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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

August 20, 2014

NOBLE ENERGY, INC.  
333 TECHNOLOGY DRIVE, SUITE 116  
CANONSBURG, PA 15317

Re: Permit Modification Approval for API Number 5101761 , Well #: MND 6 EHS

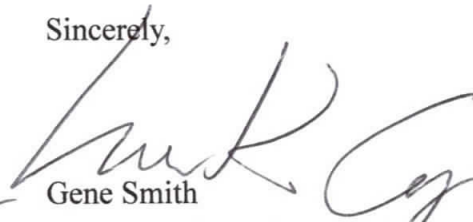
Added 16" casing

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

51-01761 MOD



Office of Oil & Gas  
601 57<sup>th</sup> street, SE  
Charleston, WV 25304-2345

August 14, 2014

Re: Casing Program Modification MND 6 Wells

To Office of Oil and Gas:

Enclosed please find a request to modify the casing programs adding a second conductor string due to hitting an unexpected layer of River Pebble for the Following wells:

MND 6 AHS API# 47-051-01746  
MND 6 BHS API# 47-051-01744  
MND 6 CHS API# 47-051-01745  
MND 6 DHS API # 47-051-01762  
MND 6 EHS API # 47-051-01761  
MND 6 FHS API # 47-051-01763  
MND 6 MHS API # 47-051-01765

Office of Oil and Gas Inspector, Jim Nicholson has given verbal approval and signed the revised WW-6B.

Should you have any questions or desire additional information, please do not hesitate to contact me at [dswiger@nobleenergyinc.com](mailto:dswiger@nobleenergyinc.com) or 724-820-3061.

Sincerely,

A handwritten signature in black ink, appearing to read 'Dee Swiger', written over a circular scribble.

Dee Swiger  
Regulatory Analyst III

DS/  
Enclosures:

RECEIVED  
Office of Oil and Gas

AUG 18 2014

WV Department of  
Environmental Protection

4705101761

WW-6B  
(9/13)

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 Franklin Powhatan Point  
Operator ID County District Quadrangle

2) Operator's Well Number: MND 6 EHS Well Pad Name: MND 6

3) Farm Name/Surface Owner: Consolidation Coal Company Public Road Access: CR 7/4-Fish Creek Rd

4) Elevation, current ground: 722' Elevation, proposed post-construction: 721'

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

(b) If Gas Shallow  Deep   
Horizontal

6) Existing Pad: Yes or No No-but has been permitted

*JK 4/29/14*

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s):  
Marcellus at 5895' and 55' in thickness. Anticipated pressure at 3927#.

8) Proposed Total Vertical Depth: 5940'

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 15,804'

11) Proposed Horizontal Leg Length: 10,677'

12) Approximate Fresh Water Strata Depths: 128' and 265'

13) Method to Determine Fresh Water Depths: Offset well data

14) Approximate Saltwater Depths: None noted in offsets

15) Approximate Coal Seam Depths: 284' to 294'

16) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated, drilling in pillar-mine maps attached

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

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Office of Oil and Gas

(a) If Yes, provide Mine Info: Name: 1082' to nearest active mining  
Depth: Base at 294' at deepest point  
Seam: Pittsburgh  
Owner: Murray American Energy (Previously Murray Energy)

MAY 08 2014

WV Department of  
Environmental Protection

18)

**CASING AND TUBING PROGRAM**

APP 47-051-01761

<u>TYPE</u>	<u>Size</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft. (lb/ft)</u>	<u>FOOTAGE: For Drilling</u>	<u>INTERVALS: Left in Well</u>	<u>CEMENT: Fill-up (Cu. Ft.)</u>
Conductor 1	20"	New	LS	117#	40'	40'	CTS
Conductor 2	16"	New	LP	65.5#	120'	120'	CTS
Coal / F.W.	13 3/8"	New	LS	94#	694'	694'	CTS
Intermediate	9 5/8"	New	J-55	36#	2017'	2017'	CTS
Production	5 1/2"	New	P110	20#	15,804'	15 804'	TOC 200' above 9 5/8" casing shoe
Tubing							
Liners							

JIN 8/13/14

<u>TYPE</u>	<u>Size</u>	<u>Wellbore Diameter</u>	<u>Wall Thickness</u>	<u>Burst Pressure</u>	<u>Cement Type</u>	<u>Cement Yield (cu. ft./k)</u>
Conductor 1	20"	26"	.375		GTS	
Conductor 2	16"	18"	.375		GTS	
Coal / F.W.	13 3/8"	17 1/2"	.380	2730	Type 1/Class A	1.2
Intermediate	9 5/8"	12 3/8"	.352	3520	Type 1/Class A	1.19
Production	5 1/2"	8 3/4" & 8 1/2"	.361	12,640	Type 1/Class A	1.27
Tubing						
Liners						

**PACKERS**

Kind:				
Sizes:				
Depths Set:				

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Office of Oil and Gas

AUG 18 2014

WV Department of  
Environmental Protection



JIN 8/13/14

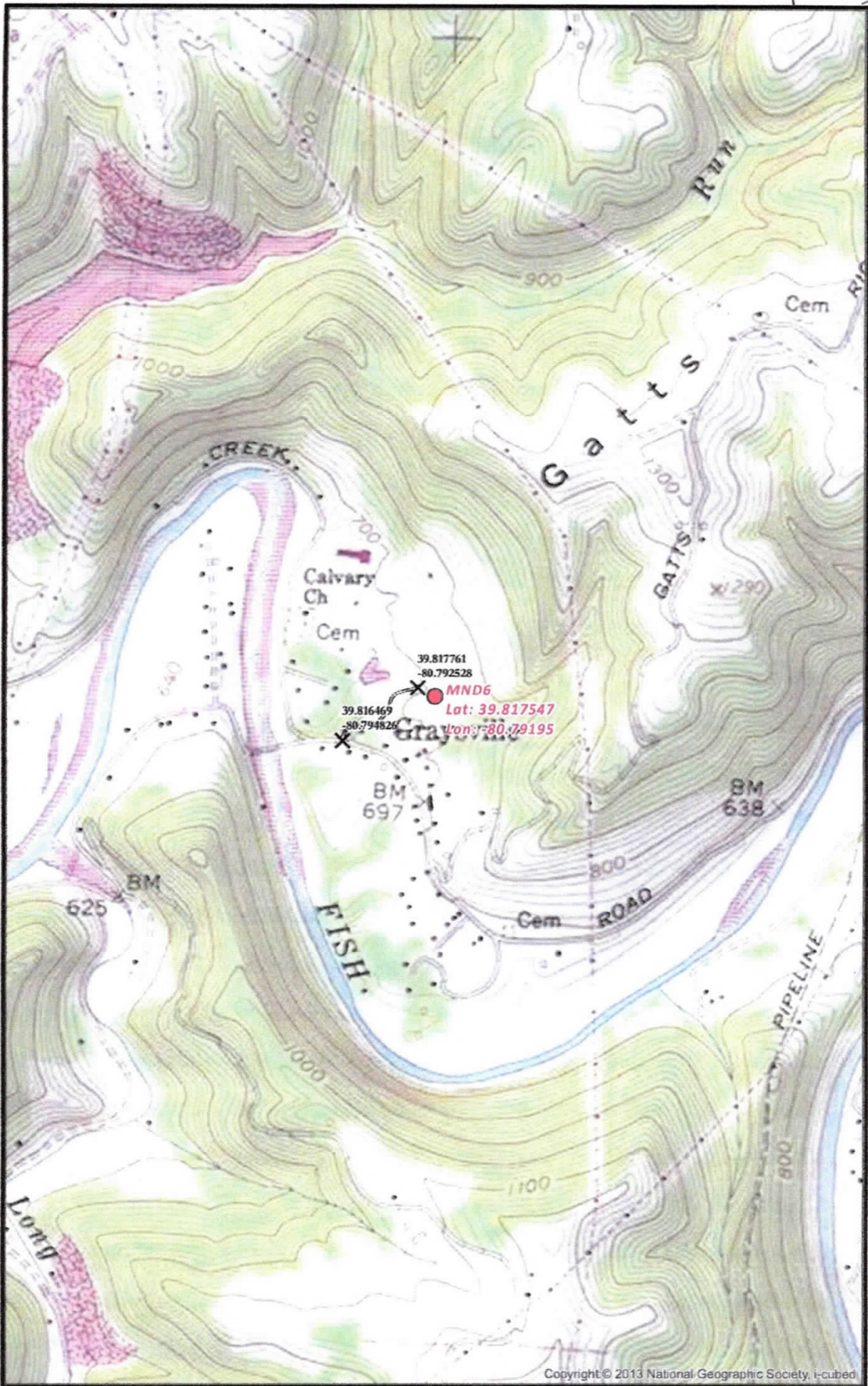


DRILLING WELL PLAN		MND-6E HS (Marcellus HZ) Marcellus Shale Horizontal Marshall County, WV		MND-6E SHL (Lat/Long) (482515.8N, 1637114.62E) (NAD27)		MND-6E LP (Lat/Long) (482390.81N, 1635864.69E) (NAD27)		MND-6E BHL (Lat/Long) (489901.61N, 1630605.58E) (NAD27)		CENTRALIZERS		CONDITIONING		COMMENTS					
Ground Elevation		722'		325°		BASE		MUD		CEMENT		CENTRALIZERS		CONDITIONING		COMMENTS			
Azm		722'		325°		BASE		MUD		CEMENT		CENTRALIZERS		CONDITIONING		COMMENTS			
WELLBORE DIAGRAM		HOLE		CASING		GEOLOGY		TOP		MUD		CEMENT		CENTRALIZERS		CONDITIONING		COMMENTS	
26	20" 94#	Conductor	40	40	AIR	To Surface	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
17 1/2	13-3/8" 54.5# J-55 BTC	Pittsburgh Coal Surface Casing	284 694	294 694	AIR	15.6 ppg Type 1 + 2% CaCl <sub>2</sub> , 0.25# Lost Circ 30% Excess Yield = 1.18	Bow Spring on first 2 joints then every third joint to 100' form surface	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8.75" Vertical	5-1/2" 23# HCP-110 TXP BTC	Speechley Java Pipe Creek Angola Rheinstreet Cashaqua Middlesex West River Burdett Tully Limestone Hamilton Marcellus TD Onontaga	3019 4570 4665 4752 5334 5655 5727 5750 5811 5836 5860 5895 5950 15804 MD 5950	3065 4665 4752 5334 5655 5727 5750 5811 5836 5860 5895 5950 5940 TVD SOBIM	8.0ppg - 9.0ppg SOBIM	+2.6% Cement extender, 0.7% Fluid Loss additive, 0.45% high temp retarder, 0.2% friction reducer 10% Excess Yield=1.27 TOC >= 200' above 9.625' shoe	Rigid Bow Spring every third joint from KOP to TOC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
																			8.75" Curve Lateral
8.75" - 8.5" Lateral	5-1/2" 20# HCP-110 TXP BTC	Tully Limestone Hamilton Marcellus TD Onontaga	5836 5860 5895 5950 15804 MD 5950	12.0ppg- 12.5ppg SOBIM	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 10% Excess Yield=1.27 TOC >= 200' above 9.625' shoe	Rigid Bow Spring every joint to KOP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

LP @ 5940' TVD / 6634' MD  
8.75' / 8.5' Hole - Cemented Long String  
5-1/2" 20# HCP-110 TXP BTC  
+/-9170' ft Lateral  
TD @ +/-5940' TVD  
+/-15804' MD  
X=centralizers.

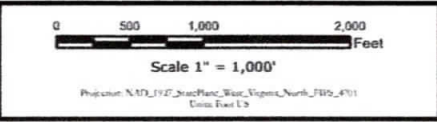
51-01761

plat spotted ✓



**MND6 SITE SAFETY PLAN**  
**- SITE WELL LOCATION -**

X Access Road Intersection    ● Well Pad Center  
 - - - - - Proposed Access Road



**noble energy**

Disclaimer: All data is licensed for use by Noble Energy Inc. use only.

Date: 12/10/2013  
 Author: Christopher Glover

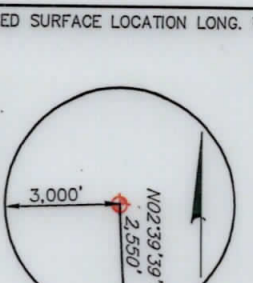
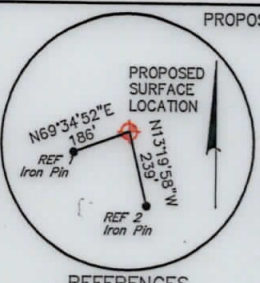
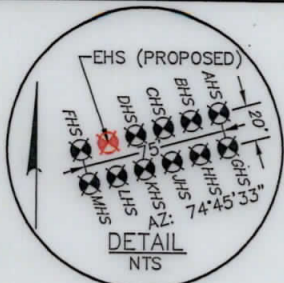
1/6

Document Path: G:\Denver\GIS-Denver\Projects\District\_30\Appalachia\X00s\EHSA\Permitting\Youngsville\MND6\030\_PA\_WV\_MND6\_Well\_Location.mxd

RECEIVED  
 Office of Oil and Gas  
 APR 29 2014  
 WV Department of  
 Environmental Protection

69'  
Longitude: W 80°47'30"

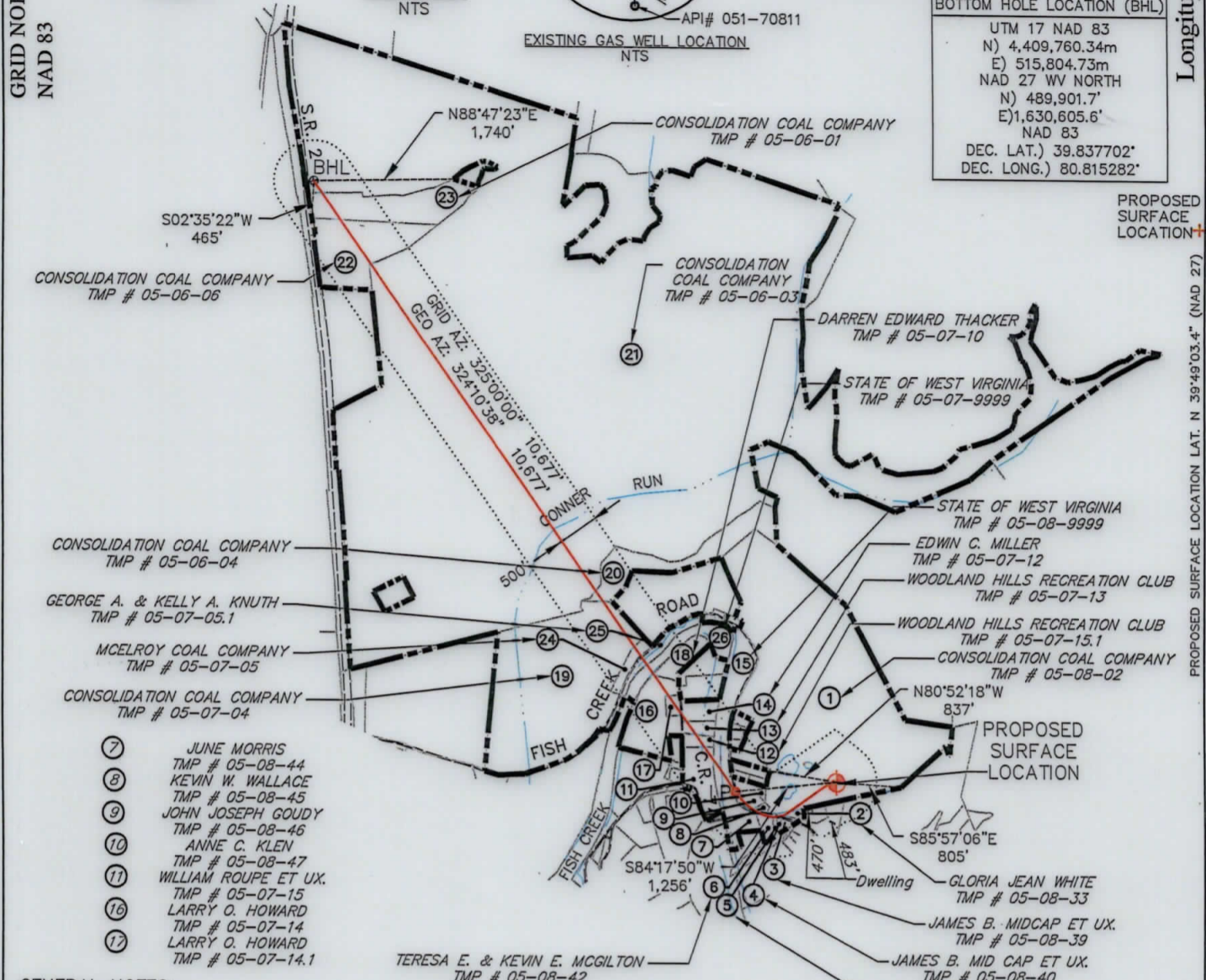
PROPOSED SURFACE LOCATION LONG. W 80°47'30.9" (NAD 27) Latitude: N 39°50'00"



SURFACE LOCATION (SHL)	LANDING POINT (LP)
UTM 17 NAD 83 N) 4,407,543.37m E) 517,825.32m NAD 27 WV NORTH N) 482,515.8' E) 1,637,114.6' NAD 83 DEC. LAT.) 39.817687° DEC. LONG.) 80.791727°	UTM 17 NAD 83 N) 4,407,498.92m E) 517,445.17m NAD 27 WV NORTH N) 482,390.8' E) 1,635,864.7' NAD 83 DEC. LAT.) 39.817295° DEC. LONG.) 80.796170°

BOTTOM HOLE LOCATION (BHL)
UTM 17 NAD 83 N) 4,409,760.34m E) 515,804.73m NAD 27 WV NORTH N) 489,901.7' E) 1,630,605.6' NAD 83 DEC. LAT.) 39.837702° DEC. LONG.) 80.815282°

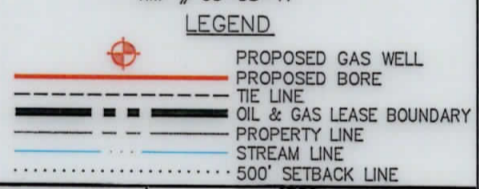
GRID NORTH  
NAD 83



- 7 JUNE MORRIS  
TMP # 05-08-44
- 8 KEVIN W. WALLACE  
TMP # 05-08-45
- 9 JOHN JOSEPH GOUDY  
TMP # 05-08-46
- 10 ANNE C. KLEN  
TMP # 05-08-47
- 11 WILLIAM ROUPE ET UX.  
TMP # 05-07-15
- 16 LARRY O. HOWARD  
TMP # 05-07-14
- 17 LARRY O. HOWARD  
TMP # 05-07-14.1

**GENERAL NOTES:**

1. THE LOCATION OF BOUNDARY LINES SHOWN HEREON ARE BASED ON RECORD DEED, PLATS, AND TAX MAPS BEST FIT TO FOUND FIELD EVIDENCE AND AERIAL PHOTOS, UNLESS OTHERWISE NOTED.
2. THIS PLAT DOES NOT REPRESENT AN ACTUAL BOUNDARY SURVEY OF THE INDIVIDUAL PARCELS.
3. THERE ARE NO EXISTING WATER WELLS OR DEVELOPED SPRINGS WITHIN 250' OF PROPOSED WELL.
4. PROPOSED WELL IS GREATER THAN 100' FROM PERENNIAL STREAM, WETLAND, POND, RESERVOIR OR LAKE.
5. THERE ARE NO NATIVE TROUT STREAMS WITHIN 300' OF PROPOSED WELL.
6. THERE ARE TWO DWELLINGS LOCATED WITHIN 650' OF PROPOSED WELLBORE.
7. THE SURROUNDING LANDS ARE BEING SERVED BY PUBLIC WATER BY THE GRAND VIEW DOOLIN WATER SYSTEM PROVIDED BY MARSHALL COUNTY PUBLIC HEALTH AND SANITATION DIVISION.



FILE #: 093842010  
 DRAWING #: 093842010\_SV-Plat  
 SCALE: PLAT & TICK: 1" = 2,000'  
 MINIMUM DEGREE OF ACCURACY: 1/200  
 PROVEN SOURCE OF ELEVATION: NGS (CORS)

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 RULES ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

SIGNED: Craig R. West  
 R.P.E.: \_\_\_\_\_ L.L.S.: 2241



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS  
 WVDEP  
 OFFICE OF OIL & GAS  
 601 57TH STREET  
 CHARLESTON, WV 25304



DATE: FEBRUARY 24, 2014  
 OPERATOR'S WELL #: MND 6 EHS  
 API WELL #: 47 051 01761 HcA  
 STATE COUNTY PERMIT

WELL TYPE:  OIL  GAS  WASTE DISPOSAL  LIQUID INJECTION  PRODUCTION  STORAGE  DEEP  SHALLOW

WATERSHED: FISH CREEK ELEVATION: 722'

COUNTY/DISTRICT: MARSHALL / FRANKLIN QUADRANGLE: POWHATAN POINT, OHIO-W.VA

SURFACE OWNER: CONSOLIDATION COAL COMPANY ACREAGE: 136.587±

OIL & GAS ROYALTY OWNER: CNX GAS COMPANY LLC and NOBLE ENERGY, INC. ACREAGE: \_\_\_\_\_

CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  PERFORATE NEW FORMATION  PLUG & ABANDON

DRILL  PLUG OFF OLD FORMATION  CLEAN OUT & REPLUG  OTHER CHANGE (SPECIFY): \_\_\_\_\_

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TVD: 5,940 ft. TMD: 15,804 ft.

WELL OPERATOR: NOBLE ENERGY, INC. DESIGNATED AGENT: STEVE M. GREEN

ADDRESS: 333 TECHNOLOGY DRIVE, SUITE 116 ADDRESS: 500 VIRGINIA STREET EAST, UNITED CENTER SUITE 590

CITY: CANONSBURG STATE: PA ZIP CODE: 15317 CITY: CHARLESTON STATE: WV ZIP CODE: 25301



CITY: CANONSBURG STATE: PA ZIP CODE: 15317 CITY: CHARLESTON STATE: WV ZIP CODE: 25301

WELL OPERATOR: NOBLE ENERGY INC. ADDRESS: 333 TECHNOLOGY DRIVE, SUITE 118

DESIGNATED AGENT: STEVE M. GREEN

ESTIMATED DEPTH: TVD: 5,940 ft. TMD: 15,804 ft.

WELL TYPE:  OIL  GAS  WASTE DISPOSAL  LIQUID INJECTION  PRODUCTION  STORAGE  DEEP  SHALLOW

WATERSHED: FISH CREEK

SURFACE OWNER: CONSOLIDATION COAL COMPANY

COUNTY/DISTRICT: MARSHALL / FRANKLIN

QUADRANGLE: POWHATAN POINT-OHIO-W.VA

ACREAGE: 136.587±

ACREAGE:

PERMITS:  DRILL  PLUG OFF OLD FORMATION  CLEAN OUT & REPLUG  OTHER CHANGE (SPECIFY):

CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  PERFORATE NEW FORMATION  PLUG & ABANDON

DATE: FEBRUARY 24, 2014

OPERATOR'S WELL #: MND 8 EHS

API WELL #: 47

STATE: COUNTY: PERMIT: **01761**

WV

WELL LOCATION: 333 TECHNOLOGY DRIVE, SUITE 118

ADDRESS: 500 VIRGINIA STREET EAST, UNITED CENTER SUITE 500

CITY: CHARLESTON STATE: WV ZIP CODE: 25301

DESIGNATED AGENT: STEVE M. GREEN

ESTIMATED DEPTH: TVD: 5,940 ft. TMD: 15,804 ft.

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WATERSHED: FISH CREEK

SURFACE OWNER: CONSOLIDATION COAL COMPANY

COUNTY/DISTRICT: MARSHALL / FRANKLIN

QUADRANGLE: POWHATAN POINT-OHIO-W.VA

ACREAGE: 136.587±

ACREAGE:

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DATE: FEBRUARY 24, 2014

OPERATOR'S WELL #: MND 8 EHS

API WELL #: 47

STATE: COUNTY: PERMIT: **01761**

WV

PROFESSIONAL SURVEYOR  
STATE OF WEST VIRGINIA  
No. 5241  
CRAIG ROBERT WEST  
LICENSED

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS  
PLAN IS CORRECT TO THE BEST OF MY KNOWLEDGE AND  
BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY  
LAW AND THE RULES ISSUED AND PRESCRIBED BY  
THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

*Craig R. West*  
C.R. WEST  
L.L.S.: 5241

OF ELEVATION: NGS (GORS)

PROVEN SOURCE

OF ACCURACY: 1/500

MINIMUM DEGREE

SCALE: PLAT & TICK: 1" = 5,000'

DRAWING #: 093842010\_2V-Plat

FILE #: 093842010

WATER SYSTEM PROVIDED BY MARSHALL COUNTY PUBLIC HEALTH AND SANITATION DIVISION.

7. THE SURROUNDING LANDS ARE BEING SERVED BY THE GRAND VIEW DOWLIN

6. THERE ARE TWO DWELLINGS LOCATED WITHIN 650' OF PROPOSED WELLBORE.

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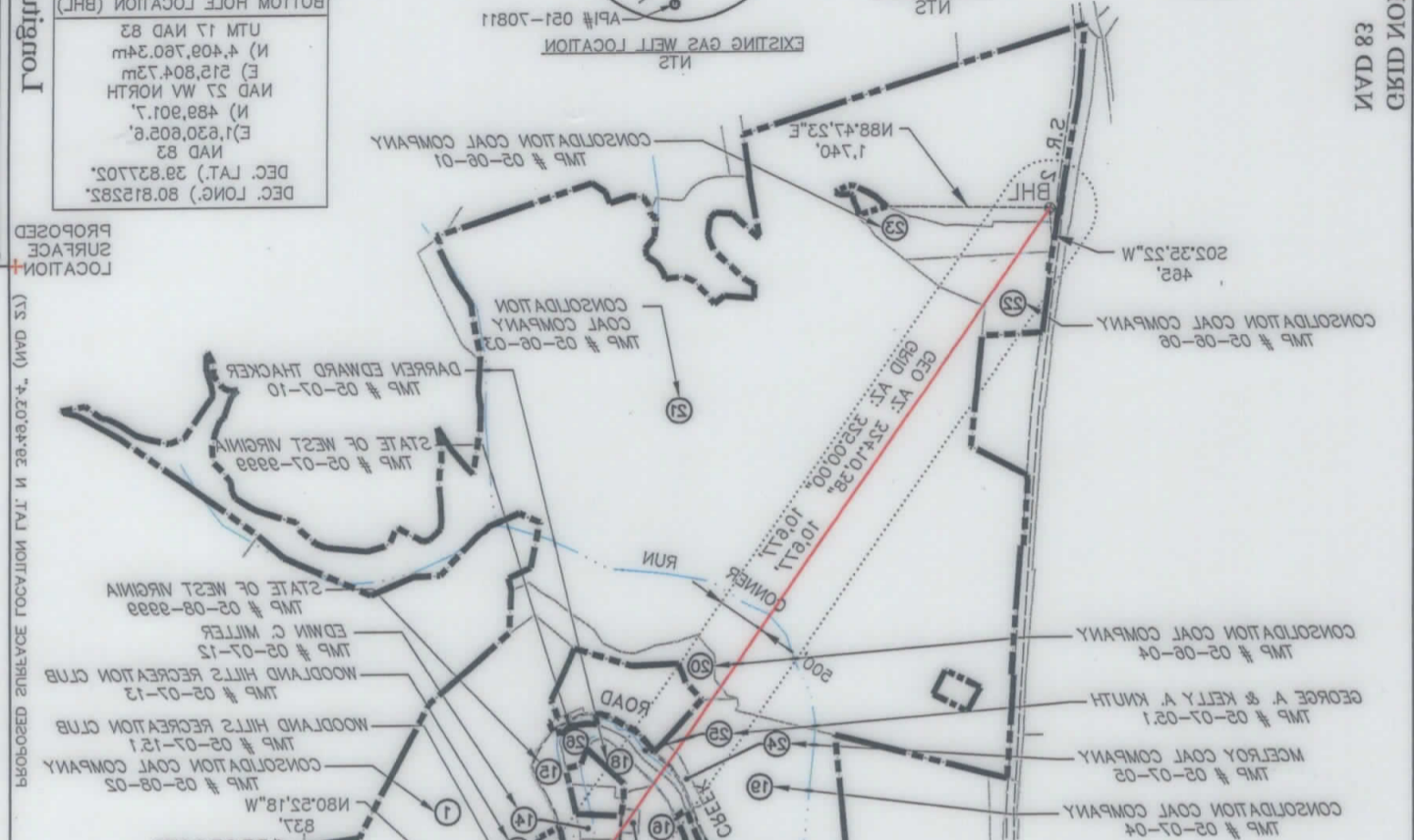
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GENERAL NOTES:

- 7. JUNE MORRIS  
TMP # 02-08-44
- 8. KEVIN W. WALLACE  
TMP # 02-08-45
- 9. JOHN JOSEPH CONDY  
TMP # 02-08-46
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TMP # 02-07-15
- 12. LARRY O. HOWARD  
TMP # 02-07-14
- 13. LARRY O. HOWARD  
TMP # 02-07-14.1



PROPOSED SURFACE LOCATION LONG. W 80°47'30.9" (NAD 27) Latitude: N 39°50'00"

PROPOSED SURFACE LOCATION (LP)

UTM 17 NAD 83  
(N) 4,407,498.92m  
(E) 517,445.17m  
NAD 27 W. NORTH  
(N) 482,390.8  
(E) 1,632,884.7  
NAD 83  
DEC. LAT. 39.817252.  
DEC. LONG. 80.796120.

SURFACE LOCATION (SHL)

UTM 17 NAD 83  
(N) 4,407,243.37m  
(E) 517,825.32m  
NAD 27 W. NORTH  
(N) 482,512.8  
(E) 1,637,114.6  
NAD 83  
DEC. LAT. 39.817877.  
DEC. LONG. 80.791227.

BOTTOM HOLE LOCATION (BHL)

UTM 17 NAD 83  
(N) 4,409,760.34m  
(E) 512,804.73m  
NAD 27 W. NORTH  
(N) 488,901.7  
(E) 1,630,602.6  
NAD 83  
DEC. LAT. 39.827702.  
DEC. LONG. 80.812582.

REFERENCES

NTS

NTS

DETAIL

NTS