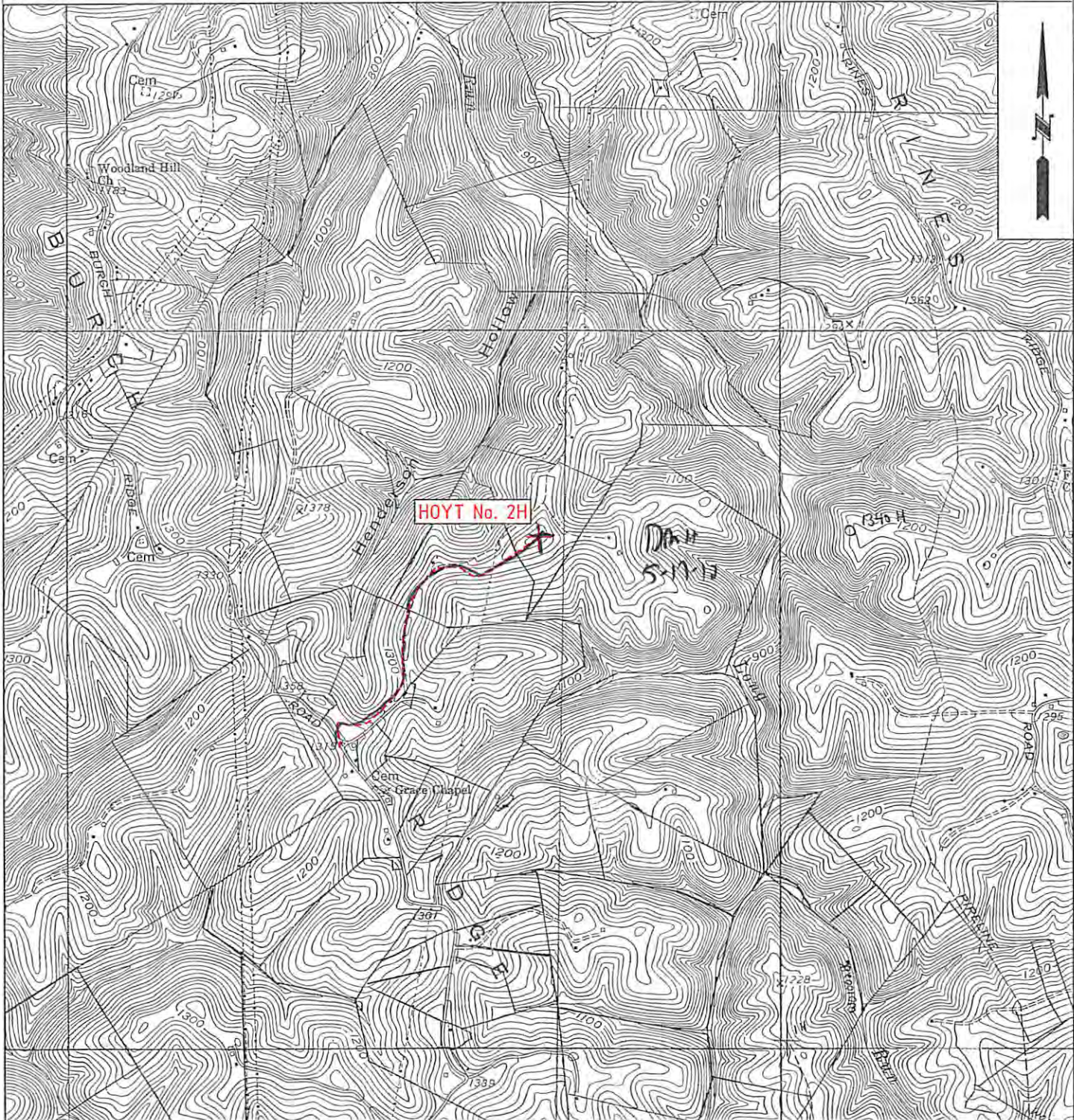
Azimuth 300.00° with reference 0.00 N, 0.00 E

Scale 1 inch = 1200 ft

WW-9

PROPOSED HOYT NORTH WELL No. 2H

SUPPLEMENT PG 4



HOYT No. 2H

DH
5-17-13

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

10/11/2013

form wv6

345'

5,940'

LONGITUDE 80° 47' 30"

SURFACE HOLE
 UTM. NAD83, ZONE 17
 IN METERS
N) 4,402,852.4
E) 517,750.1
 UTM. NAD83, ZONE 17
 IN FEET
N) 14,445,025
E) 1,698,652

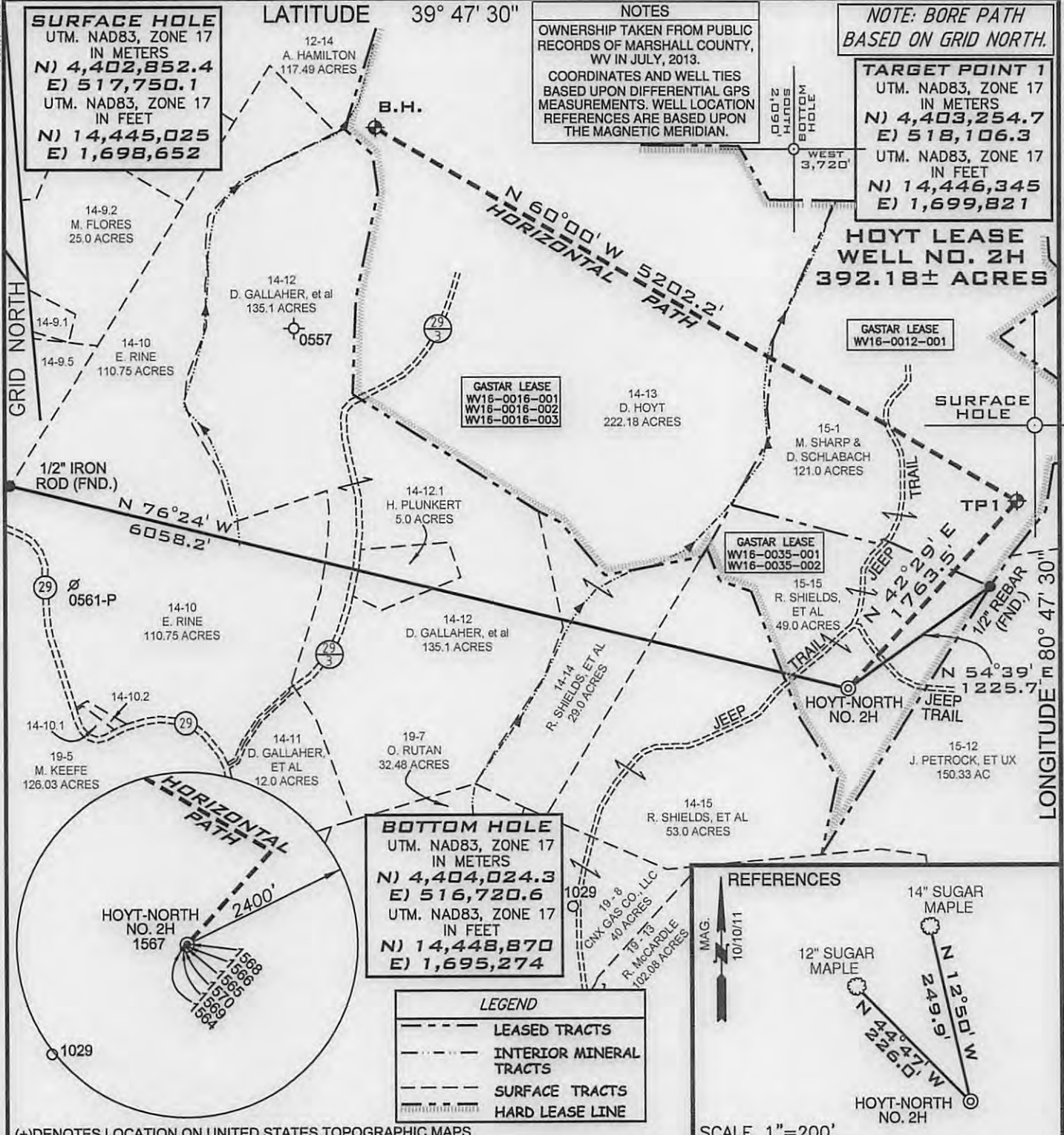
LATITUDE 39° 47' 30"

NOTES
 OWNERSHIP TAKEN FROM PUBLIC RECORDS OF MARSHALL COUNTY, WV IN JULY, 2013.
 COORDINATES AND WELL TIES BASED UPON DIFFERENTIAL GPS MEASUREMENTS. WELL LOCATION REFERENCES ARE BASED UPON THE MAGNETIC MERIDIAN.

NOTE: BORE PATH BASED ON GRID NORTH.

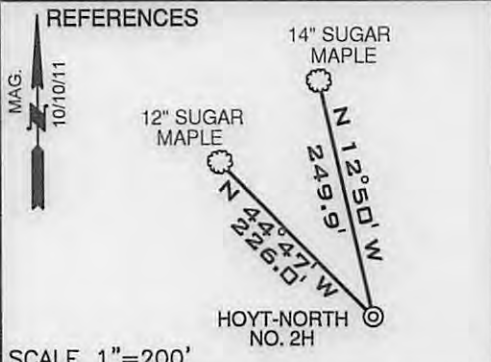
TARGET POINT 1
 UTM. NAD83, ZONE 17
 IN METERS
N) 4,403,254.7
E) 518,106.3
 UTM. NAD83, ZONE 17
 IN FEET
N) 14,446,345
E) 1,699,821

HOYT LEASE WELL NO. 2H
392.18± ACRES



BOTTOM HOLE
 UTM. NAD83, ZONE 17
 IN METERS
N) 4,404,024.3
E) 516,720.6
 UTM. NAD83, ZONE 17
 IN FEET
N) 14,448,870
E) 1,695,274

LEGEND
 - - - - - LEASED TRACTS
 - · - · - INTERIOR MINERAL TRACTS
 - - - - - SURFACE TRACTS
 - - - - - HARD LEASE LINE



FILE NUMBER W0100283 (WB1-28)
 DRAWING NUMBER HOYT_WP_2H_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. 2122 *Jonathan N. White*



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

DATE: JULY 23, 2013
 OPERATORS WELL NO. HOYT-NORTH NO. 2H
 API WELL NO. MOD
47-051-01567 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 PLUG & ABANDON ___ CLEAN OUT & REPLUG ___
 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