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

July 09, 2013

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-3305742, issued to PDC MOUNTAINEER LLC, is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

In addition to the applicable requirements of this permit, and the statutes and rules governing oil and gas activity in WV, this permit may contain specific conditions which must be followed. Permit conditions are attached to this cover letter.

Per 35CSR-4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926-0499 ext. 1654.

James Martin
Chief

Operator's Well No: MAXWELL4HM
Farm Name: LYNCH FARM LLC
API Well Number: 47-3305742
Permit Type: Horizontal 6A Well
Date Issued: 07/09/2013

Promoting a healthy environment.

PERMIT CONDITIONS

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

CONDITIONS

1. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than fifty (50) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.

2. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the fill material shall be within plus or minus 2% (unless soil test results show a greater range of moisture content is appropriate and 95% compaction can still be achieved) of the optimum moisture content as determined by the standard proctor density test, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort. Each lift must meet 95 % compaction of the optimum density based on results from the standard proctor density test of the actual soils used in specific engineered fill sites. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.

3. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.

4. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations,* 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.

5. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.

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WW - 6B
(3/13)

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
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: 4HM Well Pad Name: Maxwell

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

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):

Marcellus Shale, 7600' TVD, Approximately 100 feet thick, 7600' x 0.594 psi/ft = 4514 psi calculated reservoir pressure.

7) Proposed Total Vertical Depth: 7600'

8) Formation at Total Vertical Depth: Marcellus Shale

9) Proposed Total Measured Depth: 15,541'

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 proposed well location contain coal seams directly overlying or adjacent to an active mine? If so, indicate name and depth of mine: No

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16) Describe proposed well work: Drill and stimulate a new horitzontal Marcellus well following all State & Federal guidelines. All casing used in the well bore 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): 16.59 AC

19) Area to be disturbed for well pad only, less access road (acres): 14.23 AC

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Frac Additives, Chemical Names, and CAS #'s

Vendor	Product	Code Number	Component	CAS-NO.
Schlumberger	100-mesh Sand	S100	Crystalline silica	14808-60-7
Schlumberger	30/50 mesh sand	S012-3050	Crystalline silica	14808-60-7
Schlumberger	40/70 mesh sand	S012-4070	Crystalline silica	14808-60-7
Schlumberger	Corrosion Inhibitor	A264	Methanol	67-56-1
			Prop-2-yn-1-ol	107-19-7
Schlumberger	Surfactant	F108	Methanol	67-56-1
Schlumberger	HCL	H028	Hydrochloric Acid	7647-01-0
Schlumberger	Gelling Agent	J590	Propan-2-ol	67-63-0
Schlumberger	Friction Reducer	J609	Ammonium sulfate	7783-20-2
Schlumberger	Iron Stabilizer	L058	Sodium erthorbate	6381-77-7
XCHEM	Scale Inhibitor	TS-30	Sodium polycarboxylate	ND
XCHEM	Bleach	449610	Sodium chloride	7647-14-5
			Sodium hydroxide	1310-73-2
			Sodium Hypochlorite	7681-52-9
XCHEM	Chlorite	ADOX 3125/8125	Sodium chlorite	7758-19-2

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20) **CASING AND TUBING PROGRAM**

TAJ 22APR17

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#	15,541'	15,541'	2820 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						

PACKERS

Kind:				Received
Sizes:				Office of Oil & Gas
Depths Set:				

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21) Describe centralizer placement for each casing string. Conductor: None

Surface 13 3/8": Centralizers every 90' & 1 Basket

Intermediate 9 5/8": Centralizers every 7 joints & 1 Basket

Production 5 1/2": Centralizers every 12 joints in the vertical section & every 2 joints in the horizontal section

22) Describe all cement additives associated with each cement type. **See additional sheet for description of additives**

Conductor: Type 1 Cement

Surface: Type 1 Cement + 2% CaCl + 1/4 #/sack Cello Flake

Intermediate: Pre-Flush - Mud Clean 1 ahead of Type 1 cement + 2% CaCl + 1/4 #/sack Cello Flake

Production: Pre-Flush - Mud Clean 1 ahead of Lead Cement Type 1 + 0.4% bwoc R-3 + 0.3% bwoc CD-32 + 1% bwoc FL-62 + 0.15% bwoc ASA-301 + 50.5% Fresh Water & followed by a Tail Cement Class H + 0.1% bwoc R-3 CD-32 + 1.2% bwoc FL-62 + 0.1% bwoc ASA-301 + 0.4% bwoc Sodium Metasilicate + 50.5% Fresh Water

23) Proposed borehole conditioning procedures. Surface and intermediate holes are cleaned with air.

Production hole is circulated with mud for at least 4 hours with high viscosity sweeps ran occasionally.

*Note: Attach additional sheets as needed.

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22) Description of Cement Additives (Continued)

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 Metasillicate – Free water control + Solid Suspension

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API Number 47 - _____ - _____

Operator's Well No. 4HM

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name PDC Mountaineer, LLC OP Code 494494839

Watershed (HUC 10) West Fork River Quadrangle Mount Clare 7.5'

Elevation 1,462' County Harrison District Union

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes X No _____

Will a pit be used for drill cuttings? Yes _____ No X

If so, please describe anticipated pit waste: N/A

Will a synthetic liner be used in the pit? Yes X No _____ If so, what ml.? 60

Proposed Disposal Method For Treated Pit Wastes:

_____ Land Application
_____ Underground Injection (UIC Permit Number _____)
_____ Reuse (at API Number _____)
_____ Off Site Disposal (Supply form WW-9 for disposal location)
■ Other (Explain tings will be removed offsite to Meadow Fill Landfill

Will closed loop system be used? YES

Drilling medium anticipated for this well? Air, freshwater, oil based, etc. Synthetic Mud

-If oil based, what type? Synthetic, petroleum, etc. N/A

Additives to be used in drilling medium? Salt, Pac R, New Drill, Lime, Perma-Lose, Xan-plex, Walnut Hulls, Super Sweep, Caustic Soda, Bar, X-cide

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. Remove offsite

-If left in pit and plan to solidify what medium will be used? (cement, lime, sawdust) ~~Cement~~ N/A

-Landfill or offsite name/permit number? Meadow Fill Landfill ~~Marcellus~~ profile # 100678WV

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature _____

Company Official (Typed Name) Jamie Haga

Company Official Title Designated Agent

OFFICIAL SEAL
Notary Public, State of West Virginia
DEANNA S McVICKER
4230 Dusk Camp Run Road
Sand Fork, WV 26430
My commission expires January 22, 2023

Subscribed and sworn before me this 5th day of April, 20 13

Deanna S. McVicker Notary Public

My commission expires 1/22/2023

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PDC MOUNTAINEER, LLC

OPERATOR'S WELL NO. 4HM

LEGEND

Property Boundary

Road

Existing Fence

Planned Fence

Stream

Open Ditch

Rock

North N

Buildings

Water wells W

Drill site

Diversion

Spring

Wet Spot

Drain Pipe with size in inches 12

Waterway

Cross Drain

Artificial Filter Strip

Pit: cut walls

Pit: compacted fill walls

Area for Land Application of Pit Waste

Proposed Revegetation Treatment: Acres Disturbed 21.18 +/- Prevegetation pH _____

Lime 3 Tons/acre or to correct to pH 6.5

Fertilizer (10-20-20 or equivalent) 1/3 TON lbs/acre (500 lbs minimum)

Mulch HAY 2 Tons/acre

Seed Mixtures

Area I		Area II	
Seed Type	lbs/acre	Seed Type	lbs/acre
KY-31	40	ORCHARD GRASS	15
ALSIKE CLOVER	5	ALSIKE CLOVER	5
ANNUAL RYE	15		

Attach:
Drawing(s) of road, location,pit and proposed area for land application.

Photocopied section of involved 7.5' topographic sheet.

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Office of Oil & Gas

Plan Approved by: [signature]

Title: Oil & Gas Inspector Date: 22 APR 13

Field Reviewed? (X) Yes ( ) No

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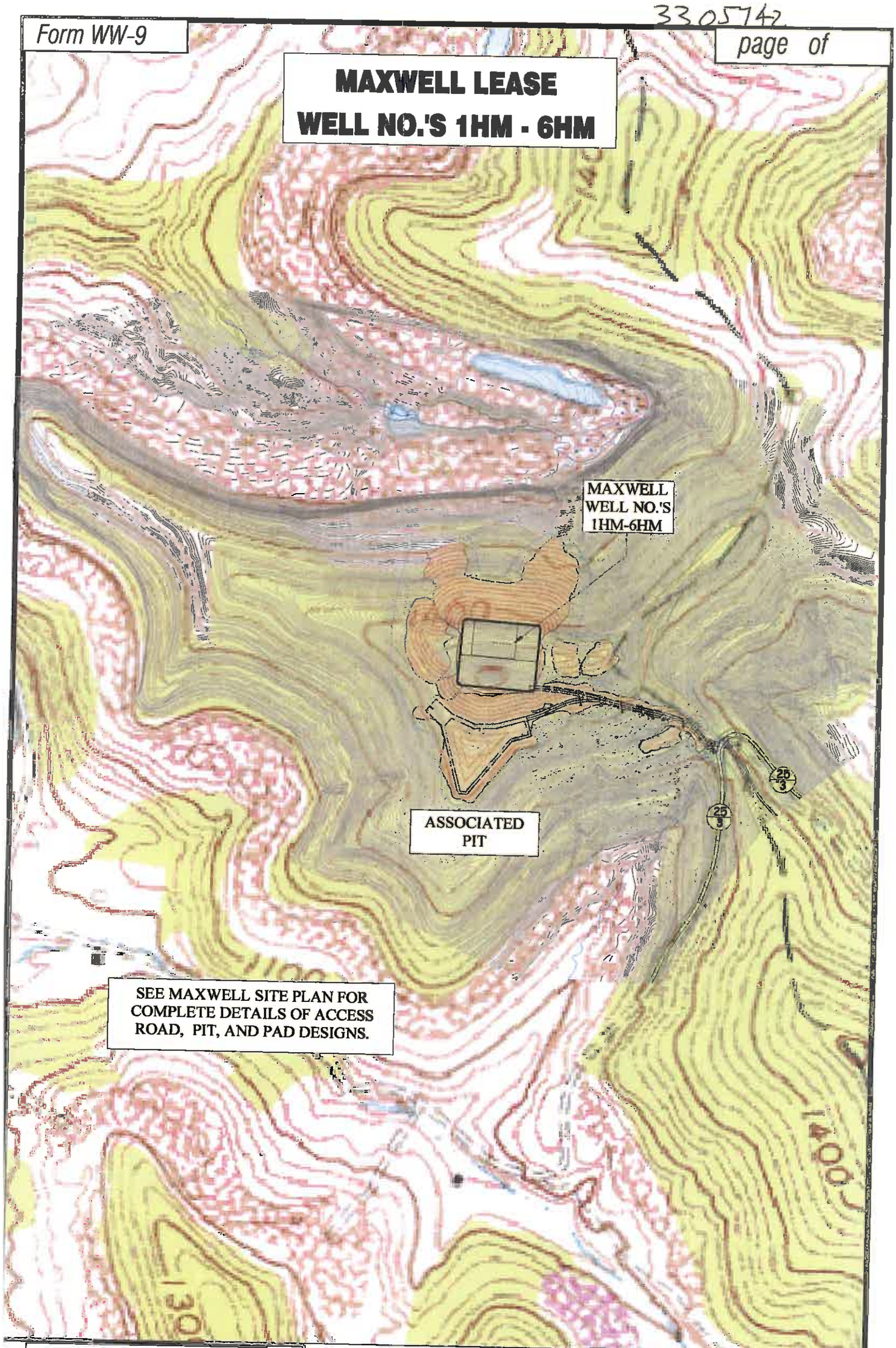
Form WW-9

page of

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



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

Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYORS
SURVEYORS PROJECT MGMT. SLS ENGINEERS ENVIRONMENTAL
226 West Main St
P.O. Box 159
Glenville, WV 26351
(304) 462-5634
56065 Dillon Bottom Road
Shadyside, OH 43947
(740) 671-9811
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

Water Management Plan:
Primary Water Sources

WMP-01230	API/ID Number:	047-033-05742	Operator:	PDC Mountaineer
		Maxwell 4HM		

Important:

For each proposed primary water source (including source intakes for purchased water sources) identified in your water management plan, and summarized herein, DEP has made an evaluation concerning water availability over the specified date range. DEP's assessment is based on the following considerations:

- Statistical analysis of historical USGS stream gauge data (transferred to un-gauged locations as necessary);
- Identification of sensitive aquatic life (endangered species, mussels, etc.);
- Quantification of known existing demands on the water supply (Large Quantity Users);
- Minimum flows required by the Army Corps of Engineers; and
- Designated stream uses.

Based on these factors, DEP has provided, for each intake location (and origination point for purchased water), a reference gauge location and discharge flow reading which must be surpassed prior to withdrawals. Additionally, DEP has established a minimum passby flow at the withdrawal location which must also be surpassed prior to withdrawals. These thresholds are considered terms of the permit and are enforceable as such.

DEP is aware that some intake points will be used for mutiple wells and well sites. In these cases, the thresholds set by the Water Management Plan are to be interepreted as total withdrawal limits for each location over the specified date range regardless of how many wells are supported by that intake.

For all purchased water intakes, determinations of water availability are made at the original source intake location. It is the responsibility of the Oil and Gas Operator, not the seller, to cease withdrawal of water from the seller when flows are less than the minimum gauge reading at the stream gauge referenced by the Water Management Plan in order to protect stream uses.

Note that the determinations made herein are based on the best available data, but it is impossible to predict water availability in the future. While the DEP has carefully established these minimum withdrawal thresholds, it remains the operator's responsibility to protect aquatic life at all times. Approval to withdrawal is contingent upon permission from the land owner. It is the responsibility of the operator to secure and maintain permission prior to any withdrawals.

The operator is reminded that 24-48 hours prior to withdrawing (or purchasing) water, DEP must be notified by email at DEP.water.use@wv.gov.

Source Summary

WMP-01230	API Number:	047-033-05742	Operator:	PDC Mountaineer
		Maxwell 4HM		

Stream/River

Source **West Fork River @ WBM Heirs Properties Withdrawal Site** Owner: **WBM Heirs Properties**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
3/1/2014	3/1/2015	8,850,000		39.223184	-80.374736

☑ Regulated Stream? Stonewall Jackson Dam Ref. Gauge ID: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Max. Pump rate (gpm): 2,000 **Min. Gauge Reading (cfs): 175.94** **Min. Passby (cfs) 111.68**

DEP Comments:

Source Detail

WMP-01230 API/ID Number: 047-033-05742 Operator: PDC Mountaineer

Maxwell 4HM

Source ID: 17929 Source Name West Fork River @ WBM Heirs Properties Withdraw WBM Heirs Properties

Source Latitude: 39.223184
Source Longitude: -80.374736

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 361.3 County: Harrison

Anticipated withdrawal start date: 3/1/2014
Anticipated withdrawal end date: 3/1/2015
Total Volume from Source (gal): 8,850,000
Max. Pump rate (gpm): 2,000
Max. Simultaneous Trucks: 1
Max. Truck pump rate (gpm) 2000

- [ ] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [x] Regulated Stream? Stonewall Jackson Dam
- [ ] Proximate PSD?
- [x] Gauged Stream?

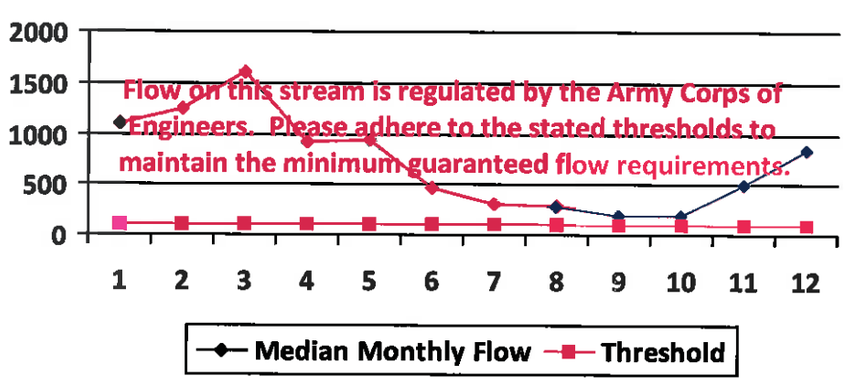
Reference Gaug 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.) 759.00

Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	1,107.13	-	-
2	1,246.52	-	-
3	1,605.57	-	-
4	918.24	-	-
5	942.54	-	-
6	472.28	-	-
7	305.99	-	-
8	292.17	-	-
9	203.29	-	-
10	199.31	-	-
11	500.16	-	-
12	853.92	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	25.23
Downstream Demand (cfs):	12.33
Pump rate (cfs):	4.46
Headwater Safety (cfs):	27.85
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	-
Passby at Location (cfs):	-

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Water Management Plan:
Secondary Water Sources

WMP-01230 API/ID Number: 047-033-05742 Operator: PDC Mountaineer

Maxwell 4HM

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Recycled Frac Water

Source ID: 17930 Source Name Various

Source start date: 3/1/2014

Source end date: 3/1/2015

Source Lat: Source Long: County

Max. Daily Purchase (gal) Total Volume from Source (gal): 250,000

DEP Comments:

FORM WW 6

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✓ Plat Spotted

MAXWELL LEASE
WELL NO. 4HM

LATITUDE 39°15'00"

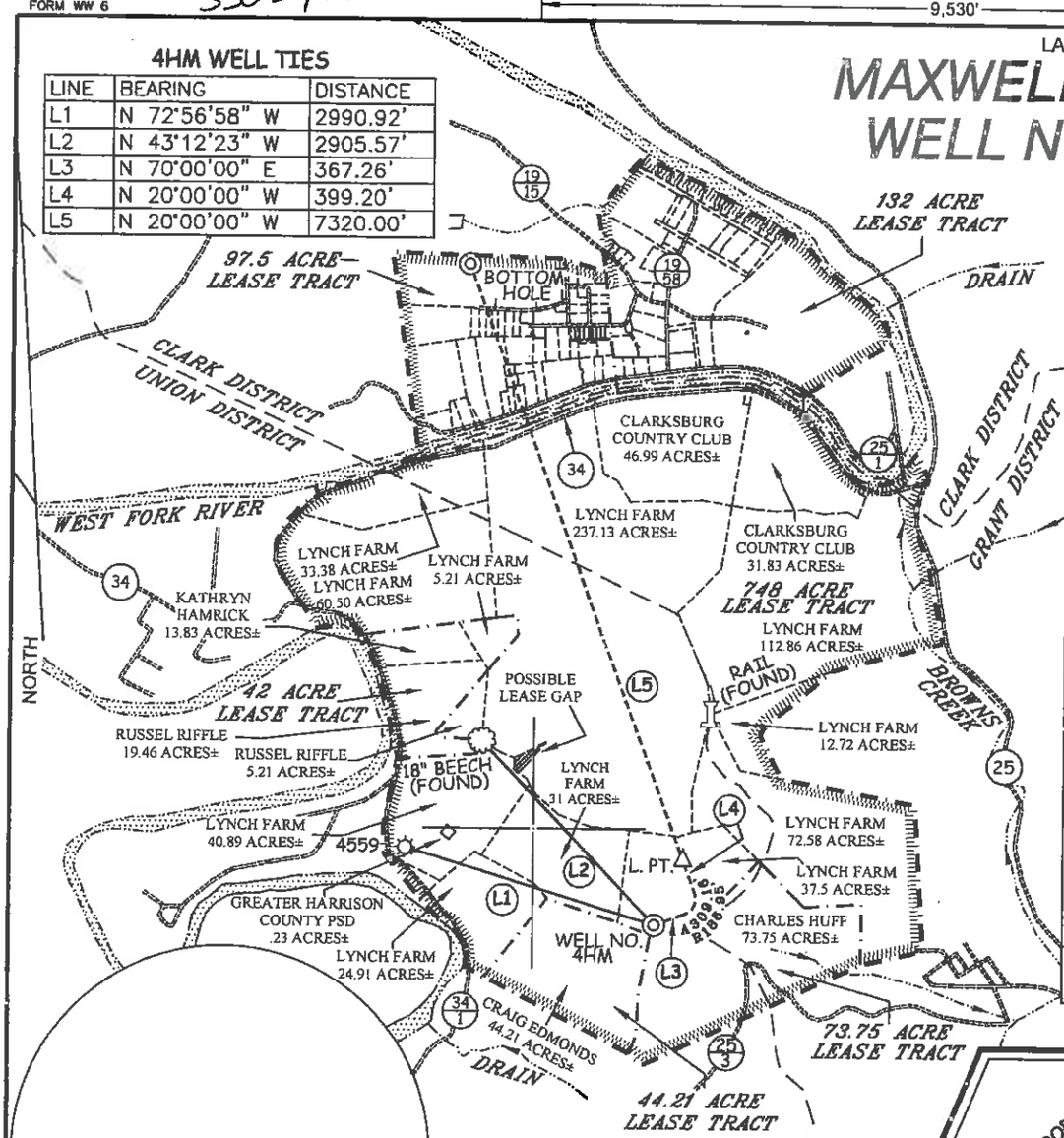
LONGITUDE 80°20'00"

9,530'

9,316'

4HM WELL TIES

LINE	BEARING	DISTANCE
L1	N 72°56'58" W	2990.92'
L2	N 43°12'23" W	2905.57'
L3	N 70°00'00" E	367.26'
L4	N 20°00'00" W	399.20'
L5	N 20°00'00" W	7320.00'

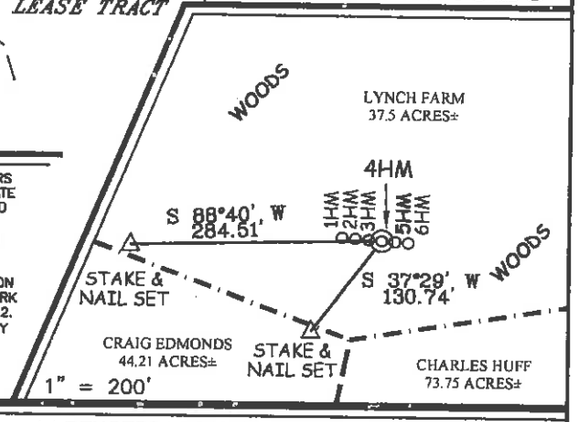


WELL NO. 4HM TOP HOLE STATE PLANE COORDINATES (NORTH ZONE NAD '27)
N. 265,035 E. 1,754,387
TOP HOLE (NAD 27) LAT=(N) 39°13'27.9" LONG=(W) 80°22'01.1"
TOP HOLE (NAD 83) LAT=(N) 39°13'28.2" LONG=(W) 80°22'00.4"
TOP HOLE UTM (NAD 83) (N) 4,341,983 (E) 554,658

WELL NO. 4HM LANDING POINT STATE PLANE COORDINATES (NORTH ZONE NAD '27)
N. 265,784 E. 1,754,714
LANDING POINT (NAD 27) LAT=(N) 39°13'35.4" LONG=(W) 80°21'57.0"
LANDING POINT (NAD 83) LAT=(N) 39°13'35.7" LONG=(W) 80°21'56.4"
LANDING POINT UTM (NAD 83) (N) 4,342,112 (E) 554,754

WELL NO. 4HM BOTTOM HOLE STATE PLANE COORDINATES (NORTH ZONE NAD '27)
N. 272,662 E. 1,752,211
BOTTOM HOLE (NAD 27) LAT=(N) 39°14'43.1" LONG=(W) 80°22'29.7"
BOTTOM HOLE (NAD 83) LAT=(N) 39°14'43.4" LONG=(W) 80°22'29.0"
BOTTOM HOLE UTM (NAD 83) (N) 4,344,195 (E) 553,956

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 APRIL 11, 20 13

OPERATORS WELL NO. MAXWELL 4HM

API WELL NO. 47 — —
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 200 FILE NO. 7995P4HMR2(448-13)

SCALE 1" = 2,000'

PROVEN SOURCE OF ELEVATION DGPS (SUBMETER MAPPING GRADE)

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 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 15,450'

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

FORM WW 6 330574Z

MAXWELL LEASE WELL NO. 4HM

LATITUDE 39°15'00"

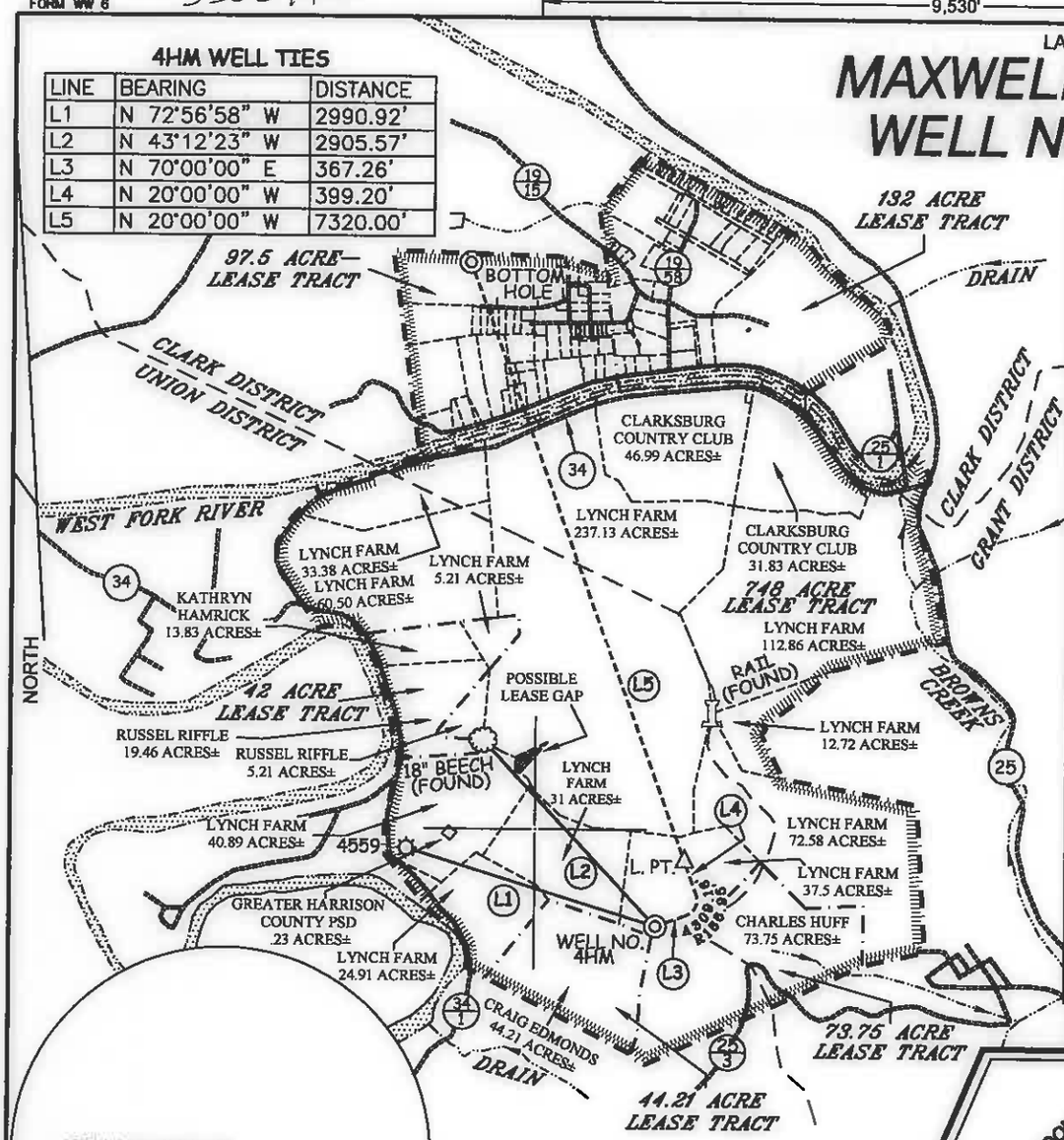
LONGITUDE 80°22'00"

9,530'

9,316'

4HM WELL TIES

LINE	BEARING	DISTANCE
L1	N 72°56'58" W	2990.92'
L2	N 43°12'23" W	2905.57'
L3	N 70°00'00" E	367.26'
L4	N 20°00'00" W	399.20'
L5	N 20°00'00" W	7320.00'



WELL NO. 4HM TOP HOLE STATE PLANE COORDINATES (NORTH ZONE NAD '27)
N. 865,035
E. 1,754,387

TOP HOLE (NAD 27)
LAT=(N) 39°13'27.9"
LONG=(W) 80°22'01.1"

TOP HOLE (NAD 83)
LAT=(N) 39°13'28.2"
LONG=(W) 80°22'00.4"

TOP HOLE UTM (NAD 83)
(N) 4,341,883
(E) 554,658

WELL NO. 4HM LANDING POINT STATE PLANE COORDINATES (NORTH ZONE NAD '27)
N. 865,784
E. 1,754,714

LANDING POINT (NAD 27)
LAT=(N) 39°13'35.4"
LONG=(W) 80°21'57.0"

LANDING POINT (NAD 83)
LAT=(N) 39°13'35.7"
LONG=(W) 80°21'58.4"

LANDING POINT UTM (NAD 83)
(N) 4,342,112
(E) 554,754

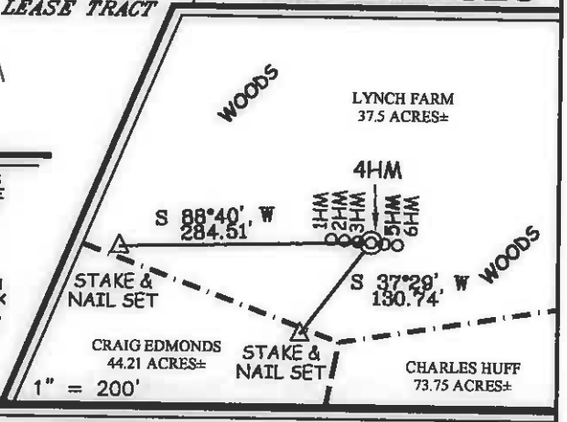
WELL NO. 4HM BOTTOM HOLE STATE PLANE COORDINATES (NORTH ZONE NAD '27)
N. 272,662
E. 1,752,211

BOTTOM HOLE (NAD 27)
LAT=(N) 39°14'43.1"
LONG=(W) 80°22'29.7"

BOTTOM HOLE (NAD 83)
LAT=(N) 39°14'43.4"
LONG=(W) 80°22'29.0"

BOTTOM HOLE UTM (NAD 83)
(N) 4,344,195
(E) 553,956

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 APRIL 11, 20 13
OPERATORS WELL NO. MAXWELL 4HM
API WELL NO. 47 — 33 — 5742 H6A
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 200 FILE NO. 7995P4HMR2(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 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 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 15,450'

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

H_2S Safety Services Equipment List-If H2S is Encountered

Hydrogen Sulfide Safety Equipment – Supplied by Total Safety, unless otherwise noted:

Respiratory Safety Systems

QTY	DESCRIPTION
8	30-minute pressure demand SCBA with Pigtail
4	4 Supplied Air Respirators with 5 min escape bottles

Detection and Alarm Safety System

1	H_2S Wireless Monitoring System w/2 relays (relays located in doghouse & company man trailer)
4	H_2S Sensors – (sensors located on rig floor, cellar, shaker, & mud tank)
2	Explosion Proof Alarms (Light and Siren)
2	Personal H_2S monitors
1	Portable Tri-Gas Hand Held Meter (O_2, LEL, H_2S)
1	Gastech Manual Impingement Pump Type Detector
2	Boxes H_2S Tubes Various Ranges
2	Boxes SO_2 Tubes Various Ranges
1	Set Paper Work for Records: Training, Cal, Inspection, other

Additional Safety Related Equipment

QTY	Description
2	Windsocks with Pole and Bracket
1	Set Well Condition Sign w/Green, Yellow, Red Flags
1	Primary Safe Briefing Area Sign
1	Secondary Safe Briefing Area Sign

H_2S Training Statement

On site personnel will be trained in H_2S safety by independent training contractors. H_2S qualified personnel will be present if the presence of H_2S is detected.

Received
Office of Oil & Gas
APR 2 0 2013