

west virginia department of environmental protection

Office of Oil and Gas 601 57th Street SE Charleston, WV 25304 (304) 926-0450 (304) 926-0452 fax Earl Ray Tomblin, Governor Randy C. Huffman, Cabinet Secretary www.dep.wv.gov

PERMIT MODIFICATION APPROVAL

December 18, 2015

NORTHEAST NATURAL ENERGY LLC 707 VIRGINIA STREET EAST CHARLESTO, WV 25301

Re: Permit Modification Approval for API Number 6101722, Well #: CAMPBELL 3H

Modified well bore direction

Oil and Gas Operator:

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

Please call James Martin at 304-926-0499, extension 1654 if you have any questions.

Sincerely,

Gene Smith

Assistant Chief of Permitting

Laura L. adkins

Office of Oil and Gas

Promoting a healthy environment.

API NO. 47	61-01	1722 MOD
	R WELL NO.	
Well Pad	Name: Camp	bell

STATE OF WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS WELL WORK PERMIT APPLICATION

1) Well Operator	r: Northeast Na	atural Energy	LLC	494498281	Monongalia	Clay	Blacksville
	-			Operator ID	County	District	Quadrangle
2) Operator's Wo	ell Number: C	ampbell 3H		Well P	ad Name: Camp	bell	
3) Farm Name/S	urface Owner:	Ellen F. Ca	ampb	ell Public Ro	oad Access: Stat	e Route 2	18 (Daybrook Road)
4) Elevation, cur	rent ground:	1293.6'	E	levation, propose	d post-construction	on: 1293	.6'
	(a) Gas X Other		oil _	Un	derground Storag	ge	
(allow X		Deep		-1:=-1	-
6) Existing Pad:	Yes or No Ye	es			HIK	19/12/	2013
	get Formation(s 18', 103', 3,600		Antic	ipated Thickness	and Expected Pr	essure(s):	
8) Proposed Tota	l Vertical Dep	th: 8,118'					
9) Formation at T	Total Vertical I	Depth: Mar	cellus	5			*
10) Proposed Tot	al Measured D	Depth: 16,4	08.0	8'	*		
11) Proposed Ho	rizontal Leg Le	ength: 8,15	0'				
12) Approximate	Fresh Water S	Strata Depths	:	50' , 1,137'			
13) Method to De 14) Approximate			_	Oriller's Log from	Offset Wells		
15) Approximate	Coal Seam De	epths: 316',	1,13	5'		15-111	
				ne, karst, other):	N/A		
17) Does Propose directly overlying	ed well location g or adjacent to	n contain coa an active m	l sear ine?	rns Yes X	No.		
(a) If Yes, provi	de Mine Info:	Name:	Adjad	ent Mine - Fede	ral No. 2	RE	CEIVED
		Depth:	1,100)'			of Oil and Gas
		Seam:	Pittsb	urgh		DE	C 1 @ 2015
		Owner:	Patrio	ot Coal Corporat	on		C 1 6 2015
					E		epartment of ental Protection

API NO. 47	61.	01	722-1	(OI)
			Campbell 3H	

Well Pad Name: Campbell

18)

CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	24"	New	NA	94.71	40'	40'	GTS
Fresh Water	13-3/8"	New	J-55	54.5	1,280'	1,250'	CTS
Coal							
Intermediate	9-5/8"	New	J-55	40	2,430'	2,400'	CTS
Production	5-1/2"	New	P-110	20	16,408'	16,378'	3799 Cu. Ft.
Tubing	2-7/8"	New	N-80	6.5	NA	8,500'	NA
Liners							

MAK 12/15/2015

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	24"	30"	.375	415		4,500 psi Grout	NA
Fresh Water	13-3/8"	17 1/2"	.38"	2,760	2,000	Class A	1.23
Coal							
Intermediate	9-5/8"	12 1/4"	.395"	3,950	3,000	Class A	1.3
Production	5-1/2"	8 3/4"	.361"	12,530	9,700	50:50 Poz	1.21
Tubing	2-7/8"	NA	.217"	10,570	3,600	NA	NA
Liners							

PACKERS

Kind:	
Sizes:	RECEIVED
Depths Set:	Office of Oil and Gas
	DEC 1 6 2015

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API NO.	17	le l	-01	72	<u> ユ</u>

OPERATOR WELL NO. Campbell 3H

Well Pad Name: Campbell

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drilling and completion of a horizontal Marcellus well. The well will be drilled on air to an approximate depth of 6,600.76' TVD/MD. The well will then be horizontally drilled on synthetic based mud from the KOP to approximately 8,118' TVD / 16,408.08' MD along a combination of 323, 327 and 338 degree azimuth.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Multi-stage / high-rate slickwater fracture treatment using various size sands as proppant. First stage will be initiated via pressurization against a burst disc ran in the production casing string or perforated with coiled tubing. Subsequent stages will be perforated with pumped down guns ran on wireline. Individual stages will be isolated with composite frac plugs. Maximum pump rate during any stage will be 110 BPM with a maximum allowable surface pressure of 9,500 PSI. Composite bridge plugs will be set at the end of the last stage to isolate the treated formation.

- 21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): NA Existing Pad
- 22) Area to be disturbed for well pad only, less access road (acres): NA Existing Pad
- 23) Describe centralizer placement for each casing string:

Surface and intermediate casing strings will have bow spring centralizers placed every third joint (~120') from the shoe joint to surface. Production casing will have rigid body centralizers placed at a minimum of every fourth joint (~160') from TD to surface.

24) Describe all cement additives associated with each cement type:

Surface string cement will be a Class A + Max 3% bwoc Calcium Chloride Fresh Water blend. Intermediate string cement will be a Class A Cement + Max 3% bwoc Calcium Chloride + Fresh Water. Production string cement will be (50:50) Poz (Fly Ash):Type I Cement with a gas migration additive.

25) Proposed borehole conditioning procedures:

Surface string will use a 25.0 bbls Gel Pill + LCM + 25 lbs Cello Flake + 20 lbs/bbl Bentenite @ 14 ppg & 10 bbls fresh water spacer prior to cement. Intermediate string will use a 25.0 bbls Ger Pill + LCM Gas 25 lbs Cello Flake + 20 lbs/bbl Bentonite @ 8.4 ppg & 10 bbls fresh water spacer plice to certain. Production string will use a 50.0 bbls SealBond 25 + 1 gal/bbl US-40 + 275 lbs/bbl Barite + 1 gal/bbl SS-2 Spacer @ 13.5 ppg prior to cement.

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*Note: Attach additional sheets as needed.

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WW-6A1
(5/13)

Operator's Well No.	Campbell 3H	

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE Chapter 22, Article 6A, Section 5(a)(5) IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
See Attachment	See Attachment	See Attachment	See Attachment	See Attachment

Acknowledgement of Possible Permitting/Approval In Addition to the Office of Oil and Gas

The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

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The applicant further acknowledges that any Office of Oil and Gas permit in no way overfices Protection nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

Well Operator: Northeast Natural Energy LLC

By: Hollie Medley

Its: Regulatory Coordinator

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Operator's Well No. Campbell 3H

Grantee, Lessee, etc. Royalty Book/Page Tax Map & Parcel NNE Lease No. Grantor, Lessor, etc. WV-061-003293-000 NORTHEAST NATURAL ENERGY LLC .125 or greater 1494/880 4-7-48 CAMPBELL, ELLEN FOLEY 1515/745 4-7-47 NORTHEAST NATURAL ENERGY LLC .125 or greater WV-061-001871-002 LEMLEY, SUSAN AND WILLIAM WV-061-002140-001 **OLIVE CEMETERY OF PENTRESS** *CHESAPEAKE APPALACHIA LLC .125 or greater 1396/669 4-7-32 WV-061-002140-002 MONONGALIA HOME CORPORATION CHESAPEAKE APPALACHIA LLC .125 or greater 1397/616 4-7-32 UNITED OLIVE M.E. CHURCH OF PENTRESS 1410/526 4-7-32 WV-061-002140-003 *CHESAPEAKE APPALACHIA LLC .125 or greater WV-061-002140-004 CONN, JOHN L. *CHESAPEAKE APPALACHIA LLC .125 or greater 1419/595 4-7-32 WV-061-002140-005 AUSTIN, LINDA *CHESAPEAKE APPALACHIA LLC 1419/591 4-7-32 .125 or greater WV-061-002140-007 HERRON, ANNA MARGARET Northeast Natural Energy LLC .125 or greater 1506/764 4-7-32 WV-061-002140-008 HERRON, DONALD R. AND JENNIFER 1507/411 4-7-32 Northeast Natural Energy LLC .125 or greater WV-061-002140-009 HERRON, JAMES F. AND DIANE 1507/403 Northeast Natural Energy LLC .125 or greater 4-7-32 WV-061-002140-010 HERRON, CHARLES K. Northeast Natural Energy LLC .125 or greater 1507/242 4-7-32 WV-061-002140-011 HERRON, HENRY G. Northeast Natural Energy LLC .125 or greater 1509/264 4-7-32 WV-061-003292-001 BREWER, RAYMOND C. AND RUBY T. NORTHEAST NATURAL ENERGY LLC .125 or greater 1495/10 4-7-31 WV-061-000182-001 LEMLEY, MARY LOU NORTHEAST NATURAL ENERGY LLC .125 or greater 1431/224 4-7-23 WV-061-000578-006 SLEETH, LUZETTA NORTHEAST NATURAL ENERGY LLC .125 or greater 1439/627 4-7-23 WV-061-000578-007 AMMONS, VIRGINIA LEMLEY NORTHEAST NATURAL ENERGY LLC 1437/822 4-7-23 .125 or greater WV-061-000578-009 PRATT, ROGER NORTHEAST NATURAL ENERGY LLC 1439/625 4-7-23 .125 or greater WV-061-002489-001 CAMPBELL, FRANCIS M. *CHESAPEAKE APPALACHIA LLC .125 or greater 1427/373 4-7-23 WV-061-002489-002 COX, DELORES E. *CHESAPEAKE APPALACHIA LLC .125 or greater 1427/377 4-7-23 WV-061-002489-003 PHILLIPS, BETTY RUTH *CHESAPEAKE APPALACHIA LLC .125 or greater 1430/324 4-7-23 WV-061-002489-004 MORRIS, ELMA JEAN *CHESAPEAKE APPALACHIA LLC 1430/310 4-7-23 .125 or greater WV-061-002489-005 **FAUST, SHARON** *CHESAPEAKE APPALACHIA LLC .125 or greater 1430/349 4-7-23 WV-061-002489-006 GRECO, DENISE *CHESAPEAKE APPALACHIA LLC .125 or greater 1431/428 4-7-23 WV-061-002489-007 MORRIS, BARBARA H. *CHESAPEAKE APPALACHIA LLC 1436/454 4-7-23 .125 or greater WV-061-002489-008 HINCHEY, MARY LEE *CHESAPEAKE APPALACHIA LLC .125 or greater 1438/635 4-7-23 WV-061-002489-009 CREAMER, STEVEN ROSS *CHESAPEAKE APPALACHIA LLC 1438/639 .125 or greater 4-7-23 WV-061-002489-010 MOORE, LLOYD HOWARD AND RUTH R. *CHESAPEAKE APPALACHIA LLC 1445/054 .125 or greater 4-7-23 WV-061-002489-011 STROSNIDER, JAMES MICHAEL *CHESAPEAKE APPALACHIA LLC 1441/850 .125 or greater 4-7-23 WV-061-002489-012 FETTY, JENNA *CHESAPEAKE APPALACHIA LLC 1441/845 .125 or greater 4-7-23 WV-061-002489-013 CREAMER, KARL WILLIAM AND DARLENE E. *CHESAPEAKE APPALACHIA LLC .125 or greater 1442/569 4-7-23 WV-061-002489-014 BENNETT, PATRICIA *CHESAPEAKE APPALACHIA LLC .125 or greater 1454/857 4-7-23 WV-061-003286-001 TRUSTEES OF UNITED OLIVE M.E. CHURCH OR PENTRESS NORTHEAST NATURAL ENERGY LLC .125 or greater 1492/567 4-7-23 TRUSTEES OF THE OLIVE CEMETERY AT PENTRESS WV-061-003286-002 NORTHEAST NATURAL ENERGY LLC .125 or greater 1492/830 4-7-23 WV-061-002619-001 TENNANT, BILLIE JEAN *CHESAPEAKE APPALACHIA LLC 1441/293 .125 or greater 4-7-16 WV-061-001137-001 WILLARD, MARJORIE SIMPSON *CHESAPEAKE APPALACHIA LLC .125 or greater 1360/274 4-7-16 WV-061-002619-002 DAWSON, MARY SPRAGG *CHESAPEAKE APPALACHIA LLC 1441/289 .125 or greater 4-7-16 WV-061-002619-003 MATHENY, BECKY SUE *CHESAPEAKE APPALACHIA LLC .125 or greater 1442/62 4-7-16 WV-061-002619-004 LEMLEY, LUANNE *CHESAPEAKE APPALACHIA LLC .125 or greater 1442/589 4-7-16 .125 or greater WV-061-002619-005 MASON, LUE *CHESAPEAKE APPALACHIA LLC 1442/593 4-7-16 WV-061-001040-001 MOHAMMADI, AMIR H. NORTHEAST NATURAL ENERGY LLC .125 or greater 4-2-25 125 or greater 1483/833 VED 4-2-25 125 or greater 01/79/31 and Gas 1.125 o NORTHEAST NATURAL ENERGY LLC WV-061-001040-002 AFSHARI, ALIAKBAR WV-061-001473-001 THOMAS, JAMES HENRY *CHESAPEAKE APPALACHIA LLC WV-061-001473-002 THOMAS, CHARLES L. *CHESAPEAKE APPALACHIA LLC .125 or greater See Attachment

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Chesapeake Appalachia, LLC.

Northeast Natural Energy Assignment

BK 120/769

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-750 r

750

1500

2250

3000

Depth (ft)

4500

5250

Vertical

NORTHEAST NATURAL ENERGY, LLC

Well: Campbell 3H Wellbore: Campbell 3H PWB

Scale 1 Inch = 2000 ft

-4000

-5000





Location: Monongalia County, WV Field: Monongalia

Facility: Campbell Pad

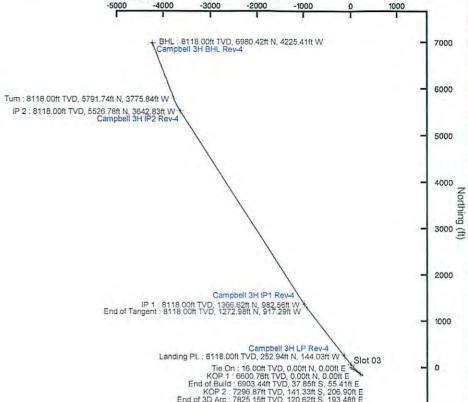
Tie On : 0.00° Inc, 16.00ft MD, 16.00ft TVD, 0.00ft VS 24in Conductor (GL): 0.00° Inc. 40.00ft MD. 40.00ft TVD. 0.00ft VS.

13.375in Casing Surface (GL): 0.00° Inc, 1250.00ft MD, 1250.00ft TVD, 0.00ft VS

9.625in Casing Intermediate (GL) : 0.00° Inc, 2400.00ft MD, 2400.00ft TVD, 0.00ft VS

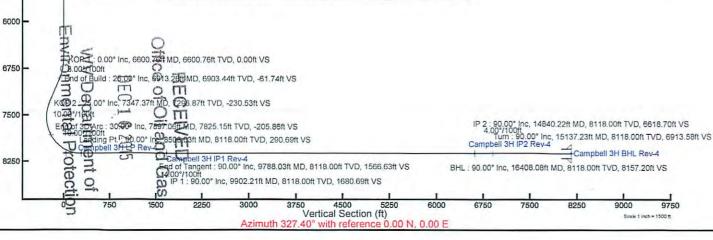
Formation	Depth (KBTVD)	
Tully	7865′	
Hamilton	7929'	
Upper Marcellus	8036'	
Lower Marcellus	8081'	
Onondaga	8139'	

Туре	Hole Size	Casing Size	Grade		GL Depth (Csg)
Conductor	28"	24"	NA		40'
Surface	17-1/2"	13-3/8"	J-55	54.5	1250'
Intermediate	12-1/4"	9-5/8"	J-55	40	2400'



Easting (ft)

KOP 2: 7296.87ft TVD, 141.33ft S, 206.90ft E End of 3D Arc: 7825.15ft TVD, 120.62ft S, 193.48ft E





BGGM (1945.0 to 2017.0) Dip: 66.95° Field: 52263.7 nT Magnetic North is 9.01 degrees West of True North (at 08/Dec/2015)
Grid North is 0.44 degrees West of True North
To correct azimuth from True to Grid add 0.44 degrees To correct azimuth from Magnetic to Grid subtract 8.57 degrees

-1000

