

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

API 47-51-01588 County Marshall District Franklin
Quad New Martinsville 7.5' Pad Name Goudy Field/Pool Name _____
Farm name PPG Industries, Inc. Well Number 7H
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 4398572.2 Easting 514676.4
Landing Point of Curve Northing 4398826.1 Easting 514601.0
Bottom Hole Northing 4400291.3 Easting 513629.9

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 29, 2013 Date drilling commenced 4/19/2013 Date drilling ceased 5/5/2013
Date completion activities began 1/25/2015 Date completion activities ceased 4/13/2015
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 1155' 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

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Reviewed by: [Signature]
10/16/2015

API 47-51 - 01588 Farm name PPG Industries, Inc. Well number 7H

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	26"	20"	105'	New	PE / 54.5 #/ft		Yes
Coal	17.5"	13.375"	1278'	New	H-40 / 48 #/ft	83'	Yes
Intermediate 1	12.25"	9.625"	2535'	New	J-55 / 36 #/ft	85'	Yes
Intermediate 2							
Intermediate 3							
Production	8.875"	5.5"	12,629'	New	P-110 / 20 #/ft		Yes
Tubing		2.375"	6509'	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	297	15.6	1.19	353	Surface	12
Coal	Type 1	933	15.2	1.26	1175	Surface	8
Intermediate 1	Type 1	855	15	1.29	1103	Surface	8
Intermediate 2							
Intermediate 3							
Production	50.50 Class H / 50.50 Type 1	1297 / 1703	14.5 / 14.5	1.18	3540	Surface	
Tubing							

Drillers TD (ft) 12,660' Loggers TD (ft) N/A
 Deepest formation penetrated Marcellus Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 5946'

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 - 189 Centralizers total - 1 centralizer every joint in the lateral and curve and 1 centralizer every third joint in the vertical section

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS RECEIVED
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WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS AUG 05 2015

WERE TRACERS USED Yes No TYPE OF TRACER(S) USED WV Department of
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Goudy #7H 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		12484	12404	24	Marcellus
2		12331	12141	39	Marcellus
3		12065	11866	40	Marcellus
4		11754	11602	36	Marcellus
5		11504	11335	40	Marcellus
6		11249	11057	40	Marcellus
7		10976	10777	40	Marcellus
8		10722	10507	40	Marcellus
9		10412	10227	40	Marcellus
10		10165	9964	40	Marcellus
11		9885	9725	36	Marcellus
12		9662	9421	40	Marcellus
13		9366	9177	40	Marcellus
14		9104	8921	40	Marcellus
15		8810	8591	40	Marcellus
16		8507	8311	40	Marcellus
17		8239	8069	40	Marcellus
18		7996	7823	40	Marcellus
19		7706	7484	39	Marcellus
20		7428	7217	40	Marcellus
21		7130	6895	40	Marcellus

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Fluid & Sand Volume Summary - Goudy #7H

<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	1/26/2015	81	7511	n/a	3156	187,895	6938
2	1/27/2015	80	7080	5639	3528	348,173	8372
3	1/28/2015	81	7207	5914	3760	351,730	8461
4	1/28/2015	81	6767	5722	3524	388,023	8662
5	1/28/2015	81	6692	5532	3818	385,989	8805
6	1/29/2015	81	6803	6146	4500	386,830	8561
7	1/29/2015	80	7180	6749	3698	356,620	8255
8	1/30/2015	62	8102	7086	4287	152,709	6640
9	1/31/2015	23	8267	6181	5752	10,596	3152
10	2/2/2015	79	6859	5961	4185	362,061	7729
11	2/3/2015	81	6773	6018	4136	371,658	8109
12	2/3/2015	81	6882	6425	4019	360,642	8032
13	2/4/2015	73	7703	7160	4768	52,705	4322
14	2/5/2015	27	7986	6044	6525	1,103	1934
15	2/5/2015	49	7956	6045	5898	3,726	2506
16	2/7/2015	80	6782	6371	3684	347,203	7669
17	2/8/2015	79	6808	6595	3882	355,027	7770
18	2/8/2015	80	6728	5959	3848	359,706	7608
19	2/9/2015	75	7068	5809	3783	354,262	7813

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



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Hydraulic Fracturing Data

[Edit](#)

Job Start Date 4/16/2014	Job End Date 2/9/2015	API Number 47-051-01588-00-00	State & County West Virginia --- Marshall
Well Name GOUDY 7H			
Longitude -80.84107	Latitude 39.75231	Datum NAD27	Federal/Tribal Well? <input type="checkbox"/>
True Vertical Depth (ft) 6490	Total Water Vol (gal) 5183052	Total Non Water Vol 0	Total Mass (lbs) 48590619.3535



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%	88.814308%		43215250.9656
Edit	Sand, White, 40/70	Baker Hughes	Proppant	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	7.21457%		3505608
Edit	Sand, White, 30/50	Baker Hughes	Proppant	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	2.72989%		1326473
Edit	HCl, 10.1 - 15%	Baker Hughes	Acidizing	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.575594%	SmartCare Product	279685
Edit	Sand, White, 100 mesh	Baker Hughes	Proppant	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.258128%		
Edit	GW-3LDF	Baker Hughes	Gelling Agent	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.1117306%	SmartCare Product	54290.61

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<input type="button" value="Edit"/>	FRW-18	Baker Hughes	Friction Reducer	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.098605%	SmartCare Product	47912.8
<input type="button" value="Edit"/>	Alpha 1427	Baker Hughes	Biocide	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0229416%	SmartCare Product	11147.5
<input type="button" value="Edit"/>	Enzyme G-NE	Baker Hughes	Breaker	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0213118%	SmartCare Product	10355.5476
<input type="button" value="Edit"/>	Calcium Chloride	Baker Hughes	Salts	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0171329%		8325
<input type="button" value="Edit"/>	ScaleSorb 4, (50# bag)	Baker Hughes	Scale Inhibitor	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0063798%	SmartCare Product	3100
<input type="button" value="Edit"/>	Ferrotrol 300L	Baker Hughes	Iron Control	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0039566%	SmartCare Product	1922.53029
<input type="button" value="Edit"/>	CI-39	Baker Hughes	Corrosion Inhibitor	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0023099%		1122.4

Non-MSDS Chemical Ingredients

	Trade Name	Supplier	Purpose	Ingredients	CAS #	% High Additive	% HF Job	Comments	Ingredient Mass
<input type="button" value="Edit"/>	Ingredients in Additive(s) (MSDS and non-MSDS)	Baker Hughes	See Trade Name(s) List	Crystalline Silica (Quartz)	14808-60-7	100%	10.1885399%		4957538
				Water	7732-18-5	95%	.5640898%		274474.697365
				Hydrochloric Acid	7647-01-0	15%	.0862197%		41952.75
				Mineral Oil	8042-47-5	70%	.0781032%		38003.427
				Guar Gum	9000-30-0	60%	.0669456%		32574.366
				Petroleum Distillates	64742-47-8	30%	.0334728%		16287.183
				Paraffinic Petroleum Distillate	64742-55-8	30%	.0334728%		16287.183
				Hydrotreated Light Distillate	64742-47-8	30%	.0295406%		14373.84
				Poly (acrylamide-co-acrylic acid) partial sodium salt	62649-23-4	30%	.0295406%		14373.84
				Calcium Chloride	10043-52-4	100%	.0171092%		8325
				Glutaraldehyde	111-30-8	30%	.006873%		3344.25
				Diatomaceous Earth, Calcined	91053-39-3	100%	.006371%		3100
				Sodium Chloride	7647-14-5	5%	.0057789%		2811.89
				Isotridecanol, ethoxylated	9043-30-5	5%	.0055788%		2714.5305

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1-butoxy-2-propanol	5131-66-8	5%	.0055788%	2714.5305
Crystalline Silica: Quartz	14808-60-7	5%	.0055788%	2714.5305
Ammonium Chloride	12125-02-9	3%	.0029541%	1437.384
Citric Acid	77-92-9	60%	.0023707%	1153.518174
Didecyl Dimethyl Ammonium Chloride	7173-51-5	10%	.002291%	1114.75
Alcohols, C12-16, ethoxylated	68551-12-2	2%	.0019694%	958.256
Oleamide DEA	93-83-4	2%	.0019694%	958.256
Quaternary Ammonium Compound	68424-85-1	5%	.0012608%	613.495
Ethanol	64-17-5	5%	.0011455%	557.375
Hemicellulase Enzyme Concentrate	9025-56-3	5%	.0010641%	517.77738
Sodium Carboxymethyl inulin	430439-54-6	15%	.0009556%	465
Sodium chloride	7647-14-5	15%	.0009556%	465
Oxyalkylated Fatty Acid	61791-002	40%	.0009227%	448.96
Potassium Chloride	7447-40-7	5%	.0008555%	416.25
Aldehyde	104-55-2	30%	.000692%	336.72
Formic Acid	64-18-6	30%	.000692%	336.72
Tar Bases, Quinoline Derivs., Benzyl Chloride-Quaternized	72480-70-7	30%	.000692%	336.72
Polyoxyethylene Sorbitan Monooleate	9005-65-6	.5%	.0004923%	239.564
Sorbitan Monooleate	1338-43-8	.5%	.0004923%	239.564
Sodium glycolate	2836-32-0	5%	.0003185%	155
Sodium diglycolate	35249-69-5	5%	.0003185%	155
Isopropanol	67-63-0	5%	.0001153%	56.12
Sulfurized polyolefin	68037-13-8	5%	.0001153%	56.12
2-butoxy-1-propanol	15821-83-7	.1%	.0001116%	54.29061
Crystalline Silica (Cristobalite)	14464-46-1	1%	.0000637%	31
Potassium Iodide	7681-11-0	2%	.0000461%	22.448
Polyaklylene	7756-94-7	1%	.0000231%	11.224
Potassium Acetate	127-08-2	.5%	.0000115%	5.612

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Goudy 7H Cement and additives

Surface: Type 1 + 2% CaCl + ¼ # per sack celloflake

Intermediate: Type 1 + 3% R-3 + 4% BA-10A + 5% SMS + ¼ per sack cello flake

Production: 50:50 Class H + .2% CD32 + 1.2% FL62 + .1% ASA301 + .4% sms

50:50 Type 1 + .4% R3 + 1% FL62 + .15% ASA301 + .3% CD32

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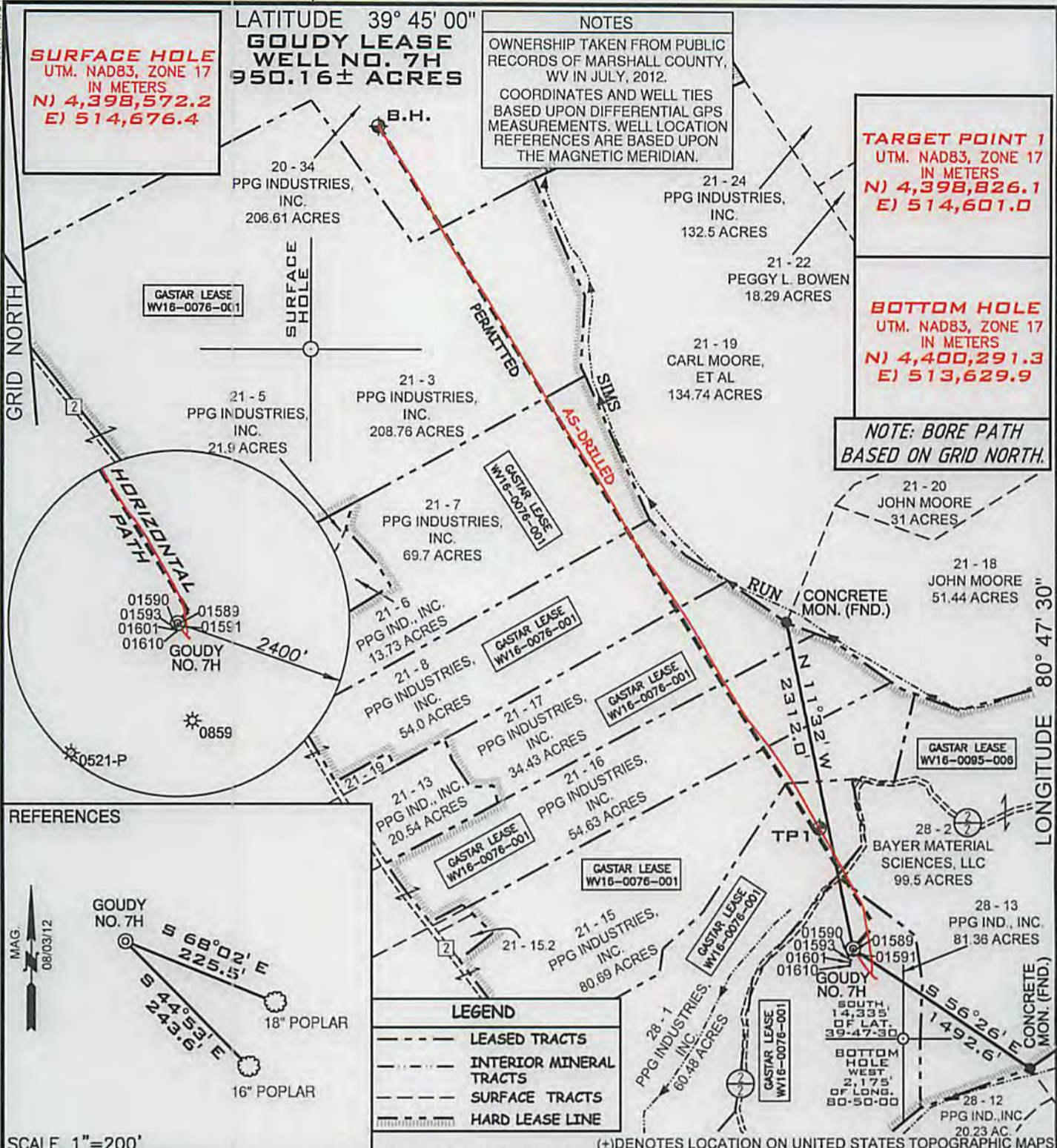
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form ww6

10,485'

4,785'

LONGITUDE 80° 47' 30"



FILE NUMBER W0120315 (WB1-55)

DRAWING NUMBER GOUDY_WP_7H-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 15, 2015

OPERATORS WELL NO. GOUDY NO. 7H AS-DRILLED

API WELL NO. 47-051-01588
STATE COUNTY PERMIT

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

LOCATION ELEVATION 1238' WATERSHED FRANKLIN TRIBUTARY OF THE OHIO RIVER

DISTRICT FRANKLIN COUNTY MARSHALL

QUADRANGLE NEW MARTINSVILLE 7.5' LEASE NUMBER WV16-0076-001, WV16-0095-006

SURFACE OWNER PPG INDUSTRIES, INC. ACREAGE 81.36

OIL & GAS ROYALTY OWNER PPG INDUSTRIES, INC., ET AL LEASE ACREAGE 950.16

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 6,426' TMD 12,660'

WELL OPERATOR GASTAR EXPLORATION INC. DESIGNATED AGENT MICHAEL McCOWN
ADDRESS 229 W MAIN STREET, SUITE 301 ADDRESS 229 W MAIN STREET, SUITE 301
CLARKSBURG WV, 26301 CLARKSBURG WV, 26301

10/16/2015

COUNTY NAME PERMIT