

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

API 47 - 061 - 01803 County Monongalia District Clay
Quad Osage, WV Pad Name Boggess Field/Pool Name _____
Farm name Blake R. & H. Preston Boggess Well Number 9H
Operator (as registered with the OOG) Northeast Natural Energy LLC
Address 707 Virginia St. 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 4391550.6 Easting 577778.2
Landing Point of Curve Northing 4391905.5 Easting 578176.7
Bottom Hole Northing 4394763.0 Easting 576447.5

Elevation (ft) 1,266' 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 12/18/2018 Date drilling commenced 1/21/19 Date drilling ceased 6/7/19
Date completion activities began 8/6/19 Date completion activities ceased 8/30/19
Verbal plugging (Y/N) N Date permission granted NA Granted by NA

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

Freshwater depth(s) ft 320', 1010', 1125' Open mine(s) (Y/N) depths N
Salt water depth(s) ft 1550', 1900' Void(s) encountered (Y/N) depths N
Coal depth(s) ft 348', 620', 680', 1010' Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Reviewed by:

API 47-061 - 01803 Farm name Blake R. & H. Preston Boggess 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	30	24	40	N	NA	NA	Y, CTS
Surface	17.5	13 3/8	1,187'	N	54.5	NA	Y, 2 bbl
Coal							
Intermediate 1	12.25	9 5/8	2,500	N	40	NA	Y, 1bbl
Intermediate 2							
Intermediate 3							
Production	8.5	5.5	20,043	N	20	NA	N
Tubing							
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	4500 psi ready mix	35		.75	27	CTS	48
Surface	Class A	1,218	15.6	1.19	1,459	CTS	8+
Coal							
Intermediate 1	Class A	808	15.2	1.26	1,019	CTS	8+
Intermediate 2							
Intermediate 3							
Production	Class A	2892	14.5	1.18	4508	1,207	8+
Tubing							

Drillers TD (ft) 20,043' Loggers TD (ft) 20,013'
 Deepest formation penetrated Marcellus Plug back to (ft) NA
 Plug back procedure NA

Kick off depth (ft) 5,967'

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 _____

Boguess 9H Stimulation Information

Stage Number	Report Date	ISIP (psi)	Breakdown Pressure (psi)	Avg Treating Pressure (psi)	Avg Treating Rate (BPM)	Pad Volume (bbls)	Total Clean Fluid (Bbls)	Total Proppant Amount (lbs)	Flush Volume (bbls)
1	8/21/19	6,285	6,350	7,942	79	587	6,794	300,180	445
2	8/6/19	5,661	7,093	7,938	79	556	7,845	331,573	437
3	8/6/19	5,453	7,509	9,016	77	300	7,828	391,980	442
4	8/6/19	5,491	7,376	8,814	82	435	8,086	400,000	434
5	8/7/19	5,767	7,011	9,005	85	425	8,071	400,180	428
6	8/7/19	5,674	6,816	8,575	81	125	8,326	399,440	420
7	8/8/19	5,848	7,070	8,542	83	422	7,525	372,480	422
8	8/9/19	5,239	6,865	8,895	84	417	8,048	399,720	418
9	8/9/19	6,011	6,343	9,281	81	365	8,366	402,140	414
10	8/10/19	6,090	6,722	9,019	85	350	8,313	399,980	405
11	8/10/19	5,790	6,834	8,780	80	140	7,838	400,760	402
12	8/10/19	6,348	7,455	8,969	82	489	8,221	403,540	402
13	8/11/19	6,394	8,171	8,839	83	463	8,239	400,260	395
14	8/11/19	5,749	6,975	8,750	80	69	7,411	401,060	425
15	8/11/19	5,631	6,466	8,675	81	438	7,927	401,140	385
16	8/12/19	5,250	6,786	8,892	80	350	10,253	398,400	300
17	8/12/19	5,538	7,085	8,486	80	115	7,858	403,260	376
18	8/12/19	5,942	7,665	8,767	81	378	7,797	403,660	369
19	8/13/19	5,338	6,329	8,718	83	448	8,026	400,440	365
20	8/13/19	5,099	7,587	8,444	80	95	7,913	403,280	360
21	8/15/19	6,016	7,181	8,524	80	140	6,166	366,840	404
22	8/15/19	5,041	5,904	8,378	80	43	7,441	402,960	357
23	8/16/19	7,059	6,006	8,385	82	518	8,516	400,620	348
24	8/16/19	6,007	5,738	8,206	80	55	8,070	408,780	353
25	8/16/19	5,941	5,720	8,472	79	414	9,507	401,740	335
26	8/17/19	6,410	5,950	8,177	80	454	8,322	399,540	336
27	8/17/19	6,659	5,939	8,310	78	69	7,603	400,160	335
28	8/17/19	6,678	6,254	8,420	79	535	9,470	404,720	327
29	8/18/19	5,862	6,136	8,351	81	75	7,906	398,620	324
30	8/18/19	5,873	5,735	8,102	79	604	8,053	400,260	317
31	8/19/19	5,954	5,983	8,077	81	412	8,486	400,460	316
32	8/19/19	5,710	5,997	7,986	80	51	7,788	400,560	306
33	8/19/19	5,825	6,079	8,058	80	50	7,251	401,120	303
34	8/20/19	5,059	6,271	8,430	80	51	7,586	402,440	297
35	8/20/19	5,928	60,406	8,320	81	101	7,987	400,260	297
36	8/21/19	5,678	6,177	8,231	79	31	7,741	399,060	288
37	8/21/19	5,306	6,140	8,232	81	50	7,206	407,460	289
38	8/21/19	5,868	5,997	8,469	76	29	8,734	399,940	278
39	8/22/19	5,642	6,081	8,487	78	42	7,981	400,400	280
40	8/22/19	5,384	6,565	8,184	79	35	7,639	400,060	273
41	8/23/19	5,545	6,188	8,070	80	35	7,831	405,600	271
42	8/23/19	5,951	6,299	8,116	81	74	7,277	403,940	267
43	8/23/19	6,466	6,170	8,282	80	62	7,854	404,320	263
44	8/24/19	5,090	6,056	8,145	79	36	7,069	401,040	255
45	8/24/19	6,359	6,086	8,110	79	32	7,782	404,820	248
46	8/24/19	5,448	6,136	8,029	80	30	7,468	403,020	246

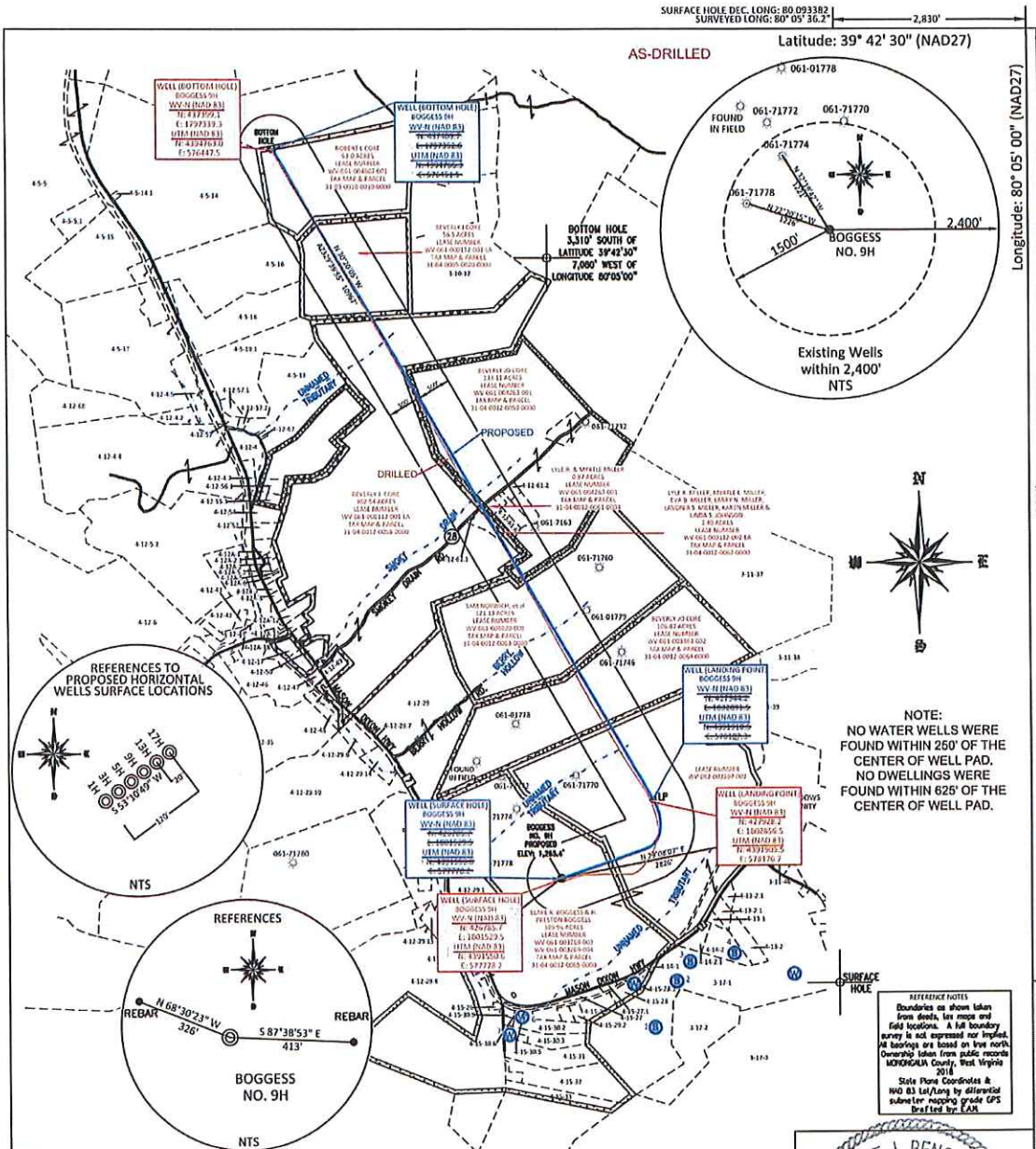
47	8/24/19	5,158	6,153	8,182	78	45	7,601	404,200	242
48	8/25/19	5,794	6,244	7,966	80	74	7,516	404,060	238
49	8/24/19	5,539	6,239	7,915	80	34	7,492	407,860	239
50	8/26/19	5,553	6,127	8,018	80	40	7,338	402,700	232
51	8/26/19	6,054	6,058	7,751	80	76	7,397	400,520	224
52	8/26/19	5,530	5,805	7,713	81	20	7,414	399,060	218
53	8/27/19	5,334	5,908	7,545	80	30	7,210	405,760	214
54	8/27/19	5,880	6,152	7,733	81	132	7,585	404,740	217
55	8/27/19	5,851	6,365	7,564	81	73	7,495	409,160	208
56	8/27/19	5,720	7,064	7,769	80	49	7,423	402,840	202
57	8/28/19	5,257	6,246	7,290	80	86	7,461	403,220	198

Bogges 9H Perforation Information

Stage Number	Report Date	Cluster 5 Bottom TD	Cluster 1 Top TD	Total Shots
1	8/21/19	19,886	0	40
2	8/6/19	19,686	19,842	40
3	8/6/19	19,487	19,644	40
4	8/6/19	19,289	19,446	40
5	8/7/19	19,091	19,247	40
6	8/7/19	18,892	19,049	40
7	8/8/19	18,694	18,851	40
8	8/9/19	18,496	18,653	40
9	8/9/19	18,298	18,454	40
10	8/10/19	18,099	18,256	40
11	8/10/19	17,901	18,058	40
12	8/10/19	17,703	17,857	40
13	8/11/19	17,505	17,661	40
14	8/11/19	17,306	17,463	40
15	8/11/19	17,108	17,265	40
16	8/12/19	16,910	17,066	40
17	8/12/19	16,711	16,868	40
18	8/12/19	16,511	16,670	40
19	8/13/19	16,315	16,471	40
20	8/13/19	16,117	16,273	40
21	8/15/19	15,918	16,075	40
22	8/15/19	15,720	15,877	40
23	8/16/19	15,522	15,678	40
24	8/16/19	15,321	15,480	40
25	8/16/19	15,125	15,282	40
26	8/17/19	14,927	15,083	40
27	8/17/19	14,729	14,885	40
28	8/17/19	14,530	14,687	40
29	8/18/19	14,332	14,489	40
30	8/18/19	14,134	14,290	40
31	8/19/19	13,935	14,092	40
32	8/19/19	13,737	13,894	40
33	8/19/19	13,539	13,696	40
34	8/20/19	13,341	13,497	40
35	8/20/19	13,142	13,299	40
36	8/21/19	12,944	13,101	40
37	8/21/19	12,746	12,902	40
38	8/21/19	12,550	12,704	40
39	8/22/19	12,349	12,506	40
40	8/22/19	12,151	12,308	40
41	8/23/19	11,953	12,109	40
42	8/23/19	11,754	11,911	40
43	8/23/19	11,556	11,713	40
44	8/24/19	11,358	11,514	40
45	8/24/19	11,160	11,316	40
46	8/24/19	10,961	11,118	40
47	8/24/19	10,763	10,920	40
48	8/25/19	10,565	10,721	40
49	8/24/19	10,366	10,523	40
50	8/26/19	10,168	10,325	40
51	8/26/19	9,970	10,126	40
52	8/26/19	9,772	9,928	40
53	8/27/19	9,573	9,730	40
54	8/27/19	9,375	9,532	40
55	8/27/19	9,177	9,333	40
56	8/27/19	8,978	9,135	40
57	8/28/19	8,780	8,937	40

Bogges Pad Lithology

Lithology/Formation	Top Depth in FT TVD	Bottom Depth in FT TVD	Describe rock type and record quantity and type of fluid (freshwater, brine, oil, gas, H2S, etc)
Shale/Sand	0	270	Shale/Sand
Sand/silt	270	320	Sand/silt
sand/shale	320	348	sand/shale
coal	348	352	coal
Sand/silt	352	380	Sand/silt
sandstone/limestone	380	500	sandstone/limestone
Sand/silt	500	620	Sand/silt
coal	620	625	coal
Siltstone/Limestone	625	680	Siltstone/Limestone
coal	680	684	coal
Limestone/Siltstone	684	770	Limestone/Siltstone
Siltstone/Shale	770	920	Siltstone/Shale
Sandstone	920	1010	Sandstone
coal	1010	1017	coal
sandstone/siltstone	1017	1280	sandstone/siltstone
sandstone/siltstone	1280	1850	sandstone/siltstone
Red Shale/Siltstone	1850	1970	Red Shale/Siltstone
Limestone	1970	2030	Limestone
Big Injun	2030	2150	Big Injun
sandstone/siltstone	2150	2210	sandstone/siltstone
Gantz	2210	2240	Gantz
siltstone/shale	2240	2510	siltstone/shale
Upper Devonian undifferentiated	2510	6350	Upper Devonian undifferentiated
siltstone/shale	6350	7008	siltstone/shale
Middlesex	7008	7310	Middlesex
Burkett	7310	7640	Burkett
Geneseo	7640	7692	Geneseo
Tully	7692	7745	Tully
Hamilton	7745	7870	Hamilton
Marcellus	7870	TD	Marcellus



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.

REFERENCE NOTES:
Boundaries on shown taken from deeds, lot maps and field locations. A full boundary survey is not required nor implied. All bearings are based on true north. Ownership taken from public records MONROGALIA County, West Virginia 2011.
State Plane Coordinates & NAD 83 Lat/Long by differential submeter mapping grade GPS that used by L&A.

FILE #: NEE14
DRAWING #: 2865
SCALE: 1" = 2000'
TICK MARK: 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
WVDEP
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: BLAKE R. & PRESTON H. BOGCESS
OIL & GAS ROYALTY OWNER: BLAKE R. & PRESTON H. BOGCESS 'et al'
LEASE NUMBERS:

DATE: JANUARY 13, 2020
OPERATOR'S WELL #: BOGCESS NO. 9H
API WELL #: 47 61 47-061-01691
STATE COUNTY PERMIT

AS-BUILT
ELEVATION: 1,266.2'
QUADRANGLE: OSAGE, WV
ACREAGE: 389.96 +/-
ACREAGE: 1176.38 +/-

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

AS-DRILLED DEPTH: TVD: 8,025' TMD: 20,043'
DESIGNATED AGENT: JOHN ADAMS
ADDRESS: 707 VIRGINIA STREET EAST, SUITE 1200
CITY: CHARLESTON STATE: WV ZIP CODE: 25301

SURFACE HOLE DEC. LONG: 80 093382 SURVEYED LONG: 80 05 36.2' 2.830'

State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Discharge Monitoring Report
Oil and Gas General Permit

Company Name: Northeast Natural Energy LLC
API No: 47-061-01803 County: Monongalia
District: Clay Well No: Bogges 9H
Farm Name: Blake R. & H. Preston Bogges

Discharge Date/s From:(MMDDYY) NA To: (MMDDYY) NA
Discharge Times. From: _____ To: _____

Total Volume to be Disposed from this facility (gallons): _____

Disposal Option(s) Utilized (write volumes in gallons):

- (1) Land Application: _____ (Include a topographical map of the Area.)
- (2) UIC: _____ Permit No. _____
- (3) Offsite Disposal: _____ Site Location: _____
- (4) Reuse: _____ Alternate Permit Number: _____
- (5) Centralized Facility: _____ Permit No. _____
- (6) Other method: _____ (Include an explanation)

Follow Instructions below to determine your treatment category:

Optional Pretreatment test: _____ Cl- mg/l _____ DO mg/l

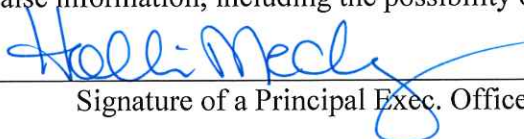
1. Do you have permission to use expedited treatment from the Director or his representative?
(Y/N) _____ If yes, who? _____ and place a four (4) on line 7.
If not go to line 2
2. Was Frac Fluid or flowback put into the pit? (Y/N) _____ If yes, go to line 5. If not, go to line 3.
3. Do you have a chloride value pretreatment (see above)? (Y/N) _____ If yes, go to line 4
If not, go to line 5.
4. Is the Chloride level less than 5000 mg/l? (Y/N) _____ If yes, then enter a one (1) on line 7.
5. Do you have a pretreatment value for DO? (See above) (Y/N) _____ If yes, go to line 6
If not, enter a three (3) in line 7.
6. Is the DO level greater than 2.5 mg/l?(Y/N) _____ If yes, enter a two (2) on line 7. If not, enter a three (3) on line 7.
7. _____ is the category of your pit. Use the Appropriate section.
8. Comments on Pit condition: Utilized a closed loop system

Name of Principal Exec. Officer: Hollie Medley

Title of Officer: Regulatory Manager

Date Completed: 1/10/2020

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this document and all the attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.



Signature of a Principal Exec. Officer or Authorized agent.

Category 1
Sampling Results
API No : _____

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	5	_____	N/A	N/A	Days
Fe	6	_____	6	_____	mg/l
D.O.	2.5	_____	2.5	_____	mg/l
Settleable Sol.	0.5	_____	0.5	_____	mg/l
Cl	5,000	_____	5,000	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
Total Al***		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Disposal Area		_____	Monitor	_____	Acres

*** Al is only reported if the pH is above 9.0

Category 2
Sampling Results
API No : _____

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	10	_____	N/A	N/A	Days
Fe	6	_____	6	_____	mg/l
D.O.	2.5	_____	2.5	_____	mg/l
Settleable Sol.	0.5	_____	0.5	_____	mg/l
Cl*	12,500	_____	12,500	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
Total Al***		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Disposal Area		_____	Monitor	_____	Acres

* Can be 25,000 with inspector's approval,

(Inspector's signature): _____

Date: _____

** Include a description of your aeration technique.

Aeration Code: _____

*** Al is only reported if the pH is above 9.0

Category 3
Sampling Results
API No : _____

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	20	_____	N/A	N/A	Days
Fe	6	_____	6	_____	mg/l
D.O.	2.5	_____	2.5	_____	mg/l
Settleable Sol.	0.5	_____	0.5	_____	mg/l
Cl*	12,500	_____	12,500	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
Total Al***		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Disposal Area		_____	Monitor	_____	Acres

* Can be 25,000 with inspector's approval,

(Inspector's signature): _____ Date: _____
 ** Include a description of your aeration technique. Aeration Code: _____
 *** Al is only reported if the pH is above 9.0.

Category 4
Sampling Results
API No: _____

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	1	_____	N/A	N/A	Days
Fe	Monitor	_____	Monitor	_____	mg/l
D.O.	Monitor	_____	Monitor	_____	mg/l
Settleable Sol.	Monitor	_____	Monitor	_____	mg/l
Cl*	12,500	_____	12,500	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Activated Carbon (0.175)		_____	N/A	N/A	lb/Bl
Date Site Reclaimed	N/A	N/A			10 days from dis.
Disposal Area		_____	Monitor	_____	Acres

* Can be 25,000 with inspector's approval,

(Inspector's signature): _____ Date: _____

BJ Cementing Treatment Report

SERVICE SUPERVISOR	Daniel Hensley	FORMATION	Marcellus Shale
CLIENT FIELD REPRESENTATIVE	Nathan Caldwell	RIG	Highlands 8
DISTRICT	Massillon, OH	COUNTY	MONONGALIA
SERVICE	Cementing	STATE / PROVINCE	WV

WELL GEOMETRY

TYPE	OD (in)	ID (in)	WEIGHT (lb/ft)	MD (ft)	TVD (ft)	EXCESS (%)	GRADE	THREAD
Previous Casing	24.00	23.25	94.58	40.00	40.00			
Open Hole		17.50		1,265.00	1,265.00	60.00		
Casing	13.38	12.62	54.50	1,187.00	1,187.00			

HARDWARE

Bottom Plug Used?	No	Tool Type	Float Collar
Bottom Plug Provided By		Tool Depth (ft)	1,142.00
Bottom Plug Size		Max Tubing Pressure - Rated (psi)	
Top Plug Used?	Yes	Max Tubing Pressure - Operated (psi)	
Top Plug Provided By	BJ	Max Casing Pressure - Rated (psi)	
Top Plug Size	13.375	Max Casing Pressure - Operated (psi)	
Centralizers Used	Yes	Pipe Movement	None
Centralizers Quantity		Job Pumped Through	Manifold
Centralizers Type	Bow	Top Connection Thread	BTC
Landing Collar Depth (ft)	1,142	Top Connection Size	13.375

CIRCULATION PRIOR TO JOB

Well Circulated By	
Circulation Prior to Job	No
Circulation Time (min)	
Circulation Rate (bpm)	
Circulation Volume (bbls)	
Lost Circulation Prior to Cement Job	No
Mud Density In (ppg)	
Mud Density Out (ppg)	
PV Mud In	
PV Mud Out	

YP Mud In	
YP Mud Out	
Solids Present at End of Circulation	No
10 sec SGS	
10 min SGS	
30 min SGS	
Flare Prior to / during the Cement Job	No
Gas Present	No
Gas Units	

TEMPERATURE

Ambient Temperature (°F)	40.00
Mix Water Temperature (°F)	49.00

Slurry Cement Temperature (°F)	56.00
Flow Line Temperature (°F)	

FLUID DETAILS

FLUID TYPE	FLUID NAME	DENSITY (ppg)	YIELD (Cu Ft/sk)	H ₂ O REQ (gals/sk)	VOL (sk)	VOL (Cu Ft)	VOL (bbls)
Spacer / Pre Flush / Flush	Fresh Water	8.3400					10.0000
Spacer / Pre Flush / Flush	Gel Spacer	8.6100					25.0000
Spacer / Pre Flush / Flush	Fresh Water	8.3400					10.0000
Tail Slurry	Cement Slurry	15.6000	1.1979	5.23	1218	1459.0000	259.7000
Displacement Final	Fresh Water	8.3400				0.0000	187.1000
Top-Out / Scavenger Slurry	Plug Blend for Top out	17.0000	1.0300				
Spacer / Pre Flush / Flush	Processed Water	8.3000					
Top-Out / Scavenger Slurry	Class A - Neat	15.6000	1.1800				

FLUID TYPE	FLUID NAME	COMPONENT	CONCENTRATION	UOM
Spacer / Pre Flush / Flush	Gel Spacer	Fresh Water	100.0000	PCT
Spacer / Pre Flush / Flush	Gel Spacer	IntegraSeal POLI	1.0000	PPB
Spacer / Pre Flush / Flush	Gel Spacer	EXTENDER, BENTONITE	20.0000	PPB
Tail Slurry	Cement Slurry	CEMENT, CLASS A	100.0000	PCT
Tail Slurry	Cement Slurry	ACCELERATOR, SALT, CHLORIDE, CALCIUM, A-7P, PELLETS	2.0000	BWOB
Tail Slurry	Cement Slurry	IntegraSeal POLI	0.2500	LBS/SK



TREATMENT SUMMARY

TIME	FLUID	RATE (bpm)	FLUID VOL (bbls)	PIPE PRESSURE (psi)	ANNULUS PRESSURE (psi)	COMMENTS
1/23/2019 4:16 AM	Fresh Water	5.50	10.00	280.00		Water ahead
1/22/2019 10:48 PM	Processed Water	5.00	910.00	250.00		Tried to pump casing down
1/23/2019 4:18 AM	Gel Spacer	5.50	25.00	300.00		Gel w/ Flake
1/23/2019 4:23 AM	Fresh Water	5.50	10.00	300.00		Water Spacer
1/23/2019 4:25 AM	Cement Slurry	6.00	260.00	750.00		Cement Slurry 15.6 ppg
1/23/2019 5:20 AM	Fresh Water	6.00	176.00	280.00		Slowed to 3 bpm to land plug 100 psi, Landed Plug to 550 psi, Floats held 1 bbl back
1/23/2019 10:15 AM	Class A - Neat	1.80	126.00	100.00		First 7 bbl then shut down to wait on sample then 119 bbl, No cement back
1/23/2019 1:25 PM	Plug Blend for Top out	1.80	98.00	100.00		17 ppg Plug blend saved for Top out / No cement to surface / Called for 800 more sacks
1/24/2019 12:15:00 AM	Class A - Neat	1.80	65.00	120.00		15.6ppg cement 63 bbl to reach surface 2 bbl circulated

MIN / MAX / AVG PRESSURE AND RATES

	MIN	MAX	AVG
Pressure (psi)	100.00	750.00	275.56
Rate (bpm)	1.80	6.00	4.32

DISPLACEMENT AND END OF JOB SUMMARY

Displaced By	BJ	Amt of Cement Returned / Reversed	0.00
Calculated Displacement Vol (bbls)	176.00	Method Used to Verify Returns	Visual
Actual Displacement Vol (bbls)	176.00	Amt of Spacer to Surface	0.00
Did Float Hold?	Yes	Pressure Left on Casing (psi)	
Bump Plug	Yes	Amt Bled Back After Job	1.00
Bump Plug Pressure (psi)	550.00	Total Volume Pumped (bbls)	176.00
Were Returns Planned at Surface	No	Top Out Cement Spotted	Yes
Cement Returns During Job	None	Lost Circulation During Cement Job	No

CEMENT PLUG

Bottom of Cement Plug?	No	Wiper Balls Used?	No
Wiper Ball Quantity		Plug Catcher	No
Number of Plugs			

SQUEEZE

Injection Rate (bpm)		Fluid Density (ppg)	
Injection Pressure (psi)		ISIP (psi)	
Type of Squeeze		FSIP (psi)	
Operators Max SQ Pressure (psi)			

Comments

TREATMENT REPORT

JOB SUMMARY

CEMENT JOB: PUMPED 910 BBL WATER TO TRY TO PUMP CASING DOWN, CASING WOULDNT SET CEMENTED PER DSM.
TESTED 200 PSI
10 BBL WATER
25 BBL GEL W/FLAKE
10 BBL WATER
260 BBL CEMENT @ 15.6PPG
DROP PLUG
176 BBL DISP. BUMPED PLUG TO 550 PSI NO RETURNS
FLOWED 1 BBL TO TRUCK FLOATS HELD
GROUT: PUMPED 7 BBL WAITED 1 HOUR
119 BBL CEMENT NO RETURNS
98 BBL NO RETURNS
PULLED 100' TUBING PUMPED 65 BBL TO SURFACE CIRCULATED 2 BBL

BJ Cementing Treatment Report

SERVICE SUPERVISOR	French Linger	FORMATION	Marcellus Shale
CLIENT FIELD REPRESENTATIVE	NATE	RIG	
DISTRICT	Massillon, OH	COUNTY	MONONGALIA
SERVICE	Cementing	STATE / PROVINCE	WV

WELL GEOMETRY

TYPE	OD (in)	ID (in)	WEIGHT (lb/ft)	MD (ft)	TVD (ft)	EXCESS (%)	GRADE	THREAD
Open Hole		12.25		2,550.00	2,550.00	40.00		
Casing	9.63	8.84	40.00	2,500.00	2,500.00			
Previous Casing	13.38	12.62	54.50	1,265.00	1,250.00			

HARDWARE

Bottom Plug Used?	No	Tool Type	Float Collar
Bottom Plug Provided By		Tool Depth (ft)	2,503.00
Bottom Plug Size		Max Tubing Pressure - Rated (psi)	
Top Plug Used?	Yes	Max Tubing Pressure - Operated (psi)	
Top Plug Provided By	BJ	Max Casing Pressure - Rated (psi)	
Top Plug Size	9.625	Max Casing Pressure - Operated (psi)	
Centralizers Used	Yes	Pipe Movement	None
Centralizers Quantity		Job Pumped Through	Manifold
Centralizers Type	Rigid	Top Connection Thread	BTC
Landing Collar Depth (ft)	2,503	Top Connection Size	9.625

CIRCULATION PRIOR TO JOB

Well Circulated By	BJ	YP Mud In
Circulation Prior to Job	No	YP Mud Out
Circulation Time (min)	60.00	Solids Present at End of Circulation
Circulation Rate (bpm)	8.00	10 sec SGS
Circulation Volume (bbls)	276.00	10 min SGS
Lost Circulation Prior to Cement Job	No	30 min SGS
Mud Density In (ppg)		Flare Prior to / during the Cement Job
Mud Density Out (ppg)		Gas Present
PV Mud In		Gas Units
PV Mud Out		

TEMPERATURE

Ambient Temperature (°F)	24.00	Slurry Cement Temperature (°F)	60.00
Mix Water Temperature (°F)	51.00	Flow Line Temperature (°F)	

FLUID DETAILS

FLUID TYPE	FLUID NAME	DENSITY (ppg)	YIELD (Cu Ft/sk)	H ₂ O REQ (gals/sk)	VOL (sk)	VOL (Cu Ft)	VOL (bbls)
Spacer / Pre Flush / Flush	Gel Spacer	8.6100					25.0000
Spacer / Pre Flush / Flush	Fresh Water	8.3400					10.0000
Tail Slurry	Cement Slurry	15.2000	1.2618	5.75	808	1019.0000	181.4000
Displacement Final	Fresh Water	8.3400				0.0000	186.5000

FLUID TYPE	FLUID NAME	COMPONENT	CONCENTRATION	UOM
Spacer / Pre Flush / Flush	Gel Spacer	Fresh Water	100.0000	PCT
Spacer / Pre Flush / Flush	Gel Spacer	EXTENDER, BENTONITE	20.0000	PPB
Tail Slurry	Cement Slurry	CEMENT, CLASS A	100.0000	PCT
Tail Slurry	Cement Slurry	FOAM PREVENTER, FP-13L	0.7000	GALS/100SK
Tail Slurry	Cement Slurry	ACCELERATOR, SALT, CHLORIDE, CALCIUM, A-7P, PELLETS	1.5000	BWOB

TREATMENT SUMMARY

TIME	FLUID	RATE (bpm)	FLUID VOL (bbls)	PIPE PRESSURE (psi)	ANNULUS PRESSURE (psi)	COMMENTS
1/27/2019 2:07:00 AM	Gel Spacer	0.00	25.00			
1/27/2019 2:13:00 AM	Fresh Water	0.00	10.00			
1/27/2019 2:15:00 AM	Cement Slurry	0.00	181.40			



1/27/2019 2:58:00
AM

Fresh Water

0.00

186.50

MIN / MAX / AVG PRESSURE AND RATES

	MIN	MAX	AVG
Pressure (psi)	0.00	1726.00	350.00
Rate (bpm)	1.00	8.00	5.50



DISPLACEMENT AND END OF JOB SUMMARY

Displaced By		Amt of Cement Returned / Reversed	1.00
Calculated Displacement Vol (bbls)		Method Used to Verify Returns	Visual
Actual Displacement Vol (bbls)		Amt of Spacer to Surface	35.00
Did Float Hold?	Yes	Pressure Left on Casing (psi)	0.00
Bump Plug	No	Amt Bled Back After Job	1.50
Bump Plug Pressure (psi)		Total Volume Pumped (bbls)	697.00
Were Returns Planned at Surface	No	Top Out Cement Spotted	No
Cement Returns During Job	Full	Lost Circulation During Cement Job	No

CEMENT PLUG

Bottom of Cement Plug?	No	Wiper Balls Used?	No
Wiper Ball Quantity		Plug Catcher	No
Number of Plugs			

SQUEEZE

Injection Rate (bpm)		Fluid Density (ppg)	
Injection Pressure (psi)		ISIP (psi)	
Type of Squeeze		FSIP (psi)	
Operators Max SQ Pressure (psi)			

Comments

TREATMENT REPORT

JOB SUMMARY

Cement Job Log



Customer: NORTHEAST NATURAL ENERGY LLC		Date: 6/5/2019		Serv. Supervisor: Aaron Shreve							
Cust. Rep.: Josh Grimm		Ticket #: JWV1906-0004		Serv. Center: Jane Lew - 3044							
Lease: Boggess 9H - Alternate Blend with CJ511		API Well #: 47-061-01803		County: Monongalia State: WV							
Well Type:		Rig: Patterson 334		Type of Job: Production Casing							
OPEN HOLE DATA			TUBULAR DATA								
12.25 in. O.H. (2,536 to 2,556 ft) 8.75 in. O.H. (2,556 to 6,000 ft) 8.5 in. O.H. (6,000 to 20,043 ft)			5.5 in. 20#, (0 to 20,043 ft)								
			SIZE WEIGHT	THREAD	DEPTH (ft)	GRADE	ID (in)	BURST (psi)	COLLAPSE (psi)		
PREVIOUS CASING DATA			PERFORATED INTERVAL DATA				CASING EQUIPMENT DEPTHS				
9.625 in. 40# (0 to 2,536 ft)			TOP	BTM	SPF	SIZE	SHOE	FLOAT	STAGE	ACP	
WELL FLUID		DISPLACEMENT FLUID		DIFF PRESS (psi)	C&G LIFT (psi)	MAX PRESS (psi)					
TYPE	DENSITY	VOLUME	TYPE	DENSITY		6220					
							WATER ON LOC (bb)				
							1500				
Time	Rate (bb/min)	Csg. Press. (psi)	Tbg. Press (psi)	Ann. Press. (psi)	Slg. Vol. (bb)	Cum. Vol. (bb)	Stage Details				
6:00PM							0 Arrive On Location				
7:35PM							0 Finished Casing				
8:05PM							0 Rig Down Casing Crew/Start Circulation				
8:10PM							0 Spot Trucks				
1:15AM							0 Safety Meeting/Finished Circulation				
1:34AM	2.3	520				5	5 Load Lines to Test/Release Bottom Plug				
1:37PM		6220					5 Test Pump And Lines to 6220 Psi				
1:43AM							5 Release Psi Test				
1:48AM	4.6	800				100	105	Start Spacer			
2:06AM	8	1370				819	924	Start Cement			
3:53AM							924	Shut Down/Set Valves/Wash Lines/Load Top Plug			
3:58AM	9.3	1850				444	1368	Release Top Plug/Displace			
4:11AM	9.3	2981					1368	100 Away			
4:23AM	8.6	3650					1368	200 Away			
4:29AM	4	3225					1368	Close Bag			
4:32AM	8.1	4075					1368	270 Away			
4:51AM	7.3	4120					1368	400 Away/Spacer to Surface			
4:56AM		4975					1368	Land Plug			
5:00AM							1368	Check Floats-Floats Held/8.5Bbls Back			
5:03AM	3.5	4775					1368	Pressure Back Up			
5:07AM							1368	Release Psi 8.5Bbls Back			
5:15AM							1368	Wash Up			
6:00AM							1368	Rig Down /Leave Location			
							1368				
Left Yard	6/5/2019@4:00PM		Left Loc.	6/6/2019@8:00AM		Start Pump	6/6/2019@1:48AM				
Arrived Loc.	6/5/2019@6:00PM		Returned Yd.	6/6/2019@7:30AM		End Pump	6/6/2019@4:56AM				
Bumped Plug (psi)	Final Differential (psi)	Floats Held (Y/N)	PSI Left on Casing	Cement to Surface (bb)	Top of Cement (ft)	Full Ck. During Job (Y/N)	Max Pump Pressure (psi)	Casing Rotation	Standby Charged (hrs)	Casing Reciprocaion	
Yes	3520	Yes	0	No	1207	Yes	4975		24		
							<i>Aaron Shreve</i>				
							Service Supervisor Date				

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	8/5/2019
Job End Date:	8/28/2019
State:	West Virginia
County:	Monongalia
API Number:	47-061-01803-00-00
Operator Name:	Northeast Natural Energy LLC
Well Name and Number:	Bogges 9H
Latitude:	39.67015600
Longitude:	-80.09338200
Datum:	NAD27
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	8,030
Total Base Water Volume (gal):	18,821,014
Total Base Non Water Volume:	0



Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Service Abstract 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	87.005553	None
Sand (Proppant)	Producers Service Corp	Proppant					
			Silica Substrate	14808-60-7	100.00000	12.495664	None
7.5% HCL	Producers Service Corp	Acidizing					
			Hydrochloric Acid	7647-01-0	7.50000	0.031011	None
StimSTREAM FR 9800P	Producers Service Corp	Friction Reducer					
			copolymer of 2-propanamide	Proprietary	30.00000	0.01662	None
			Petroleum Distillate	64742-47-8	20.00000	0.01108	None
			Oleic Acid Diethanolamide	93-83-4	2.00000	0.00111	None
			Alcohols, C12-16, ethoxylated	68551-12-2	2.00000	0.00111	None
			Ammonium chloride ((NH4)Cl)	12125-02-9	1.00000	0.00055	None
BIOC11139A	Producers Service Corp	Biocide					
			Benzyl-(C12-C16 Alkyl)-Dimethyl-Ammonium Chloride	68424-85-1	30.00000	0.00675	None
			Glutaraldehyde	111-30-8	10.00000	0.00225	None

SCAL16486A	Producers Service Corp	Scale Inhibitor	Ethanol	64-17-5	5.00000	0.00113	None
			Amine Triphosphate	Proprietary	30.00000	0.00199	None
			Ethylene Glycol	107-21-1	30.00000	0.00199	None
			Sodium Phosphate	7632-05-5	30.00000	0.00199	None
4-N-1	Producers Service Corp	Inhibitor					
			Acetic acid	64-19-7	90.00000	0.00073	None
			Methanol	67-56-1	10.00000	0.00008	None
			2-Ethylhexanol	104-76-7	10.00000	0.00008	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					
			Petroleum Distillate	64742-47-8	20.00000	0.01108	
			Glutaraldehyde	111-30-8	10.00000	0.00225	
			Amine Triphosphate	Proprietary	30.00000	0.00199	
			Sodium Phosphate	7632-05-5	30.00000	0.00199	
			Ethanol	64-17-5	5.00000	0.00113	
			Oleic Acid Diethanolamide	93-83-4	2.00000	0.00111	
			Alcohols, C12-16, ethoxylated	68551-12-2	2.00000	0.00111	
			Ammonium chloride ((NH4)Cl)	12125-02-9	1.00000	0.00055	
			2-Ethylhexanol	104-76-7	10.00000	0.00008	
			Methanol	67-56-1	10.00000	0.00008	
			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)