



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
(304) 926-0450
fax: (304) 926-0452

Jim Justice, Governor
Austin Caperton, Cabinet Secretary
www.dep.wv.gov

PERMIT MODIFICATION APPROVAL
Horizontal 6A / Horizontal 6A Well - 1

EQT PRODUCTION COMPANY
120 PROFESSIONAL PLACE
BUILDING II
BRIDGEPORT, WV 26330

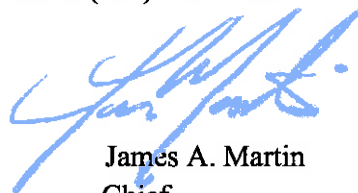
Re: Permit Modification Approval for 515885
47-085-10220-00-00

Lateral Length of Well Reduced

EQT PRODUCTION COMPANY

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.

If there are any questions, please feel free to contact me at (304) 926- 0450.



James A. Martin
Chief

Operator's Well Number: 515885
Farm Name: WILSON, JAMES H. & WILMA J.
U.S. WELL NUMBER: 47-085-10220-00-00
Horizontal 6A / Horizontal 6A Well - 1
Date Issued: 1/20/2017

Promoting a healthy environment.

01/27/2017



May 19, 2016

Mr. Gene Smith
West Virginia Department of Environmental Protection
Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304

Re: Modification of 47-085-10220

Dear Mr. Smith,

Enclosed is an updated WW-6B, schematics, WW-6A1, mylar plat and rec plan. The lateral bore was drilled shorter than what was permitted. EQT would like to submit this correction for your files.

If you have any questions, please do not hesitate to contact me at (304) 848-0076.

Sincerely,

Vicki Roark
Permitting Supervisor-WV

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Enc.

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

1) Well Operator: EQT Production Company 306686 Ritchie Union Pullman
Operator ID County District Quadrangle

2) Operator's Well Number: 515885 Well Pad Name: PUL96

3) Farm Name/Surface Owner: James H & Wilma J. Wilson Public Road Access: CR 7/4

4) Elevation, current ground: 1182.6 Elevation, proposed post-construction: 1182.6

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

Other _____

(b) If Gas Shallow Deep _____

Horizontal

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus, 6364', 54', 2190 PSI

8) Proposed Total Vertical Depth: 6364

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 14958

11) Proposed Horizontal Leg Length: 6759

12) Approximate Fresh Water Strata Depths: 352,378,409,566

13) Method to Determine Fresh Water Depths: By offsetting wells

14) Approximate Saltwater Depths: n/a

15) Approximate Coal Seam Depths: n/a

16) Approximate Depth to Possible Void (coal mine, karst, other): n/a

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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CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft./CTS)
Conductor	20	New	A-500	78.8	40	40	44.84 R³ / CTS
Fresh Water	13 3/8	New	J-55	54.5	671	671	718.8 R³ / CTS
Coal							
Intermediate	9 5/8	New	A-500	40	2568	2568	1165.84 R³ / CTS
Production	5 1/2	New	P-110	20	14958	14958	See above top producing zone
Tubing	2 3/8		J-55	4.7		May not be run, if run set 47' above top perf or 89' production	
Liners							

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	20	24	.375	1378	18	Class A	1.18
Fresh Water	13 3/8	17 1/2	.38	2700	2180	See above table	1.20
Coal							
Intermediate	9 5/8	12 3/8	.395	3950	3160	See above table	1.18
Production	5 1/2	8 1/2	.381	12840	10112	Class H	1.25/2.06
Tubing	2 3/8	NA	.19	7700			
Liners							

PACKERS

Kind:				
Sizes:				
Depths Set:				

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JAN 19 2017

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

Drill and complete a new horizontal well in the Marcellus Formation. Drill the vertical to an approximate depth of 2722'. Kick off and drill curve. Drill the lateral in the Marcellus. Center casing.

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

Hydraulic fracturing is completed in accordance with state regulations using water recycled from previously fractured wells and obtained from freshwater sources. This water is mixed with sand and a small percentage (less than 0.3%) of chemicals (including 15% Hydrochloric acid, gelling agent, gel breaker, friction reducer, biocide, and scale inhibitor), referred to in the industry as a "slickwater" completion. Maximum anticipated internal casing pressure is expected to be approximately 10000 psi, maximum anticipated treating rates are expected to average approximately 100 bpm. Stage lengths vary from 150 to 300 feet. Average approximately 200,000 barrels of water per stage. Sand sizes vary from 100 mesh to 20/40 mesh. Average approximately 200,000 pounds of sand per stage.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): no additional

22) Area to be disturbed for well pad only, less access road (acres): no additional

23) Describe centralizer placement for each casing string:

- Surface: Bow spring centralizers – One centralizer at the shoe and one spaced every 500'.
- Intermediate: Bow spring centralizers– One centralizer at the shoe and one spaced every 500'.
- Production: One solid body centralizer spaced every joint from production casing shoe to KOP

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

Conductor: Class A no additives
Surface (Class A Cement): 0-3% Calcium Chloride. Used to speed the setting of cement slurries
Intermediate (Class A Cement): 0-3% Calcium Chloride. Used to speed the setting of cement slurries.
Production:
Lead (Type H Cement): 0.2% CD-20 (dispersant makes cement easier to mix). .15% SuperFL-300 (fluid loss/lengthens thickening time) .15% SEC-10 (fluid loss) 50:50 POZ (extender)
Tail (Type H Cement): 0.2% Super CR-1 (Retarder). Lengthens thickening time. .3% Super FL-200 (fluid loss) .2% SEC-10 (Fluid loss). .2% SuperFL-350 (fluid loss) Reduces amount of water lost to formation. 60 % Calcuim Carbonate. Acid solubility.

25) Proposed borehole conditioning procedures:

Surface: Circulate hole clean while rotating & reciprocating the drill string until cuttings diminish at surface.
Intermediate: Circulate hole clean while rotating & reciprocating the drill string until cuttings diminish at surface.
Production: Pump marker sweep with nut plug to determine actual hole washout. Calculate a gauge holes bottoms up volume. Perform a cleanup cycle by pumping 3-5 bottoms up or until the shakers are clean. Check volume of cuttings coming across the shakers every 15 minutes.

*Note: Attach additional sheets as needed.

0201-580

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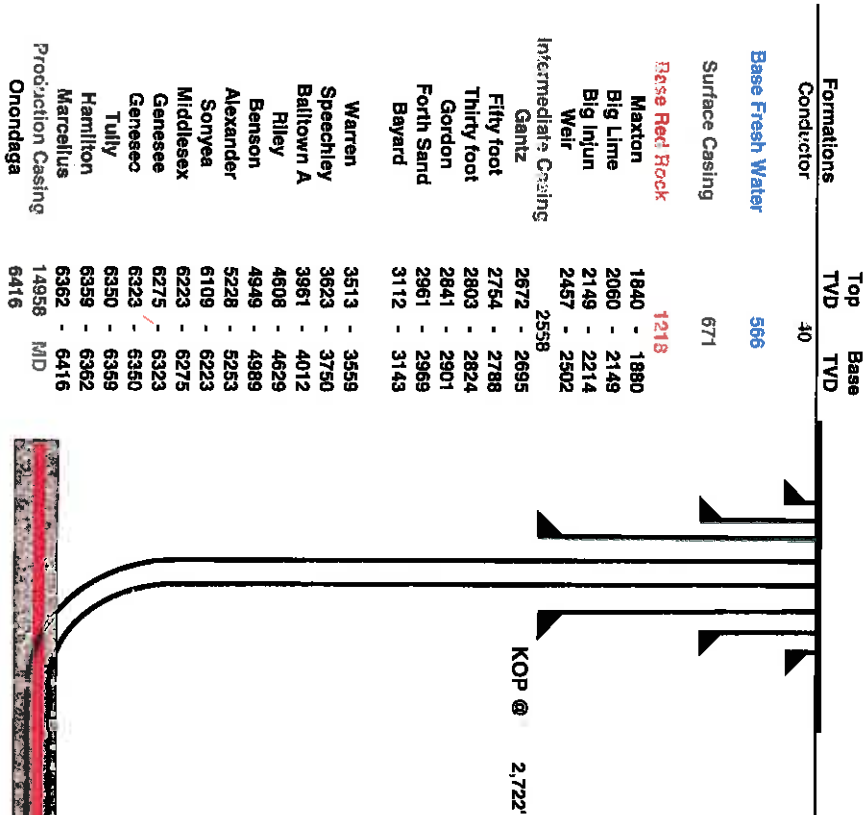
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Well 515885(PUL96H3)

EQT Production
Pullman Quad
Ritchie County, WV

Azimuth 165
Vertical Section 7382

Note: Diagram is not to scale



Casing and Cementing		Deepest Fresh Water: 566'		
Type	Conductor	Surface	Intermediate	Production
Hole Size, In.	26	17 1/2	12 3/8	8 1/2
Casing Size, OD In.	20	13 3/8	9 5/8	5 1/2
Casing Well Thickness, In.	0.375	0.380	0.395	0.361
Depth, MD	40'	671'	2,568'	14,958'
Weight	78.6#	54.5#	40#	20#
Grade	A-500	J-55	A-500	P-110
New or Used	New	New	New	New
Burst (psi)	1378	2,700	3,950	12,640
Cement Class	A	A / Type 1	A / Type 1	H
Cement Yield	1.18	1.19	1.19	1.0771, 1.85
Top of Cement (Planned) TVD	Surface	Surface	Surface	500' above top Producing Zone
Method	Displacement	Displacement	Displacement	Displacement
Est. Volume (cu ft)	60	603	1,012	3,011
Possible Additives	N/A	Calcium Chloride	Calcium Chloride	Calcium Carbonate, Fluid Loss, Extender, Dispersant, Viscosifier, Defoamer, POZ, Bonding Agent, Retarder, Anti-Settling/Suspension Agent



Proposed Well Work:
Drill and complete a new horizontal well in the Marcellus formation.
Drill the vertical to an approximate depth of 2722'.
Kick off and drill curve. Drill lateral in the Marcellus. Cement casing.

01/27/2017

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)**

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
see attachment				

**Acknowledgement of Possible Permitting/Approval
In Addition to the Office of Oil and Gas**

The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, or nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

Well Operator: EQT Production Company
 By: Victor [Signature]
 Its: Office of Oil and Gas

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085-10220

Lease No.	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>919995</u>	<u>Laurie Ann Haddox, et al (royalty owner)</u> James A. Wilson, et ux (original lessor) R. W. Richards J. E. Richards and C. W. Richards Bolyard Oil & Gas, LTD Sheffield Exploration Co. M. S. Oil Co. (69.513%) Applied Mechanics, et al FS Limited Partnership	R. W. Richards J. E. Richards and C. W. Richards Bolyard Oil & Gas, LTD Sheffield Exploration Co. M. S. Oil Co. (69.513% of working interest) and Applied Mechanics Corp. (30.487% of working interest) Applied Mechanics, et al FS Limited Partnership EQT Production Co.	***	LB79/542 LB80/78 LB189/136 LB189/521 LB208/268 LB222/836 AB274/80 AB274/102
<u>919993</u>	<u>James Douglas Wilson, et al (royalty owner)</u> Effie E. Wilson and James Wilson (original lessor) J.E. Richards J.E. Richards and C.W. Richards P.O. Burgy, B.S. Marshall, L.B. Burgy & Rollo Riggs J. E. Richards and C.W. Richards Applied Mechanics, et al FS Limited Partnership	J.E. Richards J. E. Richards and C.W. Richards P.O. Burgy, B.S. Marshall, L.B. Burgy & Rollo Riggs J. E. Richards and C.W. Richards Applied Mechanics, et al FS Limited Partnership EQT Production Co.	***	LB79/346 LB79/407 LB81/279 LB123/303 LB206/8 AB274/80 AB274/102
<u>919998</u>	<u>Jean Moore (current royalty owner)</u> Robert D. Elder, et ux (original lessor) N.M. Welch Ohio-West Virginia Oil & Gas Co. N.M. Welch J. E. Richards and C.W. Richards Applied Mechanics, et al FS Limited Partnership	N.M. Welch Ohio-West Virginia Oil & Gas Co. N.M. Welch J. E. Richards and C.W. Richards Applied Mechanics, et al FS Limited Partnership EQT Production Co.	***	LB81/521 LB81/546 LB82/425 LB82/500 LB206/8 AB274/80 AB274/102
<u>919996</u>	<u>Darren M. Dodd, et al (current royalty owner)</u> Ruby Dotson, et al (original lessor) J. E. Richards J. E. Richards and C. W. Richards Applied Mechanics, et al FS Limited Partnership	J. E. Richards J. E. Richards and C. W. Richards Applied Mechanics, et al FS Limited Partnership EQT Production Co.	***	LB80/449 LB80/455 LB206/8 AB274/80 AB274/102
<u>919994</u>	<u>S&R Gas Ventures, et al (royalty owner)</u> Ethel M. Turner, widow (original lessor) J. E. Richards J. E. Richards and C. W. Richards Applied Mechanics, et al FS Limited Partnership	J. E. Richards J. E. Richards and C. W. Richards Applied Mechanics, et al FS Limited Partnership EQT Production Co.	***	LB80/451 LB80/455 LB206/8 AB274/80 AB274/102
<u>919987</u>	<u>Arnold K. Richards (royalty owner)</u> A. H. Hodge and Ona Hodge (original lessor) J. E. Richards J. E. Richards and C. W. Richards Bolyard Oil & Gas, LTD Sheffield Exploration Co. M. S. Oil Co. (69.513%) Applied Mechanics, et al FS Limited Partnership	J. E. Richards J. E. Richards and C. W. Richards Bolyard Oil & Gas, LTD Sheffield Exploration Co. M. S. Oil Co. (69.513% of working interest) and Applied Mechanics Corp. (30.487% of working interest) Applied Mechanics, et al FS Limited Partnership EQT Production Co.	***	LB80/449 LB80/455 LB189/310 LB189/521 LB208/268 LB222/836 AB274/80 AB274/102
<u>919988</u>	<u>William K. Wilson, Trust et al (royalty owner)</u> Arden Wilson, et ux (original lessor) J. E. Richards J. E. Richards and C.W. Richards Applied Mechanics, et al FS Limited Partnership	J. E. Richards J. E. Richards and C. W. Richards Applied Mechanics, et al FS Limited Partnership EQT Production Co.	***	LB81/515 LB80/455 LB206/8 AB274/80 AB274/102

*** We will pay one-eighth of the total amount paid to or received by or allowed to the owner of the working interest at the wellhead for the oil or gas so extracted, produced, or marketed before deducting the amount to be paid to or set aside for the owner of the oil or gas in place, on which oil or gas to be extracted, produced, or marketed from the well.

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085-10220

May 19, 2016

Mr. James Martin
West Virginia Department of Environmental Protection
Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304

Re: PUL96 (515885) 47-085-10220
Union District, Ritchie County

Dear Mr. Martin,

EQT Production Company is submitting an application for a new well work permit for the above well number. Upon information and belief, Operator's lease and/ or other real property rights permit it to conduct drilling operations for the subject well in the location shown on the plat, including under any public roads that the well lateral crosses.

Sincerely,

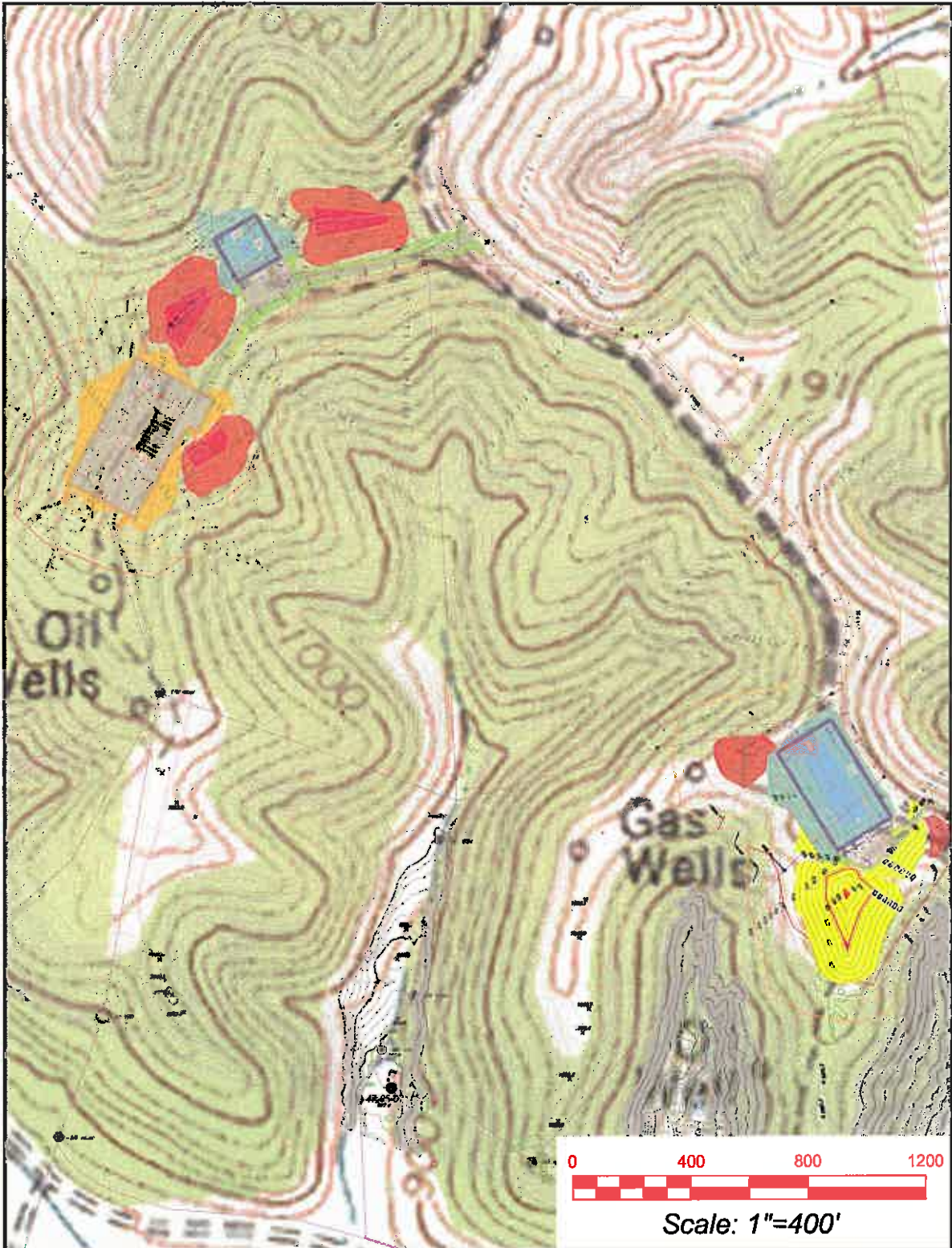
Vicki Roark
Permitting Supervisor-WV

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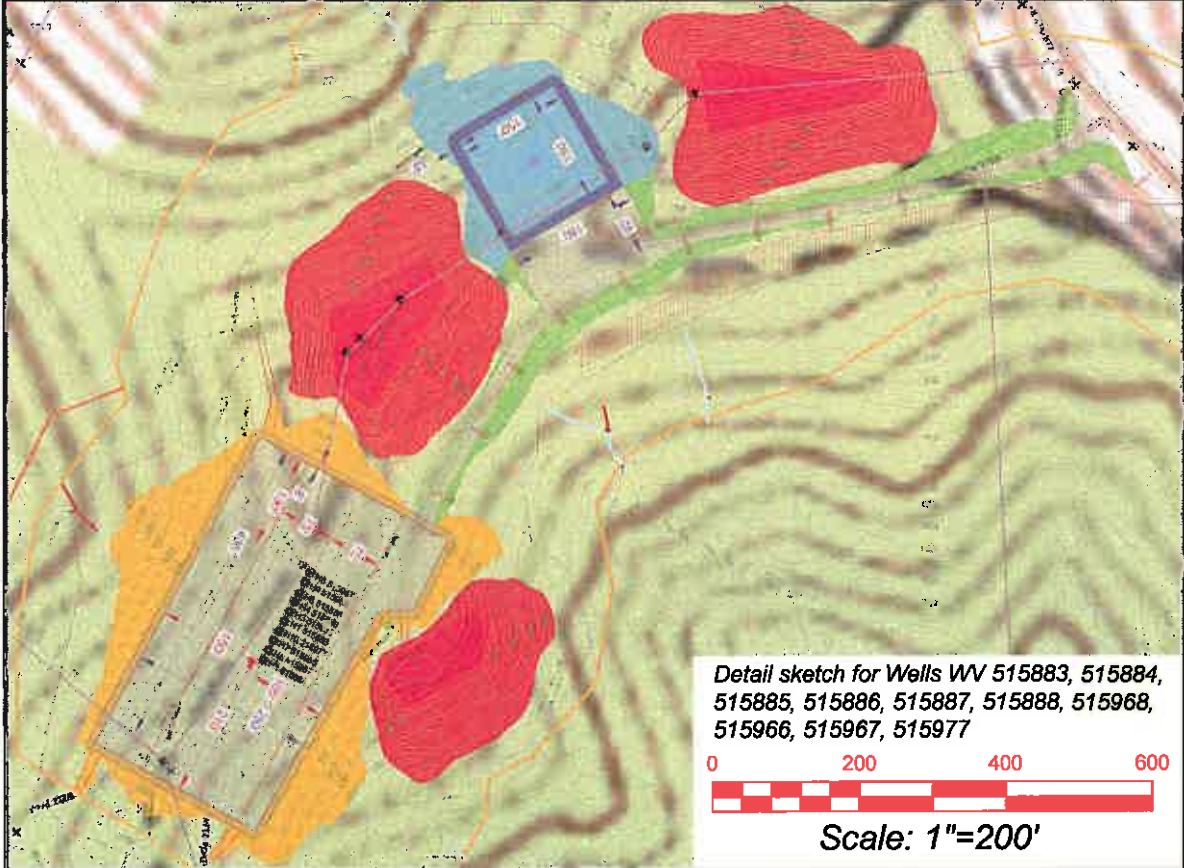
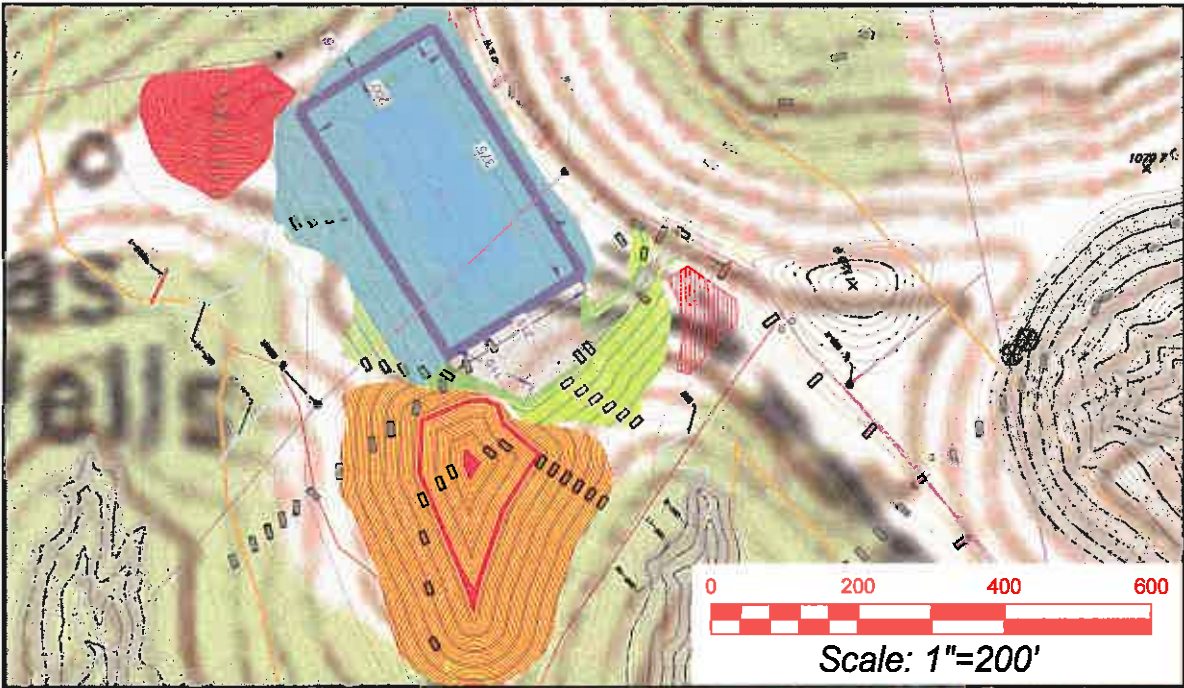
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01/27/2017



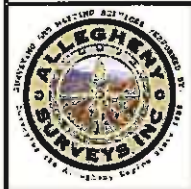
Pullman 7.5' USGS QUADRANGLE		Proposed Disturbance Area		Note: SEE SITE PLAN OF PULLMAN 96 FOR COMPLETE GRADING & DISTURBANCE CONTROL INCLUDING EROSION & SEDIMENT CONTROL. RECEIVED Office of Oil and Gas MAY 20 2016 WV Department of Environmental Protection
Projected culvert inventory. (for bid purposes only)		Well Site Location	See Site Plan	
15" minimum diameter culverts	See Site Plan	Proposed Access Road	See Site Plan	
24" minimum diameter culverts	See Site Plan	Approximate Total Disturbance	See Site Plan	
DRAWN BY: Dwayne A. Hall, PS	DATE: April 11, 2016	FILE NO. 243-14	DRAWING FILE NO. 243-14 Rec Plan	
	SURVEYING AND MAPPING SERVICES PERFORMED BY: ALLEGHENY SURVEYS, INC.			
	Birch River Office Phone: (304) 649-8606 Fax: (304) 649-8608	1-800-482-8606	237 Birch River Road P.O. Box 438 Birch River, WV 26610	



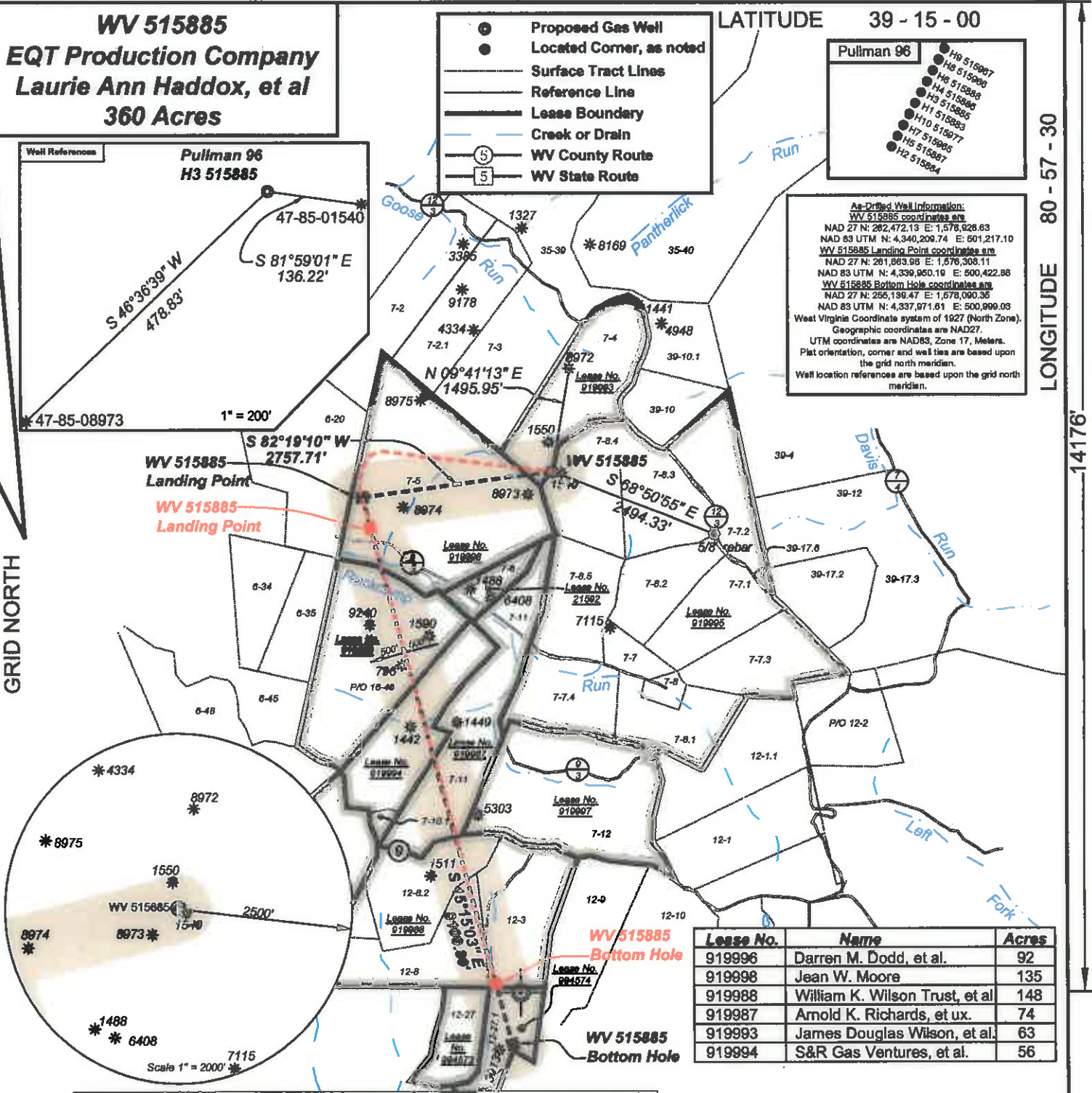
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DRAWN BY: Dwayne A. Hall, PS	DATE: April 11, 2016	FILE NO: 243-14	DRAWING FILE NO: 243-14 Rec Plan

Note: SEE SITE PLAN OF PULLMAN 96 FOR COMPLETE GRADING & DRAINAGE CONSTRUCTION INCLUDING EROSION & SEDIMENT CONTROL DETAILS, ETC.

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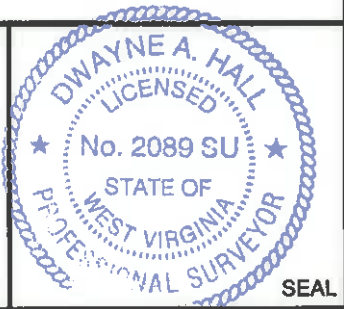


SURVEYING AND MAPPING SERVICES PERFORMED BY:
ALLEGHENY SURVEYS, INC.
1-800-482-8606
Birch River Office
Phone: (304) 649-8606
Fax: (304) 649-8608
237 Birch River Road
P.O. Box 438
Birch River, WV 26610



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 Department of Environmental Protection.

Dwayne A. Hall
 P.S. 2089SU



FILE NO: 243-14
 DRAWING NO: 243-14 Pullman 96 H3.dwg
 SCALE: 1" = 2000'
 MINIMUM DEGREE OF ACCURACY: 1:2500
 PROVEN SOURCE OF ELEVATION: NGS CORS Station

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

DATE: May 18 20 16
 OPERATOR'S WELL NO. 515885
 API WELL NO
 47 - 85 - 10220
 STATE COUNTY PERMIT

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
 (IF GAS) PRODUCTION: STORAGE DEEP SHALLOW
 LOCATION: ELEVATION: As Built: 1182.6' WATERSHED Goose Run of Rockcamp Run QUADRANGLE: Pullman
 DISTRICT: Union COUNTY: Ritchie
 SURFACE OWNER: James H. & Wilma J. Wilson ACREAGE: 01/27/2017
 ROYALTY OWNER: Laurie Ann Haddox, et al LEASE NO: 919995 ACREAGE: 360
 PROPOSED WORK: DRILL CONVERT DRILL DEEPER FRACTURE OR STIMULATE PLUG OFF OLD FORMATION
 PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL (SPECIFY) _____
 PLUG AND ABANDON CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus ESTIMATED DEPTH: TVD 6,396

WELL OPERATOR: EQT Production Company DESIGNATED AGENT: Rex C. Ray
 ADDRESS: PO Box 280 / 115 Professional Place ADDRESS: PO Box 280 / 115 Professional Place
Bridgeport, WV 26330 Bridgeport, WV 26330

18)

CASING AND TUBING PROGRAM

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Liners							

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PACKERS

WV Department of

Kind:			Environmental Protection
Sizes:			
Depths Set:			

VOID