

PM

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

API 47- 51 - 01591 County Marshall District Franklin
Quad New Martinsville 7.5' Pad Name Goudy Field/Pool Name _____
Farm name PPG Industries, Inc. et al Well Number 5H
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

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Office of Oil and Gas

JUL 10 2014

Date permit issued November 26, 2012 Date drilling commenced 1/16/2013 Date of plug creep 7/23/2013
Date completion activities began 6/2/2013 Date completion activities ceased 7/23/2013
Verbal plugging (Y/N) _____ Date permission granted _____ Granted by _____

WV Department of
Environmental Protection

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

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 - 01591 Farm name PPG Industries, Inc. et al Well number 5H

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"	1302'	New	H-40 / 48 #/ft	83'	Yes
Coal							
Intermediate 1	12.25"	9.625"	2541'	New	J-55 / 36 #/ft	85'	Yes
Intermediate 2							
Intermediate 3							
Production	8.875"	5.5"	12,300'	New	P-110 / 20 #/ft		Yes
Tubing		2.375"	6639'	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 1	205	15.2	1.26	258	Surface	12
Surface	Type 1	935	15.2	1.26	1178	Surface	8
Coal							
Intermediate 1	Type 1	850	15	1.29	1097	Surface	8
Intermediate 2							
Intermediate 3							
Production	50:50 Class H / 50:50 Type 1	1297 / 1644	14.5 / 14.5	1.18	3470	Surface	
Tubing							

Drillers TD (ft) 12,330' Loggers TD (ft) N/A
 Deepest formation penetrated Marcellus Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 5976'

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 - 123 Centralizers total - 1 centralizer every other joint in the lateral, every joint in 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 _____

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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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Goudy 5H 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	6645	4509	3455	114210	4364
2	6/15/2013	80	6268	4667	3731	103496	5022
3	6/17/2013	80	6029	4851	4029	191270	6482
4	6/22/2013	80	6529	4546	3885	126411	4716
5	6/23/2013	80	6315	6321	3660	125877	4735
6	6/23/2013	80	6345	4567	3849	123135	4759
7	6/25/2013	80	6323	4378	3543	115945	4581
8	6/26/2013	80	6020	4456	3429	127211	4661
9	6/27/2013	80	6239	4488	3676	139621	5118
10	6/28/2013	80	6176	4547	3515	135845	4961
11	6/29/2013	80	6044	4490	3827	136442	4807
12	6/30/2013	80	5889	4522	3868	139727	5023
13	7/1/2013	80	6145	4507	3902	140043	4972
14	7/1/2013	80	6023	4478	4012	123118	4610
15	7/3/2013	80	5734	4812	3642	114288	4523
16	7/4/2013	80	5920	4740	4101	109037	4465
17	7/5/2013	80	5791	4554	3974	117808	3951
18	7/6/2013	80	5665	4656	3780	114808	3780
19	7/7/2013	80	7830	4850	3976	114400	3849
20	7/8/2013	80	5756	5567	3369	124546	3881

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Nitrogen/Other
(units)

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

Hydraulic Fracturing DISCLOSURE



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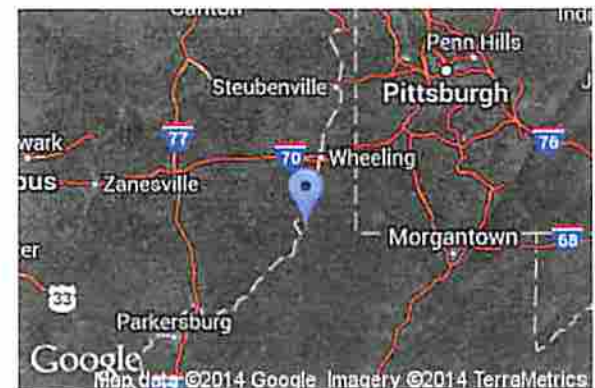
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Hydraulic Fracturing Data

Job Start Date 6/6/2013	Job End Date 7/8/2013	API Number 47-051-01591-00-00	State & County West Virginia --- Marshall
Well Name Goudy 5H			
Longitude -80.80687	Latitude 39.72922	Datum NAD27	Federal/Tribal Well? <input type="checkbox"/>
True Vertical Depth (ft) 6482	Total Water Vol (gal) 3903270	Total Non Water Vol 0	Total Mass (lbs) 35413576.7555



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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%	91.8735191%		32544684.606
<input type="button" value="Edit"/>	Sand, White, 40/70	Baker Hughes	Proppant	Crystalline Silica (Quartz)	14808-60-7	100%	4.379345%		1551311
<input type="button" value="Edit"/>	Sand, White, 30/50	Baker Hughes	Proppant	Crystalline Silica (Quartz)	14808-60-7	100%	2.7652292%		979537
<input type="button" value="Edit"/>	HCl, 10.1 - 15%	Baker Hughes	Acidizing	Water	7732-18-5	85%	.7075237%	SmartCare Product	250628.6412
				Hydrochloric Acid	7647-01-0	15%	.1248571%	SmartCare Product	44228.5837
<input type="button" value="Edit"/>	FRW-18	Baker Hughes	Friction Reducer	Petroleum Distillates	64742-47-8	30%	.0201935%	SmartCare Product	7153.2101
<input type="button" value="Edit"/>	Alpha 1427	Baker Hughes	Biocide	Glutaraldehyde	111-30-8	30%	.0066545%	SmartCare Product	2357.25
				Didecyl Dimethyl Ammonium Chloride	7173-51-5	10%	.0022182%	SmartCare Product	785.75
				Ethanol	64-17-5	5%	.0011091%	SmartCare Product	392.875
				Quaternary Ammonium Compound	68424-85-1	5%	.0011091%	SmartCare Product	392.875
<input type="button" value="Edit"/>	FRW-26D, bulk	Baker Hughes	Friction Reducer						

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			No Hazardous Ingredients	N.A.	100%	.0075035%		2658
<input type="button" value="Edit"/>	Scaletrol 720, 330 gl tote	Baker Hughes	Scale Inhibitor					
			Ethylene Glycol	107-21-1	30%	.0048989%	SmartCare Product	1735.3543
			Calcium Chloride	10043-52-4	5%	.0008165%	SmartCare Product	289.2257
<input type="button" value="Edit"/>	CI-14	Baker Hughes	Corrosion Inhibitor					
			Methanol	67-56-1	100%	.0024969%	SmartCare Product	884.5
			Polyoxyalkylenes	Trade Secret	30%	.0007491%	SmartCare Product	265.35
			Fatty Acids	Trade Secret	10%	.0002497%	SmartCare Product	88.45
			Propargyl Alcohol	107-19-7	5%	.0001248%	SmartCare Product	44.225
			Olefin	Trade Secret	5%	.0001248%	SmartCare Product	44.225
<input type="button" value="Edit"/>	Ferrotrol 300L	Baker Hughes	Iron Control					
			Citric Acid	77-92-9	60%	.0032569%	SmartCare Product	1153.6939
<input type="button" value="Edit"/>	GW-3LDF	Baker Hughes	Gelling Agent					
			Guar Gum	9000-30-0	60%	.0003566%	SmartCare Product	126.324
			Petroleum Distillates	64742-47-8	30%	.0001783%	SmartCare Product	63.162
			Paraffinic Petroleum Distillate	64742-55-8	30%	.0001783%	SmartCare Product	63.162
			Crystalline Silica: Quartz	14808-60-7	5%	.0000297%	SmartCare Product	10.527
			1-butoxy-2-propanol	5131-66-8	5%	.0000297%	SmartCare Product	10.527
			Isotridecanol, ethoxylated	9043-30-5	5%	.0000297%	SmartCare Product	10.527
<input type="button" value="Edit"/>	Enzyme G-NE	Baker Hughes	Breaker					

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Water	7732-18-5	95%	.0000671%	SmartCare Product	23.7627
Hemicellulase Enzyme Concentrate	9025-56-3	5%	.0000035%	SmartCare Product	1.2507

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%	.0578687%		20499.0305
			Poly (acrylamide-co-acrylic acid)	Trade Secret	0%	.0201935%		7153.2101
			Anionic Water Soluble Polymer	Trade Secret	0%	.0075035%		2658
			Salt	Trade Secret	0%	.0033656%		1192.2017
			Sorbitan Monooleate	Trade Secret	0%	.0033656%		1192.2017
			Polyacrylate	Trade Secret	0%	.0032659%		1156.9029
			Ethoxylated Alcohol	Trade Secret	0%	.0013462%		476.8807
			Modified Thiorea Polymer	68527-49-1	0%	.0001748%		61.915
			Formaldehyde	50-00-0	0%	.000025%		8.845
			Hydrochloric Acid	7647-01-0	0%	.000025%		8.845
			Potassium Chloride	7447-40-7	0%	.0000082%		2.8923
			Sodium Chloride	7647-14-5	0%	.0000049%		1.7354
			2-butoxy-1-propanol	15821-83-7	0%	.0000006%		0.2105

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