



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

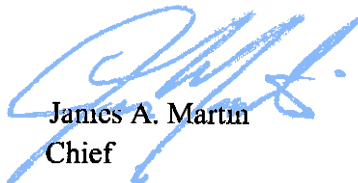
Re: Permit Modification Approval for 515277
47-085-10095-00-00

Subsurface Agreement for Additional Tract

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: 515277
Farm Name: BRITTON, DEWAYNE ET UX
U.S. WELL NUMBER: 47-085-10095-00-00
Horizontal 6A / Horizontal 6A Well - 1
Date Issued: 1/20/2017

Promoting a healthy environment.

01/27/2017



June 8, 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 47-085-10095

Dear Mr. Smith,

Please accept the attached updates for the above referenced permit. Upon inspection of our as-drilled plat, we noted the curve geometry crossed into an additional tract, for which EQT had acquired a subsurface agreement. Enclosed is an updated WW-6A1, WW-6B, mylar plat and rec plan reflecting corrections to update the permit file to be consistent with the as-drilled well bore.

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

Sincerely,

A handwritten signature in blue ink, appearing to read 'Vicki Roark'.

Vicki Roark
Permitting Supervisor-WV

Enc.

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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 Clay Pennsboro
Operator ID County District Quadrangle

2) Operator's Well Number: 515277 Well Pad Name: PEN15

3) Farm Name/Surface Owner: Dewayne Britton et ux Public Road Access: WV 74

4) Elevation, current ground: 1118.7 Elevation, proposed post-construction: 1118.7

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, 6419', 50', 2190 PSI

8) Proposed Total Vertical Depth: 6419'

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 13679'

11) Proposed Horizontal Leg Length: 5508'

12) Approximate Fresh Water Strata Depths: 86, 166, 245, 397, 773, 876

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

14) Approximate Saltwater Depths: 1655', 1946, 2424

15) Approximate Coal Seam Depths: 17, 276, 382, 747

16) Approximate Depth to Possible Void (coal mine, karst, other): none

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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WV Department of
Environmental Protection
Page 1 of 3

18)

CASING AND TUBING PROGRAM

<u>TYPE</u>	<u>Size (in)</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft. (lb/ft)</u>	<u>FOOTAGE: For Drilling (ft)</u>	<u>INTERVALS: Left in Well (ft)</u>	<u>CEMENT: Fill-up (Cu. Ft.)/CTS</u>
Conductor	20	New	A-500	78.6	40	40	45.22 ft ³ / CTS
Fresh Water	13 3/8	New	J-55	54.5	1077	1077	1104.48 ft ³ / CTS
Coal							
Intermediate	9 5/8	New	P-110	40	5354	5354	2200.9 ft ³ / CTS
Production	5 1/2	New	P-110	20	13679	13679	500' above top producing zone
Tubing	2 3/8		J-55	4.7		May not be run, if run set 40' above top perf or 80° inclination.	
Liners							

<u>TYPE</u>	<u>Size (in)</u>	<u>Wellbore Diameter (in)</u>	<u>Wall Thickness (in)</u>	<u>Burst Pressure (psi)</u>	<u>Anticipated Max. Internal Pressure (psi)</u>	<u>Cement Type</u>	<u>Cement Yield (cu. ft./k)</u>
Conductor	20	24	.375	1378	1102	Class A	1.19
Fresh Water	13 3/8	17 1/2	.38	2700	2160	Class A	1.19
Coal							
Intermediate	9 5/8	12 3/8	.395	7900	6320	Class A	1.24/1.19
Production	5 1/2	8 1/2	.361	12640	10112	Class H	1.23/2.18
Tubing	2 3/8	NA	.19	7700			
Liners							

PACKERS

Kind:				
Sizes:				
Depths Set:				

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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 4468'. Kick off and drill curve. Drill the lateral in the Marcellus. Cement casing.

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 disturbance

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

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 other 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 % Calcium 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. Circulate & 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.

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 JUN 10 2016
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 Page 3 of 3

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: Victoria J Roark

Its: Permitting Supervisor

[Signature]
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 Page 1 of 2
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0850095

Lease No.	Leasehold - Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>105804</u>	E. R. Taylor heirs (Current Royalty Owner)		***	
	E. R. Taylor & Jane Taylor, his wife	The Philadelphia & West Virginia Gas Company		LB30/123
	The Philadelphia & West Virginia Gas Company	Pittsburgh & West Virginia Gas Company		LB34/307
	Pittsburgh & West Virginia Gas Company	Equitable Gas Company		DB126/473
	Equitable Gas Company	Equitrans, Inc.		LB 201/253
	Equitrans, Inc.	Equitrans, LP.		AB269/182
	Equitrans, LP	Equitable Production/Eastern States, Inc.		DB234/830
	Equitable Production/Eastern States, Inc.	Equitable Production Company		CB6/443
	Equitable Production Company	EQT Production Company		CB6/443
<u>31-3</u>	Sammual C. Hammett et al	EQT Production Company	n/a	sub surface agreement attached

*** 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 all such oil or gas to be extracted, produced, or marketed from the well.

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Where energy meets innovation.™

085-10095

EQT Production Company
2400 Zenith Ridge Rd.
Suite 200
Canonsburg, PA 15317
www.eqt.com

Todd Klaner
Manager, Permitting
tklaner@eqt.com

Via E-Mail

June 1, 2016

WV DEP Reviewer

**RE: EQT Production Company
PAD ID – PEN15
Well# - 515277
Ritchie County**

Dear Reviewer,

This well indicated by this permit application contains a Subsurface Easement Agreement for non-productive portions of the well bore. Attached is a Memorandum of Subsurface Use Agreement which gives EQT the right to drill below the surface of the tracts 31-3 shown on the well plat.

EQT Production understands that the WVDEP will issue the permit in the normal process subject to the completeness of the requirements of the Office of Oil and Gas and does not take a position with regards to the property rights under this agreement.

EQT Production agrees that the WVDEP's issuance of the permit is in no way an affirmation or validation of EQT Production's claimed rights.

Regards,

Todd Klaner
Manager, Permitting
EQT Production Company

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085-10095

201400004567
Filed for Record in
RITCHIE COUNTY, WV
TRACIE D. McDONALD, COUNTY CLERK
07-15-2014 At 10:31 am.
MEMORANDUM 11.00
Book 275 Page 765 - 766

MEMORANDUM OF AGREEMENT

1. GRANTOR:

Samuel Hammett and Sherri Hammett , his wife
955 Bull Creek Rd
Waverly, WV 26184

Robert Hammett
#2 Pine Creek Lane
Houston, Texas 77055

2. GRANTEE:

EQT Production Company
625 Liberty Avenue
Suite 1700
Pittsburgh, PA 15222

3. ROW REFERENCE: A Sub Surface Easement(s) and Right of Way(s) Agreement dated the 10th day of July, 2014, was entered into for good and valuable consideration by and between Samuel Hammett and Sherri Hammett , his wife and Robert Hammett ("Grantor", whether one or more) and EQT Production Company ("Grantee").

4. DESCRIPTION OF THE PREMISES: That certain tract or parcel of land containing 110.637 acres, more or less, located on Clay District Ritchie County, WV, and being more particularly described in deed book 288 page 190 in the Office of the Clerk of the County of Ritchie. Map 31 Parcel 3

5. TERM: The Road Right of Way shall run with the land and shall remain in force and effect until released and relinquished by the Grantee back to the Grantor, in writing.

IN WITNESS WHEREOF, the parties have signed their names hereto as of the date of the Option referenced in Section 3 above.

GRANTOR:



Samuel Hammett



Sherri Hammett



Robert Hammett

GRANTEE:

EQT PRODUCTION COMPANY

By: 

John Damato, Attorney-in-fact

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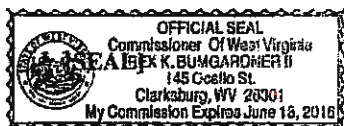
01/27/2017

085-10095

STATE OF West Virginia :

COUNTY OF Harrison :

Before me, Dee K Bumgardner #, a Notary Public,
on this day personally appeared Samuel Hammett, Sherri Hammett, and Robert Hammett,
known to me and acknowledged to me that he/she executed the instrument for the purposes and
consideration therein expressed as his/her free act and deed. Given under my hand and seal of
office this 9th day of July, 2014
My Commission expires: June 13, 2016



Dee K Bumgardner II
Notary Public

STATE OF West Virginia ;

COUNTY OF Harrison :

Before me, Dee K Bumgardner # Notary Public, on this day
personally appeared, known to me to be the John Demas of EQT PRODUCTION
COMPANY, subscribed to the foregoing instrument, and acknowledged to me that he/she
executed the instrument for the purposes and consideration therein expressed as his/her free act
and deed. Given under my hand and seal of office this 9th day of July,
2014
My Commission expires: June 13, 2016



Dee K Bumgardner II
Notary Public

Prepared by: EQT Production Company, 625 Liberty Avenue, Suite 1700, Pittsburgh, PA 15222

201400004567
EQT PRODUCTION COMPANY
ATTN: KATELYN LISTON
115 PROFESSIONAL PLACE
BRIDGEPORT WV 26330

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01/27/2017



May 20, 2016

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

Re: PEN15, 515277, 47-08510095

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,

A handwritten signature in blue ink, appearing to read 'Vicki Roark'.

Vicki Roark
Permitting Supervisor-WV

EQT Production 115 Professional Place | P.O. Box 280 | Bridgeport, WV 26330
T 304.848.0000 | F 304.848.0040 | www.eqt.com

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EQT PRODUCTION COMPANY
TAYLOR LEASE
1,600 ACRES±

LATITUDE 39° 17' 30"

**WELL NO. WV 515277
(PEN15 H8)
AS DRILLED COORDINATES**
(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)

NAD'27 S.P.C.(FT)	N. 280,813.5	E. 1,589,028.3
NAD'27 GEO.	LAT-(N) 39.261884	LONG-(W) 80.951478
NAD'83 UTM (M)	N. 4,345,848.8	E. 504,200.8

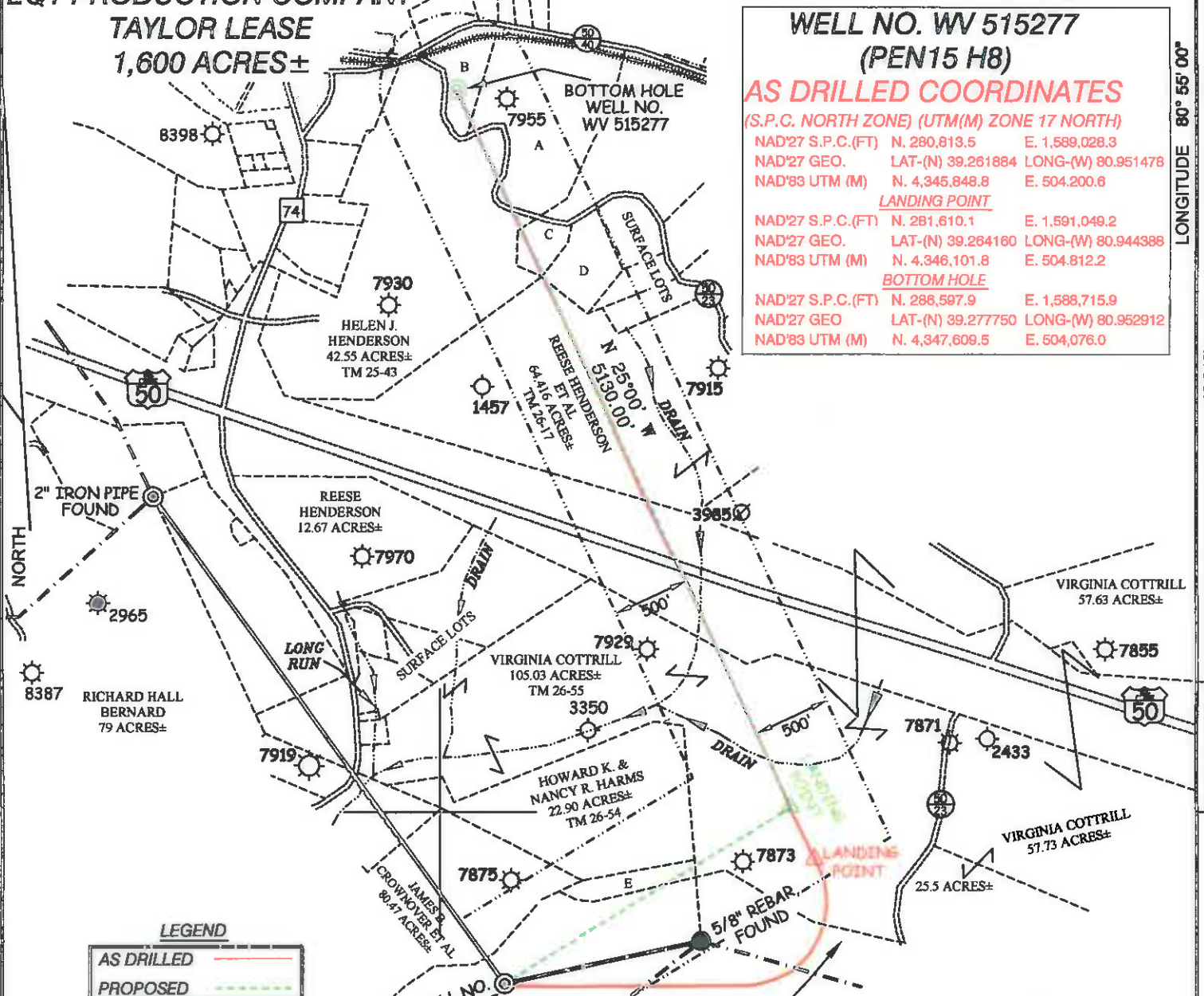
LANDING POINT

NAD'27 S.P.C.(FT)	N. 281,610.1	E. 1,591,049.2
NAD'27 GEO.	LAT-(N) 39.264160	LONG-(W) 80.944388
NAD'83 UTM (M)	N. 4,346,101.8	E. 504,812.2

BOTTOM HOLE

NAD'27 S.P.C.(FT)	N. 286,597.9	E. 1,588,715.9
NAD'27 GEO.	LAT-(N) 39.277750	LONG-(W) 80.952912
NAD'83 UTM (M)	N. 4,347,609.5	E. 504,076.0

LONGITUDE 80° 55' 00"



LEGEND
AS DRILLED (Red line)
PROPOSED (Green dashed line)

SUBSURFACE AGREEMENT
SAMUEL C. HAMMETT ET AL | 110.637 AC± | TM 31-3

DEWAYNE R. & JUDITH D. BRITTON
140.421 ACRES±
TM 31-02

A	KARL E. & KAREN M. KNUITSEN	14.35 AC±	TM 43A-14
B	KARL E. & KAREN M. KNUITSEN	2.97 AC±	TM 43A-13
C	JAMES E. & SANDRA L. LEVOS	1.777 AC±	TM 26-59
D	JAMES E. & SANDRA L. LEVOS	4.092 AC±	TM 26-17.7
E	HOWARD K. & NANCY R. HARMS	1.39 AC±	TM 31-01.1

NOTES ON SURVEY

- TIES TO WELLS, CORNERS AND REFERENCES ARE BASED ON GRID NORTH FOR THE WV STATE PLANE COORDINATE SYSTEM NORTH ZONE NAD '27.
- WELL LAT./LONG. (NAD'27) ESTABLISHED BY DGPS(SURVEY GRADE TIE TO CORS NETWORK).
- NO WATER WELLS WERE FOUND WITHIN 250 FEET OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS (GREATER THAN 2500 SQUARE FEET) OR DWELLINGS WERE FOUND WITHIN 825 FEET OF CENTER OF PROPOSED WELL PAD.
- AS DRILLED INFORMATION PROVIDED BY EQT.



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. 2288 *Earl N. Thompson*



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
DATE JANUARY 10, 2014
REVISED APRIL 17, 2015, MAY 16, 2016 & JUNE 06, 2016
OPERATORS WELL NO. WV 515277
API WELL NO. 47 - 085 - 10095-H
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1/200 FILE NO. 7496AD515277R2
PROVEN SOURCE OF ELEVATION DGPS (SURVEY GRADE TIE TO CORS NETWORK)
SCALE 1" = 1000'

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: PAD ELEVATION 1,118.7' WATERSHED LONG RUN OF NORTH FORK HUGHES RIVER
DISTRICT CLAY COUNTY RITCHIE QUADRANGLE PENNSBORO 7.5'

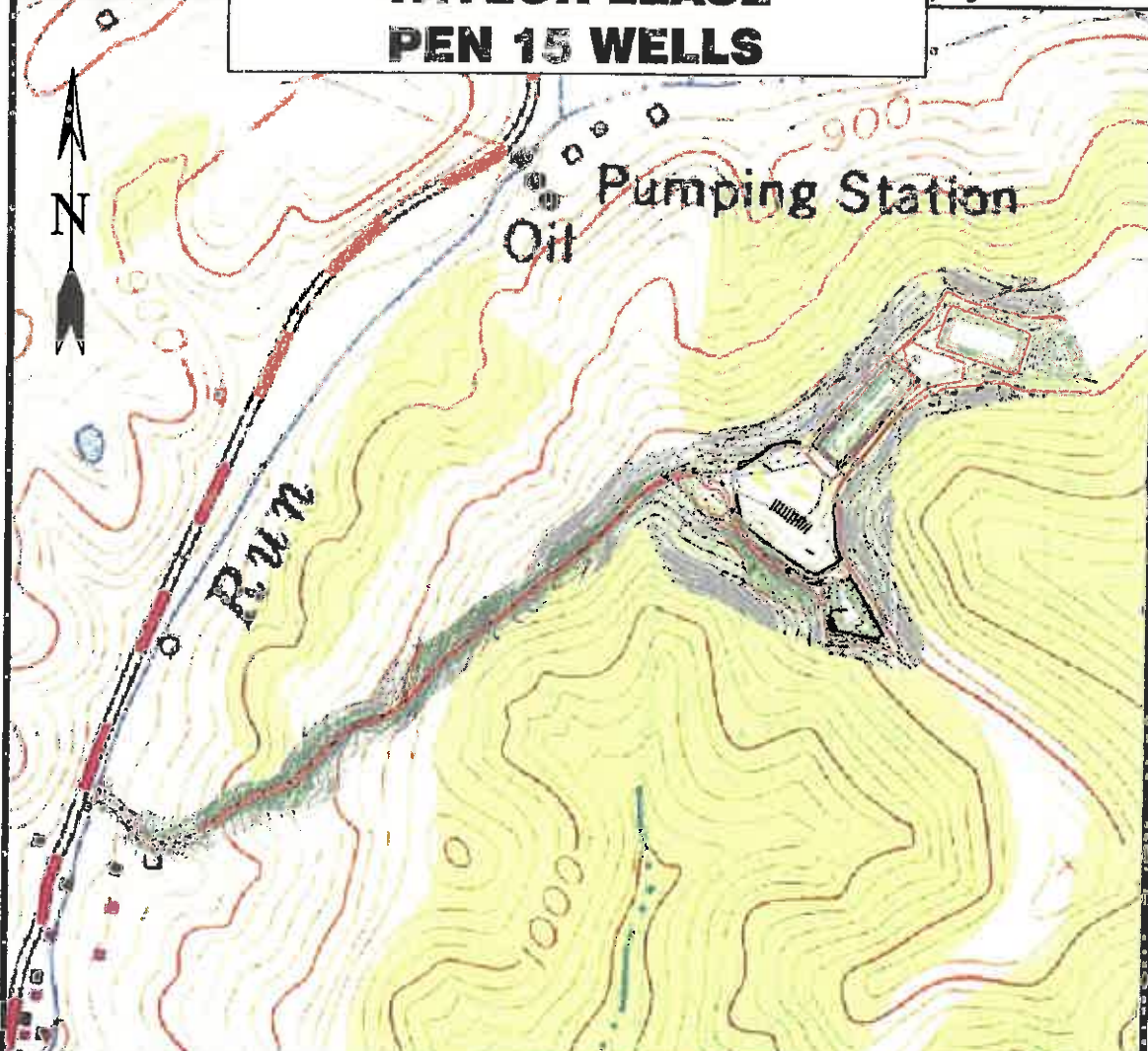
SURFACE OWNER DEWAYNE BRITTON ET UX ACREAGE 140.421
ROYALTY OWNER E. R. TAYLOR HEIRS ACREAGE 1,600±

PROPOSED WORK: 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 6,374'

WELL OPERATOR EQT PRODUCTION COMPANY DESIGNATED AGENT REX C. RAY
ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330 ADDRESS 115 PROFESSIONAL PLACE BRIDGEPORT, WV 26330

COUNTY NAME PERMIT

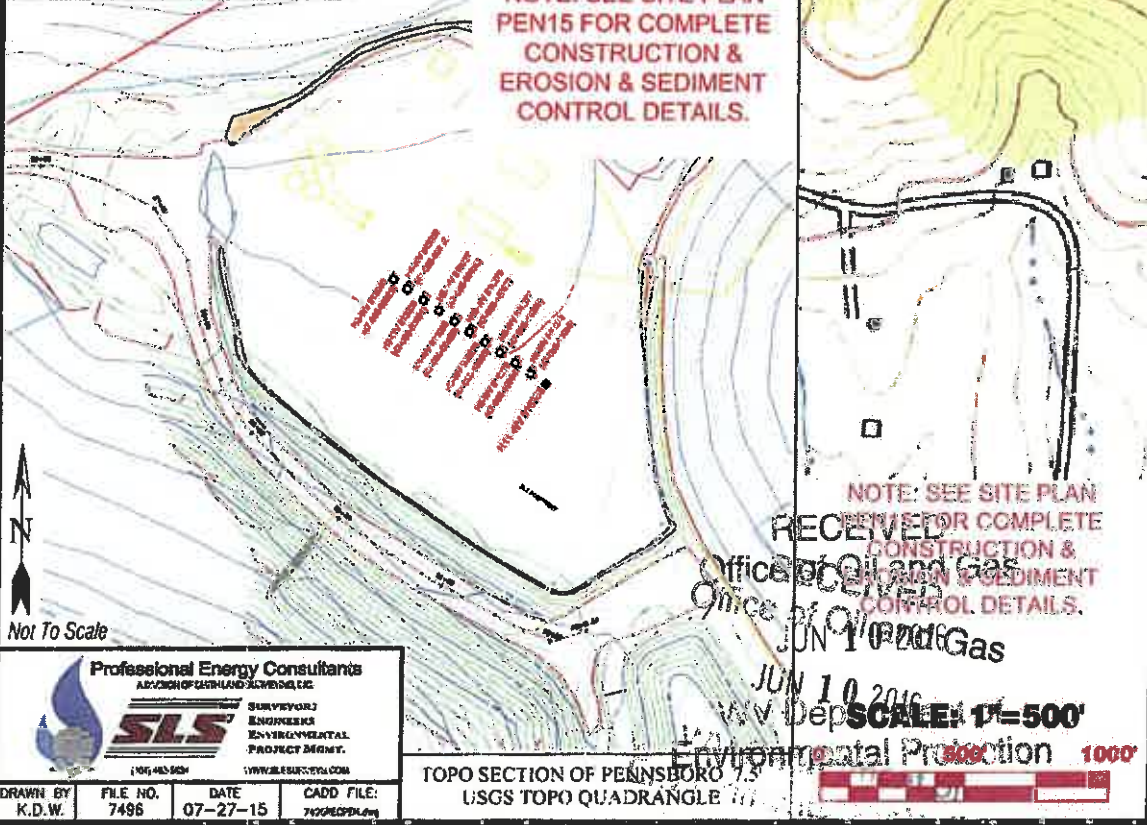
TAYLOR LEASE PEN 15 WELLS



CHS-10095

Detail Sketch for Proposed PEN15 WY 516365

**NOTE: SEE SITE PLAN
PEN15 FOR COMPLETE
CONSTRUCTION &
EROSION & SEDIMENT
CONTROL DETAILS.**



**NOTE: SEE SITE PLAN
PEN15 FOR COMPLETE
CONSTRUCTION &
EROSION & SEDIMENT
CONTROL DETAILS.**

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Professional Energy Consultants
A DIVISION OF EASTLAND SURVEYING, L.P.C.
SLS
SURVEYORS
ENGINEERS
ENVIRONMENTAL
PROJECT MGMT.
106485904 WWW.EASTLANDSURVEYING.COM

DRAWN BY K.D.W.	FILE NO. 7495	DATE 07-27-15	CADD FILE: 7495PEN15.dwg
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TOPO SECTION OF PENNSBORO 7.5
USGS TOPO QUADRANGLE

SCALE: 1"=500'
Environmental Protection 1000'