



---

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

October 07, 2014

PDC MOUNTAINEER LLC  
POST OFFICE BOX 26  
BRIDGEPORT, WV 26330

Re: Permit Modification Approval for API Number 3305741 , Well #: MAXWELL 3HM

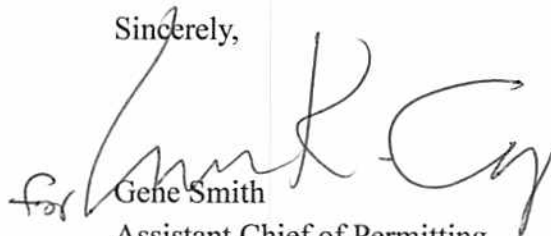
**Drill pilot hole**

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  
Assistant Chief of Permitting  
Office of Oil and Gas



**PDC MOUNTAINEER**

PDC Mountaineer, LLC  
120 Genesis Boulevard  
Bridgeport, WV 26330  
304-842-3597  
304-808-0913 (fax)

September 4, 2014

Office of Oil and Gas  
601 57<sup>th</sup> Street, SE  
Charleston, WV 25304-2345  
Attn: Mr. Justin Nottingham

Re: Permit Modification – 47-033-05741MOD; Maxwell 3HM

Dear Mr. Nottingham,

PDC Mountaineer, LLC respectfully requests approval for a permit modification for the subject well in order properly log and evaluate the Marcellus Shale. Enclosed herewith is our amended WW-6B signed off by Mr. Sam Ward, inspector for Harrison County.

Should you have any questions please contact me at the number above, my direct extension is 6558. Thank you in advance for your consideration.

Sincerely,

Steven P. Johnson  
Senior Regional Landman / Agent

Enc.

RECEIVED  
Office of Oil and Gas  
SEP 08 2014  
WV Department of  
Environmental Protection

10/10/2014



WW-6B  
(9/13)

18)

**CASING AND TUBING PROGRAM**

| TYPE         | Size    | New or Used | Grade | Weight per ft. (lb/ft) | FOOTAGE: For Drilling | INTERVALS: Left in Well | CEMENT: Fill-up (Cu. Ft.) |
|--------------|---------|-------------|-------|------------------------|-----------------------|-------------------------|---------------------------|
| Conductor    | 20"     | N           | H-40  | 94 lb.                 | 65'                   | 65'                     | Cement to Surface         |
| Fresh Water  | 13 3/8" | N           | H-40  | 48 lb.                 | 500'                  | 500'                    | Cement to Surface         |
| Coal         |         |             |       |                        |                       |                         |                           |
| Intermediate | 9 5/8"  | N           | J-55  | 40 lb.                 | 2,850'                | 2,850'                  | Cement to Surface         |
| Production   | 5 1/2"  | N           | P-110 | 20 lb.                 | 13,695'               | 13,695'                 | 2,790 minimum             |
| Tubing       |         |             |       |                        |                       |                         |                           |
| Liners       |         |             |       |                        |                       |                         |                           |

SDW  
9/13/2014

| TYPE         | Size    | Wellbore Diameter | Wall Thickness | Burst Pressure | Cement Type | Cement Yield (cu. ft./k) |
|--------------|---------|-------------------|----------------|----------------|-------------|--------------------------|
| Conductor    | 20"     | 24"               | .756           | 1,500          | 1           | 1.06                     |
| Fresh Water  | 13 3/8" | 17 1/2"           | .66            | 1,730          | 1           | 1.36                     |
| Coal         |         |                   |                |                |             |                          |
| Intermediate | 9 5/8"  | 12 1/4"           | .790           | 3,950          | 1           | 1.38                     |
| Production   | 5 1/2"  | 8 1/2" / 8 3/4"   | .722           | 12,640         | H           | 1.18                     |
| Tubing       |         |                   |                |                |             |                          |
| Liners       |         |                   |                |                |             |                          |

**PACKERS**

|             |  |  |  |  |   |
|-------------|--|--|--|--|---|
| Kind:       |  |  |  |  | RECEIVED                                  |
| Sizes:      |  |  |  |  | Office of Oil and Gas                     |
| Depths Set: |  |  |  |  | SEP 08 2014                               |
|             |  |  |  |  | WV Department of Environmental Protection |

WW-6B  
(9/13)

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

A conductor rig will move in and drill a 30" hole to programmed conductor depth, then run 20" casing and grout cement back to surface. The conductor rig will move out and the drilling rig will move in and rig up. The drilling rig will then spud a 17 1/2" hole and drill to programmed fresh water casing (surface) depth, run 13 3/8" casing and cement to surface. The rig will continue drilling a 12 1/4" intermediate hole to programmed depth, run 9 5/8" casing and cement to surface. The rig will then continue to drill a 8 3/4" hole vertically to a programmed depth, run wireline logs and then plug back the well with the programmed cement to the designed KOP. We plan on drilling 90-99 feet into the Huntersville Chert. We will then plug back 1,709' with a minimum of 620 sacks of cement. We will then wait 24 hours to kick off the cement plug and then start drilling the curve and lateral section to the programmed TMD, run 5 1/2" casing and cement according to the program.

*solid cement plug - LKC*

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

Slickwater frac, pumping 85 BBL/min. maximum. Each stage to be comprised of approximately 10,000 BBL of water and 400,000 lbs of sand. Maximum pressure of 9000 psi

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 25.42

22) Area to be disturbed for well pad only, less access road (acres): 14.2

23) Describe centralizer placement for each casing string:

Conductor: None  
Surface: 1 every 90' of pipe and a basket  
Intermediate: 1 every 7 joints and a basket  
Production: 1 every 12 Joints in the vertical section, then 1 every 2 joints in the horizontal section

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

See attached sheet.

RECEIVED  
Office of Oil and Gas

25) Proposed borehole conditioning procedures:

Surface and intermediate holes are cleaned with air. Production hole is circulated with weighted drilling mud for at least 4 hours with high viscosity sweeps ran intermittently.

SEP 08 2014  
WV Department of  
Environmental Protection

\*Note: Attach additional sheets as needed.



**PDC MOUNTAINEER**

PDC Mountaineer, LLC  
120 Genesis Boulevard, PO Box 26  
Bridgeport, WV 26330

304-842-3597  
304-808-0913 (fax)

**CEMENT ADDITIVES ASSOCIATED WITH EACH CEMENT TYPE:**

**SURFACE:** Type 1 cement + 2% CaCl + 0.25 pps Cello Flake

**INTERMEDIATE:** Pre-Flush Mud Clean 1  
Type 1 cement + 2% CaCl + 0.25 pps Cello Flake

**PRODUCTION:** Pre-Flush Mud Clean 1

**LEAD** Class H cement + 0.1% bwoc R-3 + 0.25% bwoc CD-32 + 1.2% bwoc FL-62  
+ 0.1% bwoc ASA-301 + 0.4% bwoc Sodium Metasilicate + 50.5% fresh water

**TAIL** Type 1 cement + 0.4% bwoc R-3 + 0.3% bwoc CD-32 + 1% bwoc FL-62  
+ 0.15% bwoc ASA-301 + 50.5% fresh water

**ADDITIVES:**

CaCl (Calcium Chloride)= Accelerator

Cello Flake= Lost circulation control agent

R-3= Retarder

CD-32= Dispersant

FL-62= Fluid loss control agent

ASA-301 Sodium Metasilicate= Free water control & Solid suspension

**MAXWELL LEASE  
WELL NO.'S 1HM - 6HM**

MAXWELL  
WELL NO.'S  
1HM-6HM

ASSOCIATED  
PIT

SEE MAXWELL SITE PLAN FOR  
COMPLETE DETAILS OF ACCESS  
ROAD, PIT, AND PAD DESIGNS.

10/10/2014



Professional Energy Consultants  
A DIVISION OF SMITH LAND SURVEYING

SURVEYORS  
PROJECT MGMT.



ENGINEERS  
ENVIRONMENTAL

225 Woodlawn St.  
P.O. Box 150  
Charlottesville, VA 22901  
(804) 452-8834

5885 Dunes Bottom Road  
Shalypsie, OH 43047  
(614) 471-9911

HIGHEST INTEGRITY, QUALITY

TOPO SECTION OF USGS  
MOUNT CLARE 7.5' QUADRANGLE

**SCALE: 1"=500'**



DRAWN BY: C.P.M. FILE NO.: 7995 DATE: 03-28-13 CADD FILE: 7995REC.DWG

# MAXWELL LEASE WELL NO. 3HM

| 3HM WELL TIES |               |          |
|---------------|---------------|----------|
| LINE          | BEARING       | DISTANCE |
| L1            | N 02°08'46" W | 4232.05' |
| L2            | N 14°45'23" E | 2524.34' |
| L3            | N 20°00'00" W | 5290.00' |
| L4            | S 64°40'28" W | 331.53'  |

WV L03140.001-004  
132 ACRE  
LEASE TRACT

WELL NO. 3HM  
TOP HOLE  
STATE PLANE COORDINATES  
(NORTH ZONE NAD '27)  
N. 265,036  
E. 1,754,372

TOP HOLE (NAD '27)  
LAT=(N) 39°13'27.9"  
LONG=(W) 80°22'01.3"

TOP HOLE (NAD '83)  
LAT=(N) 39°13'28.3"  
LONG=(W) 80°22'00.6"

TOP HOLE UTM (NAD '83)  
(N) 4,341,883  
(E) 554,653

WELL NO. 3HM  
LANDING POINT  
STATE PLANE COORDINATES  
(NORTH ZONE NAD '27)  
N. 265,236  
E. 1,753,210

LANDING POINT (NAD '27)  
LAT=(N) 39°13'29.8"  
LONG=(W) 80°22'16.1"

LANDING POINT (NAD '83)  
LAT=(N) 39°13'30.1"  
LONG=(W) 80°22'15.4"

LANDING POINT UTM (NAD '83)  
(N) 4,341,938  
(E) 554,298

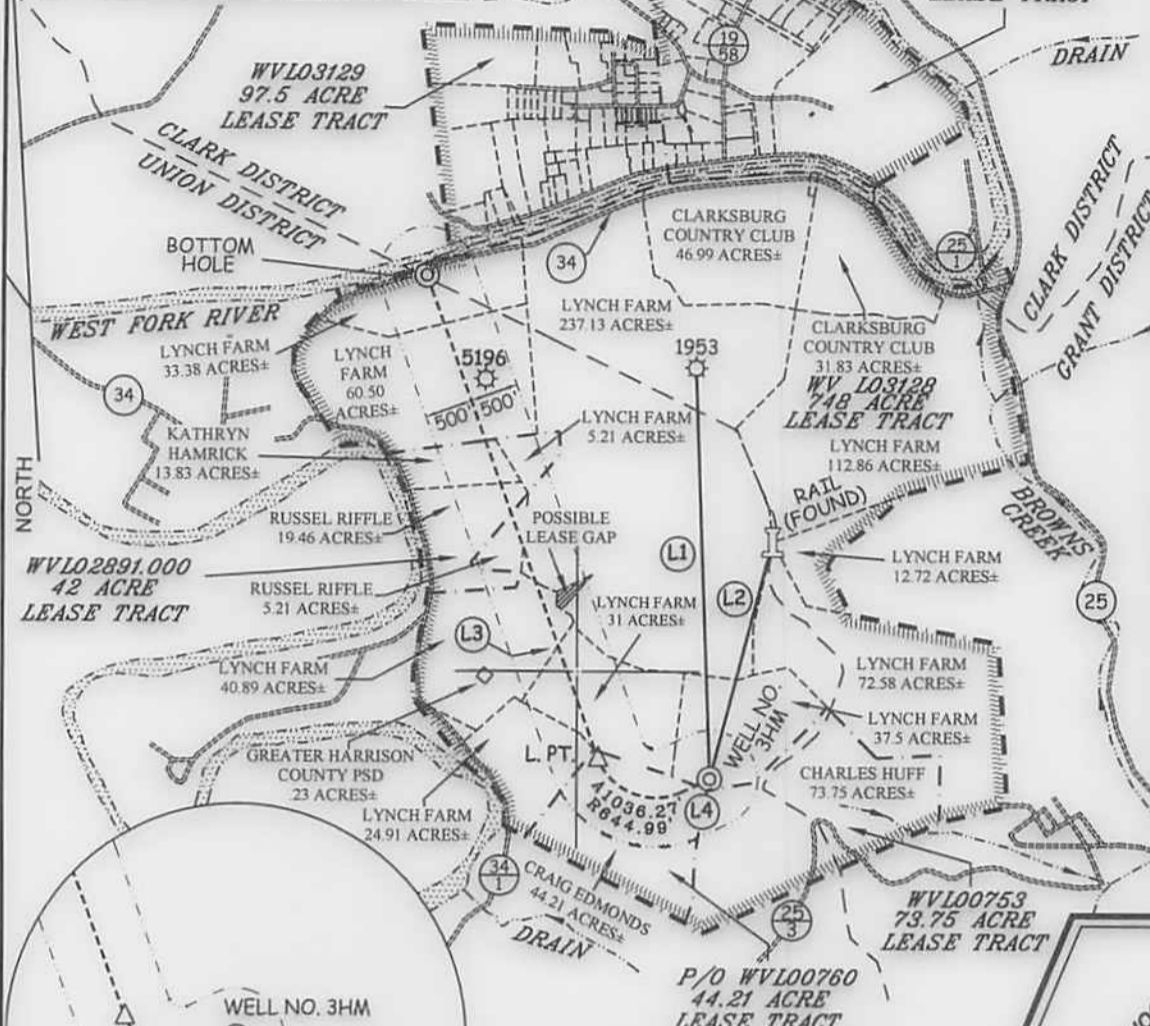
WELL NO. 3HM  
BOTTOM HOLE  
STATE PLANE COORDINATES  
(NORTH ZONE NAD '27)  
N. 270,207  
E. 1,751,400

BOTTOM HOLE (NAD '27)  
LAT=(N) 39°14'18.8"  
LONG=(W) 80°22'39.7"

BOTTOM HOLE (NAD '83)  
LAT=(N) 39°14'19.1"  
LONG=(W) 80°22'39.0"

BOTTOM HOLE UTM (NAD '83)  
(N) 4,343,443  
(E) 553,722

## REFERENCES



### NOTES ON SURVEY

1. TIES TO WELLS, REFERENCES, AND CORNERS ARE BASED ON GRID NORTH FOR THE WV STATE PLANE COORDINATE SYSTEM NORTH ZONE NAD '27.
2. LEASE BOUNDARY SHOWN HEREON TAKEN FROM DEED BOOK 142 PAGE 484 AND ADJOINING DEEDS.
3. SURFACE OWNER AND ADJOINER INFORMATION TAKEN FROM THE ASSESSOR AND COUNTY CLERK RECORDS OF HARRISON COUNTY IN JULY, 2012.
4. WELL LAT./LONG. (NAD'27) ESTABLISHED BY DGPS(SURVEY GRADE).



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 DIVISION OF ENVIRONMENTAL PROTECTION

P.S. 677 *Gregory A. Smith*

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.  
DATE APRIL 3, 20 13  
REVISED DATE SEPTEMBER 3, 20 13  
OPERATORS WELL NO. MAXWELL 3HM  
API WELL NO. 47 - 33 - MOD 05741 H6A  
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1/200 FILE NO. 7995P3HMR3(448-13)  
PROVEN SOURCE OF ELEVATION DGPS (SUBMETER MAPPING GRADE) SCALE 1" = 2,000'

STATE OF WEST VIRGINIA  
DIVISION OF ENVIRONMENTAL PROTECTION  
OFFICE OF OIL AND GAS

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

LOCATION: ELEVATION 1,462' WATERSHED WEST FORK RIVER  
DISTRICT UNION COUNTY HARRISON QUADRANGLE MOUNT CLARE 7.5'

SURFACE OWNER LYNCH FARM, LLC ACREAGE 37.5±  
ROYALTY OWNER WBM PROPERTIES LLC, ET AL ACREAGE 748, 42, 44.21, 73.75, 97.5, & 132±

PROPOSED WORK: DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  PLUG OFF OLD  
FORMATION  PERFORATE NEW FORMATION  PLUG AND ABANDON  CLEAN OUT AND REPLUG  OTHER

PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_ TARGET FORMATION MARCELLUS  
ESTIMATED DEPTH 7,590' TVD / TMD 13,695'

WELL OPERATOR PDC MOUNTAINEER, LLC DESIGNATED AGENT JAMIE HAGA  
ADDRESS 120 GENESIS BOULEVARD ADDRESS 120 GENESIS BOULEVARD  
BRIDGEPORT, WV 26330 BRIDGEPORT, WV 26330