

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

API 47-51-01567 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 2H
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 4402852.1 Easting 517750.0
Landing Point of Curve Northing 4403292.5 Easting 517962.3
Bottom Hole Northing 4404023.1 Easting 516720.1

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 5/29/2014 Date drilling ceased 1/24/2015
Date completion activities began 2/26/2015 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 _____
Salt water depth(s) ft 1828' Void(s) encountered (Y/N) depths _____
Coal depth(s) ft 973'-982' & 1160'-1190' Cavern(s) encountered (Y/N) depths _____
Is coal being mined in area (Y/N) No

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None
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None

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

API 47-51 - 01567 Farm name Robert and Rebecca Shields & Don Shields Well number 2H

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade w/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"	1230'	New	H-40 / 48 #/ft	83'	Yes
Intermediate 1	12.25"	9.625"	2610'	New	J-55 / 36 #/ft	80'	Yes
Intermediate 2							
Intermediate 3							
Production	8.875"	5.5"	11,816'	New	P-110 / 20 #/ft		Yes
Tubing		2.375"	6918'	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 ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor							
Surface	Class A	324	15.6	1.21	392	Surface	12
Coal	Class A	946	15.6	1.2	1135	Surface	8
Intermediate 1	Class A	850	15	1.19	1011	Surface	8
Intermediate 2							
Intermediate 3							
Production	50:50 Class A	2688	14.5	1.21	3252	Surface	
Tubing							

Drillers TD (ft) 11,852' Loggers TD (ft) N/A

Deepest formation penetrated Marcellus Plug back to (ft) N/A

Plug back procedure N/A

Kick off depth (ft) 6444'

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 - 192 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 _____

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

WERE TRACERS USED Yes No TYPE OF TRACER(S) USED _____

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Hoyt #2H 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	2/28/2015	11759	11607	48	Marcellus
2	3/11/2015	11557	11405	48	Marcellus
3	3/11/2015	11357	11205	48	Marcellus
4	3/11/2015	11157	11005	48	Marcellus
5	3/12/2015	10957	10805	48	Marcellus
6	3/12/2015	10757	10605	48	Marcellus
7	3/13/2015	10557	10405	48	Marcellus
8	3/13/2015	10357	10205	48	Marcellus
9	3/13/2015	10157	10005	48	Marcellus
10	3/13/2015	9957	9805	48	Marcellus
11	3/13/2015	9757	9605	48	Marcellus
12	3/14/2015	9557	9405	48	Marcellus
13	3/14/2015	9357	9205	48	Marcellus
14	3/14/2015	9157	9005	48	Marcellus
15	3/15/2015	8957	8805	48	Marcellus
16	3/15/2015	8757	8605	48	Marcellus
17	3/15/2015	8557	8405	48	Marcellus
18	3/16/2015	8357	8205	48	Marcellus
19	3/16/2015	8157	8005	48	Marcellus
20	3/16/2015	7957	7805	48	Marcellus
21	3/16/2015	7757	7605	48	Marcellus
22	3/17/2015	7557	7405	48	Marcellus

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Fluid & Sand Volume Summary - Hoyt 2H

<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	3/11/2015	79	6,627	40	4,493	188,642	4,849
2	3/11/2015	80	6,954	5,495	4,012	355,412	8,146
3	3/11/2015	80	6,954	5,282	4,968	358,131	8,089
4	3/11/2015	80	6,866	5,108	3,988	346,462	8,162
5	3/12/2015	80	7,041	5,570	4,627	333,256	7,790
6	3/12/2015	79	7,736	5,345	4,059	358,607	7,973
7	3/13/2015	79	7,320	5,543	4,902	330,759	7,965
8	3/13/2015	79	6,835	5,624	4,651	353,017	7,765
9	3/13/2015	80	6,791	5,264	4,255	358,454	7,796
10	3/14/2015	80	6,827	5,013	4,255	358,280	8,035
11	3/14/2015	80	6,607	5,219	4,813	361,249	8,072
12	3/14/2015	79	6,494	5,075	4,945	367,846	8,055
13	3/14/2015	78	6,929	4,970	4,980	358,440	8,489
14	3/14/2015	81	7,515	5,216	4,647	190,861	5,788
15	3/14/2015	81	6,835	5,411	4,813	356,271	7,848
16	3/15/2015	81	6,760	5,046	5,164	343,125	7,782
17	3/15/2015	80	6,874	4,981	4,941	357,104	7,850
18	3/16/2015	80	6,386	5,040	4,941	320,703	7,443
19	3/16/2015	81	6,860	5,072	4,626	345,810	7,746
20	3/16/2015	80	6,854	5,217	4,872	361,589	7,952
21	3/16/2015	80	6,854	4,703	4,647	295,166	7,103
22	3/16/2015	80	6,299	5,170	4,725	366,186	8,750

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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



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Hydraulic Fracturing Data

[Edit](#)

Job Start Date 3/11/2015	Job End Date 3/17/2015	API Number 47-051-01567-00-00	State & County West Virginia --- Marshall
Well Name HOYT-NORTH 2H			
Longitude -80.80491	Latitude 39.78593	Datum NAD27	Federal/Tribal Well?
True Vertical Depth (ft) 6561	Total Water Vol (gal) 6797196	Total Non Water Vol 0	Total Mass (lbs) 64589552.9662



MSDS Chemical Ingredients

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

Trade Name	Supplier	Purpose	Ingredients	CAS #	% High Additive	% HF Job	Comments	Ingredient Mass
Edit Water	Operator	Carrier	Water	7732-18-5	100%	87.6314668%		56673660.8088
Edit Sand, White, 40/70	Baker Hughes	Proppant	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	8.27133%		5342419
Edit Sand, White, 30/50	Baker Hughes	Proppant	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	2.73396%		1765858
Edit HCl, 10.1 - 15%	Baker Hughes	Acidizing	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.557671%	SmartCare Product	360197.6
Edit Sand, White, 100 mesh	Baker Hughes	Proppant	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.477086%		308148
Edit MaxPerm-20A, 265 gallon tote	Baker Hughes	Friction Reducer	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.175352%	Smart Prod	
Edit Alpha 1427	Baker Hughes	Biocide	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0224746%	Sm Pr	

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 Edit ScaleSorb 4, Baker Hughes Scale Inhibitor
 (50# bag)

MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0065847%	SmartCare Product	4253
MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0062797%	SmartCare Product	4056
MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0038061%	SmartCare Product	2458.31742
MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0011253%		726.8

Non-MSDS Chemical Ingredients

New Ingredients

Trade Name	Supplier	Purpose	Ingredients	CAS #	% High Additive	% HF Job	Comments	Ingredient Mass
Ingredients in Additive(s) (MSDS and non-MSDS)	Baker Hughes	See Trade Name(s) List	Crystalline Silica (Quartz)	14808-60-7	100%	11.4676892%		7416467.53
			Water	7732-18-5	85%	.5939451%		384120.52671
			1-Propanesulfonic acid, 2-methyl-2-[(1-oxo-2-propen-1-yl)amino]-, polymer with 2-propenamido, sodium salt	83446-68-8	60%	.105076%		67955.514
			Hydrochloric Acid	7647-01-0	15%	.0835432%		54029.64
			Hydrotreated Light Distillate	64742-47-8	30%	.052538%		33977.757
			Sodium Chloride	7647-14-5	5%	.0087563%		5662.9595
			Sorbitan, mono-(9Z)-9-octadecenoate	1338-43-8	5%	.0087563%		5662.9595
			Oxyalkylated alcohol	78330-21-9	5%	.0087563%		5662.9595
			Polyoxyethylene sorbitan monooleate	9005-65-6	5%	.0087563%		5662.9595
			Glutaraldehyde	111-30-8	30%	.0067337%		4354.875
			Diatomaceous Earth, Calcined	91053-39-3	100%	.0065762%		4253
			Ammonium Persulphate	7727-54-0	100%	.0062716%		4056
			Citric Acid	77-92-9	60%	.0022807%		1474.990452
			Didecyl Dimethyl Ammonium Chloride	7173-51-5	10%	.0022446%		1451.625
			Quaternary Ammonium Compound	68424-85-1	5%	.0011785%		762.1525
			Ethanol	64-17-5	5%	.0011223%		725.8125
			Sodium chloride	7647-14-5	15%	.0009864%		637.95
			Sodium Carboxymethyl inulin	430439-54-6	15%	.0009864%		637.95
			Oxyalkylated Fatty Acid	61791-002	40%	.0004495%		250.72
			Aldehyde	104-55-2	30%	.0003371%		218.04
			Formic Acid	64-18-6	30%	.0003371%		218.04
			Tar Bases, Quinoline Derivs., Benzyl Chloride-Quaternized	72480-70-7	30%	.0003371%		218.04

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Sodium diglycolate	35249-69-5	5%	.0003288%	212.65
Sodium glycolate	2836-32-0	5%	.0003288%	212.65
Crystalline Silica (Cristobalite)	14464-46-1	1%	.0000658%	42.53
Isopropanol	67-63-0	5%	.0000562%	36.34
Sulfurized polyolefin	68037-13-8	5%	.0000562%	36.34
Potassium Iodide	7681-11-0	2%	.0000225%	14.536
Polyaklylene	7756-94-7	1%	.0000112%	7.268
Potassium Acetate	127-08-2	.5%	.0000056%	3.634

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Operator Name: GASTAR EXPLORATION TEXAS LP
Well Name: HOYT #2H
Job Description: 20" Conductor
Date: May 28, 2014



Proposal No: 1001169088A

FLUID SPECIFICATIONS

<u>FLUID</u>	<u>VOLUME CU-FT</u>	<u>VOLUME FACTOR</u>	<u>AMOUNT AND TYPE OF CEMENT</u>
Cement Slurry	390	/ 1.21	= 324 sacks Premium NE-1 + 3% bwoc Calcium Chloride + 46.6% Fresh Water
Displacement			39.1 bbls Fresh Water @ 8.34 ppg

CEMENT PROPERTIES

**SLURRY
NO.1**

Slurry Weight (ppg)	15.60
Slurry Yield (cf/sack)	1.21
Amount of Mix Water (gps)	5.25

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Operator Name: GASTAR EXPLORATION TEXAS LP
Well Name: HOYT #2H
Job Description: 13-3/8" Surface
Date: May 28, 2014



Proposal No: 1001169088A

FLUID SPECIFICATIONS

Spacer 25.0 bbls 6% Gel + 20 lbs/bbl Bentonite - Sacked + 100% Fresh Water @ 8.4 ppg
Spacer 15.0 bbls Fresh Water @ 8.34 ppg

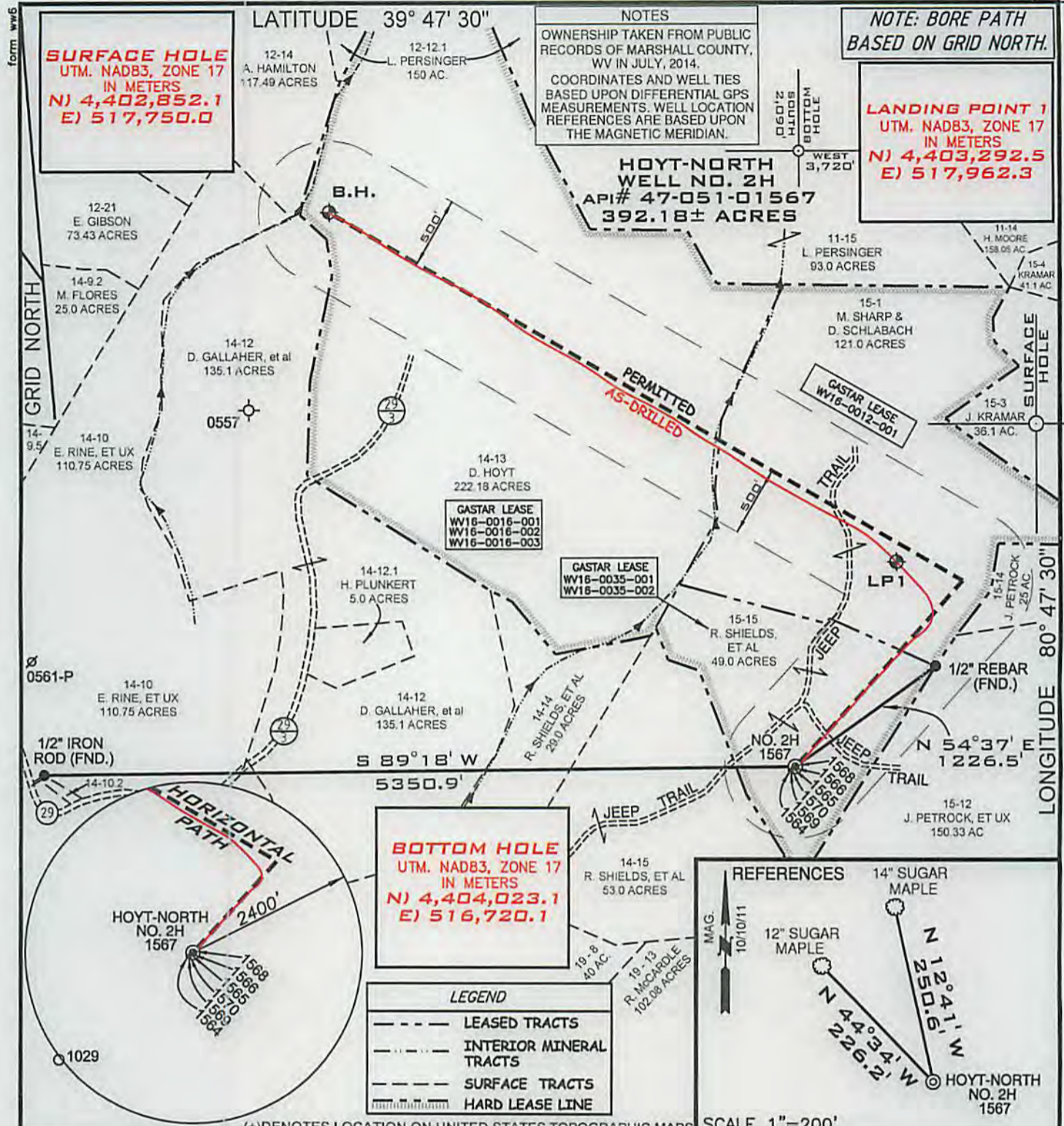
<u>FLUID</u>	<u>VOLUME CU-FT</u>	<u>VOLUME FACTOR</u>	<u>AMOUNT AND TYPE OF CEMENT</u>
Cement Slurry	1085	/ 1.21	= 900 sacks Premium NE-1 + 3% bwoc Calcium Chloride + 46.4% Fresh Water
Displacement			186.9 bbls Fresh Water @ 8.34 ppg

CEMENT PROPERTIES

SLURRY NO.1

Slurry Weight (ppg)	15.60
Slurry Yield (cf/sack)	1.21
Amount of Mix Water (gps)	5.23
Amount of Mix Fluid (gps)	5.24
Estimated Pumping Time - 50 BC (HH:MM)	1:54
Estimated Pumping Time - 70 BC (HH:MM)	2:16
Estimated Pumping Time - 100 BC (HH:MM)	2:35

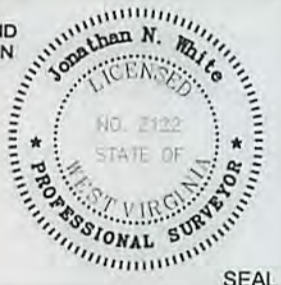
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FILE NUMBER W0100283 (WB1-28)
 DRAWING NUMBER HOYT_WP_2H_rev3-WR35
 SCALE 1" = 1000'
 MINIMUM DEGREE OF ACCURACY 1/200
 PROVEN SOURCE OF ELEVATION SUBMETER MAPPING
GRADE GPS

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. Jonathan N. White
 2122



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



DATE: July 22, 2015
 OPERATORS HOYT-NORTH
WELL NO. NO. 2H AS-DRILLED
 API WELL NO. 47-051-01567
 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, WV16-0035-002, 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 ___ CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE ___ PLUG OFF OLD FORMATION ___
 PERFORATE NEW FORMATION ___ OTHER PHYSICAL CHANGE (SPECIFY) ___

TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD: 6603' TMD: 11,852'

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