

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

API 47 - 51 - 01652 County Marshall District Franklin
Quad New Martinsville 7.5' Pad Name Hansen Field/Pool Name _____
Farm name Bayer Material Sciences, LLC Well Number 9H
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 4397472.2 Easting 515920.6
Landing Point of Curve Northing 4396926.8 Easting 516739.5
Bottom Hole Northing 4395770.3 Easting 517201.9

Elevation (ft) 1278' 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 29, 2013 Date drilling commenced 5/3/2014 Date drilling ceased 9/17/2014
Date completion activities began 11/2/2014 Date completion activities ceased 4/16/2015
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 1590' Void(s) encountered (Y/N) depths None
Coal depth(s) ft 820'-830' & 1130'-1160' Cavern(s) encountered (Y/N) depths None
Is coal being mined in area (Y/N) No

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API 47-51 - 01652 Farm name Bayer Material Sciences, LLC Well number 9H

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"	110'	New	PE / 54.5 #/ft		Yes
Coal	17.5"	13.375"	1203'	New	H-40 / 48 #/ft	83'	Yes
Intermediate 1	12.25"	9.625"	2619'	New	J-55 / 36 #/ft	80'	Yes
Intermediate 2							
Intermediate 3							
Production	8.875"	5.5"	11,971'	New	P-110 / 20 #/ft		Yes
Tubing		2.375"	7395'	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	Class A	932	15.6	1.2	1118	Surface	8
Intermediate 1	Class A	859	15.2	1.27	1091	Surface	8
Intermediate 2							
Intermediate 3							
Production	50:50 Class A	2466	14.5	1.21	2984	Surface	
Tubing							

Drillers TD (ft) 12,178' Loggers TD (ft) N/A
 Deepest formation penetrated Marcellus Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 7224'

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 - 199 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 _____

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

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

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Hansen #9H 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	11/3/2014	11875	11777	60	Marcellus
2	11/27/2014	11735	11562	60	Marcellus
3	11/27/2014	11497	11301.5	60	Marcellus
4	11/28/2014	11265	11032	60	Marcellus
5	11/29/2014	10974	10761	60	Marcellus
6	11/29/2014	10700	10554	48	Marcellus
7	12/4/2014	10493	10249	60	Marcellus
8	12/5/2014	10207	10016	60	Marcellus
9	12/5/2014	9969	9805	60	Marcellus
10	12/5/2014	9746	9580	60	Marcellus
11	12/6/2014	9532	9390	48	Marcellus
12	12/6/2014	9342	9157	48	Marcellus
13	12/7/2014	9099	8978	48	Marcellus
14	12/8/2014	8921	8732	60	Marcellus
15	12/8/2014	8577	8413	48	Marcellus
16	12/9/2014	8351	8128	60	Marcellus
17	12/9/2014	8073	7911	48	Marcellus

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Fluid & Sand Volume Summary - Hansen 9H

<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	11/27/2014	80	6891	6181	4452	185069	4750
2	11/27/2014	79	6734	5358	4692	356005	8277
3	11/28/2014	80	6721	6020	4372	187159	6415
4	11/29/2014	79	6634	5654	4512	357158	8381
5	11/29/2014	79	6487	5490	4830	359191	8190
6	12/4/2014	79	6531	5531	4735	356502	7943
7	12/5/2014	80	6549	6097	4828	360489	8322
8	12/5/2014	79	6637	7054	4836	357948	8057
9	12/6/2014	80	6657	6140	4508	357119	8630
10	12/6/2014	80	6603	6123	4563	358180	7957
11	12/7/2014	80	6768	7216	4359	358681	8186
12	12/7/2014	0	0	6805	0	0	1991
13	12/7/2014	80	6299 N/A		4291	357777	7753
14	12/8/2014	80	6227	6305	4581	357800	7873
15	12/9/2014	80	6170	6111	4414	359280	7957
16	12/9/2014	79	5908	5869	4490	353721	7767
17	12/9/2014	80	6417	6277	4216	359576	7527

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Formations	Hansen TOP TVD	Hansen BASE TVD	Top MD	Base MD
SHALE AND SANDSTONE	0	820	0	820
SEWICKLEY COAL	820	830	820	830
SHALE	830	1130	830	1130
PITTSBURGE COAL	1130	1160	1130	1160
SHALE AND SANDSTONE	1160	1590	1160	1590
3RD SALT SAND	1590	1650	1590	1650
SHALE	1650	1780	1650	1780
MAXTON	1780	1840	1780	1840
SHALE	1840	1860	1840	1860
BIG LIME	1860	1992	1860	1992
BIG INJUN	1992	2240	1992	2240
WEIR SILTSTONE	2240	2490	2240	2490
BEREA SILTSTONE	2490	2550	2490	2550
SAND AND SHALE	2550	2870	2550	2870
GORDON	2870	2960	2870	2960
SILTSTONE AND SANDSTONE	2960	3440	2960	3465
BRALLER	3440	5051	3465	5244
PIPE CREEK SHALE	5051	5454	5244	5686
SHALE	5454	5879	5686	6129
RHINESTREET	5879	6168	6129	6482
CASHAQUA	6168	6282	6482	6618
MIDDLESEX	6282	6308	6618	6649
WEST RIVER	6308	6361	6649	6722
GENESE0	6361	6388	6722	6762
TULLY LIMESTONE	6388	6423	6762	6824
HAMILTON	6423	6447	6824	6875
MARCELLUS	6447	na	6875	na
ONONDOGA	na	na	na	na

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Hydraulic Fracturing
DISCLOSURE



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Hydraulic Fracturing Data

[Edit](#)

Job Start Date 11/27/2014 Job End Date 12/9/2014 API Number 47-051-01652-00-00 State & County West Virginia --- Marshall

Well Name HANSEN 9H

Longitude -80.7995 Latitude 39.71157 Datum NAD27 Federal/Tribal Well?

True Vertical Depth (ft) 6518 Total Water Vol (gal) 5203380 Total Non Water Vol 0 Total Mass (lbs) 49044791.1098



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%	88.3602395%		43384741.764
Edit Sand, White, 40/70	Baker Hughes	Proppant	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	7.77289%		3812200
Edit Sand, White, 30/50	Baker Hughes	Proppant	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	2.75238%		1349900
Edit HCl, 10.1 - 15%	Baker Hughes	Acidizing	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.495475%	SmartCare Product	243005
Edit Sand, White, 100 mesh	Baker Hughes	Proppant	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.293609%		144000
Edit GW-3LDF	Baker Hughes	Gelling Agent	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0900514%	SmartCare Product	44165.55

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Edit FRW-18	Baker Hughes	Friction Reducer	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0871476%	SmartCare Product	42741.4
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Edit Alpha 1427	Baker Hughes	Biocide	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0226043%	SmartCare Product	11086.25
Edit Enzyme G-NE	Baker Hughes	Breaker	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0149093%	SmartCare Product	7312.2506
Edit ScaleSorb 4, (50# bag)	Baker Hughes	Scale Inhibitor	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0065246%	SmartCare Product	3200
Edit Ferrotrol 300L	Baker Hughes	Iron Control	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0034059%	SmartCare Product	1670.39517
Edit CI-14	Baker Hughes	Corrosion Inhibitor	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0015669%	SmartCare Product	768.5

Non-MSDS Chemical Ingredients

[New Ingredients](#)

Trade Name	Supplier	Purpose	Ingredients	CAS #	% High Additive	% HF Job	Comments	Ingredient Mass
Edit Ingredients in Additive(s) (MSDS and non-MSDS)	Baker Hughes	See Trade Name(s) List	Crystalline Silica (Quartz)	14808-60-7	100%	10.80682%		5306132
			Water	7732-18-5	95%	.4849141%		238092.080655
			Hydrochloric Acid	7647-01-0	15%	.0742537%		36458.435
			Mineral Oil	8042-47-5	70%	.0629653%		30915.885
			Guar Gum	9000-30-0	60%	.0539703%		26499.33
			Paraffinic Petroleum Distillate	64742-55-8	30%	.0269851%		13249.665
			Petroleum Distillates	64742-47-8	30%	.0269851%		13249.665
			Poly (acrylamide-co-acrylic acid) partial sodium salt	62649-23-4	30%	.026115%		12822.42
			Hydrotreated Light Distillate	64742-47-8	30%	.026115%		12822.42
			Glutaraldehyde	111-30-8	30%	.0067737%		3325.875
			Diatomaceous Earth, Calcined	91053-39-3	100%	.0065173%		3200
			Isotridecanol, ethoxylated	9043-30-5	5%	.0044975%		2208.2775
			1-butoxy-2-propanol	5131-66-8	5%	.0044975%		2208.2775
			Crystalline Silica: Quartz	14808-60-7	5%	.0044975%		2208.2775
			Sodium Chloride	7647-14-5	5%	.0043525%		215.07
			Ammonium Chloride	12125-02-9	3%	.0026115%		1287.243
			Didecyl Dimethyl Ammonium Chloride	7173-51-5	10%	.0022579%		1108.625

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Citric Acid	77-92-9	60%	.0020412%	1002.237102
Oleamide DEA	93-83-4	2%	.001741%	854.828
Alcohols, C12-16, ethoxylated	68551-12-2	2%	.001741%	854.828
Methanol	67-56-1	100%	.0015652%	768.5
Quaternary Ammonium Compound	68424-85-1	5%	.0011289%	554.3125
Ethanol	64-17-5	5%	.0011289%	554.3125
Sodium chloride	7647-14-5	15%	.0009776%	480
Sodium Carboxymethyl inulin	430439-54-6	15%	.0009776%	480
Hemicellulase Enzyme Concentrate	9025-56-3	5%	.0007446%	365.61253
Polyoxyalkylenes	68951-67-7	30%	.0004696%	230.55
Polyoxyethylene Sorbitan Monooleate	9005-65-6	.5%	.0004352%	213.707
Sorbitan Monooleate	1338-43-8	.5%	.0004352%	213.707
Sodium diglycolate	35249-69-5	5%	.0003259%	160
Sodium glycolate	2836-32-0	5%	.0003259%	160
Fatty Acids	61790-12-3	10%	.0001565%	76.85
Modified Thiourea Polymer	68527-49-1	7%	.0001096%	53.795
2-butoxy-1-propanol	15821-83-7	.1%	.00009%	44.16555
Propargyl Alcohol	107-19-7	5%	.0000783%	38.425
Olefin	64743-02-8	5%	.0000783%	38.425
Crystalline Silica (Cristobalite)	14464-46-1	1%	.0000652%	32
Formaldehyde	50-00-0	1%	.0000157%	7.685

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Hansen 9H Cement and additives

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

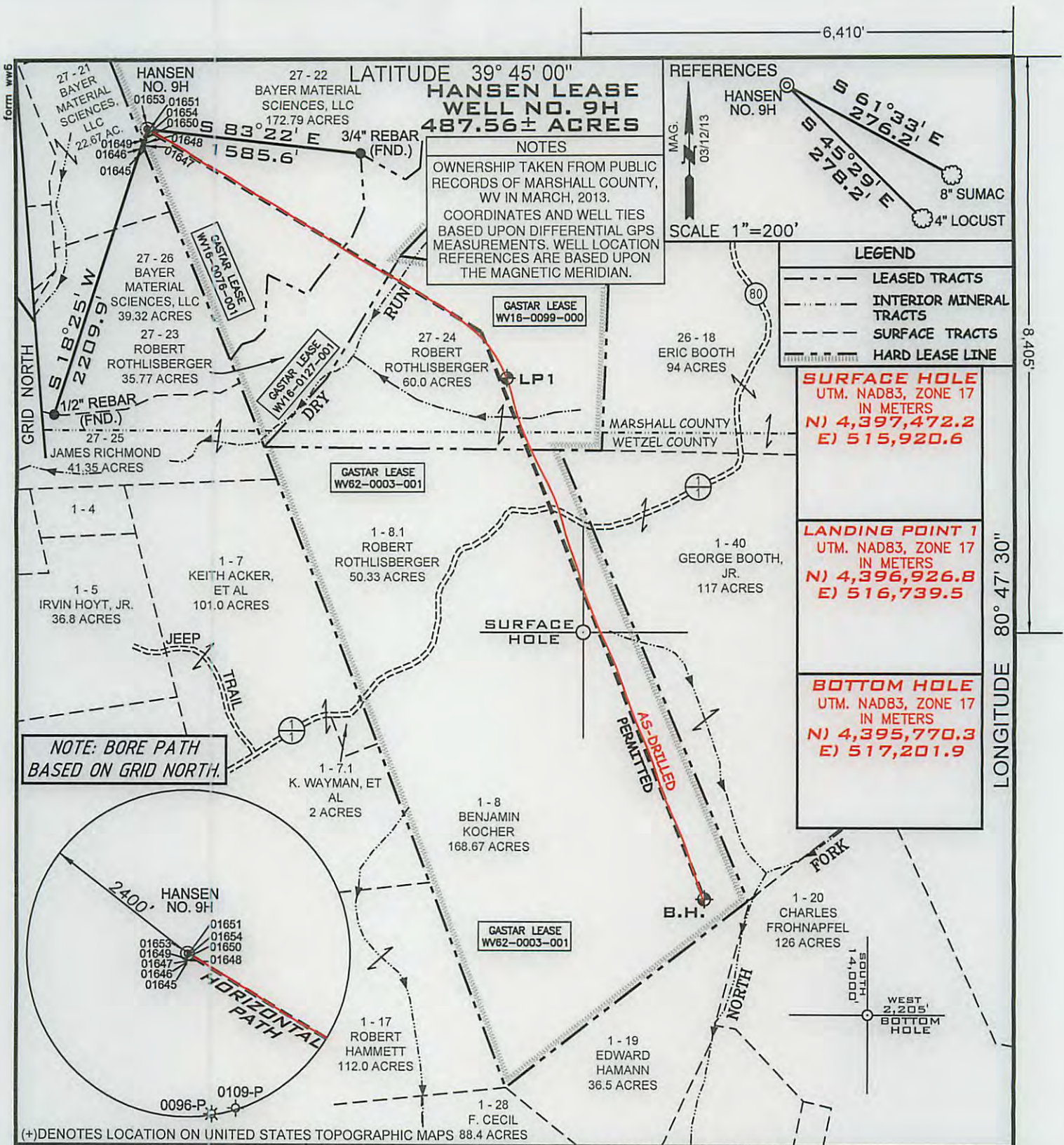
Intermediate: Class A + 1% EC-1 + ¼ per sack cello flake +.5% SMS + .55% BA-10A

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

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FILE NUMBER W0120313 (WB1-62)
 DRAWING NUMBER HANSEN_WP_9H-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

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DATE: JULY 28, 2015
 OPERATORS WELL NO. HANSEN NO. 9H AS-DRILLED
 API WELL NO. 47-051-01652
 STATE WV COUNTY MARSHALL PERMIT 10/16/2015

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

LOCATION ELEVATION 1245' WATERSHED (HUC 10) FRENCH CREEK - OHIO RIVER (0503020110)
 DISTRICT FRANKLIN COUNTY MARSHALL
 QUADRANGLE NEW MARTINSVILLE 7.5' LEASE NUMBER WW16-0099-000, WW62-0003-001, WW16-0076-001, WW16-0127-001

SURFACE OWNER BAYER MATERIAL SCIENCES, LLC ACREAGE 172.79
 OIL & GAS ROYALTY OWNER PPG INDUSTRIES, INC., et al LEASE ACREAGE 487.56
 PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION
 PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE (SPECIFY) _____
 PLUG & ABANDON CLEAN OUT & REPLUG

TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD: 6535' TMD: 11,983'
 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