

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

API 47 - 061 - 01720 County Monongalia District Clay  
Quad Blacksville Pad Name Jenkins Field/Pool Name \_\_\_\_\_  
Farm name Lois A. Jenkins Irrevocable Trust Well Number Jenkins 8H  
Operator (as registered with the OOG) Northeast Natural Energy LLC  
Address 707 Virginia Street E., Suite 1200 City Charleston State WV Zip 25301

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4395842.7 Easting 573717.5  
Landing Point of Curve Northing 4395480.2 Easting 573426.0  
Bottom Hole Northing 4393092.8 Easting 574878.5

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-I-X 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 05/18/2017 Date drilling commenced 06/21/2017 Date drilling ceased 01/22/2018  
Date completion activities began 5/5/2018 Date completion activities ceased 5/14/2018  
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

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

Reviewed

Reviewed by:  
*MJK 5/28/2019*

WR-35  
Rev. 8/23/13

API 47-061 - 01720 Farm name Lois A. Jenkins Irrevocable Trust Well number Jenkins 8H

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/R	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	30"	24"	40'	N	94.71	N/A	Y, Grouted In
Surface	17-1/2"	13-3/8"	1,098'	N	54.5	N/A	Y
Coal							
Intermediate 1	12-1/4"	9-5/8"	2,244'	N	40	N/A	Y, 25 bbl
Intermediate 2							
Intermediate 3							
Production	8-3/4"	5-1/2"	17,796'	N	20	N/A	N, Est 1,500'
Tubing	N/A	2-7/8"	N/A	N	6.5	N/A	N/A
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 Grout	-	-	3 Yds	-	-	-
Surface	Class A + 2%	1,115	15.2	1.27	1217	CTS	8
Coal							
Intermediate 1	Class A + 1%	705	15.2	1.27	895	CTS	8
Intermediate 2							
Intermediate 3							
Production	50:50 Class A + Additives	3,611	14.5	1.1859	4,283	1,500'	48
Tubing							

Drillers TD (ft) 17,759' Loggers TD (ft) 17,729'

Deepest formation penetrated Marcellus Plug back to (ft) NA

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

Kick off depth (ft) 6,003'

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 \_\_\_\_\_

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WAS WELL COMPLETED OPEN HOLE?  Yes  No DETAILS \_\_\_\_\_

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WERE TRACERS USED  Yes  No TYPE OF TRACER(S) USED \_\_\_\_\_



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<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	
Marcellus	7860'	TVD 17816' MD

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump

SHUT-IN PRESSURE Surface 3419 psi Bottom Hole \_\_\_\_\_ psi DURATION OF TEST 24 hrs

OPEN FLOW Gas 1091 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		Please See Attachment <i>see Attached</i>

Please insert additional pages as applicable.

Drilling Contractor Patterson-UTI Drilling Company  
Address 207 Carlton Dr. City Eighty Four State PA Zip 15330

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

Cementing Company BJ Service  
Address 1036 E. Main St. City Bridgeport State WV Zip 26330

Stimulating Company Producers Service Corporation  
Address 109 Graham St. 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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Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

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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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05/31/2019

Stimulation Information Per Stage - Jenkins 8H									
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)	Amount Water
1	5/5/2018	79	8,835	0	5,832	300,740	413	7,480	7,893
2	5/5/2018	80	9,442	7,051	6,645	332,740	391	7,295	7,686
3	5/5/2018	79	9,418	7,127	6,264	350,740	385	7,941	8,326
4	5/4/2018	80	9,116	6,867	6,175	349,260	380	8,237	8,617
5	5/6/2018	80	9,053	6,772	5,872	352,280	375	8,148	8,523
6	5/2/2018	79	9,237	6,845	6,243	349,620	373	7,438	7,811
7	5/6/2018	78	9,153	7,232	6,055	349,760	370	7,498	7,868
8	5/7/2018	82	9,031	7,014	5,941	330,080	363	7,083	7,446
9	5/7/2018	80	9,145	5,420	5,965	353,560	363	8,374	8,737
10	5/7/2018	80	9,169	6,285	5,745	352,420	358	7,968	8,326
11	5/7/2018	84	9,449	6,745	5,787	351,520	355	7,424	7,779
12	5/7/2018	81	9,292	6,797		355,660	180	7,166	7,346
13	5/8/2018	80	9,042	6,200	5,830	350,160	350	6,661	7,011
14	5/8/2018	80	9,007	7,229	5,927	350,740	340	7,578	7,918
15	5/8/2018	78	8,894	7,004	5,931	354,440	331	7,285	7,616
16	5/9/2018	80	8,760	7,164	6,229	349,760	330	7,423	7,753
17	5/9/2018	80	9,081	6,573	6,062	350,310	327	6,200	6,527
18	5/9/2018	76	8,257	6,344	6,058	350,250	318	9,251	9,569
19	5/9/2018	80	9,069	7,054	5,955	353,840	316	7,472	7,788
20	5/10/2018	79	9,029	7,081	6,235	349,560	311	7,366	7,677
21	5/10/2018	81	9,069	7,222	6,042	321,883	305	5,245	5,550
22	5/10/2018	81	9,079	6,585	5,859	350,177	302	5,759	6,061
23	5/10/2018	82	8,992	7,284	5,579	348,340	296	7,367	7,663
24	5/10/2018	85	9,214	7,214	6,523	349,800	292	7,336	7,628
25	5/11/2018	85	9,113	7,296	6,000	351,420	286	7,443	7,729
26	5/11/2018	80	8,933	6,456	6,322	348,820	289	5,512	5,801
27	5/11/2018	80	8,813	6,434	6,496	348,820	273	7,068	7,341
28	5/11/2018	84	9,164	7,069	6,256	353,000	276	7,405	7,681
29	5/11/2018	85	9,218	6,992	6,341	352,640	280	7,407	7,687
30	5/12/2018	85	9,164	7,400	6,192	349,440	265	7,186	7,451
31	5/12/2018	80	8,778	6,653	6,302	369,920	262	5,620	5,882
32	5/12/2018	80	8,707	7,034	5,754	349,680	258	5,806	6,064
33	5/12/2018	80	8,526	6,452	6,223	351,980	253	7,260	7,513
34	5/12/2018	86	9,095	6,989	6,448	350,820	249	7,314	7,563
35	5/12/2018	85	8,076	7,133	5,417	351,040	242	7,401	7,643
36	5/13/2018	84	8,866	7,240	6,324	351,400	244	7,335	7,579
37	5/13/2018	80	8,401	6,239	6,027	350,780	234	6,887	7,121
38	5/13/2018	80	8,435	6,402	5,557	354,080	230	6,679	6,909
39	5/13/2018	80	8,567	6,002	6,050	349,800	228	6,754	6,982
40	5/12/2018	85	8,634	7,160	6,176	350,480	219	7,209	7,428
41	5/13/2018	83	8,600	7,070	6,186	297,240	216	6,550	6,766
42	5/14/2018	83	8,536	7,117	6,322	351,000	212	7,168	7,380
43	5/14/2018	80	8,526	7,095	5,769	345,980	209	7,189	7,398
44	5/14/2018	79	8,527	7,194	6,360	348,780	203	7,375	7,578
45	5/14/2018	80	8,714	7,222	6,698	351,260	202	7,585	7,787
46	5/14/2018	85	8,649	7,601	5,726	357,680	194	7,324	7,518

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Perforation Record - Jenkins 8H				
Stage Number	Report Date	Cluster 5 Bottom TD	Cluster 1 Top TD	Total Shots
1	5/5/2018	17,650	0	0
2	5/5/2018	17,446	17,605	40
3	5/5/2018	17,245	17,404	40
4	5/4/2018	17,044	17,203	40
5	5/6/2018	16,843	17,002	40
6	5/2/2018	16,642	16,822	40
7	5/6/2018	16,441	16,600	40
8	5/7/2018	16,240	16,399	40
9	5/7/2018	16,039	16,198	40
10	5/7/2018	15,838	15,997	40
11	5/7/2018	15,637	15,796	40
12	5/7/2018	15,436	15,595	40
13	5/8/2018	15,235	15,394	40
14	5/8/2018	15,034	15,193	40
15	5/8/2018	14,833	14,992	40
16	5/9/2018	14,632	14,791	40
17	5/9/2018	14,431	14,590	40
18	5/9/2018	14,230	14,389	40
19	5/9/2018	14,029	14,188	40
20	5/10/2018	13,828	13,987	40
21	5/10/2018	13,627	13,786	40
22	5/10/2018	13,426	13,585	40
23	5/10/2018	13,225	13,384	40
24	5/10/2018	13,024	13,183	40
25	5/11/2018	12,823	12,982	40
26	5/11/2018	12,622	12,781	40
27	5/11/2018	12,421	12,580	40
28	5/11/2018	12,220	12,379	40
29	5/11/2018	12,019	12,178	40
30	5/12/2018	11,818	11,977	40
31	5/12/2018	11,617	11,776	40
32	5/12/2018	11,416	11,575	40
33	5/12/2018	11,215	11,374	40
34	5/12/2018	11,014	11,173	40
35	5/12/2018	10,813	10,972	40
36	5/13/2018	10,612	10,771	40
37	5/13/2018	10,411	10,570	40
38	5/13/2018	10,210	10,369	40
39	5/13/2018	10,009	10,168	40
40	5/12/2018	9,808	9,967	40
41	5/13/2018	9,607	9,766	40
42	5/14/2018	9,406	9,565	40
43	5/14/2018	9,205	9,364	40
44	5/14/2018	9,004	9,163	40
45	5/14/2018	8,803	8,962	40
46	5/14/2018	8,602	8,761	40

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API Permit #: 47-061-01720

Customer: Northeast

Lease and Well Name: Jenkins 8-H

A.F.E #: 100361-602



Job Type: 13 3-8

Cement Operator: Brian Fullem

Date Cemented: 6/23/2017

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)	(bb) Mix Water	(ft) Of Slurry	(bb) Of Slurry
958	Type 1 + 2% CaCl <sub>2</sub>		1.27	5.76	15.2	131	1217	217
Totals						131	1217	217

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	1,098				
Previous Casing		24		0	40			TVD (ft)	1,110
Tubing or Drillpipe								Displacement Depth (ft)	1,056
Open Hole		17 1/2		40	1,100			Displacement (bb)	162.0
Open Hole									

Pumping Returns		Cement Slurry Temperature Record (°F)					Fluid Information	
Spacer or Gel Sweep Return Seen At Surface	No	Cement	Reading 1	Reading 2	Reading 3	Average	Mix Water Temp (°F)	71
Cement Returns Seen at Surface	No	Blend 1	83	83	83	83	Displacement Fluid Type	Water
Amount of Cement Returns (BBL)		Blend 2					Displacement Fluid Temp (°F)	71
		Blend 3					Displacement Fluid Density (lb/gal)	8.3

Time	Rate (bpm)	Volume (bb)	Pressure (psi)	Event or Stage Description
14:30				Arrive on Location
				Hold Safety Meeting
				Spot Trucks, Rig in
3:11	5	190	500	Pump Recycled Water To Pump Casing Down
3:40				Shut Down Replace Hose
4:10	5	90	120	Pump Recycled Water To Pump Casing Down
4:30				Shut Down Add 1 Joint
5:00	7-8-5	230	150	Pump Recycled Water To Pump Casing Down
5:42				Shut Down Rack In Head
7:08	2	2	500	Test OPDS
7:10			2200	Pressure Test Lines
7:11	5	50	130	Pump Fresh Water
7:19	5	50	160	Pump Gel with Baroseal
7:27	5	10	130	Pump Fresh Water
7:30	5	216	230	Mix and Pump Lead Cement
8:12				Shut Down, Drop Plug
8:13	5.5-4	163.2	245	Displace Plug
8:47			245	Plug Lands, Shut Down
				Hold 5 Minutes, Release Pressure
9:02				Floats Hold, Shut in Manifold
				No Returns During Job
				Another Crew Bringing Cement To Grout
				Wash Up, Rack Out
9:30				Leave Location

Comments:

PH-6  
Hardness-200  
SG-1.001

Thank You for your Business

UWS Cement Operator Signature:

Brian Fullem

Customer Representative Signature:



API Permit #: 47-061-01720

Customer: Northeast Natural Energy

Lease and Well Name: Jenkins 8-H

A.F.E #: 100361-602



Job Type: 13 3/8"

Cement Operator: John Vance

Date Cemented: 6/24/2017

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)	(bb) Mix Water	(ft) Of Slurry	(bb) Of Slurry
157	Gas Block			1.29	5.54	15.7	21	203	36
						Totals	21	203	36

Wellbore Information								
	New/Used	Diameter (in)	Weight (lb/ft)	Top (ft)	Bottom (ft)	Collapse/Burst Pressures (psi)		Requested TOC (ft)
Casing	New	13 3/8	54.5	0	1,090			TVD (ft)
Previous Casing	New	24		0	40			
Tubing or Drillpipe								Displacement Depth (ft)
Open Hole		17 1/2		40	1,090			
Open Hole								Displacement (bb)

Pumping Returns		Cement Slurry Temperature Record (°F)					Fluid Information	
Spacer or Gel Sweep Return Seen At Surface		Cement	Reading 1	Reading 2	Reading 3	Average	Mix Water Temp (°F)	74
Cement Returns Seen at Surface	Yes	Blend 1	94			94	Displacement Fluid Type	
Amount of Cement Returns (BBL)		Blend 2					Displacement Fluid Temp (°F)	
		Blend 3					Displacement Fluid Density (lb/gal)	

Time	Rate (bpm)	Volume (bb)	Pressure (psi)	Event or Stage Description
12:30				AOL, spoke to company rep
12:40				Hold JSA, spot trucks, rack in
13:11	2	7	21	Mix and pump cement down backside
13:15				Shut down, WOC
14:14	2	7	28	Mix and pump cement down backside
14:18				Shut down, WOC
15:19	3	17	76	Mix and pump cement down backside
15:25				Shut down, cement came to surface and held
15:30				Hold JSA, clean truck, rack out
16:30				Leave location

Comments: Job completed per company rep request

Thank You for your Business

UWS Cement Operator Signature: John Vance

Customer Representative Signature: *[Signature]*

API Permit #: 47-061-01720

Customer: Northeast Natural Energy

Lease and Well Name: Jenkins 8-H

A.P.E. #: 100361-602



Job Type: 8 5/8"

Cement Operator: Frank Voyck

Date Cemented: 8/27/2017

Drilling Contractor: Highlands #14

Cement Slurry Information									
No. of Sacks	Cement Blend Composition			Yield (ft³/sk)	Mix Water (gal/sk)	Density (lb/gal)	(bb) Of Slurry	(ft) Of Slurry	(bb) Of Slurry
705	Type I + 2%CaCl2 + .25# Cellulose			1.27	6.78	16.2	97	895	169
						Totals	97	895	169

Wellbore Information									
	New/Used	Diameter (in)	Weight (lb/ft)	Top (ft)	Bottom (ft)	Collapse/Burst Pressures (psf)		Requested TOC (ft)	Surface
Casing	New	9 5/8	40.0	0'	2240'			TVD (ft)	2,240
Previous Casing	New	13 3/8	64.5	0'	1080'			Displacement Depth (ft)	2,189
Open Hole		12 1/4		1080'	2270'			Displacement (bb)	168.7

Pumping Returns			Cement Slurry Temperature Record (°F)					Fluid Information	
Spacer or Gal Sweep Return Seen At Surface	Yes	No	Cement Blend	Reading 1	Reading 2	Reading 3	Average	Mix Water Temp (°F)	72/PH 8
Cement Returns Seen at Surface	Yes	No	Blend 1	91	82	82	82	Displacement Fluid Type	Water
Amount of Cement Returns (BBL)	25	No	Blend 2					Displacement Fluid Temp (°F)	
		No	Blend 3					Displacement Fluid Density (lb/gal)	

Time	Rate (bpm)	Volume (bb)	Pressure (psf)	Event or Stage Description
0:00				Arrive on location, spoke to Company Man
0:10				Spot trucks, rack in
0:45				Walk on rig to finish running casing
6:00				Finish racking in
8:35				Hold Safety Meeting
9:00	0-3-0	3	0-500-0-2100-0	Wet lines, test OPSD, pressure test lines
9:16	0-5	180	0-118	Pump fresh water
	XXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXX	XX
9:48	5	25	118-132	Pump 600lb Bentonite gel
9:53	5	10	140	Pump fresh water
	XXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXX	XX
9:55	5-0	159	139-231-0	Mix and pump 705sbs Cement
10:30				Shut down, drop plug
10:31	0-5-4-3.5-0	168	0-117-1228	Displace plug w/ fresh water
11:05			1228-1738	Plug down, shut down, wait to check floats
11:10			1738-0	Floats hold, 1bb back
11:15				Clean up, rack out
12:00				Leave location

Comments:

Hole circulated @ 218bb pumped

Job done per Company Man request

Thank You for your Business

UWS Cement Operator Signature: Frank Voyck

Customer Representative Signature: Brian Chadwick

## Cementing Treatment



Start Date	1/20/2018	Well	Lois A Jenkins Irrevocable Trust 8H
End Date	1/21/2018	County	MONONGALIA
Client	NORTHEAST NATURAL ENERGY LLC	State/Province	WV
Client Field Rep	Jason Grim	API	47-061-01720
Service Supervisor	Michael Peck	Formation	
Field Ticket No.	FT-02938-H4X3T90202-97334	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	2,244.00	2,244.00	0.00	J-55	
Open Hole	8.50			17,796.00	7,921.00	10.00		
Casing	4.78	5.50	20.00	17,796.00	7,921.00		P-110	
Open Hole	8.75			6,000.00	6,000.00	10.00		

Shoe Length (ft): 45

## HARDWARE

Bottom Plug Used?	Yes	Tool Type	Float Collar
Bottom Plug Provided By	Non BJ	Tool Depth (ft)	17,796.00
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)	12,640.00
Top Plug Size	5.500	Max Casing Pressure - Operated (psi)	11,376.00
Centralizers Used	Yes	Pipe Movement	None
Centralizers Quantity		Job Pumped Through	Manifold
Centralizers Type	Bow	Top Connection Thread	Butt
Landing Collar Depth (ft)	17,751	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	No	10 sec SGS	
Circulation Time (min)		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)		Gas Units	
Mud Density Out (ppg)			
PV Mud In			
PV Mud Out			
YP Mud In			
YP Mud Out			

## TEMPERATURE

Ambient Temperature (°F)		Slurry Cement Temperature (°F)	56.00
Mix Water Temperature (°F)	50.00	Flow Line Temperature (°F)	

## BJ FLUID DETAILS

Fluid Type	Fluid Name	Density (ppg)	Yield (Cu Ft/sk)	H2O Req. (gals/sk)	Vol (sk)	Vol (Cu Ft)	Vol (bbls)
Spacer / Pre Flush / Flush	IntegraGuard RHEO 10 13.5 ppg	13.5000					100.0000
Tail Slurry	Single Slurry 14.5 ppg	14.5000	1.1859	5.18	3,611	4,283.0000	762.7000
Displacement 1	Inhibited Water	8.3400				0.0000	20.0000
Displacement Final	Treated Water	8.3400				0.0000	373.7000

Fluid Type	Fluid Name	Component	Concentration	UOM
Spacer / Pre Flush / Flush	IntegraGuard RHEO 10	WEIGHTING ADDITIVE,	276.0000	PPB

# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	5/15/2018
Job End Date:	5/31/2018
State:	West Virginia
County:	Monongalia
API Number:	47-061-01741-00-00
Operator Name:	Northeast Natural Energy LLC
Well Name and Number:	Jenkins 2H
Latitude:	39.70920000
Longitude:	-80.13990000
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	7,885
Total Base Water Volume (gal):	14,482,418
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	90.37895	None
Sand (Proppant)	Producers Service Corp	Proppant	Crystalline Silica (quartz)	14808-60-7	100.00000	9.19611	None
HC Acid (7.5%)	Producers Service Corp	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.05354	None
STIMLUBE HBVB	Producers Service Corp	Friction Reducer	Petroleum Distallates	64742-47-8	30.00000	0.01771	None
			Ammonium Acetate	631-61-8	10.00000	0.00590	None
SCAL16486A	Nalco-Champion	Scale Inhibitor	Amine Triphosphate	Proprietary	30.00000	0.00168	None
			Ethylene Glycol	107-21-1	30.00000	0.00168	None
BIOC11219A	Nalco-Champion	Biocide	Methanol	67-56-1	60.00000	0.00160	None
			Benzyl-(C12-C16 Alkyl)-Dimethyl-Ammonium Chloride	68424-85-1	30.00000	0.00080	None
			Glutaraldehyde	111-30-8	10.00000	0.00027	None

PROHIB II	Producers Service Corp	Inhibitor					
			Acetic Acid	64-19-7	90.00000	0.00060	None
			2-Ethylhexanol	104-76-7	10.00000	0.00007	None
			Methanol	67-56-1	10.00000	0.00007	None
			Cocamide Diethanolamine	68603-42-9	5.00000	0.00003	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	0.00590	
			Ethylene Glycol	107-21-1	30.00000	0.00168	
			Benzyl-(C12-C16 Alkyl)-Dimethyl-Ammonium Chloride	68424-85-1	30.00000	0.00080	
			Glutaraldehyde	111-30-8	10.00000	0.00027	
			Methanol	67-56-1	10.00000	0.00007	
			2-Ethylhexanol	104-76-7	10.00000	0.00007	
			Cocamide Diethanolamine	68603-42-9	5.00000	0.00003	
			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%

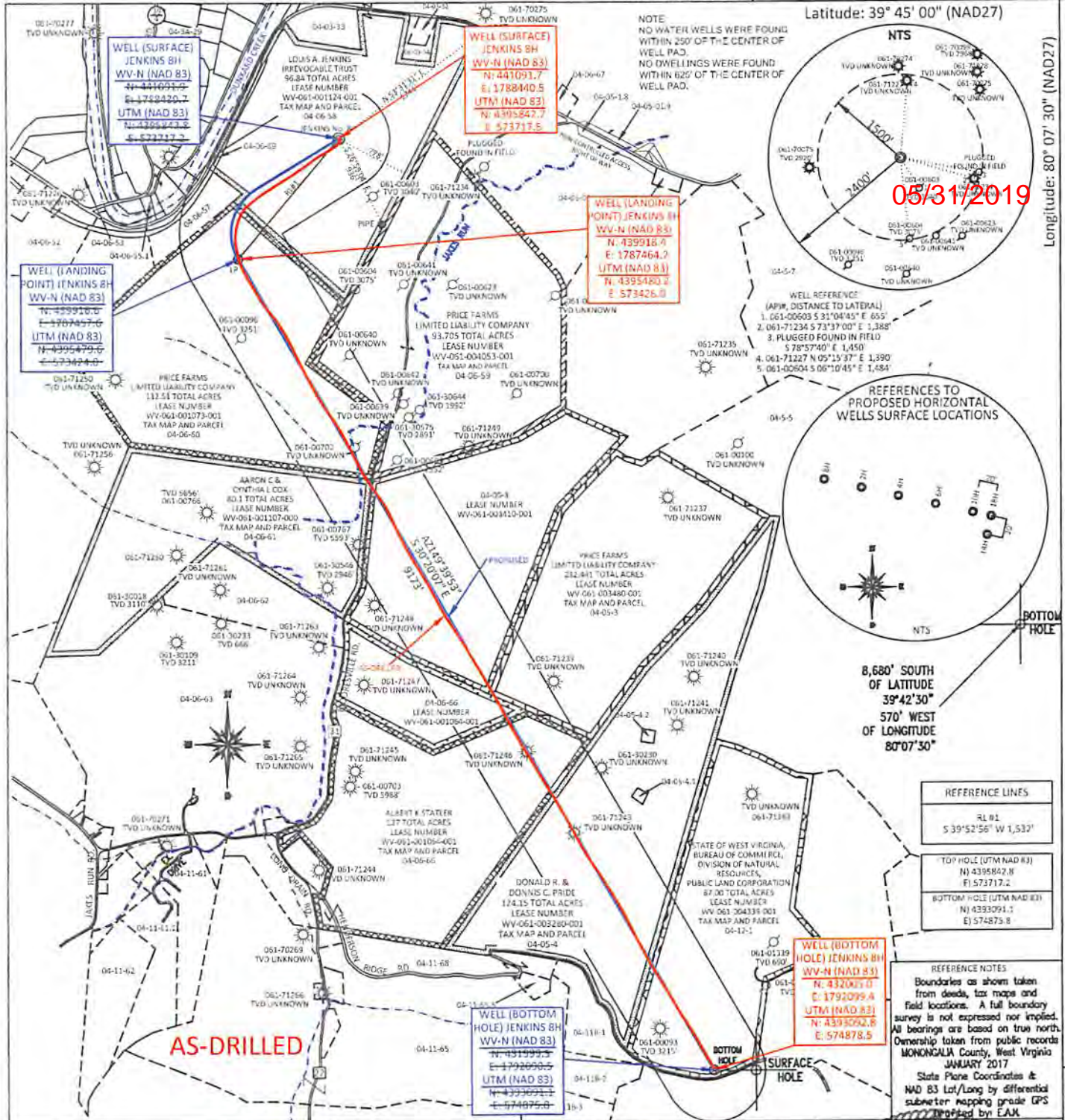
Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided.

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

SURFACE HOLE DEC. LONG: 80.140244 SURVEYED LONG: 80° 08' 24.9" 4,280'

Latitude: 39° 45' 00" (NAD27)

Longitude: 80° 07' 30" (NAD27)



FILE #: NNE16  
DRAWING #: 2728  
SCALE: PLAT: 1" = 1400'  
TRK: 1" = 2000'  
MINIMUM DEGREE OF ACCURACY: 1/200  
PROVEN SOURCE: 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

DATE: FEBRUARY 13, 2019  
OPERATOR'S WELL #: JENKINS NO. 8H  
API WELL #: 47 61  
STATE COUNTY PERMIT  
PROPOSED ELEVATION: 1,113.77'  
CURRENT ELEVATION: 1,128'  
QUADRANGLE: BLACKSVILLE  
ACREAGE: 96.84 +/-  
ACREAGE: 1,003.746 +/-

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS WYDEP  
OFFICE OF OIL & GAS  
601 57TH STREET  
CHARLESTON, WV 25304  
Well Type:  Oil  Waste Disposal  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  
WELL OPERATOR: NORTHEAST NATURAL ENERGY LLC  
ADDRESS: 707 VIRGINIA STREET EAST, SUITE 1200  
CITY: CHARLESTON STATE: WV ZIP CODE: 25301

ESTIMATED DEPTH: TVD: 7,880' TMD: 17,816'  
DESIGNATED AGENT: JOHN ADAMS  
ADDRESS: 707 VIRGINIA STREET EAST, SUITE 1200  
CITY: CHARLESTON STATE: WV ZIP CODE: 25301

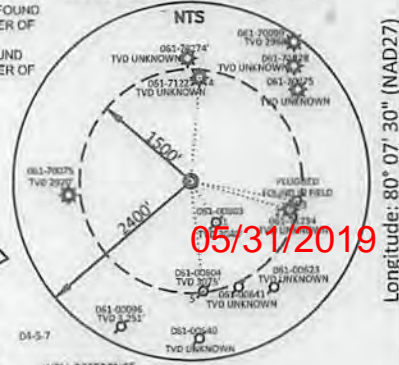
SURFACE HOLE DEC. LAT: 39.709186 SURVEYED LAT: 39° 42' 33.1"

SURFACE HOLE DEC. LONG: 80.140244  
 SURVEYED LONG: 80° 08' 24.9"

Latitude: 39° 45' 00" (NAD27)

Longitude: 80° 07' 30" (NAD27)

NOTE: NO WATER WELLS WERE FOUND WITHIN 250' OF THE CENTER OF WELL PAD. NO DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF WELL PAD.



05/31/2019

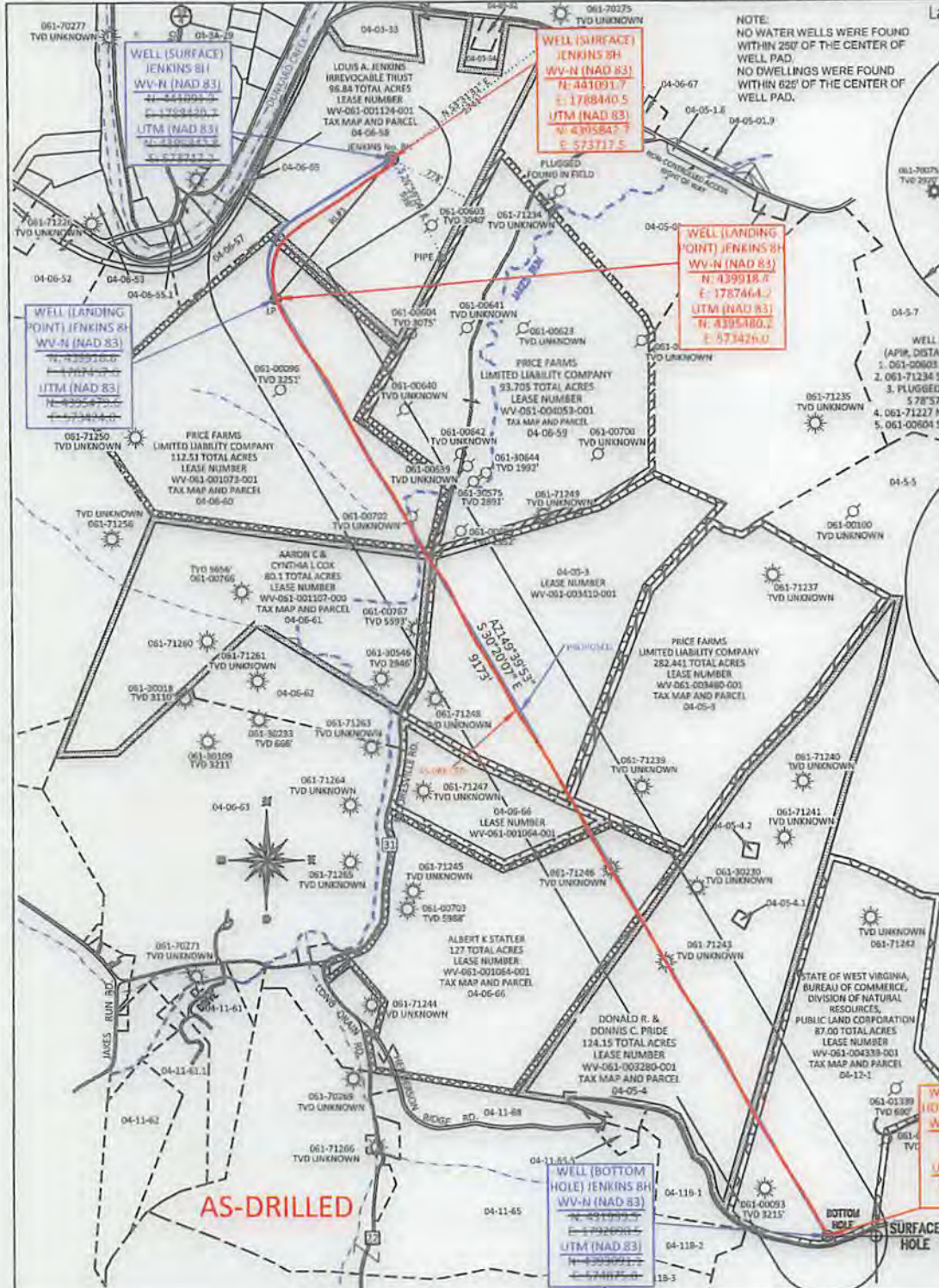
- WELL REFERENCE (APPR. DISTANCE TO LATERAL)
- 061-00603 S 31°04'43" E 655'
  - 061-71234 S 73°37'00" E 1,388'
  - PLUGGED FOUND IN FIELD S 78°57'40" E 1,450'
  - 061-71227 N 05°13'57" E 1,390'
  - 061-00604 S 06°10'45" E 1,484'

REFERENCES TO PROPOSED HORIZONTAL WELLS SURFACE LOCATIONS

8,680' SOUTH OF LATITUDE 39°42'30"  
 570' WEST OF LONGITUDE 80°07'30"

REFERENCE LINES	
RL #1	S 39°52'56" W 1,532'
TOP HOLE (UTM NAD 83)	N: 4395842.8 E: 573717.2
BOTTOM HOLE (UTM NAD 83)	N: 4393091.1 E: 574875.8

REFERENCE NOTES  
 Boundaries as shown taken from deeds, tax maps and field locations. A full boundary survey is not expressed nor implied. All bearings are based on true north. Ownership taken from public records MONONGALIA County, West Virginia JANUARY 2017  
 State Plane Coordinates & NAD 83 Lat/Long by differential submeter mapping grade GPS created by EAJ



AS-DRILLED

FILE #: NNE16  
 DRAWING #: 2728  
 SCALE: 1" = 1400'  
1/2" = 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 Disposal  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  
 WELL OPERATOR: NORTHEAST NATURAL ENERGY LLC  
 ADDRESS: 707 VIRGINIA STREET EAST, SUITE 1200  
 CITY: CHARLESTON STATE: WV ZIP CODE: 25301  
 DATE: FEBRUARY 13, 2019  
 OPERATOR'S WELL #: JENKINS NO. 8H  
 API WELL #: 47 61 01720  
 STATE COUNTY PERMIT  
 PROPOSED ELEVATION: 1,113.77'  
 CURRENT ELEVATION: 1,128'  
 QUADRANGLE: BLACKSVILLE  
 ACREAGE: 96.84 +/-  
 ACREAGE: 1,003.746 +/-  
 ESTIMATED DEPTH: TVD: 7,880' TMD: 17,816'  
 DESIGNATED AGENT: JOHN ADAMS  
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 CITY: CHARLESTON STATE: WV ZIP CODE: 25301

SURFACE HOLE DEC. LAT: 39.750186  
 SURVEYED LAT: 39° 42' 33.1"

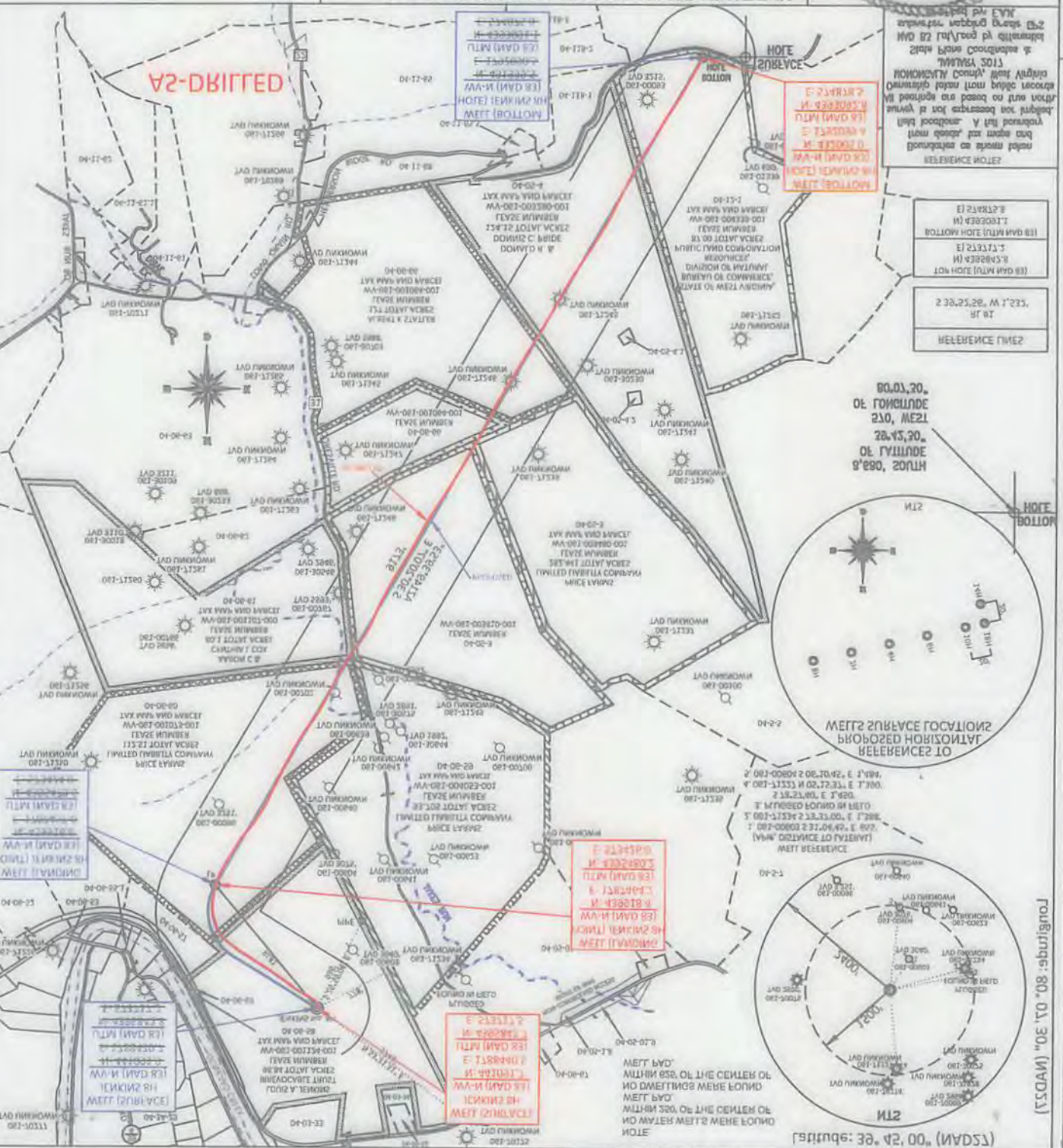


CITY: CHARLESTON STATE: WV ZIP CODE: 25301  
 ADDRESS: 203 VIRGINIA STREET EAST, SUITE 1300  
 WELL OPERATOR: NORTHEAST NATURAL ENERGY LLC  
 DESIGNATED AGEN: JOHN ADAMS  
 ESTIMATED DEPTH: LWD: 2'880, TWD: 12'816,  
 CREAM OIL & BEBUC  OTHER CHANCE  (SPECIFY):  
 BEBUC OIL FORMATION  BEBUCALIE MEM FORMATION  BEBUC & ABANDON   
 DRIFT  CONCRET  DRIFT DEEPEK  BEDDING  FRASURE OR STIMULATE

FEASE NUMBERS:  
 OIG & GAS BOYALTY OMIER: GOIS A TENKING IBBELASCYBE IBBUZI, ET AL  
 SURFACE OMIER: GOIS A TENKING IBBELASCYBE IBBUZI  
 COUNTY\DISTRICT: MONONGAHLA \ CLAY  
 WATERSHED: OUNIKARD CREEK  
 Gas  Fluid Injection  Storage  Shallow  
 Well Type:  Oil  Waste Disposal  Production  Deep  
 CHARLESTON, WV 25304  
 601 25TH STREET  
 OFFICE OF OIG & GAS  
 WYDEP  
 UNITED STATES TOPOGRAPHIC MAPS  
 (+) DENOTES LOCATION OF WELL ON  
 ACSEVAGE: 1'003  
 ACSEVAGE: 88.84  
 SURFACE ELEVATION: 1'158,  
 PROPOSED ELEVATION: 1'113.22,  
 STATE COUNTY PERMIT  
 ARI WELL #: 47 81 0130  
 OPERATOR'S WELL #: TENKING NO. 8H  
 DATE: FEBRUARY 13, 2018

OF ELEVATION: GRADE CB2  
 PROVEN SOURCE SURVEYER MAPPING  
 OF ACCURACY: 1/500  
 MINIMUM DEGREE  
 SCALE: HSC: 1, = 3000,  
 HVA: 1, = 1400,  
 DRAWING #: 2258  
 FIGE #: NINE 8

FIG. # 2154: Ernest J. Bencher III  
 signed:  
 THE DEPARTMENT OF ENVIRONMENTAL PROTECTION,  
 LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY  
 BEBUC AND SHOWS ALL THE INFORMATION REQUIRED BY  
 LAW IS CORRECT TO THE BEST OF MY KNOWLEDGE AND  
 I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS



20180213 08:00:00

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