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

November 05, 2013

PDC MOUNTAINEER LLC
POST OFFICE BOX 26
BRIDGEPORT, WV 26330

Re: Permit Modification Approval for API Number 3305743 , Well #: MAXWELL 5HM
Changed bottom 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
(1/12)

33-05743 MOD

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
W.VA. CODE §22-6A - WELL WORK PERMIT APPLICATION

1) Well Operator:	PDC Mountaineer LLC	494494839	Harrison	Union	Mount Clare 7.5'
		Operator ID	County	District	Quadrangle

2) Operator's Well Number: 5 HM Well Pad Name: Maxwell

3 Elevation, current ground: 1462' Elevation, proposed post-construction: 1459'

4) Well Type: (a) Gas ■ Oil _____
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):
Marcellus Shale, 7600' TVD, Approximately 100 feet thick, 7600' x 0.594 psi/ft = 4514 psi calculated reservoir pressure.

SDW 9/5/13

7) Proposed Total Vertical Depth: 7600'
8) Formation at Total Vertical Depth: Marcellus Shale
9) Proposed Total Measured Depth: 15,481'
10) Approximate Fresh Water Strata Depths: 302', 369', 396', & 429'
11) Method to Determine Fresh Water Depth: Reported wells: 47-033-04775, 04559, 04575, & 05556
12) Approximate Saltwater Depths: 628', 1261'
13) Approximate Coal Seam Depths: 361', 540'
14) Approximate Depth to Possible Void (coal mine, karst, other): Not Known.
15) Does land contain coal seams tributary or adjacent to, active mine? No
16) Describe proposed well work: Drill & stimulate a new horizontal Marcellus well following all State & Federal guidelines.
All casing used in the wellbore will be new casing. Centralizers will be used contingent upon final log of well. Production string cement will be at least 100 feet into the intermediate string. Cement will be API grade.

17) Describe fracturing/stimulating methods in detail:
Slick water frac, pumping 80 bbls minimum. Each stage to contain approximately 10,000 bbl of water and 40,000 pounds of sand.
Frac additives, chemical names, and CAS #'s are provided on the next page.

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): _____

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

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(1/12)

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20) **CASING AND TUBING PROGRAM**

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill -up (Cu. Ft.)
Conductor	20"	New	H-40	94#	65'	65'	Cement to Surface
Fresh Water	13 3/8"	New	J-55	54.5#	500'	500'	Cement to Surface
Coal							
Intermediate	9 5/8"	New	J-55	40#	2850'	2850'	Cement to Surface
Production	5 1/2"	New	P-110	20#	15,481'	15,481'	3241 minimum
Tubing							
Liners							

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
Conductor	20"	24"	0.756	1500	1	1.06
Fresh Water	13 3/8"	17 1/2"	0.66	1730	1	1.18
Coal						
Intermediate	9 5/8"	12 1/4"	0.704	3520	1	1.18
Production	5 1/2"	8.5"/8.75"	0.722	12,460	H	1.18
Tubing						
Liners						

SDW 9/5/13

PACKERS

Kind:				
Sizes:				
Depths Set:				

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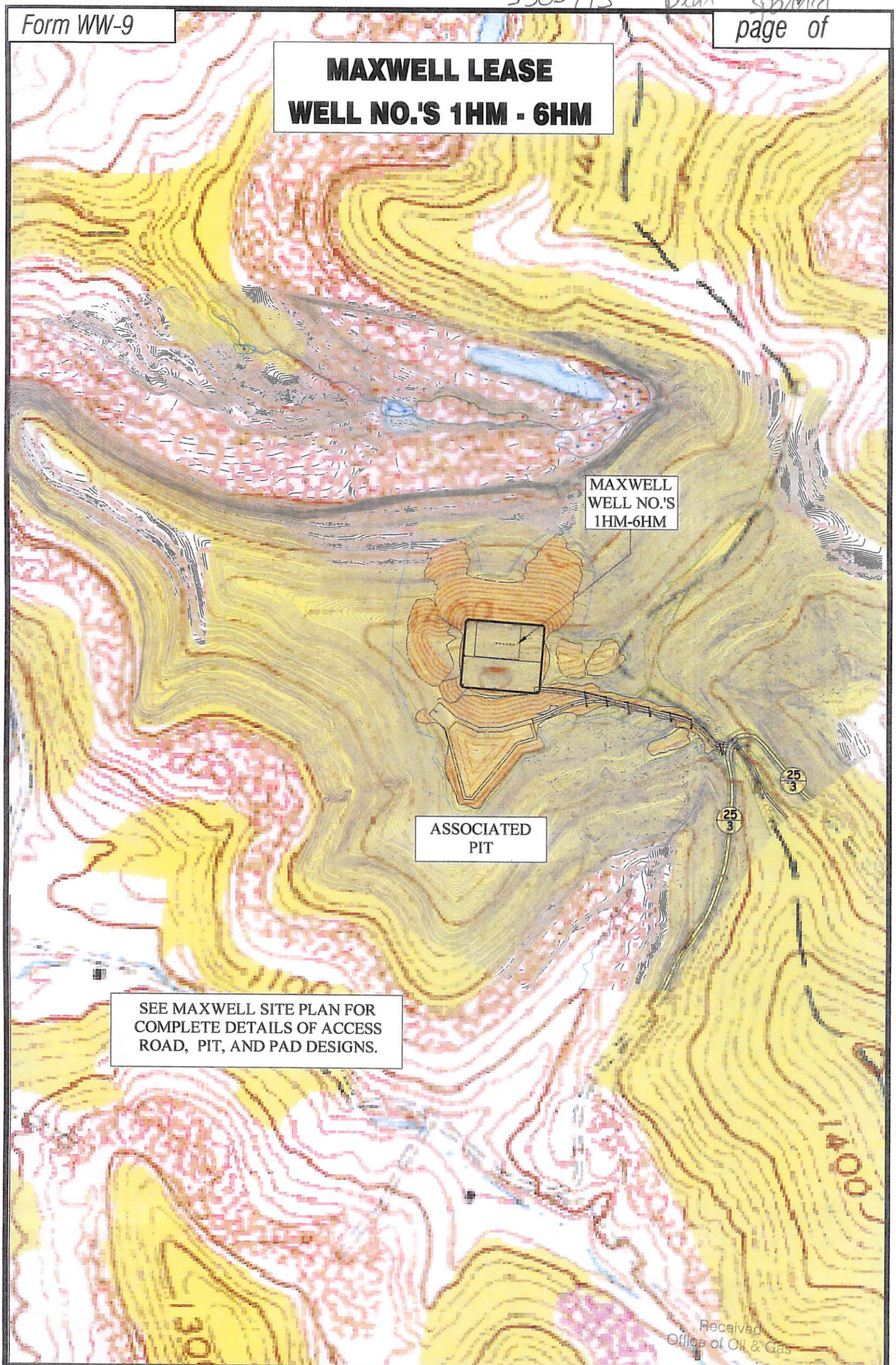
WV Dept. of Environmental Protection

3305743 plat spotted

Form WW-9

page of

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



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

Received
Office of Oil & Gas

APR 26 2013

Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYING
SURVEYORS PROJECT MGMT. SLS ENGINEERS ENVIRONMENTAL
220 West Main St
P.O. Box 150
Glenville, WV 26351
(304) 462-5634
55805 Dilles Bottom Road
Shadyside, OH 43947
(740) 671-5911
HONESTY, INTEGRITY, QUALITY

TOPO SECTION OF USGS
MOUNT CLARE 7.5' QUADRANGLE

SCALE: 1"=500'

0' 500' 1000'

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

FORM WW 6

MAXWELL LEASE
WELL NO. 5HM

9,515'

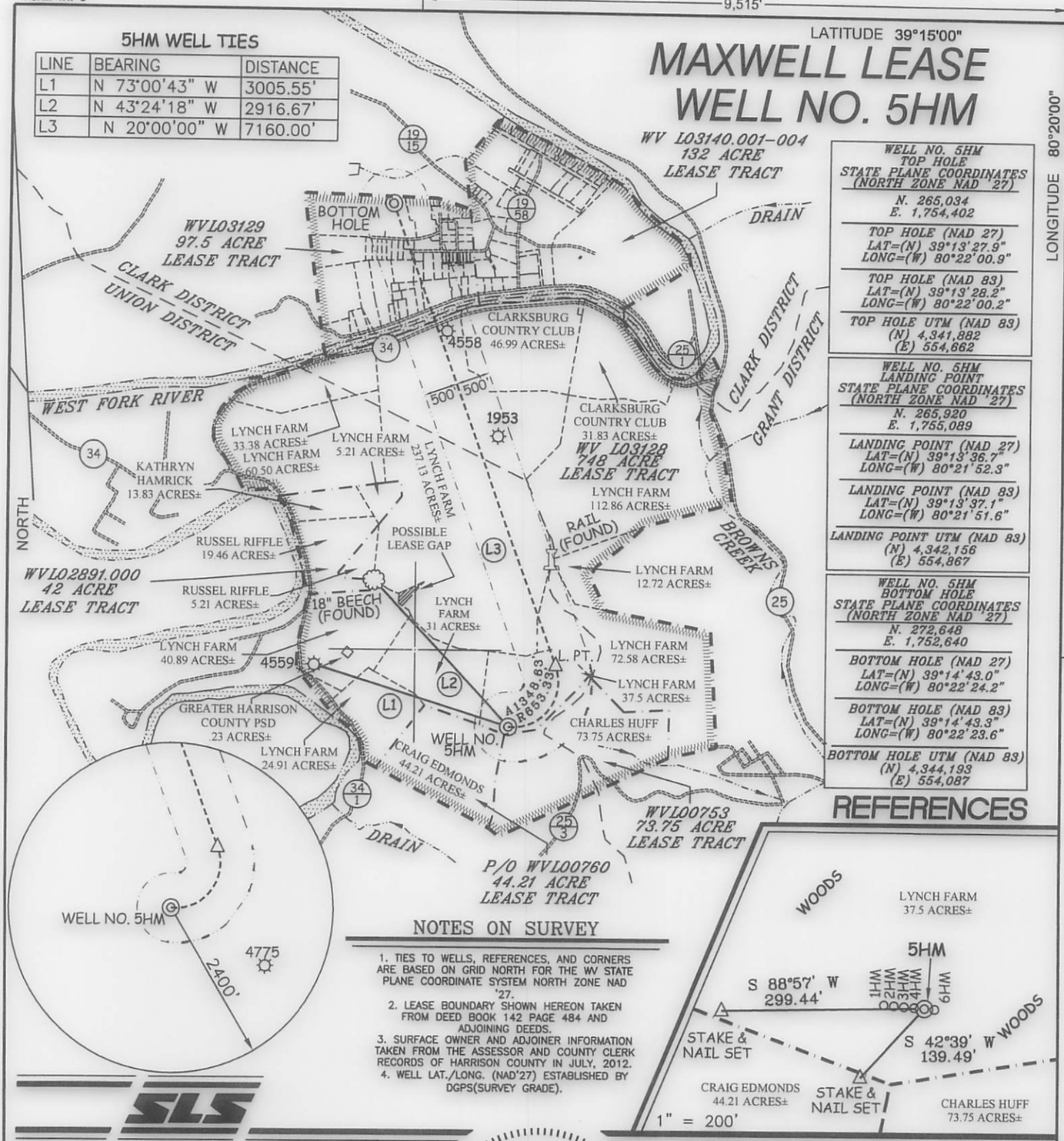
LATITUDE 39°15'00"

LONGITUDE 80°20'00"

9,317'

5HM WELL TIES

LINE	BEARING	DISTANCE
L1	N 73°00'43" W	3005.55'
L2	N 43°24'18" W	2916.67'
L3	N 20°00'00" W	7160.00'



WELL NO. 5HM TOP HOLE STATE PLANE COORDINATES (NORTH ZONE NAD 27)
N. 265,034
E. 1,754,402
TOP HOLE (NAD 27) LAT=(N) 39°13'27.9" LONG=(W) 80°22'00.9"
TOP HOLE (NAD 83) LAT=(N) 39°13'28.2" LONG=(W) 80°22'00.2"
TOP HOLE UTM (NAD 83) (N) 4,341,882 (E) 554,662

WELL NO. 5HM LANDING POINT STATE PLANE COORDINATES (NORTH ZONE NAD 27)
N. 265,920
E. 1,755,089
LANDING POINT (NAD 27) LAT=(N) 39°13'36.7" LONG=(W) 80°21'52.3"
LANDING POINT (NAD 83) LAT=(N) 39°13'37.1" LONG=(W) 80°21'51.6"
LANDING POINT UTM (NAD 83) (N) 4,342,156 (E) 554,867

WELL NO. 5HM BOTTOM HOLE STATE PLANE COORDINATES (NORTH ZONE NAD 27)
N. 272,648
E. 1,752,640
BOTTOM HOLE (NAD 27) LAT=(N) 39°14'43.0" LONG=(W) 80°22'24.2"
BOTTOM HOLE (NAD 83) LAT=(N) 39°14'43.3" LONG=(W) 80°22'23.6"
BOTTOM HOLE UTM (NAD 83) (N) 4,344,193 (E) 554,087

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).

SLS

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

GREGORY A. SMITH LICENSED No. 677 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.

DATE APRIL 3 , 20 13

REVISED DATE SEPTEMBER 3 , 20 13

OPERATORS WELL NO. MAXWELL 5HM

API WELL NO. 47 — 33 — 05743 MOD HGA

STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 200

PROVEN SOURCE OF ELEVATION DGPS (SUBMETER MAPPING GRADE)

FILE NO. 7995P5HMR3(448-13)

SCALE 1" = 2,000'

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

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

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 HEIRS PROPERTIES, LLC ETAL ACREAGE 748, 42, 44.21, 73.75, 97.5, & 132±

PROPOSED WORK : LEASE NO. ____

DRILL X CONVERT ____ DRILL DEEPER ____ REDRILL ____ FRACTURE OR STIMULATE X 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 15,481'

COUNTY NAME

PERMIT

WELL OPERATOR PDC MOUNTAINEER, LLC DESIGNATED AGENT JAMIE HAGA

ADDRESS 120 GENESIS BOULEVARD ADDRESS 120 GENESIS BOULEVARD

BRIDGEPORT, WV 26330 BRIDGEPORT, WV 26330

SLS

124588