



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

October 15, 2014

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-3305822, 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: GOFF 19HM
Farm Name: H. DOTSON CATHER TRUSTEE
API Well Number: 47-3305822
Permit Type: Horizontal 6A Well
Date Issued: 10/15/2014

Promoting a healthy environment.

10/17/2014

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. The operator will exercise extreme caution when excavating above any dwellings.
2. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.
3. 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.
4. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. 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.
5. 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.
6. 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.
7. 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.
8. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.
9. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.
10. Operator shall provide the Office of Oil & Gas notification of the date that drilling commenced on this well. Such notice shall be provided by sending an email to DEPOOGNotify@wv.gov within 30 days of commencement of drilling.

10/17/2014

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

33 1 692

1) Well Operator: PDC Mountaineer, LLC. 494494839 Harrison Clark Wolf Summit 7.5
Operator ID County District Quadrangle

2) Operator's Well Number: Goff 19HM Well Pad Name: Goff

3) Farm Name/Surface Owner: H. Dotson Cather, Trustee Public Road Access: WV Route 98

4) Elevation, current ground: 1129.0' Elevation, proposed post-construction: 1126.3'

5) Well Type (a) Gas Oil Underground Storage
Other
(b) If Gas Shallow Deep
Horizontal

SDW
5/1/2014

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s):
Marcellus Shale / Depth Approx. 7039' / Thickness approx. 70', / 7039 x 0.42 = 2960 psi

8) Proposed Total Vertical Depth: 7089'

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 14,163'

11) Proposed Horizontal Leg Length: 5,210'

12) Approximate Fresh Water Strata Depths: 25'

13) Method to Determine Fresh Water Depths: Drilling Reports, API permit #s: 4703302434, 2435, 3483, 3539, 4160

14) Approximate Saltwater Depths: 749'

15) Approximate Coal Seam Depths: 500'

16) Approximate Depth to Possible Void (coal mine, karst, other): Not known.

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

(a) If Yes, provide Mine Info: Name: _____
Depth: _____
Seam: _____
Owner: _____

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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.	100'	100'	Cement to Surface
Fresh Water	13 3/8"	N	H-40	48 lb.	600'	600'	Cement to Surface
Coal							
Intermediate	9 5/8"	N	J-55	40 lb.	2,600'	2,600'	Cement to Surface
Production	5 1/2"	N	P-110	20 lb	14,163'	14,163'	2,971
Tubing							
Liners							

*SDW
5/11/2014*

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:				
Sizes:				
Depths Set:				

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Environment

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

Drill and Complete a horizontal Marcellus Shale well following all State and Federal guidelines. All casing will be new and the production casing will be cemented a minimum of 100' into the intermediate casing if it is not cemented to the surface.

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): 9.76

22) Area to be disturbed for well pad only, less access road (acres): 7.66

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.

25) Proposed borehole conditioning procedures:

Surface and intermediate holes to be cleaned with air. Production hole to be circulated with mud for a minimum of 4 hours with high viscosity sweeps ran occasionally.

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*Note: Attach additional sheets as needed.

Open Mine Contingency Plan

The Goff 18HM, 19HM, 20HM and 21HM wells are being drilled at ground elevation of 1127', which is at or just below the existing strip bench elevation just to the west of the pad. We do not anticipate a mine void in this area, but will plan for the possibility of an open mine with the following plan.

Conductor: diameter will be changed to accommodate possible mine string, the new diameter will be 24", H-40 grade, 94#, cemented to surface.

Mine String: if an open mine is encountered, PDCM will run 20" (H-40, 48#) as a mine string. The mine string will be set between 30 to 50 feet below the base of the open mine encountered. The mine string will have a cement balance job on the bottom (below the open mine), and the top will be surface-grouted to ground level.

Regardless of whether an open mine is encountered, PDCM will drill to 600' (per the Casing and Tubing Program in the Permit package) and set a 13 3/8" fresh water string through all potential zones and cement to surface.

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OCT 08 2014

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Environmental Protection

4703305822



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

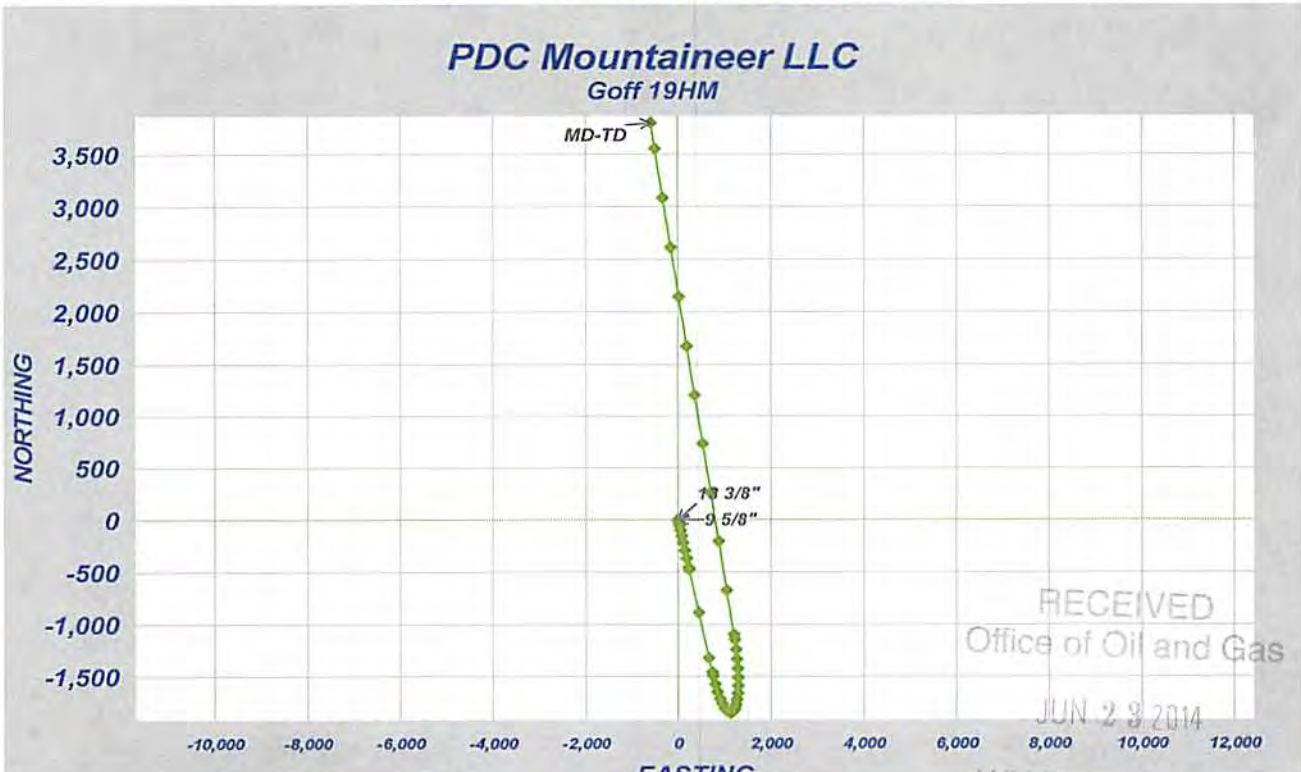
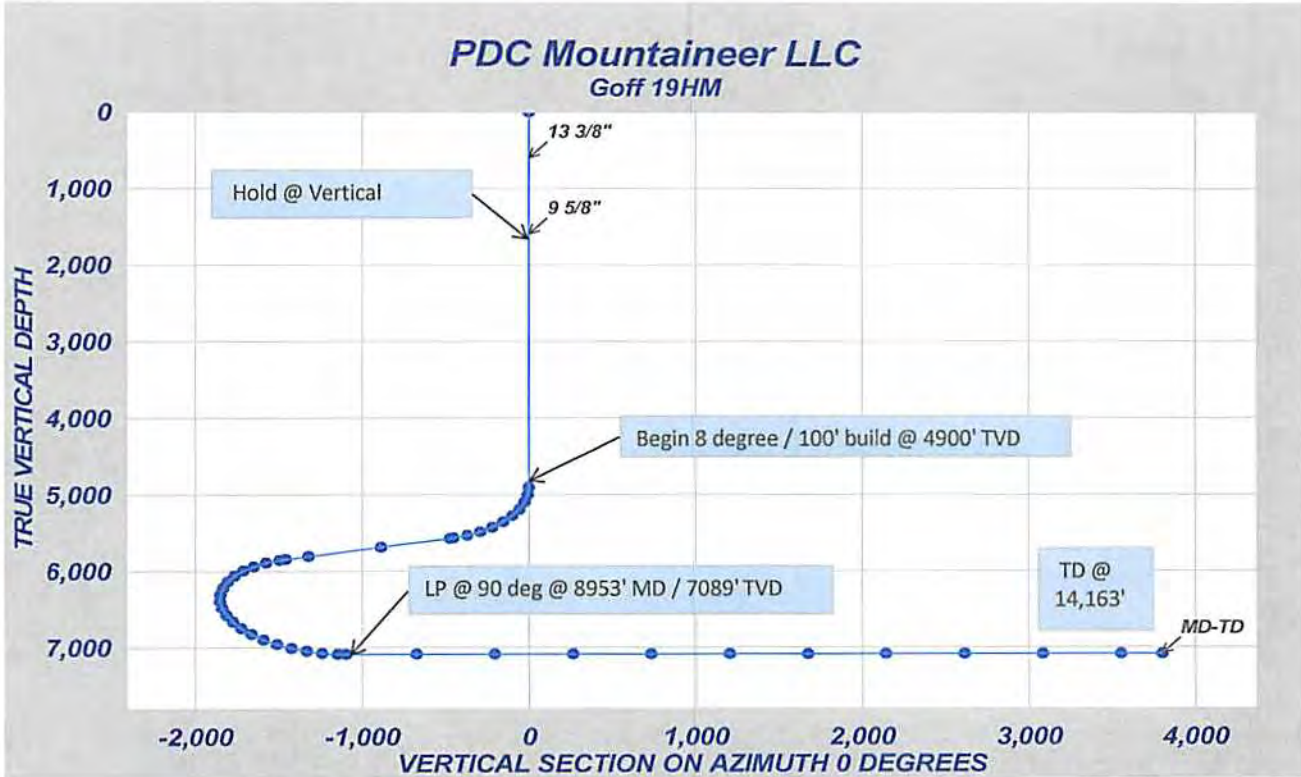
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Environmental Protection 10/17/2014

4703305822

PDC Mountaineer LLC
Goff 19HM Well Plan
Harrison County, WV



PDC MOUNTAINEER



10/17/2014

WW-9
(9/13)

API Number 47 - 4703305822
Operator's Well No. Goff 19HM

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 Wolf Summit

Elevation 1125.5' County Harrison District Clark

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

Will a pit be used? Yes No

If so, please describe anticipated pit waste: Flowback

Will a synthetic liner be used in the pit? Yes No If so, what ml.? 40

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection (UIC Permit Number 2459, 4037, 8462, K&H Well (Ohio) 34-9-2-3821)
- Reuse (at API Number to be determined.)
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain _____)

*SDCW
5/1/2014*

Will closed loop system be used? If so, describe: Yes, cuttings go into a half round where they will be solidified and hauled to Meadowfill.

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. Vertical-air; Horizontal-mud

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

Additives to be used in drilling medium? Lime, perma-lose, xan-plex, super sweep, caustic soda, bar, x-cide

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

-If left in pit and plan to solidify what medium will be used? (cement, lime, sawdust) NA

-Landfill or offsite name/permit number? Meadowfill Landfill 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 Steven P. Johnson

Company Official (Typed Name) Steven P. Johnson

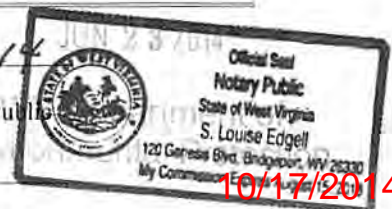
Company Official Title Agent

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Subscribed and sworn before me this 14th day of April, 2014

S. Louise Edgell Notary Public

My commission expires April 15, 2018



10/17/2014

PDC Mountaineer, LLC

Proposed Revegetation Treatment: Acres Disturbed 7.66 Prevegetation pH 7.2

Lime 3 Tons/acre or to correct to pH 6.5

Fertilizer type 10-20-20

Fertilizer amount 500 Minimum lbs/acre

Mulch 2-3 Tons/acre

Seed Mixtures

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
Timothy Grass	40	Timothy Grass	40
Orchard Grass	12	Orchard Grass	12
Redtop Clover	5	Redtop Clover	5

Attach:

Drawing(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided)

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: S P D Warratt

Comments: Pre-seed & mulch all disturbed areas as soon as reasonably possible. Upgrade E+S as necessary per WVDEPE+S manual

Title: Oil & Gas Inspector

Date: 5/1/2014

Field Reviewed? (X) Yes () No

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10/17/2014

4703305822



PDC MOUNTAINEER

SITE SAFETY PLAN

PDC Mountaineer, LLC

Goff #19HM

911 Address

**2499 Davisson Run Road
Clarksburg, WV 26301**

Wolf Summit, Clark District - Harrison County, West Virginiaol.

The Following Site Safety Plan Approved By:

By: 

Date: 4-23-14

Title: EHS Manager, PDCM

By: _____

Date: _____

Title: _____, WVOOG

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SDW WV Department of
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5/1/2014

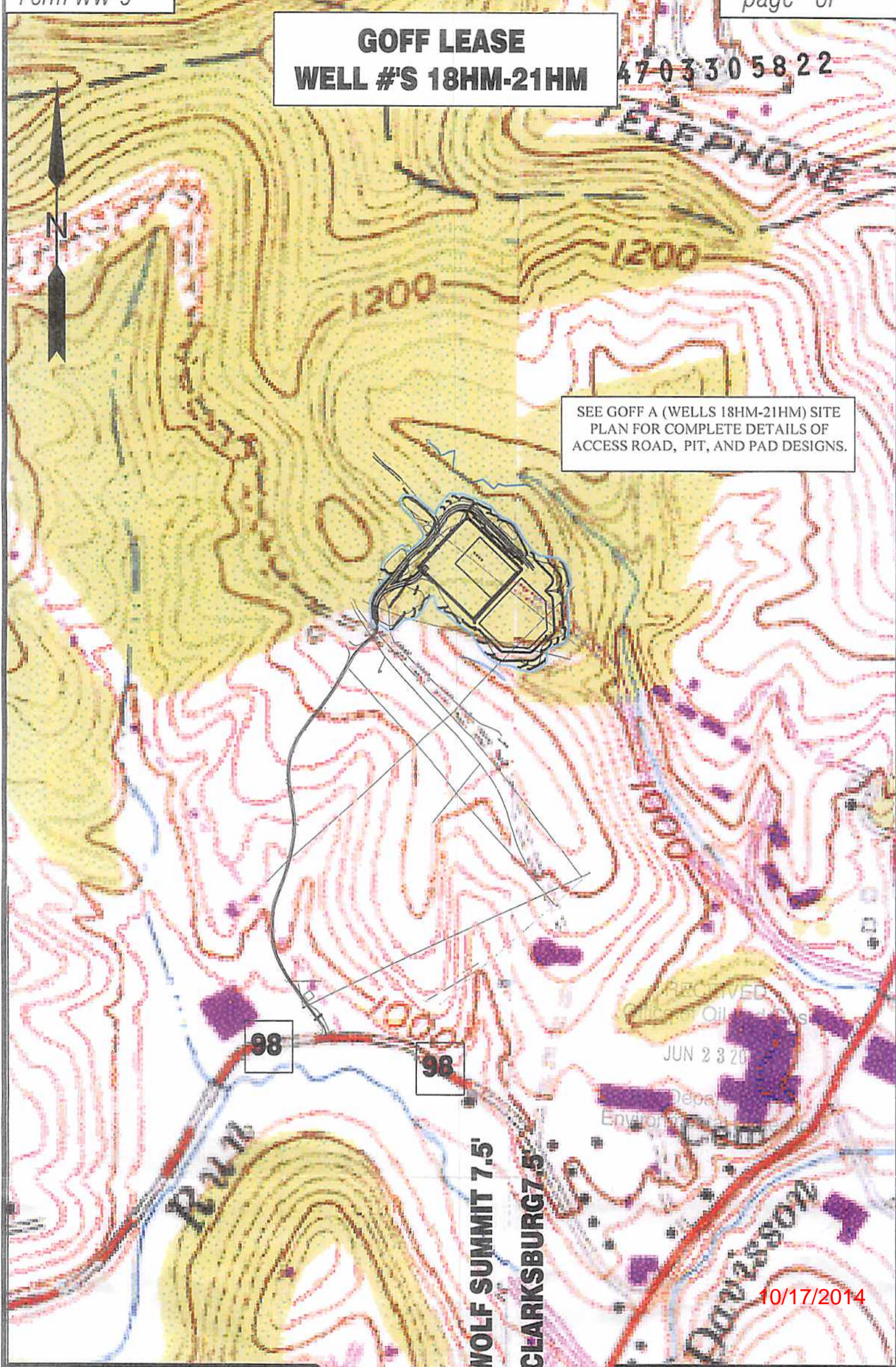
10/17/2014

GOFF LEASE WELL #'S 18HM-21HM

47 03 30 58 22



SEE GOFF A (WELLS 18HM-21HM) SITE PLAN FOR COMPLETE DETAILS OF ACCESS ROAD, PIT, AND PAD DESIGNS.



10/17/2014



Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYING

SURVEYORS
PROJECT MGMT.



ENGINEERS
ENVIRONMENTAL

P.O. Box 150
Clawville, WV 25031
(304) 450-0214

5065 Dilles Bottom Road
Shady Side, OH 43087
(740) 574-9011

HONESTY. INTEGRITY. QUALITY.

TOPO SECTION OF USGS
WOLF SUMMIT & CLARKSBURG
7.5' QUADRANGLES

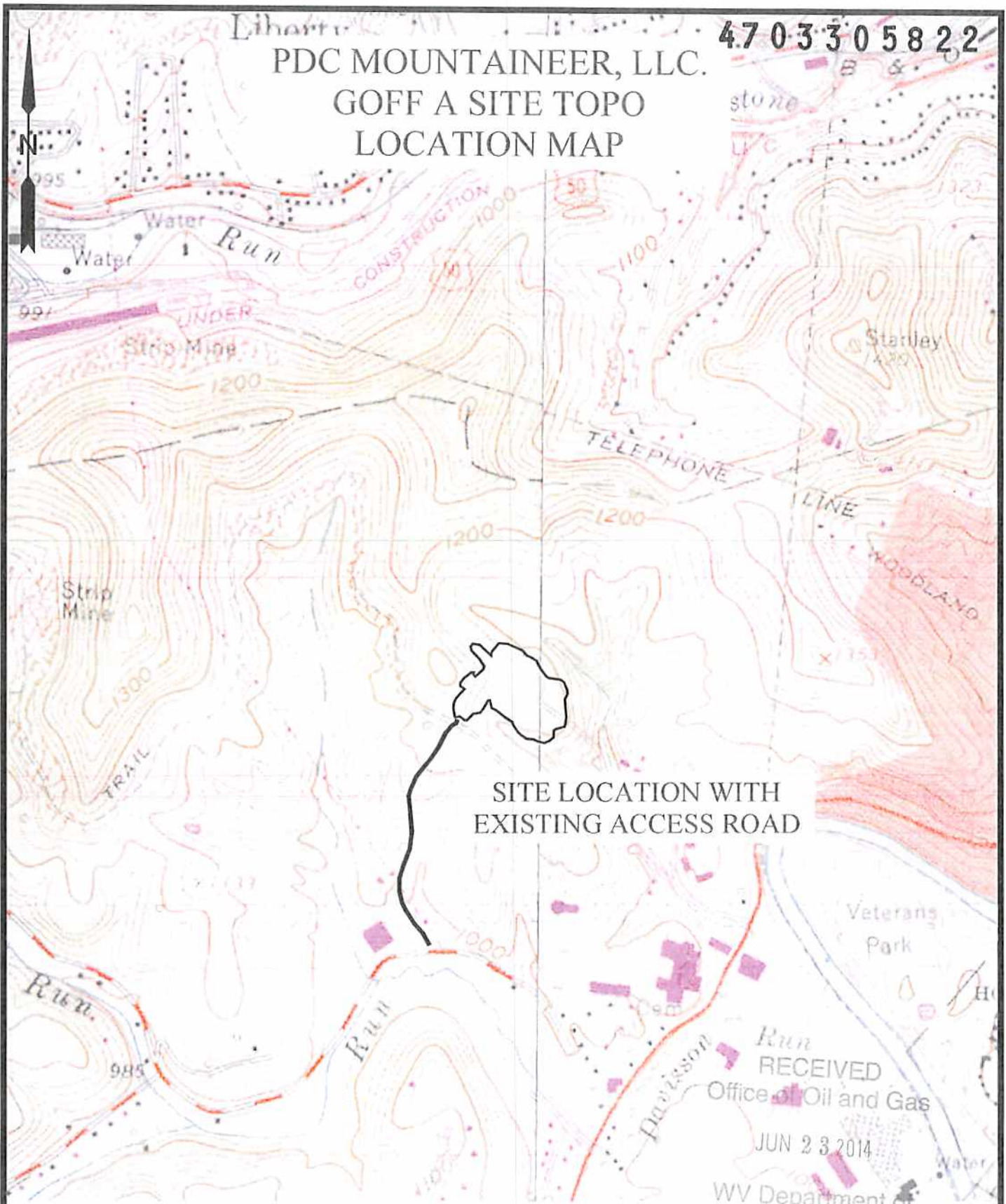
SCALE: 1"=500'



DRAWN BY C.P.M.	FILE NO. 8099	DATE 01-10-14	CADD FILE: 8099REC.DWG
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4703305822

PDC MOUNTAINEER, LLC. GOFF A SITE TOPO LOCATION MAP



SITE LOCATION WITH
EXISTING ACCESS ROAD

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SCALE
1 INCH = 1000 FEET

0' 1000' 2000' 3000'



Professional Energy Consultants
A DIVISION OF SOUTH LAND SURVEYING

SURVEYORS PROJECT MGMT. **SLS** ENGINEERS ENVIRONMENTAL

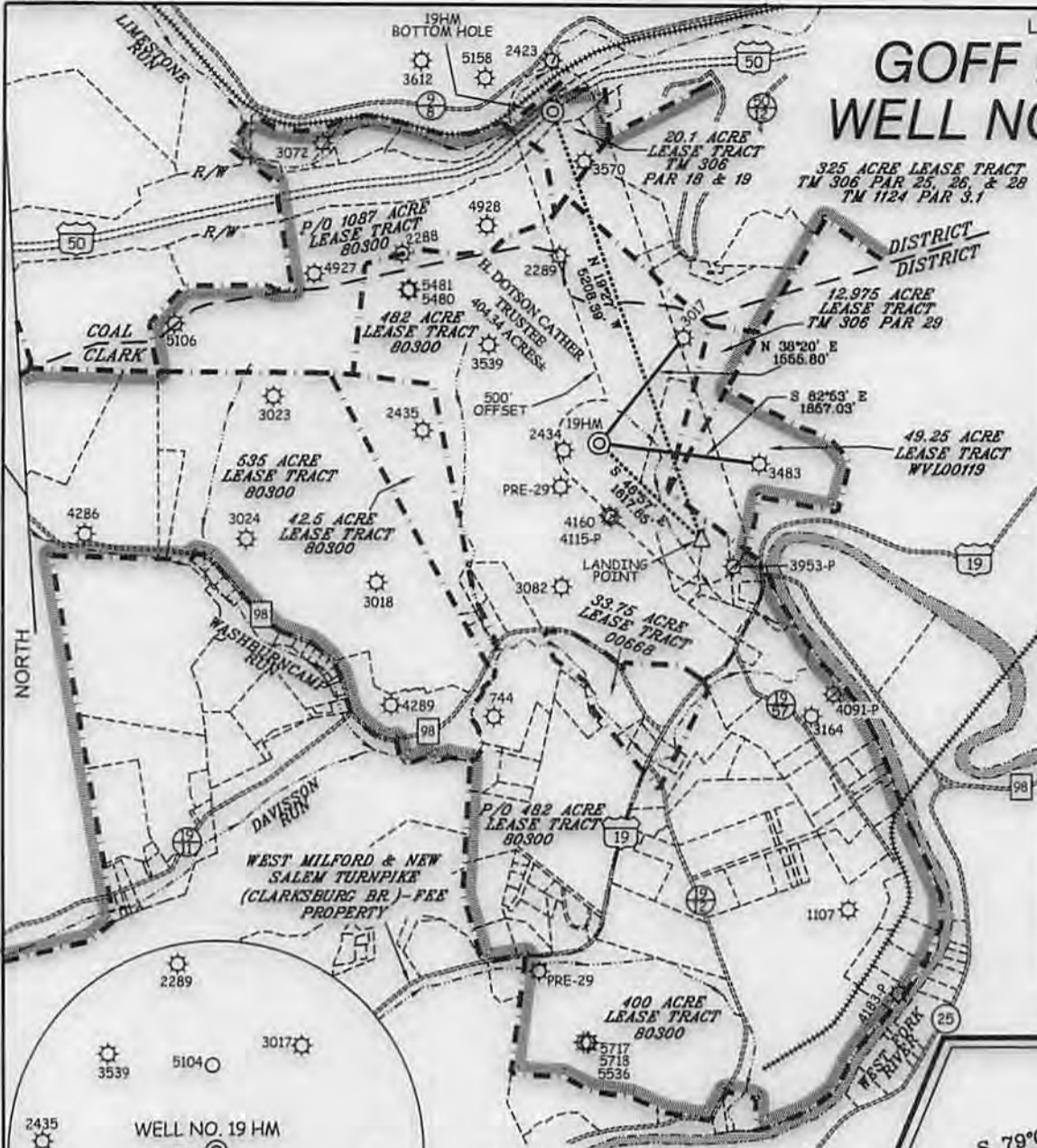
228 West Main St.
P.O. Box 110
Cranfield, WV 26301
(304) 452-2634

3668 Gilrae Outcrop Road
Starkville, OH 43087
(740) 671-8911

Honesty. Integrity. Quality.

FILE NO. 8099	DATE 1/9/14	CADD FILE: 8009LOCATIONMAP.dwg
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10/17/2014



LATITUDE 39°17'30"

GOFF LEASE WELL NO. 19 HM

LONGITUDE 80°22'30"
5.094'

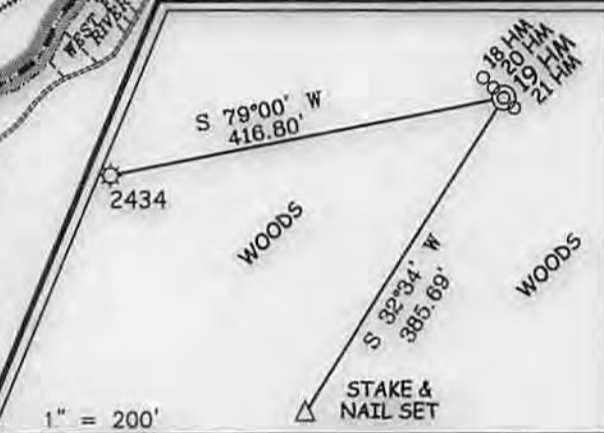
WELL NO. 19 HM TOP HOLE STATE PLANE COORDINATES (NORTH ZONE NAD 27) N. 284,455 E. 1,752,136
TOP HOLE (NAD 27) LAT=(N) 39°16'39.6" LONG=(W) 80°22'32.1"
TOP HOLE (NAD 83) LAT=(N) 39°16'40.0" LONG=(W) 80°22'31.4"
TOP HOLE UTM (NAD 83) (N) 4,347,788 (E) 553,874
WELL NO. 19 HM LANDING POINT STATE PLANE COORDINATES (NORTH ZONE NAD 27) N. 283,350 E. 1,753,319
LANDING POINT (NAD 27) LAT=(N) 39°16'28.8" LONG=(W) 80°22'16.9"
LANDING POINT (NAD 83) LAT=(N) 39°16'29.2" LONG=(W) 80°22'16.2"
LANDING POINT UTM (NAD 83) (N) 4,347,457 (E) 554,239
WELL NO. 19 HM BOTTOM HOLE STATE PLANE COORDINATES (NORTH ZONE NAD 27) N. 288,262 E. 1,751,585
BOTTOM HOLE (NAD 27) LAT=(N) 39°17'17.2" LONG=(W) 80°22'39.6"
BOTTOM HOLE (NAD 83) LAT=(N) 39°17'17.5" LONG=(W) 80°22'38.9"
BOTTOM HOLE UTM (NAD 83) (N) 4,348,945 (E) 553,686

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 70 PAGE 152 AND ADJOINING DEEDS.
3. SURFACE OWNER AND ADJOINER INFORMATION TAKEN FROM THE ASSESSOR AND COUNTY CLERK RECORDS OF HARRISON COUNTY IN JULY, 2013.
4. WELL COORDINATES ESTABLISHED BY DGPS (SURVEY GRADE).
5. NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS ≥ 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.



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. [Signature]
2266

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
DATE APRIL 16, 20 14
OPERATORS WELL NO. GOFF 19HM
API WELL NO. 47 - 33 - 05822
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 200 FILE NO. 8099P19R(475-70)
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: GROUND PROPOSED ELEVATION 1127.30' 1126.30' WATERSHED WEST FORK RIVER

DISTRICT CLARK COUNTY HARRISON QUADRANGLE WOLF SUMMIT 7.5'

SURFACE OWNER H. DOTSON CATHER TRUSTEE ACREAGE 404.34±

ROYALTY OWNER H. DOTSON CATHER TRUSTEE ETAL ACREAGE 1087, 49.25, 12,975, 325 & 20.1±

PROPOSED WORK: LEASE NO. 80300, WV L00119, ANTERO(TM 306 P 29), ANTERO(TM 306 P 25, 26, & 28 & TM 1124 P 3.1), ANTERO(TM 306 P 18 & 19)

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 7,089' TVD / TMD 14,163'

WELL OPERATOR PDC MOUNTAINEER, LLC DESIGNATED AGENT STEVEN P. JOHNSON
ADDRESS 120 GENESIS BOULEVARD ADDRESS 120 GENESIS BOULEVARD
BRIDGEPORT, WV 26330 BRIDGEPORT, WV 26330

COUNTY NAME PERMIT

10/17/2014