

State of West Virginia  
Department of Environmental Protection - Office of Oil and Gas  
Well Operator's Report of Well Work

API 47 - 51 - 01568 County Marshall District Franklin  
Quad Powhatan Point 7.5' Pad Name Hoyt Field/Pool Name \_\_\_\_\_  
Farm name Robert and Rebecca Shields & Don Shields Well Number 1H  
Operator (as registered with the OOG) Gastar Exploration Inc.  
Address 229 West Main Street Suite 301 City Clarksburg State WV Zip 26301

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4402855.8 Easting 517754.9  
Landing Point of Curve Northing 4403427.4 Easting 517969.9  
Bottom Hole Northing 4404144.0 Easting 516756.2

Elevation (ft) 1364' GL Type of Well  New  Existing Type of Report  Interim  Final  
Permit Type  Deviated  Horizontal  Horizontal 6A  Vertical Depth Type  Deep  Shallow  
Type of Operation  Convert  Deepen  Drill  Plug Back  Redrilling  Rework  Stimulate  
Well Type  Brine Disposal  CBM  Gas  Oil  Secondary Recovery  Solution Mining  Storage  Other \_\_\_\_\_  
Type of Completion  Single  Multiple Fluids Produced  Brine  Gas  NGL  Oil  Other \_\_\_\_\_  
Drilled with  Cable  Rotary

Drilling Media Surface hole  Air  Mud  Fresh Water Intermediate hole  Air  Mud  Fresh Water  Brine  
Production hole  Air  Mud  Fresh Water  Brine  
Mud Type(s) and Additive(s)  
Synthetic Oil Base Mud

Date permit issued July 24, 2013 Date drilling commenced 5/16/2014 Date drilling ceased 1/8/2015  
Date completion activities began 1/26/2015 Date completion activities ceased 4/14/2015  
Verbal plugging (Y/N) \_\_\_\_\_ Date permission granted \_\_\_\_\_ Granted by \_\_\_\_\_

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 55' Open mine(s) (Y/N) depths None  
Salt water depth(s) ft 1828' Void(s) encountered (Y/N) depths None  
Coal depth(s) ft 973'-982' & 1160'-1190' Cavern(s) encountered (Y/N) depths None  
Is coal being mined in area (Y/N) No

Reviewed by:  
Jc 8/21/15  
10/30/2015

API 47- 51 - 01568 Farm name Robert and Rebecca Shields & Don Shields Well number 1H

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor							
Surface	30"	20"	110'	New	PE / 54.5 #/ft		Yes
Coal	17.5"	13.375"	1238'	New	H-40 / 48 #/ft	83'	Yes
Intermediate 1	12.25"	9.625"	2631'	New	J-55 / 36 #/ft	80'	Yes
Intermediate 2							
Intermediate 3							
Production	8.875"	5.5"	11,887'	New	P-110 / 20 #/ft		Yes
Tubing		2.375"	6840'	New	N80/4.7#		
Packer type and depth set							

Comment Details \_\_\_\_\_

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor							
Surface	Class A	320	15.6	1.2	384	Surface	12
Coal	Class A	933	15.6	1.2	1119	Surface	8
Intermediate 1	Class A	850	15	1.19	1011	Surface	8
Intermediate 2							
Intermediate 3							
Production	50:50 Class A	2702	14.5	1.21	3269	Surface	
Tubing							

Drillers TD (ft) 11,932' Loggers TD (ft) N/A  
 Deepest formation penetrated Marcellus Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) 6184'

Check all wireline logs run  caliper  density  deviated/directional  induction  
 neutron  resistivity  gamma ray  temperature  sonic

Well cored  Yes  No Conventional Sidewall Were cuttings collected  Yes  No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING \_\_\_\_\_

Surface/Coal Casing - 3 Centralizers at 300' spacing  
Intermediate Casing - 7 Centralizers at 300' Spacing  
Production Casing - 201 Centralizers total - 1 centralizer every joint in the lateral and curve and 1 centralizer every other joint in the vertical section

WAS WELL COMPLETED AS SHOT HOLE  Yes  No DETAILS \_\_\_\_\_

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WAS WELL COMPLETED OPEN HOLE?  Yes  No DETAILS \_\_\_\_\_

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WERE TRACERS USED  Yes  No TYPE OF TRACER(S) USED \_\_\_\_\_

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PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
SEE ATTACHED PERF INFO SHEET					

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
			See Attached					

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Please insert additional pages as applicable.

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**PRODUCING FORMATION(S)**

**DEPTHS**

Marcellus 6,569' - 6,601' TVD 7,296' - 11,932' MD

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump

SHUT-IN PRESSURE Surface 1450 psi Bottom Hole 4312 psi DURATION OF TEST 216 hrs

OPEN FLOW Gas 1370 mcfpd Oil 227 bpd NGL \_\_\_\_\_ bpd Water 680 bpd GAS MEASURED BY  Estimated  Orifice  Pilot

LITHOLOGY/ FORMATION	TOP	BOTTOM	TOP	BOTTOM	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H <sub>2</sub> S, ETC)
	DEPTH IN FT NAME TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	
	0		0		SEE ATTACHED

Please insert additional pages as applicable.

Drilling Contractor Nomac Drilling  
Address 171 Locust Ave. City Mt. Morris State PA Zip 15349

Logging Company Baker Hughes  
Address 370 Westec Drive City Mt. Pleasant State PA Zip 15666

Cementing Company Baker Hughes  
Address 837 Philippi Pike City Clarksburg State WV Zip 26301

Stimulating Company Baker Hughes  
Address 837 Philippi Pike City Clarksburg State WV Zip 26301

Please insert additional pages as applicable.

Completed by Thomas Rowan Telephone 304-622-4796  
Signature [Signature] Title Drilling and Completions Engineer Date Office of Oil & Gas

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Register JUL 30 2015

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Hoyt #1H Perforation Information

<u>Stage</u>	<u>Date</u>	<u>Perforated interval</u>		<u>Number of Perfs</u>	<u>Formation</u>
		<u>From</u> ft	<u>To</u> ft		
1	2/4/2015	11677	11525	48	Marcellus
2	3/3/2015	11448	11218	60	Marcellus
3	3/3/2015	11172	11060	48	Marcellus
4	3/4/2015	10988	10763	60	Marcellus
5	3/4/2015	10733	10568	48	Marcellus
6	3/4/2015	10540	10334	60	Marcellus
7	3/4/2015	10298	10134	48	Marcellus
8	3/5/2015	10092	9968	48	Marcellus
9	3/6/2015	9918	9753	48	Marcellus
10	3/6/2015	9708	9502	60	Marcellus
11	3/6/2015	9456	9346	48	Marcellus
12	3/6/2015	9303	9181	48	Marcellus
13	3/7/2015	9140	9006	48	Marcellus
14	3/7/2015	8936	8798	48	Marcellus
15	3/7/2015	8744	8518	60	Marcellus
16	3/7/2015	8466	8282	48	Marcellus
17	3/8/2015	8232	8082	48	Marcellus
18	3/9/2015	7987	7888	48	Marcellus
19	3/9/2015	7840	7617	60	Marcellus
20	3/9/2015	7588	7439	48	Marcellus

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**Fluid & Sand Volume Summary - Hoyt 1H**

<u>Stage</u>	<u>Stimulation Date</u>	<u>Avg Pump Rate (BPM)</u>	<u>Avg Pressure (PSI)</u>	<u>Max Break Pres. (PSI)</u>	<u>ISIP (PSI)</u>	<u>Sand Total (lbs)</u>	<u>Total Water (bbls)</u>
1	3/3/2015	80	6693	4537	4392	191,161	4,688
2	3/3/2015	80	6656	4830	3706	359,193	8,318
3	3/3/2015	79	6756	5508	4683	350,372	8,173
4	3/4/2015	80	6797	5138	4333	361,406	8,194
5	3/4/2015	80	6854	5274	4451	358,099	8,069
6	3/4/2015	80	6610	4615	4529	365,848	8,050
7	3/4/2015	78	6942	5076	5218	416,697	10,608
8	3/5/2015	80	6916	5595	4870	361,733	8,351
9	3/6/2015	82	6915	5842	4203	363,866	799
10	3/6/2015	80	6211	4950	4536	355,124	7,934
11	3/6/2015	79	7101	5307	4904	363,004	8,055
12	3/6/2015	81	7065	5658	3805	359,990	7,889
13	3/7/2015	81	7081	5274	4840	349,549	7,848
14	3/7/2015	80	6795	5025	5268	346,884	7,807
15	3/7/2015	80	6632	4933	4538	359,028	7,361
16	3/8/2015	81	6495	4904	4847	353,122	7,080
17	3/8/2015	79	6502	4920	4808	356,548	9,065
18	3/9/2015	79	6330	5112	4568	337,819	7,722
19	3/9/2015	80	6216	4946	4823	345,025	7,842
20	3/9/2015	80	6700	6242	4645	359,405	7,865

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Formations	Hoyt TOP TVD	HOYT BASE TVD	Top MD	Base MD
SHALE AND SANDSTONE	0	973	0	973
SEWICKLEY COAL	973	982	973	982
SHALE	982	1160	982	1160
PITTSBURGE COAL	1160	1190	1160	1190
SHALE AND SANDSTONE	1190	1828	1190	1828
3RD SALT SAND	1828	1883	1828	1883
SHALE	1883	1970	1883	1970
MAXTON	1970	2030	1970	2030
SILTSTONE	2030	2060	2030	2060
BIG LIME	2060	2160	2060	2160
BIG INJUN	2160	2360	2160	2360
WEIR SILTSTONE	2360	2540	2360	2540
BEREA SILTSTONE	2540	2570	2540	2570
SAND AND SHALE	2570	2695	2570	2695
GORDON	2695	2725	2695	2725
SILTSTONE AND SANDSTONE	2725	3491	2725	3523
BRAILLER	3491	5371	3523	5713
PIPE CREEK SHALE	5371	5571	5713	5953
SHALE	5571	5998	5953	6448
RHINESTREET	5998	6264	6448	6758
CASHAQUA	6264	6399	6758	6949
MIDDLESEX	6399	6418	6949	6980
WEST RIVER	6418	6477	6980	7084
GENESEO	6477	6502	7084	7134
TULLY LIMESTONE	6502	6537	7134	7221
HAMILTON	6537	6569	7221	7332
MARCELLUS	6569	na	7332	na
ONONDOGA	na	na	na	na

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**Hydraulic Fracturing**  
DISCLOSURE

Submission to FracFocus using Excel Spreadsheets has been turned off.

[FIND A WELL BY STATE](#)

[ABOUT PROJECT PARTNERS](#)

(Note: Clicking the FracFocus, FIND A WELL links will open a new window.)



**Prepare Disclosure for FracFocus Submission**

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**Hydraulic Fracturing Data**

[Edit](#)

Job Start Date 3/3/2015    Job End Date 3/9/2015    API Number 47-051-01568-00-00    State & County West Virginia --- Marshall

Well Name HOYT-NORTH 1H

Longitude -80.80449    Latitude 39.787    Datum NAD27    Federal/Tribal Well?

True Vertical Depth (ft) 6601    Total Water Vol (gal) 6730668    Total Non Water Vol 0    Total Mass (lbs) 63446687.7176



**MSDS Chemical Ingredients**

[New Additive](#)    [Select Additive](#) ▼    [Add Additive](#)

Trade Name	Supplier	Purpose	Ingredients	CAS #	% High Additive	% HF Job	Comments	Ingredient Mass
<a href="#">Edit</a> Water	Operator	Carrier	Water	7732-18-5	100%	88.3545573%		56118963.6504
<a href="#">Edit</a> Sand, White, 40/70	Baker Hughes	Proppant	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	7.74185%		4911950
<a href="#">Edit</a> Sand, White, 30/50	Baker Hughes	Proppant	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	2.90029%		1840142
<a href="#">Edit</a> HCl, 10.1 - 15%	Baker Hughes	Acidizing	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.448045%	SmartCare Product	284270
<a href="#">Edit</a> Sand, White, 100 mesh	Baker Hughes	Proppant	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.276983%		175737
<a href="#">Edit</a> MaxPerm-20A, 265 gallon tote	Baker Hughes	Friction Reducer	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.1469973%	SmartCare Product	95241.92

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<a href="#">Edit</a>	Alpha 1427	Baker Hughes	Biocide	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0210452%	SmartCare Product	13352.5
<a href="#">Edit</a>	ScaleSorb 4, (50# bag)	Baker Hughes	Scale Inhibitor	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0063045%	SmartCare Product	4000
<a href="#">Edit</a>	GBW-5	Baker Hughes	Breaker	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0035368%	SmartCare Product	2244
<a href="#">Edit</a>	Ferrotrol 300L	Baker Hughes	Iron Control	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0030798%	SmartCare Product	1954.04718
<a href="#">Edit</a>	CI-39	Baker Hughes	Corrosion Inhibitor	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.001276%		809.6

**Non-MSDS Chemical Ingredients**

[New Ingredients](#)

Trade Name	Supplier	Purpose	Ingredients	CAS #	% High Additive	% HF Job	Comments	Ingredient Mass
<a href="#">Edit</a> Ingredients in Additive(s) (MSDS and non-MSDS)	Baker Hughes	See Trade Name(s) List						
			Crystalline Silica (Quartz)	14808-60-7	100%	10.9073432%		6927869
			Water	7732-18-5	85%	.4827815%		306641.74359
			1-Propanesulfonic acid, 2-methyl-2-[(1-oxo-2-propen-1-yl)amino]-, polymer with 2-propenamide, sodium salt	83446-68-8	60%	.0881026%		55958.952
			Hydrochloric Acid	7647-01-0	15%	.0671339%		42640.5
			Hydrotreated Light Distillate	64742-47-8	30%	.0440513%		27979.476
			Oxyalkylated alcohol	78330-21-9	5%	.0073419%		4663.246
			Polyoxyethylene sorbitan monooleate	9005-65-6	5%	.0073419%		4663.246
			Sorbitan, mono-(9Z)-9-octadecenoate	1338-43-8	5%	.0073419%		4663.246
			Sodium Chloride	7647-14-5	5%	.0073419%		4663.246
			Glutaraldehyde	111-30-8	30%	.0063067%		4005.75
			Diatomaceous Earth, Calcined	91053-39-3	100%	.0062977%		4000
			Ammonium Persulphate	7727-54-0	100%	.003533%		2244
			Didecyl Dimethyl Ammonium Chloride	7173-51-5	10%	.0021022%		1335.25
			Citric Acid	77-92-9	60%	.0018459%		1172.428308
			Quaternary Ammonium Compound	68424-85-1	5%	.0011149%		708.105
			Ethanol	64-17-5	5%	.0010511%		667.041
			Sodium Carboxymethyl inulin	430439-54-6	15%	.0009446%		600

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Sodium chloride	7647-14-5	15%	.0009446%	600
Oxyalkylated Fatty Acid	61791-002	40%	.0005099%	323.84
Tar Bases, Quinoline Derivs., Benzyl Chloride-Quaternized	72480-70-7	30%	.0003824%	242.88
Formic Acid	64-18-6	30%	.0003824%	242.88
Aldehyde	104-55-2	30%	.0003824%	242.88
Sodium diglycolate	35249-69-5	5%	.0003149%	200
Sodium glycolate	2836-32-0	5%	.0003149%	200
Sulfurized polyolefin	68037-13-8	5%	.0000637%	40.48
Isopropanol	67-63-0	5%	.0000637%	40.48
Crystalline Silica (Cristobalite)	14464-16-1	1%	.000063%	40
Potassium Iodide	7681-11-0	2%	.0000255%	16.192
Polyaklylene	7756-94-7	1%	.0000127%	8.096
Potassium Acetate	127-08-2	.5%	.0000064%	4.048

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Hoyt 1H Cement and additives

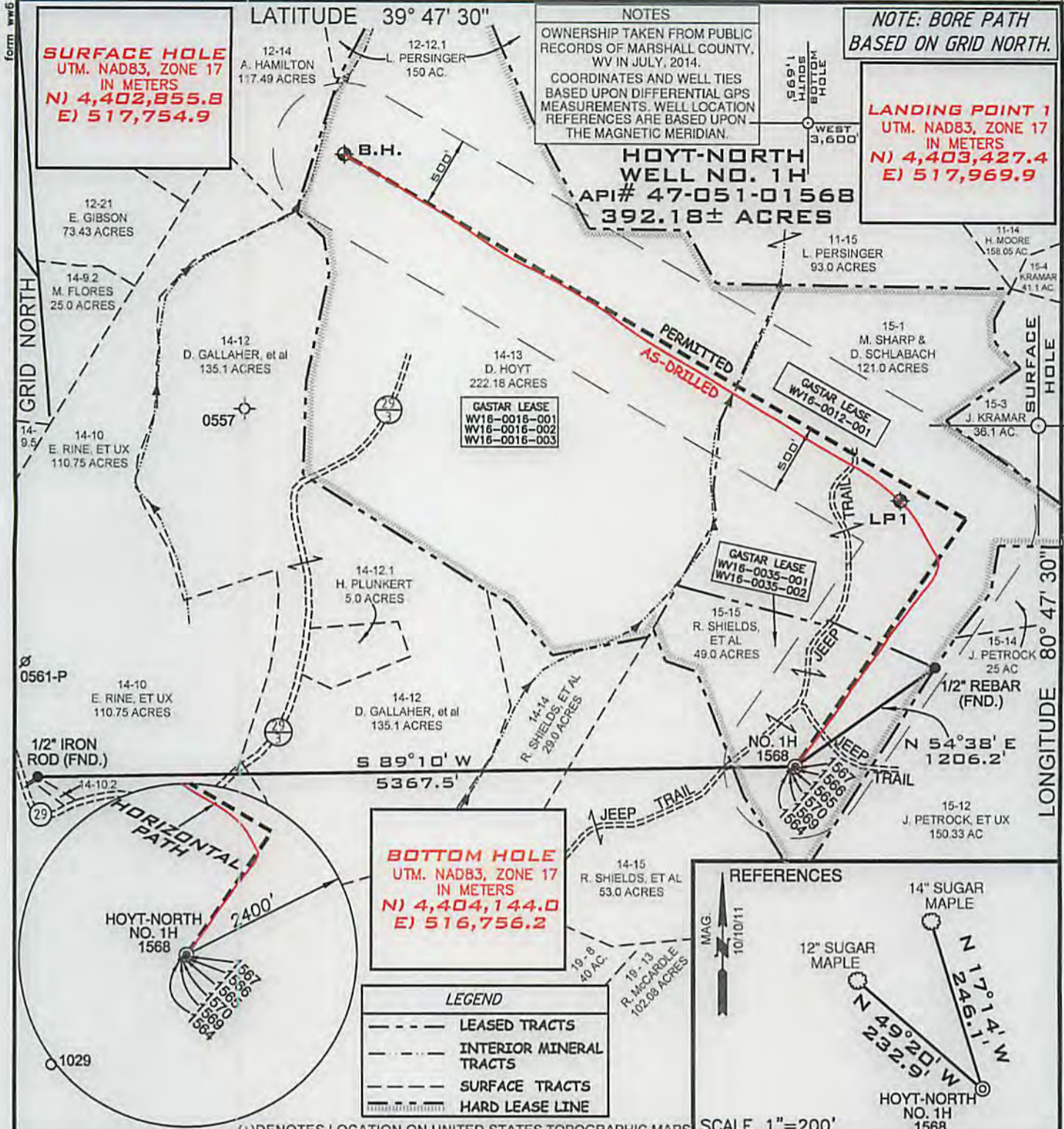
Surface: Class A + 3% CaCl + .25 #/sk Flake

Intermediate: Class A + 1% EC-1 + ¼ per sack cello flake +.5% SMS + .55% BA-10A

Production: 50:50 Class A + 3 lbs/sk BA-90 + .25% R-3 + .3% MPA-170

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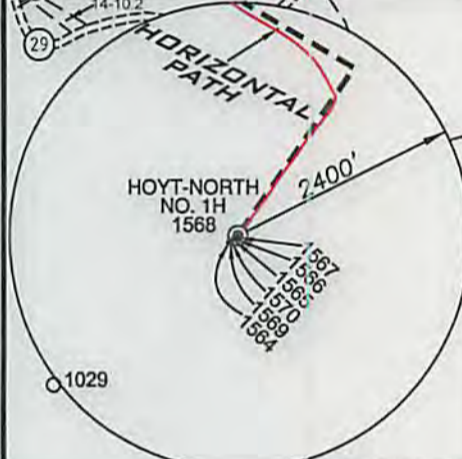


**SURFACE HOLE**  
 UTM. NAD83, ZONE 17  
 IN METERS  
**N) 4,402,855.8**  
**E) 517,754.9**

**NOTE: BORE PATH  
 BASED ON GRID NORTH.**

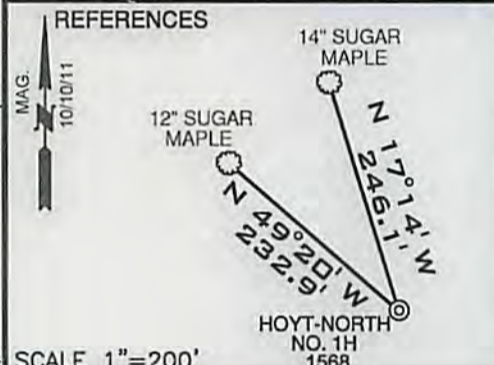
**LANDING POINT 1**  
 UTM. NAD83, ZONE 17  
 IN METERS  
**N) 4,403,427.4**  
**E) 517,969.9**

**BOTTOM HOLE**  
 UTM. NAD83, ZONE 17  
 IN METERS  
**N) 4,404,144.0**  
**E) 516,756.2**



**LEGEND**

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



FILE NUMBER **W0100283 (WB1-28)**  
 DRAWING NUMBER **HOYT\_WP\_1H\_rev3-WR35**  
 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 22, 2015  
 OPERATORS WELL NO. HOYT-NORTH  
NO. 1H AS-DRILLED  
 API WELL NO. 47-051-01568  
 STATE COUNTY PERMIT

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

LOCATION ELEVATION 1368' WATERSHED (HUC 10) FISH CREEK (UNDEFINED)

DISTRICT FRANKLIN COUNTY MARSHALL

QUADRANGLE POWHATAN POINT 7.5' LEASE NUMBER WV16-0012-001, WV16-0035-001, 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 \_\_\_ CONVERT \_\_\_ DRILL DEEPER \_\_\_ REDRILL \_\_\_ FRACTURE OR STIMULATE \_\_\_ PLUG OFF OLD FORMATION \_\_\_  
 PERFORATE NEW FORMATION \_\_\_ OTHER PHYSICAL CHANGE (SPECIFY) \_\_\_

TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD: 6601' TMD: 11,932'

WELL OPERATOR GASTAR EXPLORATION 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

10/30/2015

COUNTY NAME PERMIT