



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

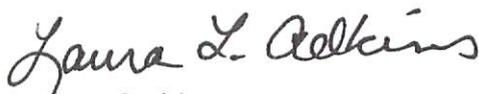
Modified well bore direction

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,


for Gene Smith
Assistant Chief of Permitting
Office of Oil and Gas

Promoting a healthy environment.

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

1) Well Operator: Northeast Natural Energy LLC 494498281 Monongalia Clay Blacksville
Operator ID County District Quadrangle

2) Operator's Well Number: Campbell 3H Well Pad Name: Campbell

3) Farm Name/Surface Owner: Ellen F. Campbell Public Road Access: State Route 218 (Daybrook Road)

4) Elevation, current ground: 1293.6' Elevation, proposed post-construction: 1293.6'

5) Well Type (a) Gas Oil _____ Underground Storage _____

Other _____

(b) If Gas Shallow Deep _____

Horizontal _____

MDK 12/15/2015

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus, 8,118' , 103' , 3,600 psi

8) Proposed Total Vertical Depth: 8,118'

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 16,408.08'

11) Proposed Horizontal Leg Length: 8,150'

12) Approximate Fresh Water Strata Depths: 50' , 1,137'

13) Method to Determine Fresh Water Depths: Driller's Log from Offset Wells

14) Approximate Saltwater Depths: 1,521' , 2,363'

15) Approximate Coal Seam Depths: 316' , 1,135'

16) Approximate Depth to Possible Void (coal mine, karst, other): N/A

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes No _____

(a) If Yes, provide Mine Info: Name: Adjacent Mine - Federal No. 2 RECEIVED
Depth: 1,100' Office of Oil and Gas
Seam: Pittsburgh
Owner: Patriot Coal Corporation DEC 16 2015

WV Department of
Environmental Protection

WW-6B
(04/15)

API NO. 47- 61-01722-100
 OPERATOR WELL NO. Campbell 3H
 Well Pad Name: Campbell

18)

CASING AND TUBING PROGRAM

<u>TYPE</u>	<u>Size (in)</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft. (lb/ft)</u>	<u>FOOTAGE: For Drilling (ft)</u>	<u>INTERVALS: Left in Well (ft)</u>	<u>CEMENT: Fill-up (Cu. Ft.)/CTS</u>
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							

MBK 12/15/2015

<u>TYPE</u>	<u>Size (in)</u>	<u>Wellbore Diameter (in)</u>	<u>Wall Thickness (in)</u>	<u>Burst Pressure (psi)</u>	<u>Anticipated Max. Internal Pressure (psi)</u>	<u>Cement Type</u>	<u>Cement Yield (cu. ft./k)</u>
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:				
Depths Set:				

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WW-6B
(10/14)

API NO. 47- 61-01722
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 Bentonite @ 8.4 ppg & 10 bbls fresh water spacer prior to cement. Intermediate string will use a 25.0 bbls Gel Pill + LCM + 25 lbs Cello Flake + 20 lbs/bbl Bentonite @ 8.4 ppg & 10 bbls fresh water spacer prior to cement. 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.

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 overrides, replaces, or 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 *Hollie Medley*
 Its: Regulatory Coordinator

61-1722 Flow

Operator's Well No. Campbell 3H

NNE Lease No.	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page	Tax Map & Parcel
WV-061-003293-000	CAMPBELL, ELLEN FOLEY	NORTHEAST NATURAL ENERGY LLC	.125 or greater	1494/880	4-7-48
WV-061-001871-002	LEMLEY, SUSAN AND WILLIAM	NORTHEAST NATURAL ENERGY LLC	.125 or greater	1515/745	4-7-47
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
WV-061-002140-003	UNITED OLIVE M.E. CHURCH OF PENTRESS	*CHESAPEAKE APPALACHIA LLC	.125 or greater	1410/526	4-7-32
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	.125 or greater	1419/591	4-7-32
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	Northeast Natural Energy LLC	.125 or greater	1507/411	4-7-32
WV-061-002140-009	HERRON, JAMES F. AND DIANE	Northeast Natural Energy LLC	.125 or greater	1507/403	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	.125 or greater	1437/822	4-7-23
WV-061-000578-009	PRATT, ROGER	NORTHEAST NATURAL ENERGY LLC	.125 or greater	1439/625	4-7-23
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	.125 or greater	1430/310	4-7-23
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	.125 or greater	1436/454	4-7-23
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	.125 or greater	1438/639	4-7-23
WV-061-002489-010	MOORE, LLOYD HOWARD AND RUTH R.	*CHESAPEAKE APPALACHIA LLC	.125 or greater	1445/054	4-7-23
WV-061-002489-011	STROSNIDER, JAMES MICHAEL	*CHESAPEAKE APPALACHIA LLC	.125 or greater	1441/850	4-7-23
WV-061-002489-012	FETTY, JENNA	*CHESAPEAKE APPALACHIA LLC	.125 or greater	1441/845	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
WV-061-003286-002	TRUSTEES OF THE OLIVE CEMETERY AT PENTRESS	NORTHEAST NATURAL ENERGY LLC	.125 or greater	1492/830	4-7-23
WV-061-002619-001	TENNANT, BILLIE JEAN	*CHESAPEAKE APPALACHIA LLC	.125 or greater	1441/293	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	.125 or greater	1441/289	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
WV-061-002619-005	MASON, LUE	*CHESAPEAKE APPALACHIA LLC	.125 or greater	1442/593	4-7-16
WV-061-001040-001	MOHAMMADI, AMIR H.	NORTHEAST NATURAL ENERGY LLC	.125 or greater	1483/497	4-2-25
WV-061-001040-002	AFSHARI, ALIAKBAR	NORTHEAST NATURAL ENERGY LLC	.125 or greater	1483/833	4-2-25
WV-061-001473-001	THOMAS, JAMES HENRY	*CHESAPEAKE APPALACHIA LLC	.125 or greater	1379/323	4-2-22.1, 11
WV-061-001473-002	THOMAS, CHARLES L.	*CHESAPEAKE APPALACHIA LLC	.125 or greater	1379/311	4-2-22.1, 11

*See Attachment

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61-07.2240D

Chesapeake Appalachia, LLC.



Northeast Natural Energy
Assignment
BK 120/769

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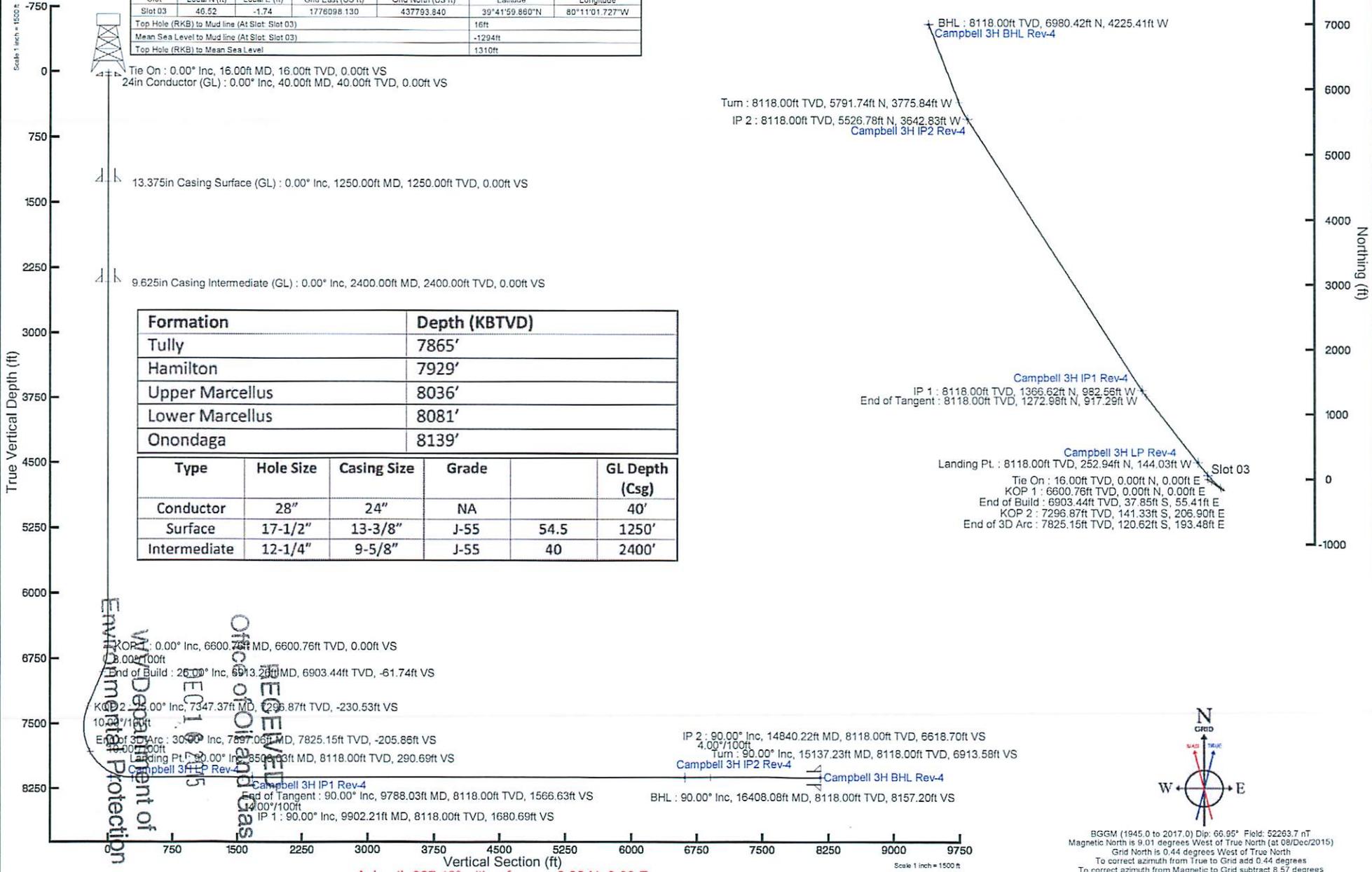
WV Department of
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NORTHEAST NATURAL ENERGY, LLC

Location: Monongalia County, WV
Field: Monongalia
Facility: Campbell Pad

Slot: Slot 03
Well: Campbell 3H
Wellbore: Campbell 3H PWB

Location Information					
Facility Name		Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
Campbell Pad		1776099.874	437747.321	39°41'59.400"N	80°11'01.700"W
Slot	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Latitude
Slot 03	46.52	-1.74	1776098.130	437793.840	39°41'59.860"N
Top Hole (RKB) to Mud line (At Slot Slot 03)				16ft	
Mean Sea Level to Mud line (At Slot Slot 03)				-1294ft	
Top Hole (RKB) to Mean Sea Level				1310ft	



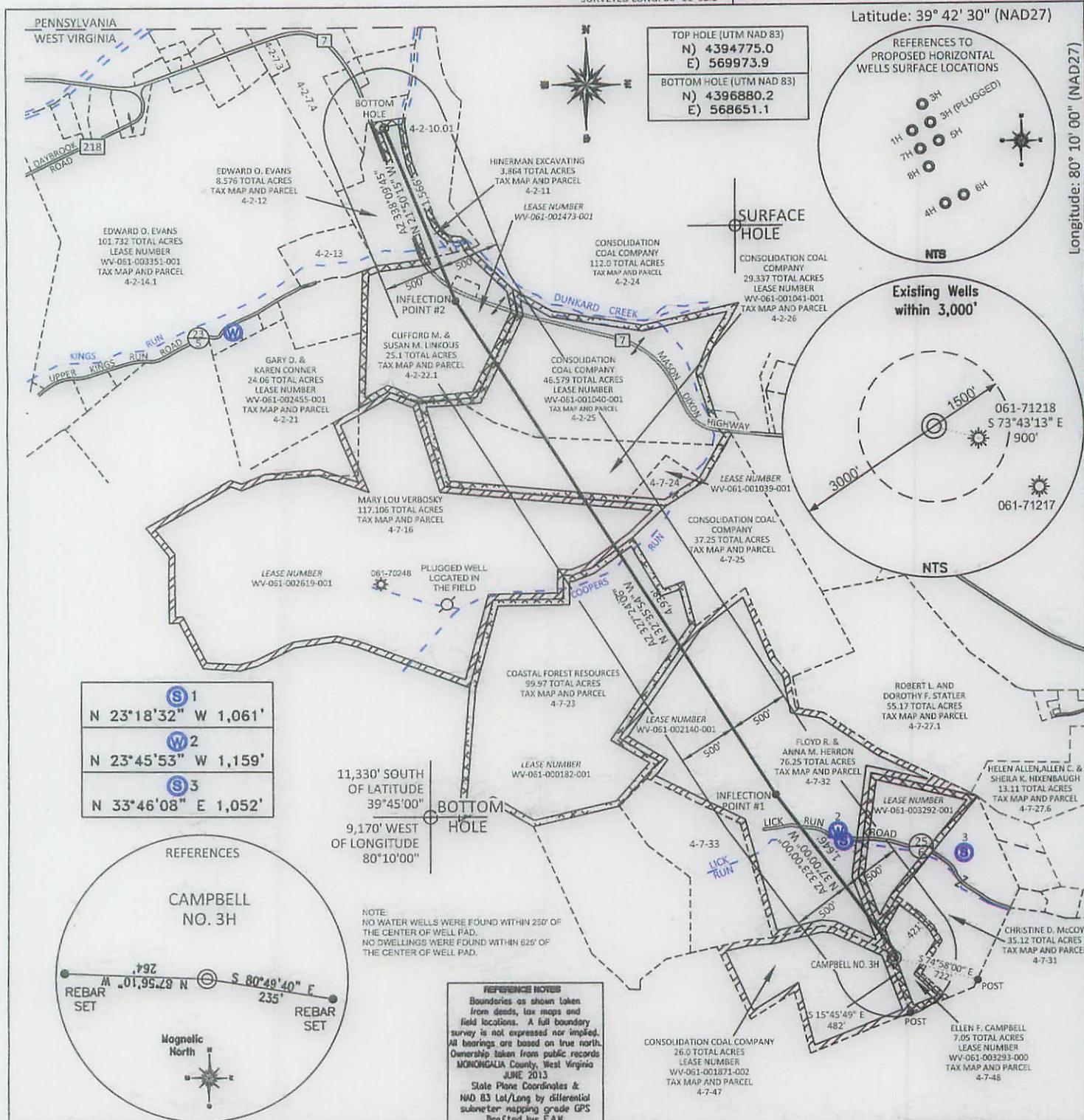
Formation	Depth (KBTVD)
Tully	7865'
Hamilton	7929'
Upper Marcellus	8036'
Lower Marcellus	8081'
Onondaga	8139'

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

Azimuth 327.40° with reference 0.00 N, 0.00 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

61-01722101



FILE #: NNE12

DRAWING #: 2323

SCALE: PLAT: 1" = 1200'
TICK: 1" = 2000'

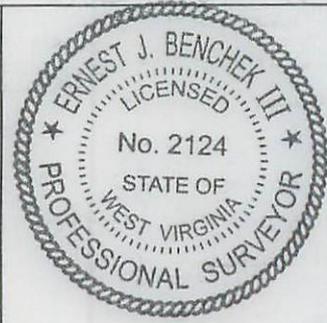
MINIMUM DEGREE OF ACCURACY: 1/200

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 WVDEP
OFFICE OF OIL & GAS
601 57TH STREET
CHARLESTON, WV 25304

DATE: DECEMBER 14, 2015

OPERATOR'S WELL #: CAMPBELL NO. 3H

API WELL #: 47 61 01722400
STATE COUNTY PERMIT

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

WATERSHED: DUNKARD CREEK ELEVATION: 1,293.6'

COUNTY/DISTRICT: MONONGALIA / CLAY QUADRANGLE: BLACKSVILLE

SURFACE OWNER: ELLEN F. CAMPBELL ACREAGE: 7.05 +/-

OIL & GAS ROYALTY OWNER: ELLEN FOLEY CAMPBELL, ET AL ACREAGE: 558.85 +/-

LEASE NUMBERS: _____

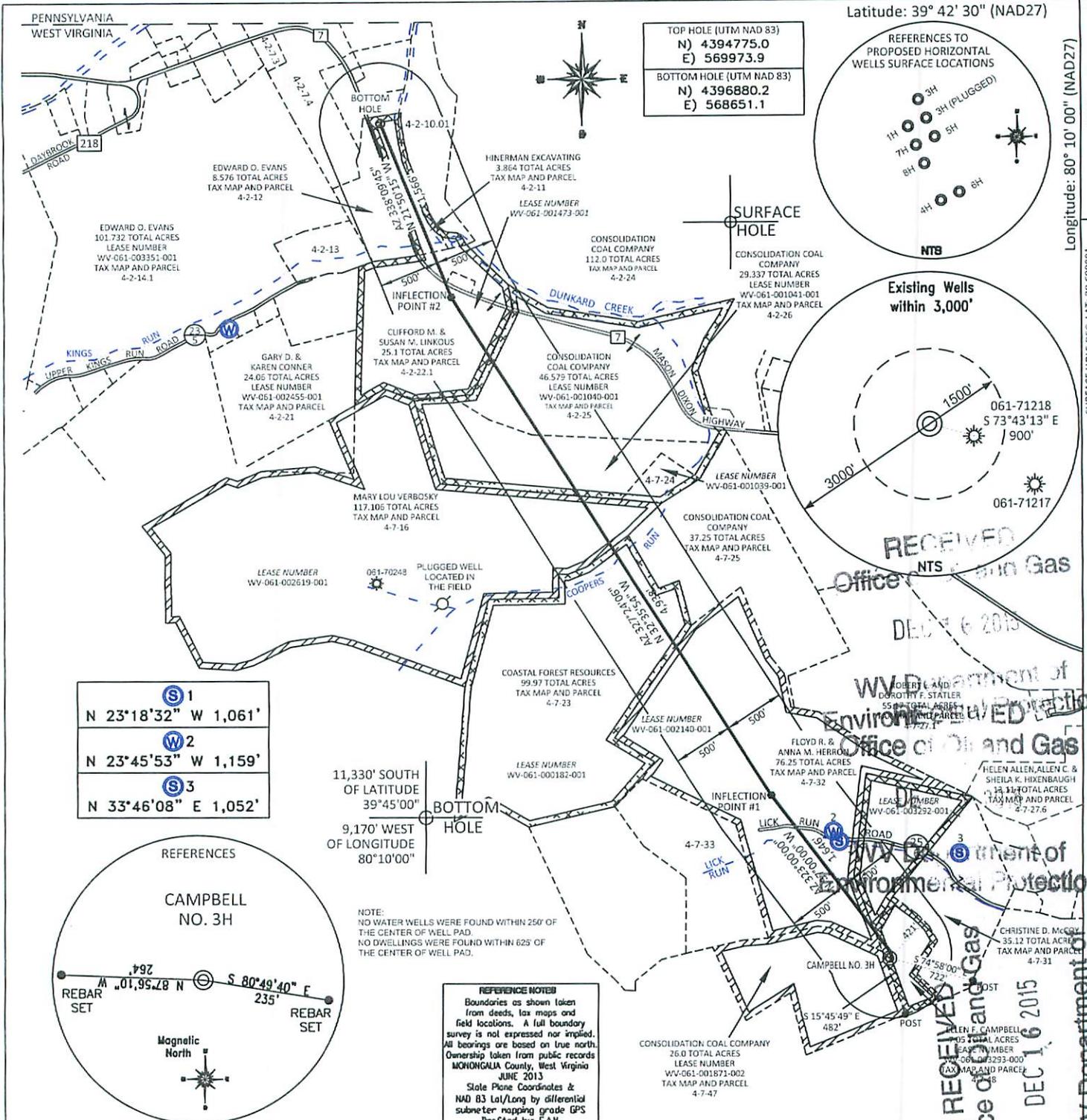
DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE
PLUG OFF FORMATION PERFORATE NEW FORMATION PLUG & ABANDON
CLEAN OUT & REPLUG OTHER CHANGE (SPECIFY): _____

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TVD: 8,118' TMD: 16,408.08'

WELL OPERATOR: NORTHEAST NATURAL ENERGY LLC DESIGNATED AGENT: JOHN ADAMS

ADDRESS: 707 VIRGINIA STREET EAST, SUITE 1200 ADDRESS: 707 VIRGINIA STREET EAST, SUITE 1200

CITY: CHARLESTON STATE: WV ZIP CODE: 25301 CITY: CHARLESTON STATE: WV ZIP CODE: 25301



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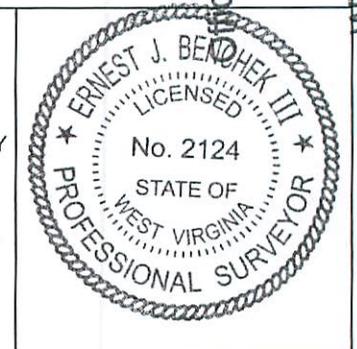
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Signed: [Signature]

L.L.S. #2124 : Ernest J. Benchek III



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OFFICE OF OIL & GAS
601 57TH STREET
CHARLESTON, WV 25304

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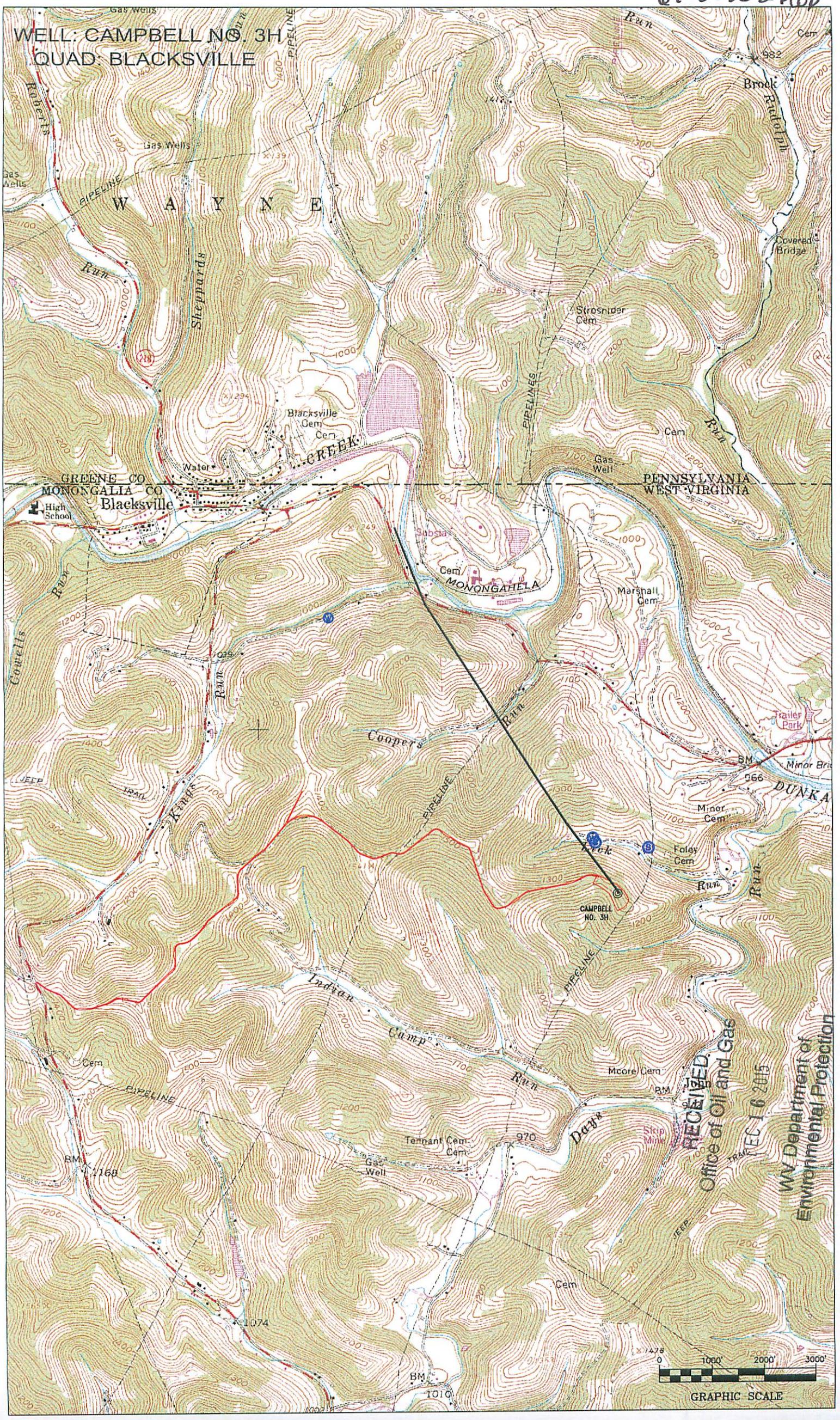
WELL OPERATOR: NORTHEAST NATURAL ENERGY LLC DESIGNATED AGENT: JOHN ADAMS
ADDRESS: 707 VIRGINIA STREET EAST, SUITE 1200 ADDRESS: 707 VIRGINIA STREET EAST, SUITE 1200
CITY: CHARLESTON STATE: WV ZIP CODE: 25301 CITY: CHARLESTON STATE: WV ZIP CODE: 25301

DATE: DECEMBER 14, 2015

OPERATOR'S WELL #: CAMPBELL NO. 3H

API WELL #: 47 61 01722 MOD
STATE COUNTY PERMIT

WELL: CAMPBELL NO. 3H
QUAD: BLACKSVILLE



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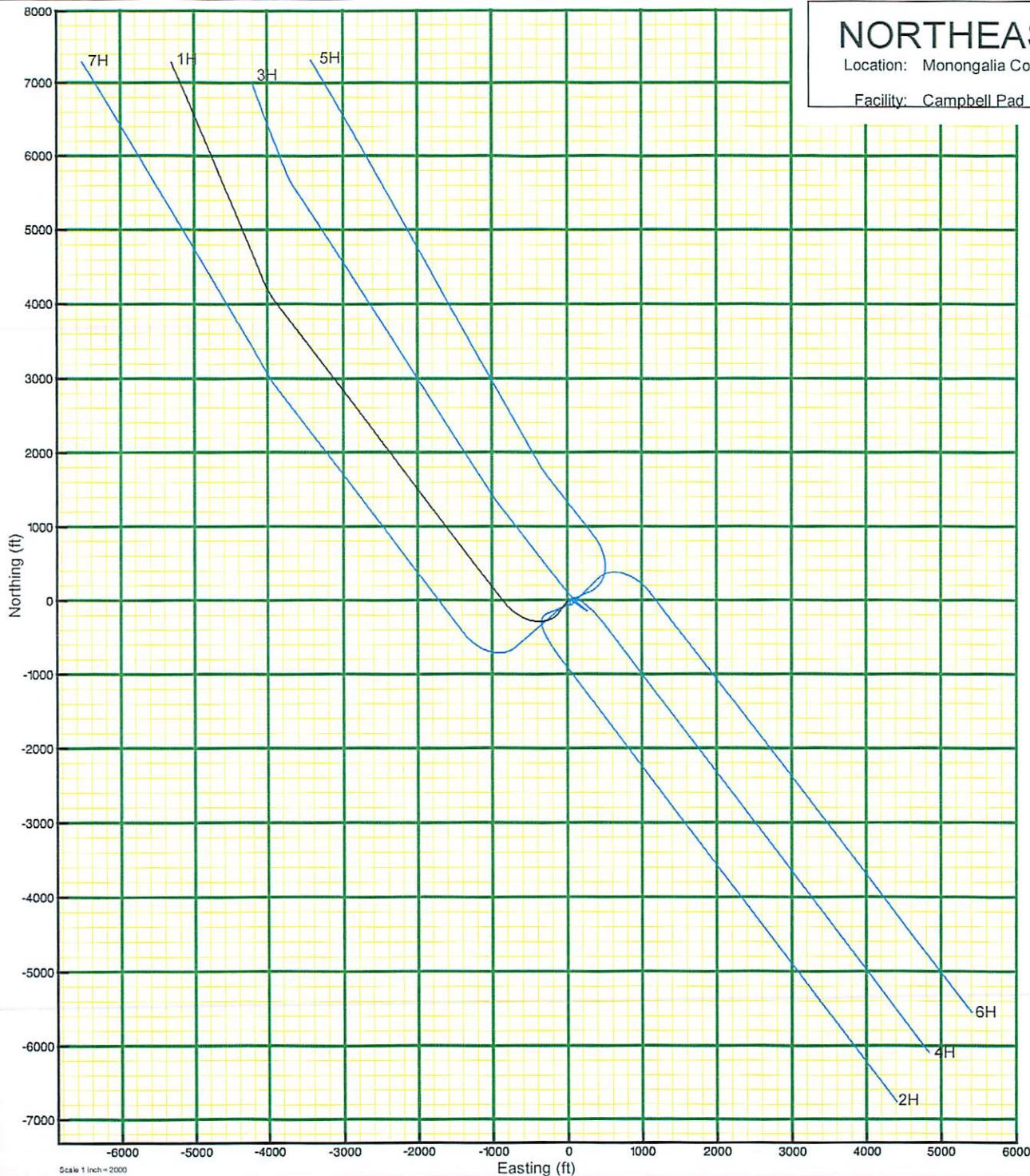


GRAPHIC SCALE

NORTHEAST NATURAL ENERGY, LLC

Location: Monongalia County, WV

Facility: Campbell Pad



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151-01722(K)