

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

26

PM

API 47 - 51 - 01601 County Marshall District Franklin
Quad New Martinsville 7.5' Pad Name Goudy Field/Pool Name _____
Farm name PPG Industries, Inc. et al Well Number 2H
Operator (as registered with the OOG) Gastar Exploration
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 See attached report Easting _____
Landing Point of Curve Northing _____ Easting _____
Bottom Hole Northing _____ Easting _____

Elevation (ft) 1238' 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 January 2, 2013 Date drilling commenced 2/4/2013 Date drilling ceased 3/30/2013
Date completion activities began 6/2/2013 Date completion activities ceased 7/27/2013
Verbal plugging (Y/N) _____ Date permission granted _____ Granted by _____

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Office of Oil and Gas

JUL 10 2014

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

WV Department of
Environmental Protection

Freshwater depth(s) ft 1255' Open mine(s) (Y/N) depths None
Salt water depth(s) ft 1670' Void(s) encountered (Y/N) depths None
Coal depth(s) ft 999'-1006' & 1221'-1245' Cavern(s) encountered (Y/N) depths None
Is coal being mined in area (Y/N) No

Reviewed by: _____

10/03/2014

API 47-51 - 01601 Farm name PPG Industries, Inc. et al Well number 2H

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	26"	20"	110'	New	PE / 54.5 #/ft		Yes
Surface	17.5"	13.375"	1295'	New	H-40 / 48 #/ft	83'	Yes
Coal							
Intermediate 1	12.25"	9.625"	2539'	New	J-55 / 36 #/ft	85'	Yes
Intermediate 2							
Intermediate 3							
Production	8.875"	5.5"	13,116'	New	P-110 / 20 #/ft		Yes
Tubing		2.375"	6727'	New	N-80/4.7#		
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	Type I	280	15.6	1.19	334	Surface	12
Surface	Type 1	930	15.2	1.26	1172	Surface	8
Coal							
Intermediate 1	Type 1	930	15	1.29	1200	Surface	8
Intermediate 2							
Intermediate 3							
Production	50:50 Class H / 50:50 Type 1	1300 / 1825	14.5 / 14.5	1.18	3688	Surface	
Tubing							

Drillers TD (ft) 13,145' Loggers TD (ft) N/A
 Deepest formation penetrated Marcellus Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 5992'

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 - 183 Centralizers total - 1 centralizer every other joint in the lateral, one every joint thru the curve and 1 centralizer every third 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 _____

API 47- 51 - 01601 Farm name PPG Industries, Inc. et al Well number 2H

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
					See attached report

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)
			attached					

Please insert additional pages as applicable.

API 47- 51 - 01601 Farm name PPG Industries, Inc. et al Well number 2H

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	
<u>Marcellus</u>	<u>6,405' - 6,456'</u> TVD	<u>6,613' - 13,145'</u> MD
_____	_____	_____
_____	_____	_____
_____	_____	_____

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 1294 psi Bottom Hole 4123 psi DURATION OF TEST 144 hrs

OPEN FLOW Gas 2129 mcfpd Oil 261 bpd NGL _____ bpd Water 400 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 ₂ S, ETC)
	DEPTH IN FT NAME TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	
	0		0		See attached report

Please insert additional pages as applicable.

Drilling Contractor Precision Drilling
Address 2640 Reach Road City Williamsport State PA Zip 17701

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 7-7-14

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

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Goudy 2H Completion Summary

Stage	Stimulation Date	Avg Pump Rate (BPM)	Avg Pressure (PSI)	Max Break Pres. (PSI)	ISIP (PSI)	Proppant (lbs)	Water (bbls)
1	6/13/2013	80	7168	4983	3706	117559	7894
2	6/17/2013	80	6608	5116	4391	122491	4901
3	6/17/2013	81	6774	4866	4328	126694	4907
4	6/23/2013	80	6695	4633	4326	127650	4848
5	6/24/2013	80	6860	4709	4012	126055	5175
6	6/25/2013	80	6573	4539	3746	126925	4841
7	6/26/2013	80	6617	4563	4306	126654	4814
8	6/27/2013	80	6486	4554	3898	133767	5369
9	6/28/2013	80	6555	4905	3926	132239	4993
10	6/29/2013	80	6391	4922	4146	134448	4986
11	6/30/2013	80	6458	4777	3702	139675	5034
12	7/1/2013	80	6365	4903	4054	138909	5017
13	7/2/2013	80	6375	4930	4148	142391	5066
14	7/3/2013	80	6633	4981	4012	141298	5041
15	7/4/2013	80	6340	5339	4310	139075	4813
16	7/5/2013	80	6715	5229	4034	106465	4059
17	7/6/2013	80	6305	4776	3985	118506	4041
18	7/7/2013	80	6425	4931	4054	127113	4073
19	7/8/2013	80	6163	4681	4060	120364	3944
20	7/9/2013	80	6273	4781	4093	127222	3979
21	7/9/2013	80	6260	4874	3614	128307	4633
22	7/10/2013	80	5808	5032	3495	123926	4280

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Nitrogen/Other
(units)

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Welcome Tracy H., Operator - OpNo. G1410907 [[Log Out](#)]

Hydraulic Fracturing DISCLOSURE



Please use the FracFocus XML submission process or create disclosures online.

**FIND A WELL
BY STATE**

**ABOUT PROJECT
PARTNERS**

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

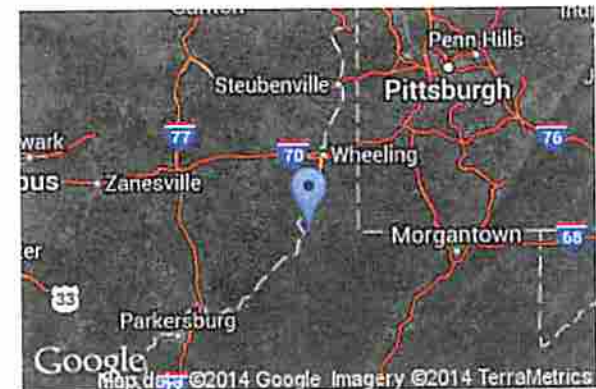
Prepare Disclosure for FracFocus Submission

[Disclosure Lists](#) | [Dashboard](#)

Note: This window expires with 10 minutes of inactivity. After that you will be taken back to the dashboard.

Hydraulic Fracturing Data

Job Start Date	Job End Date	API Number	State & County
6/6/2013	7/10/2013	47-051-01601-00-00	West Virginia --- Marshall
Well Name			
Goudy 2H			
Longitude	Latitude	Datum	Federal/Tribal Well?
-80.80683	39.728	NAD27	<input type="checkbox"/>
True Vertical Depth (ft)	Total Water Vol (gal)	Total Non Water Vol	Total Mass (lbs)
6458	4479300	0	40332448.2298



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MSDS Chemical Ingredients

	Trade Name	Supplier	Purpose	Ingredients	CAS #	% High Additive	% HF Job	Comments	Ingredient Mass
<input type="button" value="Edit"/>	Water	Operator	Carrier	Water	7732-18-5	100%	92.5735538%		37347507.54
<input type="button" value="Edit"/>	Sand, White, 40/70	Baker Hughes	Proppant	Crystalline Silica (Quartz)	14808-60-7	100%	4.1248819%		1664126
<input type="button" value="Edit"/>	Sand, White, 30/50	Baker Hughes	Proppant	Crystalline Silica (Quartz)	14808-60-7	100%	2.357246%		950998
<input type="button" value="Edit"/>	HCl, 10.1 - 15%	Baker Hughes	Acidizing	Water	7732-18-5	85%	.6776555%	SmartCare Product	273390.6523
				Hydrochloric Acid	7647-01-0	15%	.1195863%	SmartCare Product	48245.4092
<input type="button" value="Edit"/>	FRW-18	Baker Hughes	Friction Reducer	Petroleum Distillates	64742-47-8	30%	.0184865%	SmartCare Product	7458.1097
<input type="button" value="Edit"/>	Alpha 1427	Baker Hughes	Biocide	Glutaraldehyde	111-30-8	30%	.006845%	SmartCare Product	2761.5
				Didecyl Dimethyl Ammonium Chloride	7173-51-5	10%	.0022817%	SmartCare Product	920.5
				Quaternary Ammonium Compound	68424-85-1	5%	.0011408%	SmartCare Product	460.25
				Ethanol	64-17-5	5%	.0011408%	SmartCare Product	460.25
<input type="button" value="Edit"/>	FRW-26D, bulk	Baker Hughes	Friction Reducer						

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			No Hazardous Ingredients	N.A.	100%	.0087374%		3525
<input type="button" value="Edit"/>	Scaletrol 720	Baker Hughes	Scale Inhibitor					
			Ethylene Glycol	107-21-1	30%	.0051573%	SmartCare Product	2080.6392
			Calcium Chloride	10043-52-4	5%	.0008595%	SmartCare Product	346.7732
<input type="button" value="Edit"/>	Ferrotrol 300L	Baker Hughes	Iron Control					
			Citric Acid	77-92-9	60%	.0036566%	SmartCare Product	1475.2151
<input type="button" value="Edit"/>	CI-14	Baker Hughes	Corrosion Inhibitor					
			Methanol	67-56-1	100%	.0023901%	SmartCare Product	964.25
			Polyoxyalkylenes	Trade Secret	30%	.000717%	SmartCare Product	289.275
			Fatty Acids	Trade Secret	10%	.000239%	SmartCare Product	96.425
			Propargyl Alcohol	107-19-7	5%	.0001195%	SmartCare Product	48.2125
			Olefin	Trade Secret	5%	.0001195%	SmartCare Product	48.2125
<input type="button" value="Edit"/>	GW-3LDF	Baker Hughes	Gelling Agent					
			Guar Gum	9000-30-0	60%	.0002704%	SmartCare Product	109.098
			Petroleum Distillates	64742-47-8	30%	.0001352%	SmartCare Product	54.549
			Paraffinic Petroleum Distillate	64742-55-8	30%	.0001352%	SmartCare Product	54.549
			1-butoxy-2-propanol	5131-66-8	5%	.0000225%	SmartCare Product	9.0915
			Crystalline Silica: Quartz	14808-60-7	5%	.0000225%	SmartCare Product	9.0915
			Isotridecanol, ethoxylated	9043-30-5	5%	.0000225%	SmartCare Product	9.0915
<input type="button" value="Edit"/>	Enzyme G-NE	Baker Hughes	Breaker					
			Water	7732-18-5	95%	.0001178%		47.5255

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Hemicellulase Enzyme Concentrate	9025-56-3	5%	.0000062%	SmartCare Product	2.5013
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Non-MSDS Chemical Ingredients

New Ingredients

Trade Name	Supplier	Purpose	Ingredients	CAS #	% High Additive	% HF Job	Comments	Ingredient Mass
		Other Chemicals						
			Water	7732-18-5	0%	.0561673%		22659.9033
			Poly (acrylamide-co-acrylic acid)	Trade Secret	0%	.0184865%		7458.1097
			Anionic Water Soluble Polymer	Trade Secret	0%	.0087374%		3525
			Polyacrylate	Trade Secret	0%	.0034382%		1387.0928
			Salt	Trade Secret	0%	.0030811%		1243.0183
			Sorbitan Monooleate	Trade Secret	0%	.0030811%		1243.0183
			Ethoxylated Alcohol	Trade Secret	0%	.0012324%		497.2073
			Modified Thiorea Polymer	68527-49-1	0%	.0001673%		67.4975
			Formaldehyde	50-00-0	0%	.0000239%		9.6425
			Hydrochloric Acid	7647-01-0	0%	.0000239%		9.6425
			Potassium Chloride	7447-40-7	0%	.0000086%		3.4677
			Sodium Chloride	7647-14-5	0%	.0000052%		2.0806
			2-butoxy-1-propanol	15821-83-7	0%	.0000005%		0.1818

Edit

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Formations	Top TVD	Base TVD	Top MD	Base MD
SHALE	0	1000	0	1000
SEWICKLEY COAL	1000	1010	1000	1010
SHALE	1010	1220	1010	1220
PITTSBURGE COAL	1220	1230	1220	1230
SHALE AND SANDSTONE	1230	1685	1230	1685
3RD SALT SAND	1685	1740	1865	1740
SHALE	1740	1827	1740	1827
MAXTON	1827	1860	1827	1860
SHALE	1860	1883	1860	1883
BIG LIME	1883	1958	1883	1958
BIG INJUN	1958	2216	1958	2216
WEIR SILTSTONE	2216	2455	2216	2455
BEREA SILTSTONE	2455	2695	2455	2695
SAND AND SHALE	2695	3030	2695	3030
GORDON	3030	3070	3030	3070
SHALE	3070	3520	3070	3520
WARREN SANDSTONE	3520	3550	3520	3550
BRAILLER	3550	5013	3550	5014
JAVA SHALE	5013	5232	5014	5235
PIPE CREEK SHALE	5232	5432	5235	5435
SHALE	5432	5853	5435	5869
RHINESTREET	5853	6147	5869	6188
CASHAQUA	6147	6232	6188	6296
MIDDLESEX	6232	6256	6296	6331
WEST RIVER	6256	6323	6331	6440
GENESEO	6323	6347	6440	6490
TULLY LIMESTONE	6347	6378	6490	6567
HAMILTON	6378	6387	6567	6599
MARCELLUS	6387	na	6599	na
ONONDOGA	na	na	na	na

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