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west virginia department of environmental protection

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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](http://www.dep.wv.gov)

## PERMIT MODIFICATION APPROVAL

February 06, 2014

NOBLE ENERGY, INC.  
333 TECHNOLOGY DRIVE, SUITE 110  
CANONSBURG, PA 15317

Re: Permit Modification Approval for API Number 5101678 , Well #: WEB 22 CHS

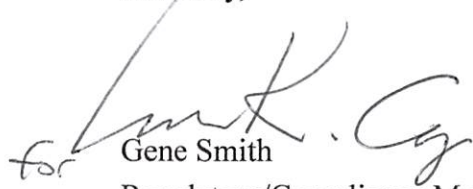
Drill pilot hole

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  
Regulatory/Compliance Manager  
Office of Oil and Gas

WW - 6B  
(3/13)

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

- 1) Well Operator: Noble Energy, Inc 494501907 Marshall Webster Majorsville  
Operator ID County District Quadrangle
- 2) Operator's Well Number: WEB 22 CHS Well Pad Name: WEB 22 HS
- 3 Elevation, current ground: 1325' Elevation, proposed post-construction: 1340.25'
- 4) Well Type: (a) Gas  Oil  Underground Storage   
Other \_\_\_\_\_  
(b) If Gas: Shallow  Deep   
Horizontal
- 5) Existing Pad? Yes or No: NO
- 6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):  
Target-Marcellus, Depth-6875', Thickness-48', Pressure-4569#
- 7) Proposed Total Vertical Depth: 7022' for pilot, log and then plug back to 6913'.
- 8) Formation at Total Vertical Depth: Onandaga then plug back to Marcellus with solid cement plug
- 9) Proposed Total Measured Depth: 14,758'
- 10) Approximate Fresh Water Strata Depths: 212', 295'
- 11) Method to Determine Fresh Water Depth: Offset well data
- 12) Approximate Saltwater Depths: None noted for offsets
- 13) Approximate Coal Seam Depths: 761' to 771' Pittsburgh
- 14) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated, drilling in pillar-see mine maps
- 15) Does proposed well location contain coal seams directly overlying or adjacent to an active mine? If so, indicate name and depth of mine: Yes, Bailey Mine at approx. 770'
- 16) Describe proposed well work: Drill the vertical depth to 99' into the Onandaga at an estimated total vertical depth of approximately 7022'-log, then plug back to 6913'.  
Drill Horizontal leg - stimulate and produce the Marcellus Formation. 6913-6875  
If we should encounter an unanticipated void we will install casing at a minimum of 20' below the void but not more than 100' below the void, set a basket and grout to surface.
- 17) Describe fracturing/stimulating methods in detail:  
The stimulation will be multiple stages divided over the lateral length of the well. Stage spacing is dependent upon engineering design. Slickwater fracturing technique will be utilized on each stage using sand, water, and chemicals. See attached list.
- 18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 18.5 acres
- 19) Area to be disturbed for well pad only, less access road (acres): 8.45 acres

modification

51-0167 8 MOD

noble energy				DRILLING WELL PLAN WEB-22C-HS (Marcellus HZ) Macellus Shale Horizontal Marshall County, WV						
Ground Elevation		1325'		WEB-22C SHL (Lat/Long)			(519824.36N, 1713953.99E) (NAD27)			
Azm		325°		WEB-22C LP (Lat/Long)			(520411.45N, 1713867.68E) (NAD27)			
WELLBORE DIAGRAM		325°		WEB-22C BHL (Lat/Long)			(526531.86N, 1709582.12E) (NAD27)			
HOLE	CASING	GEOLOGY	MD	TVD	MUD	CEMENT	CENTRALIZERS	CONDITIONING	COMMENTS	
36	30" 117#	Conductor	40	40	AIR	To Surface	N/A	Ensure the hole is clean at TD.	Stabilize surface fill/soil. Conductor casing = 0.375" wall thickness	
		Surface Casing	400	400	AIR	15.6 ppg Type 1 + 2% CaCl, 0.25# Lost Circ 30% Excess Yield = 1.18	Centralized every 3 joints to surface	Fill with KCl water once drilled to TD. Once casing is at setting depth, circulate a minimum of one hole volume prior to pumping cement.	Surface casing = 0.438" wall thickness Burst=2730 psi	
17 1/2	13-3/8" 54.5# J-55 BTC	Pittsburgh Coal	761	761	AIR	15.6 ppg Type 1 + 2% CaCl, 0.25# Lost Circ 30% Excess Yield = 1.18	Bow Spring on first 2 joints then every third joint to 100' form surface	Fill with KCl water once drilled to TD. Once casing is at setting depth, circulate a minimum of one hole volume prior to pumping cement.	Intermediate casing = 0.380" wall thickness Burst=2730 psi	
		Int. Casing	1220	1220	AIR	15.6ppg Class A +0.4% Ret, 0.15% Disp, 0.2% AntiFoam, 0.125#/sk Lost Circ 20% Excess Yield=1.19 To Surface	Bow spring centralizers every third joint to 100' feet from surface.	Fill with KCl water once drilled to TD. Once casing is at setting depth, circulate a minimum of one hole volume prior to pumping cement.	Casing to be ran 250' below the 5th Sand. Intermediate casing = 0.352" wall thickness Burst=3520 psi	
12 3/8	9-5/8" 36# J-55 LTC	Big Lime	1405	1405	AIR	15.6ppg Class A +0.4% Ret, 0.15% Disp, 0.2% AntiFoam, 0.125#/sk Lost Circ 20% Excess Yield=1.19 To Surface	Bow spring centralizers every third joint to 100' feet from surface.	Fill with KCl water once drilled to TD. Once casing is at setting depth, circulate a minimum of one hole volume prior to pumping cement.	Casing to be ran 250' below the 5th Sand. Intermediate casing = 0.352" wall thickness Burst=3520 psi	
		Big Injun	2007	2007						
		5th Sand Base	3106	3106						
		Int. Casing	3356	3356						
8.75" Vertical	5-1/2" 20# HCP-110 TXP BTC	Warren Sand		4567	8.0ppg - 9.0ppg SOBM	14.8ppg Class A 25:75:0 System +2.6% Cement extender, 0.7% Fluid Loss additive, 0.45% high temp retarder, 0.2% friction reducer	Rigid Bow Spring every third joint from KOP to TOC	Once at TD, circulate at max allowable pump rate for at least 6x bottoms up. Once on bottom with casing, circulate a minimum of one hole volume prior to pumping cement.	Production casing = 0.361" wall thickness Burst=12640 psi Note: Actual centralizer schedules may be changed due to hole conditions	
		Java		5240						
		Angola		5456						
		Rhinestreet		6088						
		Cashaqua		6523						
8.75" Curve	5-1/2" 20# HCP-110 TXP BTC	Middlesex		6622	12.0ppg- 12.5ppg SOBM	10% Excess Yield=1.27	Rigid Bow Spring every joint to KOP	Once at TD, circulate at max allowable pump rate for at least 6x bottoms up. Once on bottom with casing, circulate a minimum of one hole volume prior to pumping cement.	Production casing = 0.361" wall thickness Burst=12640 psi Note: Actual centralizer schedules may be changed due to hole conditions	
		West River		6654						
		Burkett		6710						
		Tully Limestone		6734						
8.75" - 8.5" Lateral	5-1/2" 20# HCP-110 TXP BTC	Hamilton		6760	12.0ppg- 12.5ppg SOBM	TOC >= 200' above 9.625" shoe	Rigid Bow Spring every joint to KOP	Once at TD, circulate at max allowable pump rate for at least 6x bottoms up. Once on bottom with casing, circulate a minimum of one hole volume prior to pumping cement.	Production casing = 0.361" wall thickness Burst=12640 psi Note: Actual centralizer schedules may be changed due to hole conditions	
		Marcellus		6875						
		TD	14758	6913						
		Onondaga		6923						

LP @ 6913' TVD / 7286' MD

8.75 / 8.5 Hole - Cemented Long String  
5-1/2" 20# HCP-110 TXP BTC

+/-7472' ft Lateral

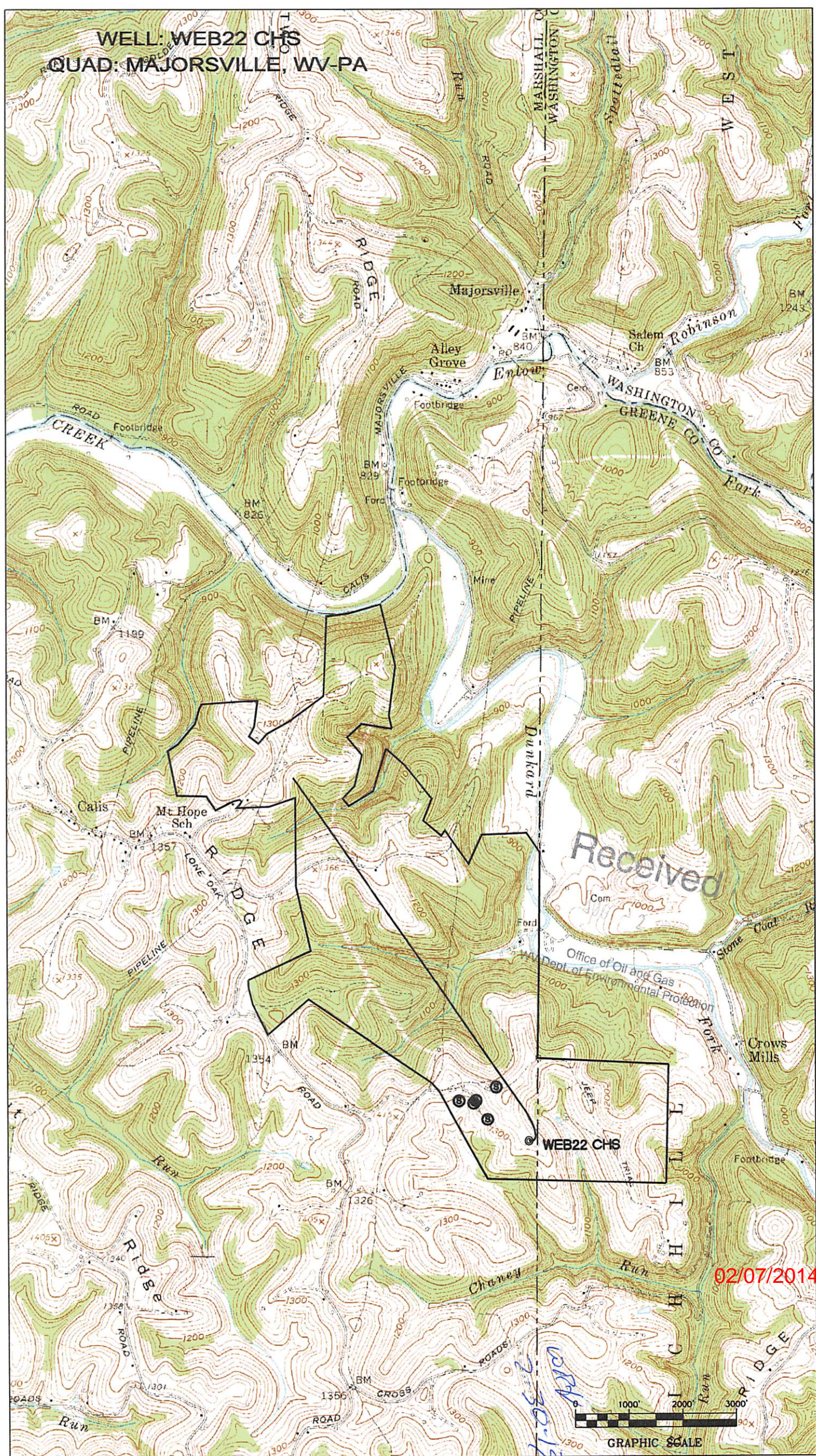
TD @ +/-6913' TVD  
+/-14758' MD

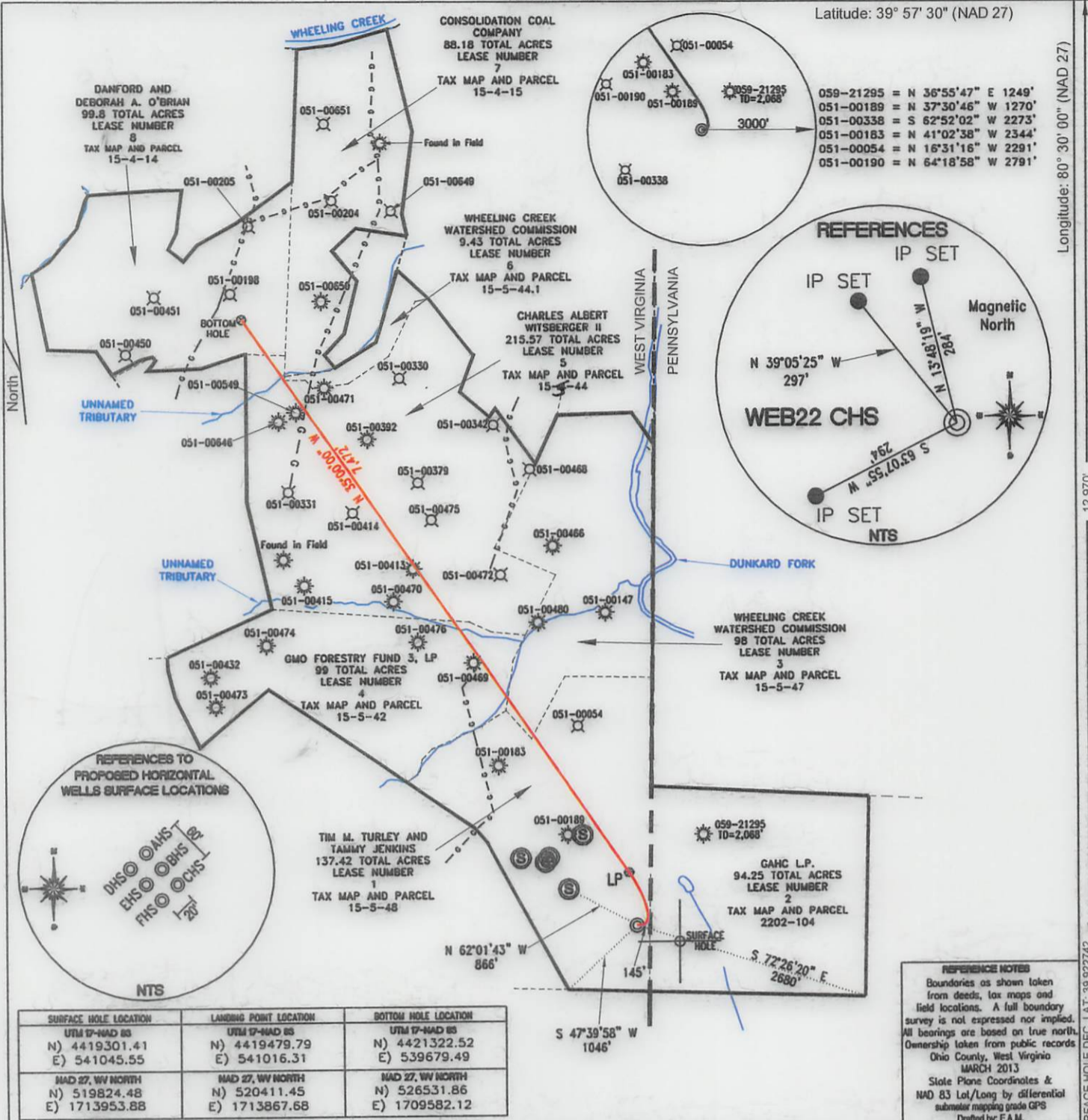
RECEIVED  
Office of Oil and Gas  
JAN 1 2014  
West Virginia Department of  
Environmental Protection

02/07/2014

51-0001678

WELL: WEB22 CHS  
QUAD: MAJORSVILLE, WV-PA

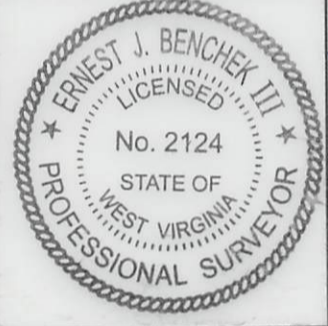




FILE #: NOB 001  
DRAWING #: 2166  
SCALE: PLAT - 1"=1600'  
TICK MARK - 1"=2000'  
MINIMUM DEGREE OF ACCURACY: 1/200  
PROVEN SOURCE OF ELEVATION: SUBMETER MAPPING GRADE GPS

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: \_\_\_\_\_  
L.L.S. #2124 : Ernest J. Benček 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 Diposal  Production  Deep  
 Gas  Liquid Injection  Storage  Shallow

WATERSHED: Dunkard Fk. HUC 10  
COUNTY/DISTRICT: MARSHALL / WEBSTER  
SURFACE OWNER: TIM M. TURLEY AND TAMMY JENKINS  
OIL & GAS ROYALTY OWNER: TIM M. TURLEY AND TAMMY JENKINS  
LEASE NUMBERS: \_\_\_\_\_

DATE: JUNE 3, 2013  
OPERATOR'S WELL #: WEB22 CHS  
API WELL #: 47 51 01678  
STATE COUNTY PERMIT #6A

ELEVATION: 1,325'  
QUADRANGLE: MAJORSVILLE WV-PA  
ACREAGE: 137.42 +/-  
ACREAGE: 841.65 +/-

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: NOBLE ENERGY, INC.  
ADDRESS: 333 TECHNOLOGY DRIVE SUITE 116  
CITY: CANONSBURG STATE: PA ZIP CODE: 15317

ESTIMATED DEPTH: TVD: 6,913' TMD: 14,758'  
DESIGNATED AGENT: STEVEN M. GREEN  
ADDRESS: 500 VIRGINIA STREET EAST  
CITY: CHARLESTON STATE: WV ZIP CODE: 25301

SURFACE HOLE DEC. LAT: 39.922742 SURVEYED LAT: 39° 55' 21.9"

WEB22  
7-30-13

02/07/2014