

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

API 47 - 051 - 02048 County Marshall District Franklin
Quad Powhatan Point 7.5' Pad Name Blake Field/Pool Name _____
Farm name Wilbert H. Bungard, et ux Well Number Blake N-1HM
Operator (as registered with the OOG) Tug Hill Operating, LLC
Address 380 Southpointe Boulevard, Plaza II, Suite 200 City Canonsburg State PA Zip 15317

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4,401,600.76 Easting 516,703.11
Landing Point of Curve Northing 4,401,840.12 Easting 516,460.10
Bottom Hole Northing 4,403,138.09 Easting 514,744.70

Elevation (ft) 1315.6' 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)
SOBM; Base oil, osmotic inhibitor, weighting agent, viscosifier, emulsifier, hardness buffer, fluid loss additive, LCM, Shale inhibitor, de-foamer, soaping agent, coagulant, flocculant; specific additives per WSSP and Permit.

Date permit issued 8/1/2018 Date drilling commenced 10/28/2018 Date drilling ceased 11/20/2018
Date completion activities began 2/18/2019 Date completion activities ceased 6/9/2019
Verbal plugging (Y/N) N Date permission granted N/A Granted by N/A

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

Freshwater depth(s) ft 70' Open mine(s) (Y/N) depths N
Salt water depth(s) ft 1595' Void(s) encountered (Y/N) depths N
Coal depth(s) ft 969-975', 1054-1059' Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Reviewed by:

7/28/2020

API 47-051 - 02048 Farm name Wilbert H. Bungard, et ux Well number Blake N-1HM

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	36"	30"	120'	NEW	94.5#	N/A	Y
Surface	17 1/2"	13 3/8"	1161'	NEW	54.5#	N/A	Y
Coal	17 1/2"	13 3/8"	1161'	NEW	54.5#	N/A	Y
Intermediate 1	12 1/4"	9 5/8"	2833'	NEW	36#	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8 3/4"	5 1/2"	14,083'	NEW	20#	N/A	Y
Tubing		2 3/8"	7463'	NEW	4.7#	N/A	
Packer type and depth set							

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Comment Details _____

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CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft ³ /sks)	Volume (ft ³)	Cement Top (MD)	WV Department of Environmental Protection WOC (hrs)
Conductor	A		15.6	1.19		0	8
Surface	A	891	15.6	1.19	1114	0	8
Coal	A	891	15.6	1.19	1114	0	8
Intermediate 1	A	978	15.6	1.19	1157	0	8
Intermediate 2							
Intermediate 3							
Production	A	4188	14.5	1.17	4919	0	8
Tubing							

Drillers TD (ft) 14,112' Loggers TD (ft) n/a
 Deepest formation penetrated Marcellus Plug back to (ft) n/a
 Plug back procedure n/a

Kick off depth (ft) 5,933'

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 3 centralizers on surface casing at equal distance.

Intermediate - 1 centralizer every other joint.

Production - one centralizer every other joint in lateral, one centralizer every joint through curve, one centralizer every other joint to surface.

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 _____

Blake N-1HM
PEFORATION RECORD

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD. Ft.	Number of Perforations	Formation(s)
1	4/3/2019	13943	13990	48	Marcellus
2	4/8/2019	13710	13863	48	Marcellus
3	4/9/2019	13534	13688	48	Marcellus
4	4/9/2019	13359	13512	48	Marcellus
5	4/9/2019	13183	13337	48	Marcellus
6	4/9/2019	13008	13161	48	Marcellus
7	4/10/2019	12833	12986	48	Marcellus
8	4/10/2019	12657	12811	48	Marcellus
9	4/10/2019	12482	12635	48	Marcellus
10	4/11/2019	12306	12460	48	Marcellus
11	4/11/2019	12131	12284	48	Marcellus
12	4/12/2019	11956	12109	48	Marcellus
13	4/12/2019	11780	11934	48	Marcellus
14	4/12/2019	11605	11758	48	Marcellus
15	4/13/2019	11429	11583	48	Marcellus
16	4/13/2019	11254	11407	48	Marcellus
17	4/13/2019	11079	11232	48	Marcellus
18	4/14/2019	10903	11057	48	Marcellus
19	4/14/2019	10728	10881	48	Marcellus
20	4/15/2019	10552	10706	48	Marcellus
21	4/15/2019	10377	10530	48	Marcellus
22	4/15/2019	10202	10355	48	Marcellus
23	4/16/2019	10026	10180	48	Marcellus
24	4/16/2019	9851	10004	48	Marcellus
25	4/16/2019	9675	9829	48	Marcellus
26	4/17/2019	9500	9653	48	Marcellus
27	4/17/2019	9325	9478	48	Marcellus
28	4/17/2019	9149	9303	48	Marcellus
29	4/18/2019	8974	9127	48	Marcellus
30	4/18/2019	8798	8952	48	Marcellus
31	4/18/2019	8623	8776	48	Marcellus
32	4/18/2019	8448	8601	48	Marcellus
33	4/18/2019	8272	8426	48	Marcellus
34	4/19/2019	8097	8250	48	Marcellus
35	4/19/2019	7921	8075	48	Marcellus
36	4/19/2019	7746	7899	48	Marcellus
37	4/19/2019	7571	7724	48	Marcellus
38	4/19/2019	7395	7549	48	Marcellus
39	4/20/2019	7220	7373	48	Marcellus
40	4/20/2019	7044	7198	48	Marcellus

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STIMULATION INFORMATION PER STAGE

Stage No.	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)
1	85.1	7330	4761		312290	7705	0
2	89.03	6916	4635	4186	441760	8967	0
3	89.64	6797	5002	4168	438610	9321	0
4	89.07	6740	5010	4402	519510	10200	0
5	89.89	6566	4928	4133	522710	10176	0
6	89.48	6511	4742	4527	519095	9963	0
7	89.67	6716	5147	4075	521910	10694	0
8	89.87	6663	4954	4211	519180	10147	0
9	88.57	6614	4748	4440	518195	9788	0
10	89.4	6706	4662	3978	510330	9670	0
11	89.31	6663	5199	3967	518300	9407	0
12	89.68	6638	5066	4406	527820	9522	0
13	89.63	6623	5021	4392	527165	9562	0
14	89.25	6602	5040	4624	520350	9515	0
15	89.28	6552	4584	4284	440810	8321	0
16	89.22	6473	4773	4085	437990	8274	0
17	88.69	6604	4853	4350	436160	9573	0
18	89.35	6545	5271	4803	437840	8251	0
19	89.27	6489	4801	4681	439580	8200	0
20	89.82	6414	4967	4025	438860	8518	0
21	88.2	6610	4704	4427	428980	8160	0
22	89.55	6531	4888	4670	437710	8122	0
23	89.66	6536	4789	4375	441670	9055	0
24	89.63	6696	5015	4860	434760	8097	0
25	89.88	6561	4908	4603	440560	8884	0
26	89.37	6553	4796	4990	440210	8568	0
27	86.38	6708	4789	4844	439150	9243	0
28	89.16	6293	4774	4617	358240	7163	0
29	89.03	6407	4934	4809	357900	7183	0
30	88.9	6398	5304	5000	355040	6836	0
31	89.33	6301	4860	4792	361780	6735	0
32	89.3	6114	4708	4804	359600	6666	0
33	89.48	6109	4673	4907	360140	6741	0

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34	89.52	6081	4766	4853	359600	6804	0
35	89.56	6314	4771	4825	358760	6703	0
36	89.3	6317	4862	4676	359200	6678	0
37	89.57	6272	4599	4630	364703	7191	0
38	89.08	6133	4746	4738	359260	7206	0
39	89.21	6301	4518	4915	360200	7076	0
40	88.35	6118	4755	4386	357760	7961	0

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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
Maxton	1972	2060	1972	2060	Sandstone
Big Lime	2060	2102	2060	2102	Limestone
Big Injun	2102	2448	2102	2448	Sandstone
Weir	2448	2603	2448	2603	Sandstone
Berea	2603	2883	2603	2883	Sandstone
Gordon	2883	2930	2883	2930	Sandstone
Fifty Foot	2930	3546	2930	3546	Sandstone
Speechley	3546	4958	3546	4970	Sandstone
Benson	4958	5345	4970	5366	Sandstone
Alexander	5345	5924	5366	5957	Siltstone
Rhinestreet	5924	6345	5957	6460	Black shale
Middlesex	6345	6426	6460	6575	Black shale
Geneseo/Burkett	6426	6454	6575	6626	Black shale
Tully	6454	6477	6626	6679	Limestone
Hamilton	6477	6506	6679	6773	Grey shale
Marcellus	6506	-	6773	-	Black shale

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