

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

API 47-51-01645 County Marshall District Franklin
Quad New Martinsville 7.5' Pad Name Hansen Field/Pool Name _____
Farm name Bayer Material Sciences, LLC Well Number 1H
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 4397423.9 Easting 515913.9
Landing Point of Curve Northing 4396910.2 Easting 516214.5
Bottom Hole Northing 4395450.2 Easting 516806.6

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 24, 2013 Date drilling commenced 2/26/2014 Date drilling ceased 10/11/2014
Date completion activities began 10/31/2014 Date completion activities ceased 4/15/2015
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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Reviewed by: JZ
10/16/2015

API 47-51 - 01645 Farm name Bayer Material Sciences, LLC Well number 1H

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"	1252'	New	H-40 / 48 #/ft	83'	Yes
Intermediate 1	12.25"	9.625"	2641'	New	J-55 / 36 #/ft	80'	Yes
Intermediate 2							
Intermediate 3							
Production	8.875"	5.5"	12,280'	New	P-110 / 20 #/ft		Yes
Tubing		2.375"	6840'	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	915	15.6	1.21	1107	Surface	8
Intermediate 1	Class A	864	15	1.29	1115	Surface	8
Intermediate 2							
Intermediate 3							
Production	50:50 Class A	2792	14.5	1.21	3378	Surface	
Tubing							

Drillers TD (ft) 12,308' Loggers TD (ft) N/A
 Deepest formation penetrated Marcellus Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 6464'

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 - 166 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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API 47- 51 - 01645 Farm name Bayer Material Sciences, LLC Well number 1H

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
					SEE ATTACHED PERF INFO SHEET

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)
			See Attached					

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Please insert additional pages as applicable.

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<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	
<u>Marcellus</u>	<u>6,447' - 6,522'</u> TVD	<u>7,128' - 12,308'</u> MD
_____	_____	_____
_____	_____	_____
_____	_____	_____

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 1150 psi Bottom Hole 3978 psi DURATION OF TEST 192 hrs

OPEN FLOW Gas 4378.5 mcfpd Oil 636 bpd NGL _____ bpd Water 693 bpd GAS MEASURED BY Estimated Orifice Pilot

LITHOLOGY/ FORMATION	TOP DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H ₂ S, ETC)
	<u>0</u>		<u>0</u>		<u>SEE ATTACHED</u>

Please insert additional pages as applicable.

Drilling Contractor Nomac Drilling
Address 171 Locust Ave. City Mt. Morris State PA Zip 15349

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 7/31/15

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

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Hansen #1H 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	11/1/2014	12226	12128	60	Marcellus
2	11/19/2014	12092	11910	60	Marcellus
3	11/19/2014	11826	11635	60	Marcellus
4	11/20/2014	11586	11446	48	Marcellus
5	11/20/2014	11372	11242	48	Marcellus
6	11/21/2014	11172	11045	48	Marcellus
7	11/21/2014	10996	10858	48	Marcellus
8	11/22/2014	10800	10636	48	Marcellus
9	11/22/2014	10580	10462	48	Marcellus
10	11/22/2014	10412	10226	60	Marcellus
11	11/23/2014	10177	10009	60	Marcellus
12	11/23/2014	9956	9777	60	Marcellus
13	11/23/2014	9726	9515	60	Marcellus
14	11/24/2014	9462	9240	60	Marcellus
15	11/24/2014	9187	9002	60	Marcellus
16	11/25/2014	8952	8761	60	Marcellus
17	12/2/2014	8712	8578	48	Marcellus
18	12/2/2014	8517	8393	48	Marcellus
19	12/2/2014	8332	8212	36	Marcellus
20	12/2/2014	8164	8001	60	Marcellus
21	12/3/2014	7962	7852	36	Marcellus
22	12/4/2014	7786	7640	48	Marcellus
23	12/4/2014	7585	7460	48	Marcellus
24	12/4/2014	7396	7229	48	Marcellus
25	12/4/2014	7180	7035	48	Marcellus

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Fluid & Sand Volume Summary - Hansen 1H

<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	11/19/2015	80	7145	7725	4613	181,764	4,501
2	11/19/2015	80	7196	5923	4699	322,438	7,818
3	11/20/2015	80	6927	7078	4629	342,405	7,778
4	11/20/2015	79	6969	6097	4763	352,701	7,910
5	11/21/2015	80	7019	5879	4708	352,179	7,847
6	11/21/2015	80	6800	5602	4360	358,641	8,161
7	11/22/2015	81	6600	5835	4509	359,003	8,064
8	11/22/2015	80	6779	5807	4509	359,628	8,102
9	11/22/2015	80	6637	5264	4512	360,024	8,115
10	11/23/2015	80	6350	5033	4570	359,957	8,141
11	11/23/2015	80	6282	5345	4577	359,059	7,977
12	11/23/2015	80	6451	6180	4416	361,287	8,008
13	11/24/2015	81	6585	5745	4479	358,436	7,943
14	11/24/2015	80	6449	5925	4262	359,062	7,942
15	11/25/2015	80	6455	6357	4297	359,317	8,012
16	12/2/2015	80	6628	5588	4065	358,231	8,078
17	12/2/2015	80	6983	7679	3972	354,008	7,798
18	12/2/2015	79	6930	7968	3658	354,013	7,928
19	12/2/2015	77	6675	8706	4304	615,310	8,649
20	12/3/2015	80	6400	7525	3873	353,572	7,838
21	12/3/2015	78	6886	7674	4800	357,969	7,757
22	12/3/2015	80	6205	6589	4219	355,631	7,823
23	12/3/2015	80	6355	6205	4524	357,095	7,858
24	12/3/2015	80	5997	7881	4469	355,693	7,802
25	12/4/2015	80	5998	5454	4710	356,229	7,788

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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
BRAILLER	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
GENESEO	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



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.)

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Prepare Disclosure for FracFocus Submission

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

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Hydraulic Fracturing Data

[Edit](#)

Job Start Date 11/19/2014	Job End Date 12/4/2014	API Number 47-051-01645-00-00	State & County West Virginia --- Marshall
Well Name HANSEN 1H			
Longitude -80.81453	Latitude 39.7265	Datum NAD27	Federal/Tribal Well?
True Vertical Depth (ft) 6490	Total Water Vol (gal) 8259258	Total Non Water Vol 0	Total Mass (lbs) 78009625.4915



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%	88.1690945%		68864041.3524
Edit Sand, White, 40/70	Baker Hughes	Proppant	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	7.82006%		6100400
Edit Sand, White, 30/50	Baker Hughes	Proppant	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	2.98283%		2326900

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40/70

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FracFocus Chemical Disclosure Registry

Edit	FRW-18	Baker Hughes	FILTRON Reducer	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0904741%	SmartCare Product	70578.56
Edit	Alpha 1427	Baker Hughes	Biocide	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0227135%	SmartCare Product	17718.75
Edit	Enzyme G-NE	Baker Hughes	Breaker	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0158933%	SmartCare Product	12398.3086
Edit	ScaleSorb 4, (50# bag)	Baker Hughes	Scale Inhibitor	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0064095%	SmartCare Product	5000
Edit	Ferrotrol 300L (Totes)	Baker Hughes	Iron Control	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0016565%	SmartCare Product	1292.19249
Edit	Ferrotrol 300L	Baker Hughes	Iron Control	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0014544%	SmartCare Product	1134.60804
Edit	CI-14	Baker Hughes	Corrosion Inhibitor	MSDS and Non-MSDS Ingredients Listed Below	N/A	0%	.0014312%	SmartCare Product	1116.5

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%	11.0190176%		8606350
				Water	7732-18-5	95%	.4506191%		351953.882435
				Mineral Oil	8042-47-5	70%	.0690103%		53900.154
				Hydrochloric Acid	7647-01-0	15%	.0678167%		52967.915
				Guar Gum	9000-30-0	60%	.0591517%		46200.132
				Petroleum Distillates	64742-47-8	30%	.0295758%		23100.066
				Paraffinic Petroleum Distillate	64742-55-8	30%	.0295758%		23100.066

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Ammonium Chloride	12125-02-9	3%	.0027109%	2117.3568
Didecyl Dimethyl Ammonium Chloride	7173-51-5	10%	.00222686%	1771.875
Citric Acid	77-92-9	60%	.0018643%	1456.080318
Oleamide DEA	93-83-4	2%	.0018073%	1411.5712
Alcohols, C12-16, ethoxylated	68551-12-2	2%	.0018073%	1411.5712
Methanol	67-56-1	100%	.0014295%	1116.5
Quaternary Ammonium Compound	68424-85-1	5%	.0011343%	885.9375
Ethanol	64-17-5	5%	.0011343%	885.9375
Sodium Carboxymethyl Inulin	430439-54-6	15%	.0009603%	750
Sodium chloride	7647-14-5	15%	.0009603%	750
Hemicellulase Enzyme Concentrate	9025-56-3	5%	.0007937%	619.91543
Sorbitan Monooleate	1338-43-8	.5%	.0004518%	352.8928
Polyoxyethylene Sorbitan Monooleate	9005-65-6	.5%	.0004518%	352.8928
Polyoxyalkylenes	68951-67-7	30%	.0004288%	334.95
Sodium glycolate	2836-32-0	5%	.0003201%	250
Sodium diglycolate	35249-69-5	5%	.0003201%	250
Fatty Acids Modified Thiourea Polymer	61790-12-3	10%	.0001429%	111.65
2-butoxy-1-propanol	68527-49-1	7%	.0001001%	78.155
Olefin	15821-83-7	.1%	.0000986%	77.00022
Propargyl Alcohol	64743-02-8	5%	.0000715%	55.825
Crystalline Silica (Cristobalite)	107-19-7	5%	.0000715%	55.825
Formaldehyde	14464-46-1	1%	.000064%	50
	50-00-0	1%	.0000143%	11.165

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Hansen 1H 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

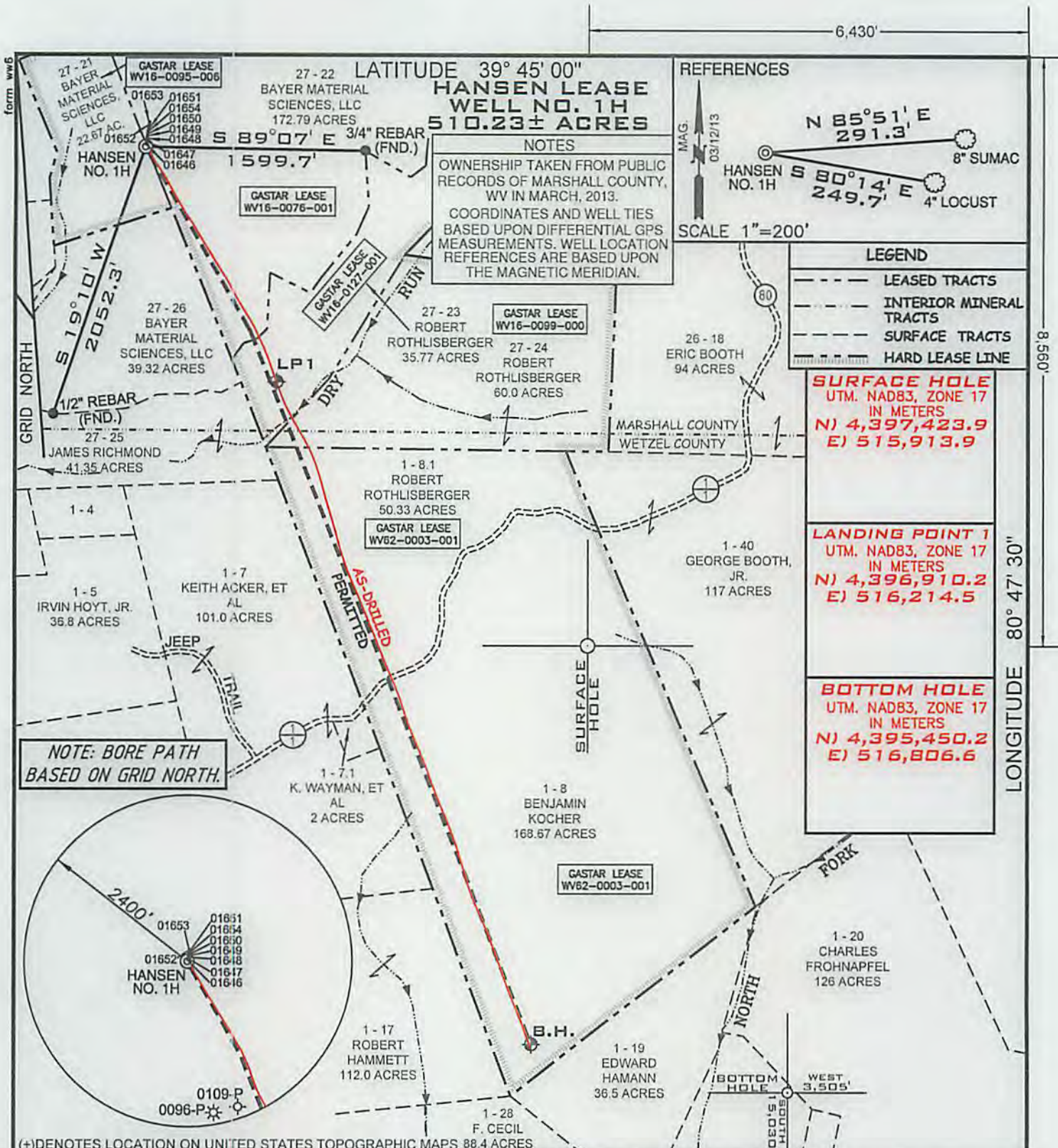
Production: 50:50 Class A + 3 lbs/sk BA-90 + .25% R-3 + .3% MPA-170

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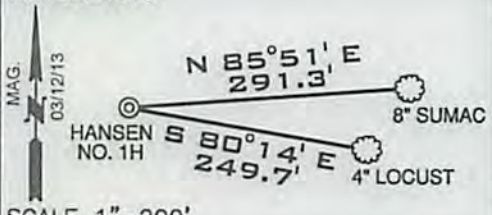
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LATITUDE 39° 45' 00"
HANSEN LEASE
WELL NO. 1H
510.23± ACRES

REFERENCES



NOTES
 OWNERSHIP TAKEN FROM PUBLIC RECORDS OF MARSHALL COUNTY, WV IN MARCH, 2013.
 COORDINATES AND WELL TIES BASED UPON DIFFERENTIAL GPS MEASUREMENTS. WELL LOCATION REFERENCES ARE BASED UPON THE MAGNETIC MERIDIAN.

LEGEND

- LEASED TRACTS
- INTERIOR MINERAL TRACTS
- SURFACE TRACTS
- HARD LEASE LINE

SURFACE HOLE
 UTM. NAD83, ZONE 17
 IN METERS
N) 4,397,423.9
E) 515,913.9

LANDING POINT 1
 UTM. NAD83, ZONE 17
 IN METERS
N) 4,396,910.2
E) 516,214.5

BOTTOM HOLE
 UTM. NAD83, ZONE 17
 IN METERS
N) 4,395,450.2
E) 516,806.6

NOTE: BORE PATH BASED ON GRID NORTH.



(+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS 88.4 ACRES

FILE NUMBER W0120318 (WB1-62)

DRAWING NUMBER HANSEN_WP_1H-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 28, 2015

OPERATORS WELL NO. HANSEN NO. 1H AS-DRILLED

API WELL NO. 47-051-01645

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

STATE COUNTY PERMIT

LOCATION ELEVATION 124.5' WATERSHED (HUC 10) FRENCH CREEK - OHIO RIVER (0503020110)

DISTRICT FRANKLIN COUNTY MARSHALL

QUADRANGLE NEW MARTINSVILLE 7.5' LEASE NUMBER WV16-0099-000, WV62-0003-001, WV16-0076-001, WV16-0095-006, WV16-0127-001

SURFACE OWNER BAYER MATERIAL SCIENCES, LLC ACREAGE 22.67

OIL & GAS ROYALTY OWNER BAYER MATERIAL SCIENCES, LLC, et al LEASE ACREAGE 510.23

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: 6522' TMD: 12,308'

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

10/16/2015

COUNTY NAME
 PERMIT