

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

API 47-061-01769 County Monongalia District Clay  
Quad Blacksville Pad Name Jenkins Field/Pool Name \_\_\_\_\_  
Farm name Lois A. Jenkins Irrevocable Trust Well Number 18H  
Operator (as registered with the OOG) Northeast Natural Energy LLC  
Address 707 Virginia Street East STE 1200 City Charleston State West Virginia Zip 25301

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4395831.6 Easting 573770.9  
Landing Point of Curve Northing 4396097.8 Easting 574377.1  
Bottom Hole Northing 4393261.5 Easting 576106.9

Elevation (ft) 1,128' 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 Based Mud - Horizontal Section: BIO-BASE 365, CALCIUM CHLORIDE POWDER, G-SEAL PLUS, HRP, LIME, M-I WATE (BARITE),  
M-LX II MEDIUM, MEGADRIL P SYSTEM, MEGADRIL P SYSTEM RENTAL, MEGAMUL, SAFE-CARB 250, VERSATHIN HF, VERSAWET, VG-PLUS, VINSEAL MEDIUM, WALNUT NUT PLUG MEDIUM

Date permit issued 7/17/2017 Date drilling commenced 08/01/2017 Date drilling ceased 4/7/2018  
Date completion activities began 6/21/2018 Date completion activities ceased 7/12/2018  
Verbal plugging (Y/N) \_\_\_\_\_ Date permission granted \_\_\_\_\_ Granted by \_\_\_\_\_

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

Freshwater depth(s) ft 1034' Open mine(s) (Y/N) depths N  
Salt water depth(s) ft 2182' Void(s) encountered (Y/N) depths N  
Coal depth(s) ft 710' Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

Reviewed by:  
MDK 4/23/2019

Reviewed

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WR-35  
Rev. 8/23/13

API 47-061 - 01769 Farm name Lois A. Jenkins Irrevocable Trust Well number 18H

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	30"	24"	40'	New	NA	NA	Y, grouted in
Surface	17-1/2"	13-3/8"	1,120'	New	J-55	NA	Y, 35 bbl
Coal							
Intermediate 1	12-1/4"	9-5/8"	2,280	New	J-55	NA	Y, 25 bbl
Intermediate 2							
Intermediate 3							
Production	8-3/4"	5-1/2"	20,102.84	New	P-110	NA	N, est 1,163
Tubing	2-7/8"	2-7/8"	NA	New	N-80	NA	
Packer type and depth set							

Comment Details \_\_\_\_\_

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	4,500 PSI	-	-	NA	-	-	-
Surface	Class A	925	15.2	1.23	1175	CTS	8
Coal							
Intermediate 1	Class A	705	15.2	1.3	895	CTS	8
Intermediate 2							
Intermediate 3							
Production	50:50 Poz	3,747	14.5	1.21	3,747'	1,163'	48
Tubing	NZ			NA			

Drillers TD (ft) 20,126' Loggers TD (ft) 20,096'

Deepest formation penetrated Marcellus Plug back to (ft) NA

Plug back procedure \_\_\_\_\_

Kick off depth (ft) 5,675'

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: Bow spring centralizers every 3rd joint or approximately 120'

Intermediate: Bow spring centralizers every 3rd joint or approximately 120'

Production: Rigid body centralizers placed at a minimum of every other joint (~80') from TD 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 \_\_\_\_\_

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WR-35  
Rev. 8/23/13

Page \_\_\_ of \_\_\_

API 47- 061 - 01769

Farm name Lois A. Jenkins Irrevocable Trust Well number 18H

### PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
	Please See	Attached			

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)
	Please	See	Attached					
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WR-35  
Rev. 8/23/13

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PRODUCING FORMATION(S)	DEPTHS		
Marcellus	7860'	TVD	20,126' MD

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump

SHUT-IN PRESSURE Surface 3120 psi Bottom Hole \_\_\_\_\_ psi DURATION OF TEST 24 hrs

OPEN FLOW Gas 1687 mcfpd Oil \_\_\_\_\_ bpd NGL \_\_\_\_\_ bpd Water \_\_\_\_\_ bpd  
GAS MEASURED BY  Estimated  Orifice  Pilot

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

Please insert additional pages as applicable.

Drilling Contractor Patterson-UTI Company  
Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Logging Company Baker Hughes  
Address 837 Philippi Pike City Clarksburg State WV Zip 26301

Cementing Company BJ Services  
Address 11211 FM 2920 Rd City Tomball State TX Zip 77375

Stimulating Company Producers Service Corporation  
Address 109 Graham Street City Zanesville State OH Zip 43701

Please insert additional pages as applicable.

Completed by Hollie Medley Telephone 304-212-0422  
Signature Hollie Medley Title Regulatory Manager Date 3-25-19

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Lithology/Formation	Top Depth in FT Name TVD	Bottom Depth in FT TVD	Describe rock type and record quantity and type of fluid (freshwater, brine, oil, gas, H2S, etc)
sand/shale	0	310	sand/shale
Sand	310	350	gray sand
coal	350	355	coal - (Washington)
shale	355	374	gray shale
coal	374	377	coal
shale	377	475	red and gray shale
shale	475	590	gray sandstone and shale interbedded
coal	590	598	coal - (Waynesburg)
sand/shale	598	710	brown sand/shale
coal	710	718	coal - (Pittsburgh)
sand/shale	718	1100	brown sand/shale
sand/shale	1100	1200	sand/shale interbedded
red shale	1200	1650	red rock - clay rich
sand/shale	1650	1880	brown sand/shale
Big Lime	1880	1935	limestone
Siltstone	1935	2000	siltstone
Big Injun	2000	2030	sandstone
sandstone/siltstone	2030	2700	interbedded sandstone and siltstone
red rock	2700	2950	clay rich red shale
sandstone/siltstone	2950	3852	interbedded sandstone and siltstone
sandstone	3852	3925	sandstone
siltstone/shale	3925	6100	interbedded brown siltstone and shale
shale	6100	6225	gray shale
silt/shale	6225	7190	mixed brown siltstone and brown/gray shale
Middlesex	7202	7425	light gray shale
Burkett	7425	7629	gray shale
Geneseo	7629	7686	black shale
Tully	7686	7744	limestone
Mahantango	7744	7860	gray shale
Marcellus	7860	7976	Black shale

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## Jenkins 18H - Stimulation Report

Stage Number	Report Date	Avg Treating Rate (BPM)	Avg Treating Pressure (psi)	Breakdown Pressure (psi)	ISIP (psi)	Total Proppant Amount (lbs)	Flush Volume (bbbls)	Total Clean Fluid (Bbls)	Water Amount (bbbls)
1	6/21/2018	69	9,195	10,262		273,900	420	8,227	8,647
2	6/22/2018	80	9,422	7,415	6,374	302,740	444	7,585	8,029
3	6/23/2018	78	9,344	8,177	5,869	350,260	439	7,722	8,161
4	6/23/2018	75	9,660	8,020	6,066	376,500	434	10,754	11,188
5	6/24/2018	75	9,784	7,854	5,519	451,400	426	10,904	11,330
6	6/24/2018	77	10,091	8,461	5,578	298,440	429	8,147	8,576
7	6/24/2018	77	9,542	6,908	5,558	450,540	419	10,173	10,592
8	6/25/2018	79	9,876	7,294	5,902	448,540	413	9,815	10,228
9	6/25/2018	79	9,384	8,237	6,049	450,400	409	9,958	10,367
10	6/25/2018	77	9,353	6,370	5,905	451,020	406	9,515	9,921
11	6/26/2018	78	9,261	7,417	5,702	451,920	405	9,974	10,379
12	6/26/2018	80	9,236	7,158	6,347	441,280	397	10,007	10,404
13	6/26/2018	77	9,378	7,854	5,876	458,060	392	9,850	10,242
14	6/27/2018	80	9,582	7,679	5,868	449,760	388	9,938	10,326
15	6/27/2018	80	9,510	8,034	6,076	449,800	382	10,306	10,688
16	6/27/2018	75	9,710	7,570	5,387	450,820	380	9,897	10,277
17	6/28/2018	81	9,070	7,191	5,973	449,040	374	9,990	10,364
18	6/28/2018	81	9,560	7,058	6,042	446,600	375	10,070	10,445
19	6/29/2018	77	8,811	6,730	5,397	452,420	367	9,383	9,750
20	6/29/2018	80	9,482	6,932	6,359	450,640	365	10,063	10,428
21	6/29/2018	80	9,068	7,132		389,700	0	9,037	9,037
22	6/29/2018	81	8,881	6,749	5,873	451,780	353	9,473	9,826
23	6/30/2018	80	9,842	7,781	6,182	455,380	351	10,175	10,526
24	6/30/2018	77	9,511	7,749	5,643	449,000	341	9,368	9,709
25	6/30/2018	77	9,089	7,044	5,987	315,040	337	7,829	8,166
26	7/1/2018	77	9,445	7,557	5,695	448,020	339	9,916	10,255
27	6/29/2018	77	9,161	6,977	6,563	450,560	330	9,953	10,283
28	7/1/2018	78	8,717	7,614	6,562	452,020	332	9,599	9,931
29	7/2/2018	79	9,031	7,019	6,066	451,520	317	9,971	10,288
30	7/2/2018	76	9,086	7,097	5,954	368,840	318	8,697	9,015
31	7/2/2018	80	8,440	7,257	6,090	451,280	313	9,608	9,921
32	7/3/2018	80	9,095	6,262	5,810	449,200	315	9,888	10,203
33	7/3/2018	80	9,212	7,396	5,898	459,160	306	9,315	9,621
34	7/4/2018	79	8,412	7,793	5,859	456,120	305	10,066	10,371
35	7/4/2018	81	8,825	7,037	5,802	450,740	297	9,499	9,796
36	7/4/2018	81	8,242	7,673	5,991	453,500	292	9,574	9,866
37	7/5/2018	81	8,676	7,684	5,561	452,000	291	9,293	9,584
38	7/5/2018	81	8,298	6,843	6,045	451,660	283	9,477	9,760
39	7/6/2018	81	8,066	6,811	6,036	449,420	278	9,370	9,648
40	7/6/2018	83	8,927	7,384	5,627	450,600	277	9,291	9,568
41	7/6/2018	80	8,774	7,550	6,191	450,660	273	9,731	10,004
42	7/7/2018	84	8,310	7,252	5,952	449,340	267	9,252	9,519
43	7/7/2018	83	8,745	8,056	5,861	450,680	259	9,177	9,436
44	7/7/2018	81	8,277	7,517	5,773	449,960	258	9,442	9,700
45	7/8/2018	83	8,202	7,348	6,009	449,980	252	9,057	9,309
46	7/8/2018	81	8,099	7,096	5,928	449,580	246	9,360	9,606
47	7/8/2018	81	8,080	7,188	5,939	449,560	244	9,221	9,465
48	7/9/2018	81	8,410	8,000	6,444	457,580	238	9,352	9,590
49	7/9/2018	81	8,255	8,208	6,466	450,000	233	8,284	8,517
50	7/10/2018	83	8,314	7,942	6,415	454,140	231	9,228	9,459
51	7/10/2018	78	9,238	8,663	6,309	450,320	226	9,514	9,740
52	7/10/2018	82	7,962	7,661	6,190	450,360	220	8,867	9,087
53	7/11/2018	83	7,884	8,054	6,245	452,000	219	8,955	9,174
54	7/11/2018	83	8,376	8,083	6,257	455,260	212	9,378	9,590
55	7/11/2018	85	8,609	7,183	5,784	449,660	207	8,488	8,695
56	7/12/2018	83	8,153	7,096	5,796	448,520	203	8,939	9,142

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Jenkins 18H Perforation Report				
Stage Number	Report Date	Cluster 5 Bottom TD	Cluster 1 Top TD	Total Shots
1	6/21/2018	19,948	0	0
2	6/22/2018	19,746	19,903	40
3	6/23/2018	19,547	19,704	40
4	6/23/2018	19,347	19,505	40
5	6/24/2018	19,148	19,306	40
6	6/24/2018	18,949	19,106	40
7	6/24/2018	18,750	18,907	40
8	6/25/2018	18,551	18,708	40
9	6/25/2018	18,352	18,509	40
10	6/25/2018	18,153	18,310	40
11	6/26/2018	17,953	18,111	40
12	6/26/2018	17,754	17,912	40
13	6/26/2018	17,555	17,712	40
14	6/27/2018	17,356	17,513	40
15	6/27/2018	17,157	17,314	40
16	6/27/2018	16,958	17,115	40
17	6/28/2018	16,759	16,916	40
18	6/28/2018	16,559	16,717	40
19	6/29/2018	16,360	16,518	40
20	6/29/2018	16,161	16,318	40
21	6/29/2018	15,962	16,119	40
22	6/29/2018	15,763	15,920	40
23	6/30/2018	15,564	15,721	40
24	6/30/2018	15,365	15,522	40
25	6/30/2018	15,165	15,323	40
26	7/1/2018	14,966	15,124	40
27	6/29/2018	14,767	14,924	40
28	7/1/2018	14,568	14,725	40
29	7/2/2018	14,369	14,526	40
30	7/2/2018	14,170	14,327	40
31	7/2/2018	13,971	14,128	40
32	7/3/2018	13,771	13,929	40
33	7/3/2018	13,572	13,730	40
34	7/4/2018	13,373	13,530	40
35	7/4/2018	13,174	13,331	40
36	7/4/2018	12,975	13,132	40
37	7/5/2018	12,776	12,933	40
38	7/5/2018	12,577	12,734	40
39	7/6/2018	12,377	12,535	40
40	7/6/2018	12,178	12,336	40
41	7/6/2018	11,979	12,136	40
42	7/7/2018	11,780	11,937	40
43	7/7/2018	11,581	11,738	40
44	7/7/2018	11,382	11,539	40
45	7/8/2018	11,183	11,340	40
46	7/8/2018	10,983	11,141	40
47	7/8/2018	10,784	10,942	40
48	7/9/2018	10,585	10,742	40
49	7/9/2018	10,386	10,543	40
50	7/10/2018	10,187	10,344	40
51	7/10/2018	9,988	10,145	40
52	7/10/2018	9,789	9,946	40
53	7/11/2018	9,589	9,747	40
54	7/11/2018	9,390	9,548	40
55	7/11/2018	9,191	9,348	40
56	7/12/2018	8,992	9,149	40

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XPI Permit #: 47-061-01769

Customer: Northeast

Lease and Well Name: Jenkins 18-H

A.F.E #: 100388-602



Job Type: 13.375 Surface

Cement Operator: Ralph Hiles

Date Cemented: 8/2/2017

Drilling Contractor: Highlands 14

Cement Slurry Information									
No. of Sacks	Cement Blend Composition			Yield (ft <sup>3</sup> /sk)	Mix Water (gal/sk)	Density (lb/gal)	(bbl) Mix Water	(ft <sup>3</sup> ) Of Slurry	(bbl) Of Slurry
925	Type 1 + 2% CaCl <sub>2</sub>			1.27	5.76	15-2	127	1175	209
Totals							127	1175	209

Wellbore Information										
	New/Used	Diameter (in)	Weight (lb/ft)	Top (ft)	Bottom (ft)	Collapse/Burst Pressures (psi)			Requested TOC (ft)	Surface
Casing	New	13 3/8	54.5	0	1,090				TVD (ft)	1,110
Previous Casing		24		0	57				Displacement Depth (ft)	1,051
Tubing or Drillpipe									Displacement (bbl)	162.4
Open Hole		17 1/2		1,090	1,110					
Open Hole										

Pumping Returns		Cement Slurry Temperature Record (°F)					Fluid Information	
Spacer or Gel Sweep Return Seen At Surface	Yes	Cement	Reading 1	Reading 2	Reading 3	Average	Mix Water Temp (°F)	74
Cement Returns Seen at Surface	Yes	Blend 1	92	92	92	92	Displacement Fluid Type	Water
Amount of Cement Returns (BBL)	35	Blend 2					Displacement Fluid Temp (°F)	74
		Blend 3					Displacement Fluid Density (lb/gal)	8.4

Time	Rate (bpm)	Volume (bbl)	Pressure (psi)	Event or Stage Description
1:00				Arrive on location
1:01				Wait on rig to run casing
2:30				Spot trucks, Rig up, Wait on rig to run casing
3:30				Hold Safety Meeting
3:45	5.5	230	6	Wash casing down with processed water
4:25				Shut down, put head on
4:45	5.0	3	2000	Pump Fresh Water, Pressure test
4:55	5.0	50	125	Pump Gel with Celloflaka
5:05	5.0	10	125	Pump Fresh Water
5:07	4.8	925 sacks / 209 bbl	160	Mix and Pump Cement at 15.2
5:57				Shut Down, Drop Plug
6:00	5.5	165	60 to 400	Displace Plug with processed water
6:35	3.5		400 to 900	Plug Lands, Shut Down
6:40		1/2 barrel back	900	Hold 5 Minutes, Release Pressure
6:43			900 to 0	Floats Hold, Shut in Manifold
6:55				Wash Up, Rack Out
8:00				Leave Location

Comments:

Thank You for your Business

UWS Cement Operator Signature:

Ralph Hiles

Customer Representative Signature:

*Brian Chalkley*



API Permit #: 47-061-01769

Customer: Northeast Natural Energy

Lease and Well Name: Jankina 18-H

A.F.E #: 100388-802

Job Type: 9 8/8"

Cement Operator: Frank Voytek

Date Cemented: 8/4/2017

Drilling Contractor: Highlands #14



Cement Slurry Information									
No. of Sacks	Cement Blend Composition			Yield (ft <sup>3</sup> /sck)	Mix Water (gal/sk)	Density (lb/gal)	(bbl) Of Slurry	(ft <sup>3</sup> ) Of Slurry	(bbl) Of Slurry
705	Type 1 + 2% CaCl <sub>2</sub>			1.27	6.76	15.2	97	895	159
						Totals	97	895	159

Wellbore Information								
	New/Used	Diameter (in)	Weight (lb/ft)	Top (ft)	Bottom (ft)	Collapse/Burst Pressures (psi)	Requested TOC (ft)	Surface
Casing	New	9 5/8	40.0	0'	2240'		TVD (ft)	2,240
Previous Casing	New	13 3/8	54.5	0'	1090'		Displacement Depth (ft)	2,188
Tubing or Drillpipe							Displacement (bbl)	188.6
Open Hole		12 1/4		1080'	2270'			
Open Hole								

Pumping Returns		Cement Slurry Temperature Record (°F)					Fluid Information	
Spacer or Gel Sweep Return Seen At Surface	Yes	Cement	Reading 1	Reading 2	Reading 3	Average	Mix Water Temp (°F)	73/PH 7
Cement Returns Seen at Surface	Yes	Blend 1	103	103	104	103	Displacement Fluid Type	Water
Amount of Cement Returns (BBL)	26	Blend 2					Displacement Fluid Temp (°F)	
		Blend 3					Displacement Fluid Density (lb/gal)	

Time	Rate (bpm)	Volume (bbl)	Pressure (psi)	Event or Stage Description
13:00				Arrive on location, spoke to Company Man
15:30				Spot trucks, rack in
16:30				Hold Safety Meeting
16:40	0-3-0	3	0-500-0-2700-0	Wet lines, test OPSD, pressure test
16:45	0-6-0	180	0-52	Pump fresh water
17:14	6.0	60	62-96	Pump 1000lbs Bentonite gel
17:22	6.0	10	89-89	Pump fresh water
17:24	6.0-5.0-0	190	69-132-0	Mix and pump 705lbs Cement
17:59				Shut down, drop plug
18:01	0-6.0-5.0-3.5-0	188	0-34-1141	Displace plug w/ fresh water
18:40			1141-1710	Plug down, shut down, wait to check floats
18:45			1710-0	Floats hold, 1bbl back, shut in
18:50				Clean up, rack out
18:30				Leave location

Comments:

Hole circulated @ 226bbl  
Job done per customer request

Thank You for your Business

UW9 Cement Operator Signature:

Frank Voytek

Customer Representative Signature:

*Beard Chadwick*

# Cementing Treatment



Start Date	4/5/2018	Well	47-061-01769
End Date	4/6/2018	County	MONONGALIA
Client	NORTHEAST NATURAL ENERGY LLC	State/Province	WV
Client Field Rep	Jaime	API	47-061-01769
Service Supervisor	Delmos Graham	Formation	
Field Ticket No.		Rig	Patterson 334
District	Bridgeport, WV	Type of Job	Long String

## WELL GEOMETRY

Type	ID (in)	OD (in)	Wt. (lb/ft)	MD (ft)	TVD (ft)	Excess(%)	Grade	Thread
Previous Casing	8.84	9.63	40.00	2,245.00	2,245.00	0.00	J-55	
Open Hole	8.50			20,147.00	7,980.00	0.00		
Casing	4.78	5.50	20.00	20,147.00	7,980.00		Q-125	
Open Hole	8.75			5,700.00	5,700.00			

Shoe Length (ft): 45

## HARDWARE

Bottom Plug Used?	Yes	Tool Type	Float Collar
Bottom Plug Provided By	Non BJ	Tool Depth (ft)	20,079.00
Bottom Plug Size	5.500	Max Tubing Pressure - Rated (psi)	
Top Plug Used?	Yes	Max Tubing Pressure - Operated (psi)	
Top Plug Provided By	Non BJ	Max Casing Pressure - Rated (psi)	12,600.00
Top Plug Size	5.500	Max Casing Pressure - Operated (psi)	6,000.00
Centralizers Used	Yes	Pipe Movement	None
Centralizers Quantity		Job Pumped Through	Manifold
Centralizers Type		Top Connection Thread	BTC
Landing Collar Depth (ft)	20,079	Top Connection Size	5.5

## CIRCULATION PRIOR TO JOB

# Cementing Treatment



Well Circulated By	Rig	Solids Present at End of Circulation	No
Circulation Prior to Job	Yes	10 sec SGS	
Circulation Time (min)	3.00	10 min SGS	
Circulation Rate (bpm)		30 min SGS	
Circulation Volume (bbls)		Flare Prior to/during the Cement Job	No
Lost Circulation Prior to Cement Job	No	Gas Present	No
Mud Density In (ppg)	12.30	Gas Units	
Mud Density Out (ppg)	12.30		
PV Mud In			
PV Mud Out			
YP Mud In			
YP Mud Out			

## TEMPERATURE

Ambient Temperature (°F)	45.00	Slurry Cement Temperature (°F)	75.00
Mix Water Temperature (°F)	67.00	Flow Line Temperature (°F)	

## BJ FLUID DETAILS

Fluid Type	Fluid Name	Density (ppg)	Yield (Cu Ft/sk)	H2O Req. (gals/sk)	Planned Top of Fluid (Ft)	Length (Ft)	Vol (sk)	Vol (Cu Ft)	Vol (bbls)
Spacer / Pre Flush / Flush	IntegraGuard RHEO 10 13.5 ppg	13.5000			0.00				100.0000
Tail Slurry	Single Slurry 14.5 ppg	14.5000	1.1861	5.18	1,263.00	18,884.00	3,747	4,444.0000	791.4000
Displacement 1	Inhibited Water	8.3400			19,201.00			0.0000	20.0000
Displacement Final	Treated Water	8.3400			0.00			0.0000	425.9000

Fluid Type	Fluid Name	Component	Concentration	UOM
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# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	6/21/2018
Job End Date:	7/12/2018
State:	West Virginia
County:	Monongalia
API Number:	47-061-01769-00-00
Operator Name:	Northeast Natural Energy LLC
Well Name and Number:	Jenkins 18H
Latitude:	39.70920000
Longitude:	-80.13940000
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	7,818
Total Base Water Volume (gal):	22,113,114
Total Base Non Water Volume:	0



## Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	Company 1	Carrier/Base Fluid	Water	7732-18-5	100.00000	87.87831	None
Sand (Proppant)	Producers Service Corp	Proppant	Crystalline Silica (quartz)	14808-60-7	100.00000	11.57967	None
IC Acid (7.5%)	Producers Service Corp	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.07067	None
STIMLUBE HBVB	Producers Service Corp	Friction Reducer	Petroleum Distallates	64742-47-8	30.00000	0.01854	None
			Ammonium Acetate	631-61-8	10.00000	0.00618	None
SCAL16486A	Nalco-Champion	Scale Inhibitor	Ethylene Glycol	107-21-1	30.00000	0.00167	None
			Amine Triphosphate	Proprietary	30.00000	0.00167	None
BIOC11219A	Nalco-Champion	Biocide	Methanol	67-56-1	60.00000	0.00157	None
			Benzyl-(C12-C16 Alkyl)-Dimethyl-Ammonium Chloride	68424-85-1	30.00000	0.00079	None
			Glutaraldehyde	111-30-8	10.00000	0.00026	None

PROHIB II	Producers Service Corp	Inhibitor					
			Acetic Acid	64-19-7	90.00000	0.00079	None
			Methanol	67-56-1	10.00000	0.00009	None
			2-Ethylhexanol	104-76-7	10.00000	0.00009	None
			Cocamide Diethanolamine	68603-42-9	5.00000	0.00004	None
			Diethanolamine	111-42-2	1.00000	0.00001	None
Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.							
Other Chemical(s)	Listed Above	See Trade Name(s) List					
			Ammonium Acetate	631-61-8	10.00000	0.00618	
			Ethylene Glycol	107-21-1	30.00000	0.00167	
			Benzyl-(C12-C16 Alkyl)-Dimethyl-Ammonium Chloride	68424-85-1	30.00000	0.00079	
			Glutaraldehyde	111-30-8	10.00000	0.00026	
			Methanol	67-56-1	10.00000	0.00009	
			2-Ethylhexanol	104-76-7	10.00000	0.00009	
			Cocamide Diethanolamine	68603-42-9	5.00000	0.00004	
			Diethanolamine	111-42-2	1.00000	0.00001	

\* Total Water Volume sources may include fresh water, produced water, and/or recycled water

\*\* Information is based on the maximum potential for concentration and thus the total may be over 100%

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided.

Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

05/03/2019

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS  
OFFICE OF OIL & GAS  
601 5TH STREET  
CHARLESTON, WV 25304  
Well Type:  Oil  Waste Disposal  Production  Deep  
 Gas  Liquid Injection  Storage  Shallow

WATERSHED: DUNKARD CREEK  
COUNTY/DISTRICT: MONONGALIA / CLAY  
WELL NO. 188  
SURFACE OWNER: LOIS A. JENKINS IRREVOCABLE TRUST  
OIL & GAS ROYALTY OWNER: LOIS A. JENKINS IRREVOCABLE TRUST, ET AL  
LEASE NUMBERS: \_\_\_\_\_

DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE   
PLUG OFF FORMATION  PERFORATE NEW FORMATION  PLUG & ABANDON   
CLEAN OUT & REPLUG  OTHER CHANGE  (SPECIFY): \_\_\_\_\_

TARGET FORMATION: MARCELLUS  
WELL OPERATOR: NORTHEAST NATURAL ENERGY LLC  
ADDRESS: 707 VIRGINIA STREET EAST, SUITE 1200  
CITY: CHARLESTON STATE: WV ZIP CODE: 25301

ESTIMATED DEPTH: TVD: 7,904' TMD: 20,126'  
DESIGNATED AGENT: JOHN ADAMS  
ADDRESS: 707 VIRGINIA STREET EAST, SUITE 1200  
CITY: CHARLESTON STATE: WV ZIP CODE: 25301

DATE: FEBRUARY 13, 2019  
OPERATOR'S WELL #: JENKINS NO. 188  
APL WELL #: 47 STATE COUNTY PERMIT  
61

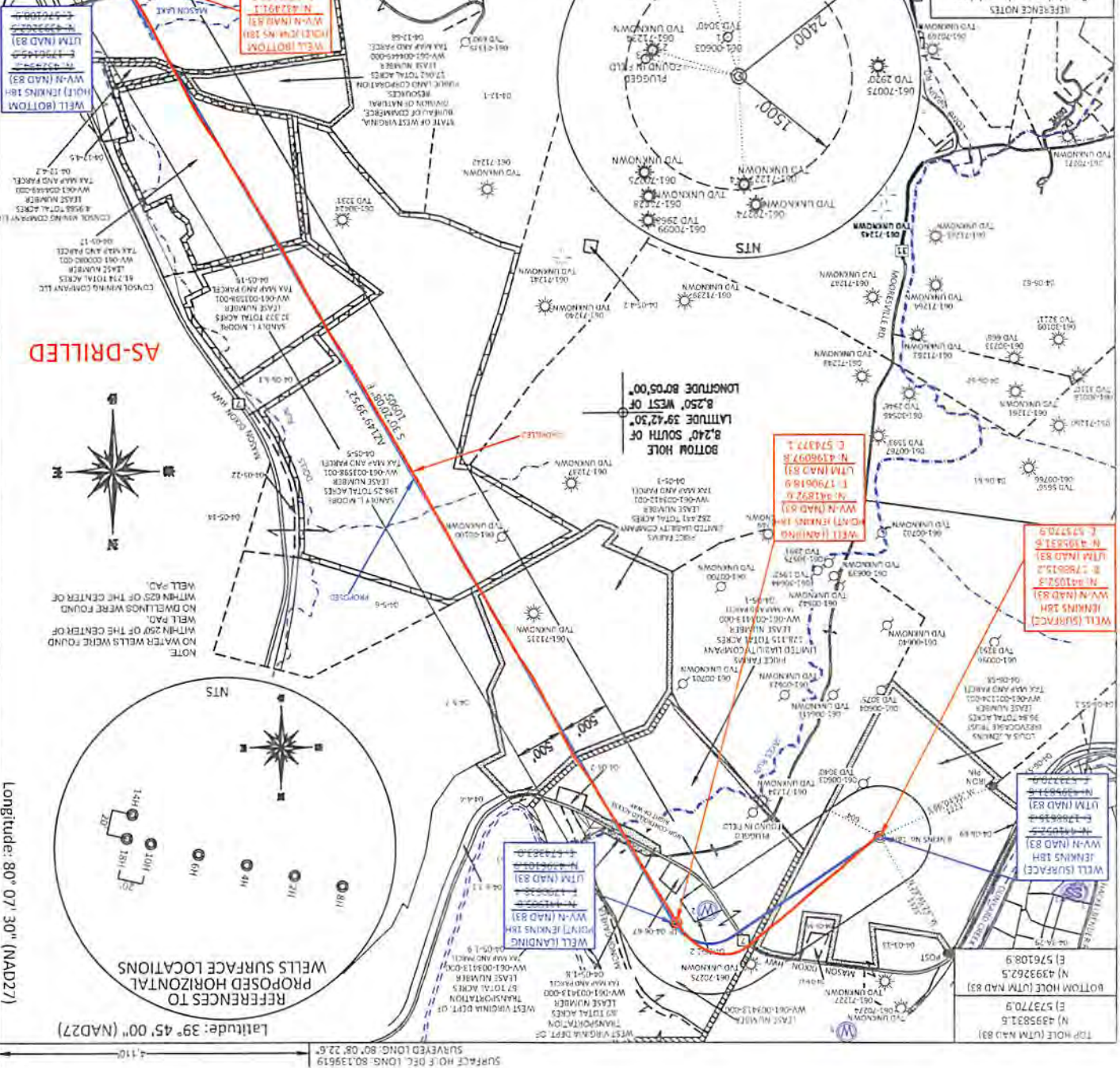
FILE #: NNE16  
DRAWING #: 2737  
SCALE: PLAN 1" = 1500'  
TICK 1" = 2000'

MINIMUM DEGREE OF ACCURACY: 1/200  
PROVEN SOURCE SUBMETER MAPPING GRADE GPS

OF ELEVATION: \_\_\_\_\_  
L.L.S. #2124 : Ernest J. Benchek III

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.

Signed: \_\_\_\_\_  
L.L.S. #2124 : Ernest J. Benchek III

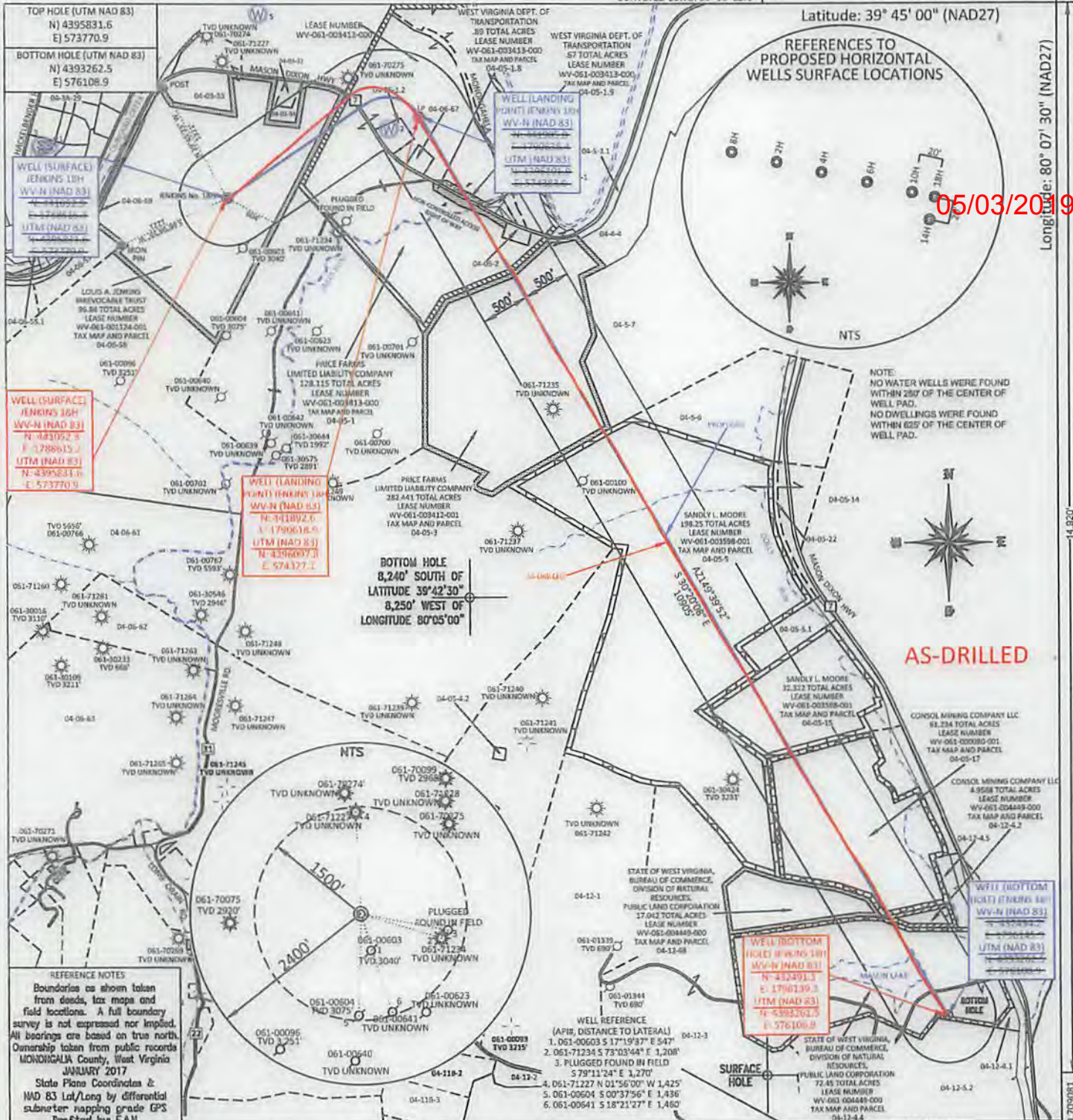


SURFACE HOLE DEC. LONG: 80.139619  
SURVEYED LONG: 80° 08' 22.6"

4.110"

Latitude: 39° 45' 00" (NAD27)

Longitude: 80° 07' 30" (NAD27)



05/03/2019

NOTE:  
NO WATER WELLS WERE FOUND WITHIN 200' OF THE CENTER OF WELL PAD.  
NO DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF WELL PAD.



AS-DRILLED

FILE #: NNE16  
DRAWING #: 2737  
SCALE: 1" = 1500'  
TICK: 1" = 2000'  
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.  
Signed: *[Signature]*  
L.L.S. #2124 : Ernest J. Benchek III



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS WYDEP  
OFFICE OF OIL & GAS  
601 57TH STREET  
CHARLESTON, WV 25304

Well Type:  Oil  Waste Diposal  Production  Deep  
 Gas  Liquid Injection  Storage  Shallow

WATERSHED: DUNKARD CREEK  
COUNTY/DISTRICT: MONONGALIA / CLAY  
SURFACE OWNER: LOIS A. JENKINS IRREVOCABLE TRUST  
OIL & GAS ROYALTY OWNER: LOIS A. JENKINS IRREVOCABLE TRUST, ET AL  
LEASE NUMBERS:

DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE   
PLUG OFF FORMATION  PERFORATE NEW FORMATION  PLUG & ABANDON   
CLEAN OUT & REPLUG  OTHER CHANGE  (SPECIFY):

TARGET FORMATION: MARCELLUS  
ESTIMATED DEPTH: TVD: 7,904' TMD: 20,126'  
WELL OPERATOR: NORTHEAST NATURAL ENERGY LLC  
DESIGNATED AGENT: JOHN ADAMS  
ADDRESS: 707 VIRGINIA STREET EAST, SUITE 1200  
CITY: CHARLESTON STATE: WV ZIP CODE: 25301

DATE: FEBRUARY 13, 2019  
OPERATOR'S WELL #: JENKINS NO. 18H  
API WELL #: 47 61 01769  
STATE COUNTY PERMIT  
PROPOSED ELEVATION: 1,113.77'  
CURRENT ELEVATION: 1,128'  
QUADRANGLE: BLACKSVILLE  
ACREAGE: 96.84 +/-  
ACREAGE: 895.213 +/-

SURFACE HOLE DEC. LAT: 39.75081 SURVEYED LAT: 39° 47' 32.7"

CITY: CHARGESTON STATE: MD ZIP CODE: 21730  
 ADDRESS: 303 LIBERTY STREET EAST SUITE 1300  
 WELL OPERATOR: NORTHWEST NATURAL ENERGY LLC  
 TARGET FORMATION: MARCELLUS

CITY: CHARGESTON STATE: MD ZIP CODE: 21730  
 ADDRESS: 303 LIBERTY STREET EAST SUITE 1300  
 DESIGNATED AGENT: JOHN ADAMS  
 ESTIMATED DEPTH: LWD: 1,804, LMD: 20,136,

STEAM OUT & BEGINS  OTHER CHANGE  (SPECIFY):  
 BEGINS OFF FORMATION  BEFORE/ATE NEW FORMATION  BEGINS & ABANDON   
 DRIFT  CORRECT  DRIFT DEEPER  REDRILL  FRACTURE OR STIMULATE

LEASE NUMBERS:  
 OIL & GAS BOGALTY OWNER: TOIS A TENKINS IBBELSCYBGE TRUST ET AL  
 SURFACE OWNER: TOIS A TENKINS IBBELSCYBGE TRUST  
 COUNTY/DISTRICT: MONTGOMERY \ CIVIL

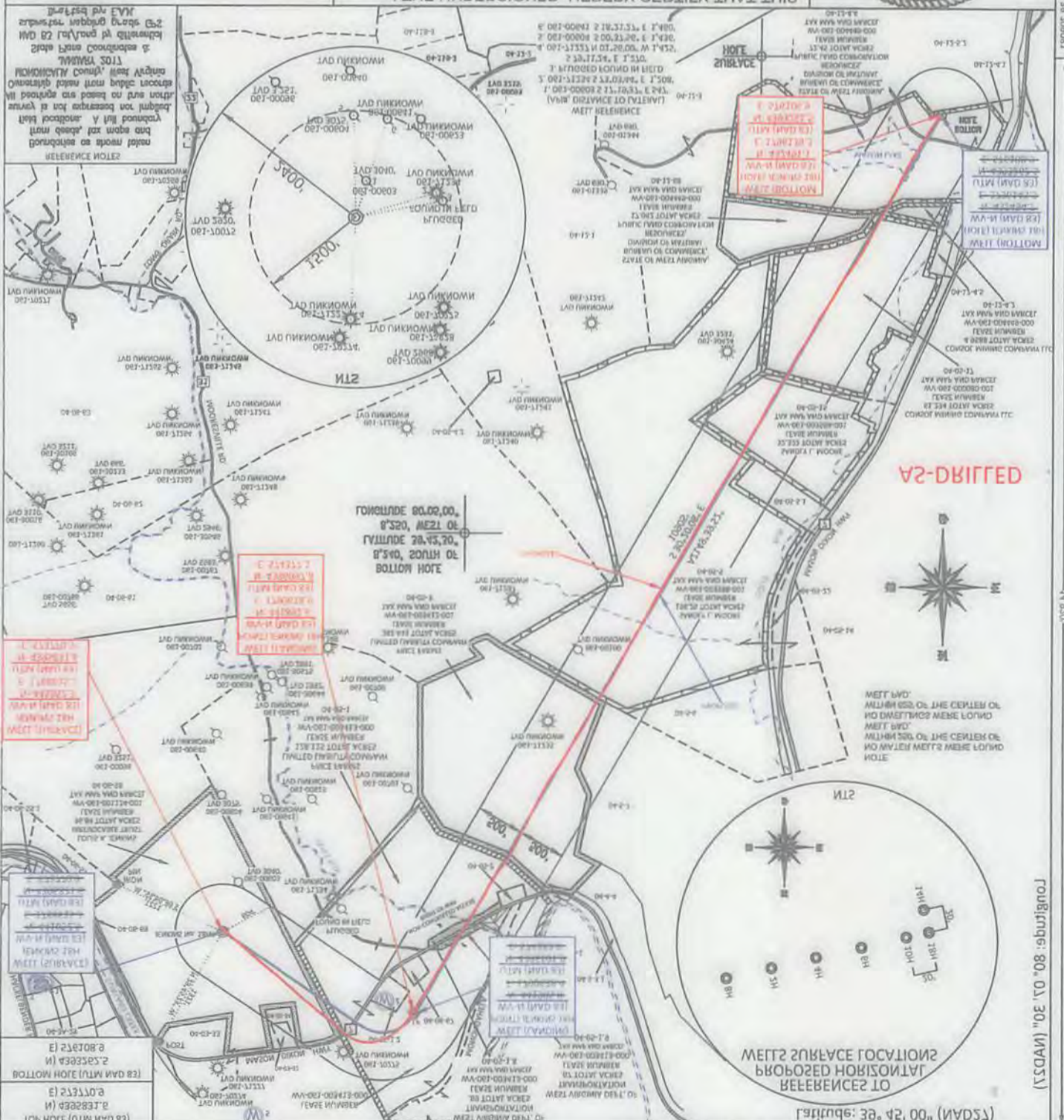
ACREAGE: 882.313 +  
 ACREAGE: 88.84 + -  
 05/03/2019  
 QUADRANGLE: BRACKSALGTE

WATERBODIED: DUKKARD CREEK  
 Gas  Fluid Injection  Storage  Shallow  
 Well Type:  Oil  Waste Disposal  Production  Deep  
 CHARGESTON, MD 21730  
 801 21TH STREET  
 OFFICE OF OIL & GAS  
 MADEP  
 UNITED STATES GEOGRAPHIC MAPS  
 (+) DENOTES LOCATION OF WELL ON

ELEVATION: 1,138,  
 SURFENT ELEVATION: 1,113.33,  
 PROPOSED STATE COUNTY PERMIT  
 WPI WELL #: 14 81 10  
 OPERATOR, 2 WELL #: TENKINS NO. 18H  
 DATE: FEBRUARY 13, 2018

OF ELEVATION: GRADE CBS  
 PROVEN SOURCE SUBMETER MAPPING  
 OF ACCURACY: 1/500  
 MINIMUM DEGREE  
 SCALE: HCK: 1, = 3000,  
 HVA: 1, = 1200,  
 DRAWING #: 5331  
 FIGE #: NINE1E

FIG. # 5154 : EMBERT J. BEUSCHER III  
 signed: *[Signature]*  
 THE DEPARTMENT OF ENVIRONMENTAL PROTECTION,  
 LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY  
 BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY  
 STATUTE IS CORRECT TO THE BEST OF MY KNOWLEDGE AND  
 I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS



REVISED PLAN: 05-13-2018

1:1250

T (SCALE) 80.00' 30.00" (NAD83)

SURFACE NOTE DEC: 80.00, 33.8'