



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

Earl Ray Tomblin, Governor
Randy C. Huffman, 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 515747
47-091-01320-00-00

Adding Additional Lease

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: 515747
Farm Name: TAYLOR, JAMES M. ET AL
U.S. WELL NUMBER: 47-091-01320-00-00
Horizontal 6A / Horizontal 6A Well - 1
Date Issued: 12/30/2016

Promoting a healthy environment.

01/06/2017



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 47-091-01320

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 1 additional lease, #122266. 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 Taylor Fleming Rosemont
Operator ID County District Quadrangle

2) Operator's Well Number: 515747 Well Pad Name: RSM118

3) Farm Name/Surface Owner: Taylor Farm Public Road Access: 50/2

4) Elevation, current ground: 1465.00 Elevation, proposed post-construction: 1465.00

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, 7595', 132', 1869 PSI

8) Proposed Total Vertical Depth: 7595

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 12481

11) Proposed Horizontal Leg Length: 3688

12) Approximate Fresh Water Strata Depths: 292, 616, 837

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

14) Approximate Saltwater Depths: 1367

15) Approximate Coal Seam Depths: 32, 610, 656, 707, 767, 807, 823, 857, 899, 948, 1081

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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18)

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	78.6	40	40	44.84 ft ³ / CTS
Fresh Water	13 3/8	New	J-55	54.5	921	921	925.12 ft ³ / CTS
Coal							
Intermediate	9 5/8	New	A-500	40	2502	2502	1135 ft ³ / CTS
Production	5 1/2	New	P-110	20	12470	12470	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							

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	1102	Class A	1.18
Fresh Water	13 3/8	17 1/2	.38	2700	2160	Class A	1.18
Coal							
Intermediate	9 5/8	12 3/8	.395	3950	3160	Class A/H	1.25/1.25
Production	5 1/2	8 1/2	.361	12640	10112	Class A/H	1.07/1.84
Tubing	2 3/8	NA	.19	7700			
Liners							

PACKERS

Kind:				
Sizes:				
Depths Set:				

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 Page 2 of 3
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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 4676'. 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 at the shoe and one spaced every 500'.
- Intermediate: Bow spring centralizers– One cent at the shoe and one spaced every 500'.
- Production: One solid body cent 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. .25% Flake Loss Circulation Material (LCM)
Intermediate (Class A/H Cement): 0-3% Calcium Chloride. Used to speed the setting of cement slurries. 0.25% flake. Loss Circulation Material (LCM) .6% Super FL-300 (fluid loss/lengthens thickening time)
Production:
Lead (Type A 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. 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.

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**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

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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: RSM118, 515747, 47-09101320

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 L'.

Vicki Roark
Permitting Supervisor-WV

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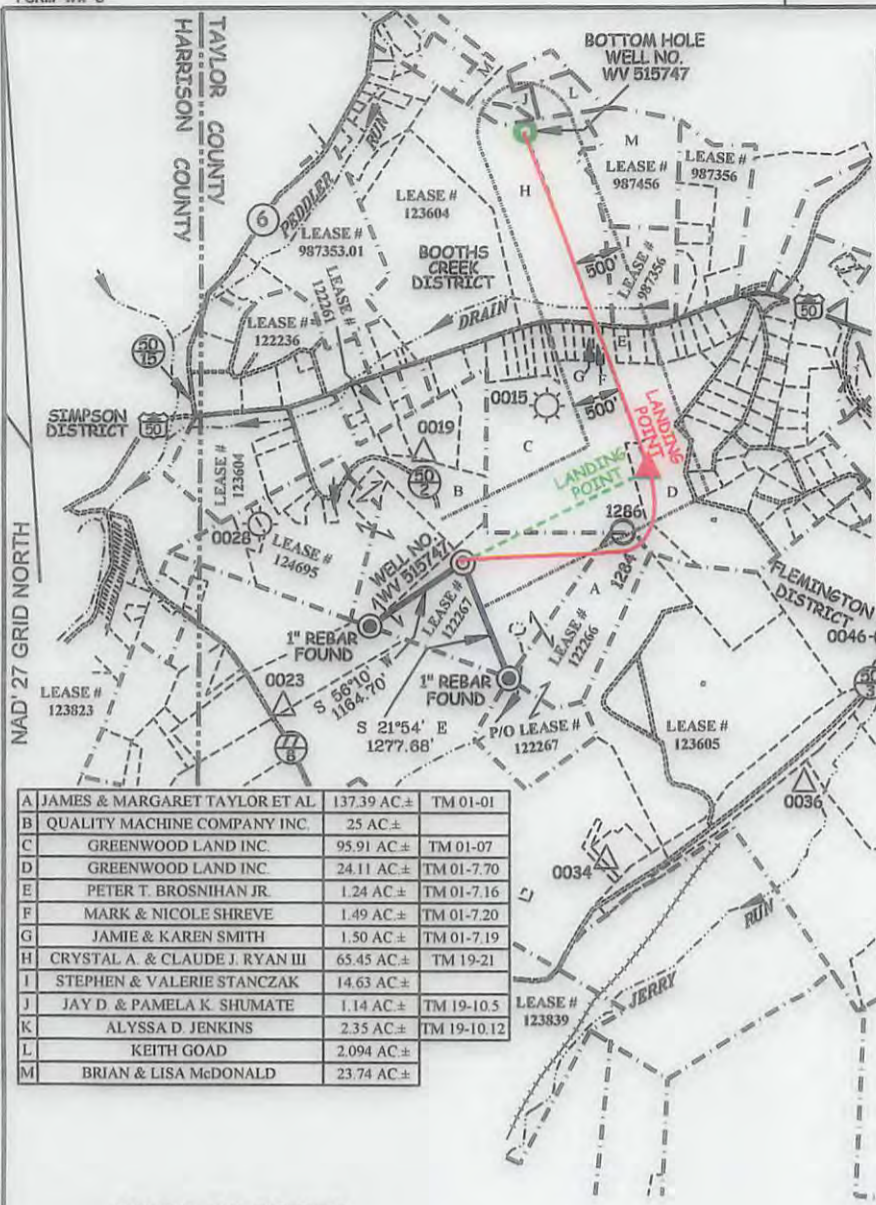
WW-6A1 attachment

Operator's Well No. 515747

Lease No.	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>122267</u>	<u>James Taylor (Life), et al (current royalty owner)</u>			
	J. F. Taylor, et ux (original lessor)	Pittsburgh & WV Gas Co.	min pd 1/8th	LB18/423
	Pittsburgh & WV Gas Co.	Equitable Gas Co.		DB110/388
	Equitable Gas Co.	Equitrans, Inc.		AB9/435
	Equitrans, Inc.	EQT Production Company		CB281/346 Doddridge Co.
<u>122266</u>	<u>Charles E. Pryor, et al (current royalty owner)</u>			
	Hazel G. Taylor, et al (original lessor)	Equitable Gas Company	min pd 1/8th	LB 30/48
	Equitable Gas Company	Equitrans, Inc.		AB9/435
	Equitrans, Inc.	Equitrans, L.P.		LB33/478
	Equitrans, L.P.	EQT Production Company		LB63/462
<u>123604</u>	<u>Greenwood Land Inc., et al (current royalty owner)</u>			
	J.W. Tucker, et ux (original lessor)	Pittsburgh & WV Gas Co.	min pd 1/8th	LB20/139
	Pittsburgh & WV Gas Co.	Equitable Gas Company		DB110/435
	Equitable Gas Company	Equitrans, Inc.		AB9/435
	Equitrans, Inc.	EQT Production Company		CB281/346 Doddridge Co.

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**EQT PRODUCTION COMPANY
TAYLOR LEASE
123 ACRES±
WELL NO. WV 515747
(RSM118 H11)
AS DRILLED COORDINATES**
(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)

NAD'27 S.P.C.(FT)	N. 289,960.3	E. 1,803,885.2
NAD'27 GEO.	LAT-(N) 39.294036	LONG-(W) 80.192938
NAD'83 UTM (M)	N. 4,349,727.5	E. 569,611.8

LANDING POINT

NAD'27 S.P.C.(FT)	N. 290,955.95	E. 1,805,803.17
NAD'27 GEO.	LAT-(N) 39.296810	LONG-(W) 80.186188
NAD'83 UTM (M)	N. 4,350,040.61	E. 570,191.06

BOTTOM HOLE

NAD'27 S.P.C.(FT)	N. 294,410.2	E. 1,804,519.9
NAD'27 GEO.	LAT-(N) 39.306267	LONG-(W) 80.190817
NAD'83 UTM (M)	N. 4,351,086.5	E. 569,782.6

A	JAMES & MARGARET TAYLOR ET AL	137.39 AC±	TM 01-01
B	QUALITY MACHINE COMPANY INC.	25 AC±	TM 01-07
C	GREENWOOD LAND INC.	95.91 AC±	TM 01-07
D	GREENWOOD LAND INC.	24.11 AC±	TM 01-7,70
E	PETER T. BROSNIHAN JR.	1.24 AC±	TM 01-7,16
F	MARK & NICOLE SHREVE	1.49 AC±	TM 01-7,20
G	JAMIE & KAREN SMITH	1.50 AC±	TM 01-7,19
H	CRYSTAL A. & CLAUDE J. RYAN III	65.45 AC±	TM 19-21
I	STEPHEN & VALERIE STANCZAK	14.63 AC±	
J	JAY D. & PAMELA K. SHUMATE	1.14 AC±	TM 19-10,5
K	ALYSSA D. JENKINS	2.35 AC±	TM 19-10,12
L	KEITH GOAD	2.094 AC±	
M	BRIAN & LISA McDONALD	23.74 AC±	

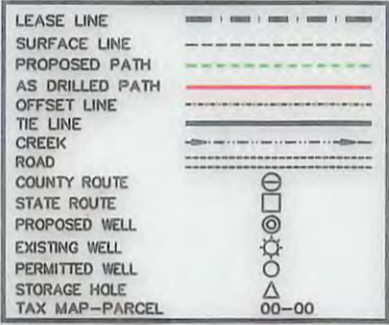
ROYALTY OWNERS		
GREENWOOD LAND INC. ET AL	409.86 AC±	LEASE NO. 123804

ADDITIONAL ROYALTY OWNER		
CHARLES E. PRYOR ET AL	30 AC±	LEASE NO. 122268

NOTES ON SURVEY

1. 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.
2. U.S. RT. 50 IN THIS AREA IS PART OF THE OLD NORTHWESTERN TURNPIKE, A 60 FOOT STRIP OF GROUND CLAIMED IN FEE BY THE W.V.D.O.H. SLS RECOMMENDS PROPER LEGAL & LEASING (IF NEEDED) PROCEDURES BE TAKEN BEFORE DRILLING COMMENCES.
3. AS DRILLED INFORMATION PROVIDED BY EQT.

LEGEND



Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYING, INC.
SLS
SURVEYORS
ENGINEERS
ENVIRONMENTAL
PROJECT MGMT.
(304) 462-5634 WWW.SLSURVEYS.COM



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 SEPTEMBER 03, 20 14
REVISED 09/21/15, 04/12/16 & 06/03/16
OPERATORS WELL NO. WV 515747
API WELL NO. 47 - 091 - 01320H
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 200 FILE NO. 7265AD515747R2
HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'

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:
PAD ELEVATION 1,465' WATERSHED PEDDLER RUN
DISTRICT FLEMINGTON COUNTY TAYLOR QUADRANGLE ROSEMONT 7.5'

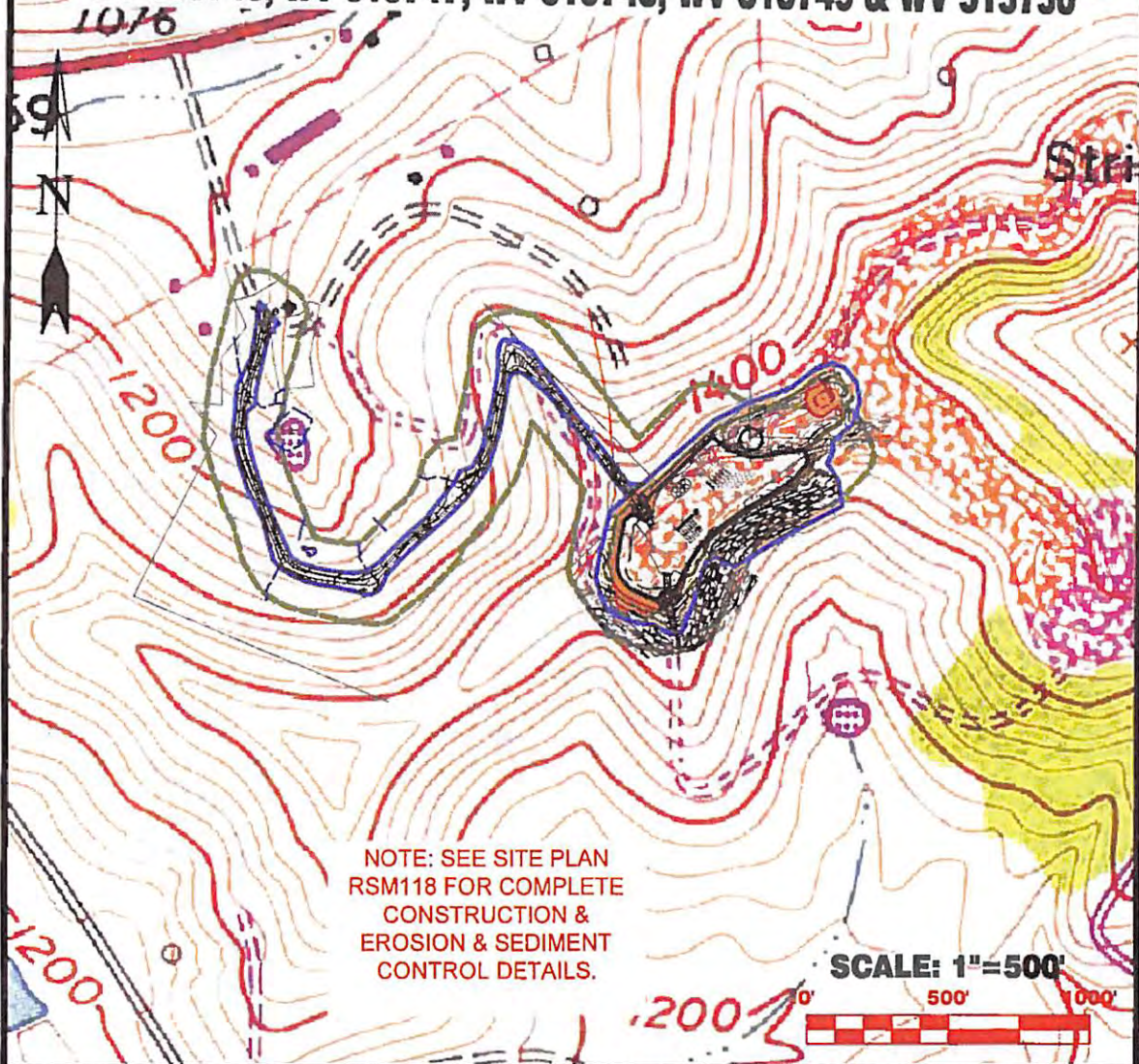
SURFACE OWNER JAMES M. TAYLOR ET AL ACREAGE 137.39±
ROYALTY OWNER JAMES TAYLOR (LIFE) ET AL ACREAGE 01/06/2017
LEASE NO. 122267

PROPOSED WORK:
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 7,632'

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 P.O. BOX 280 BRIDGEPORT, WV 26330

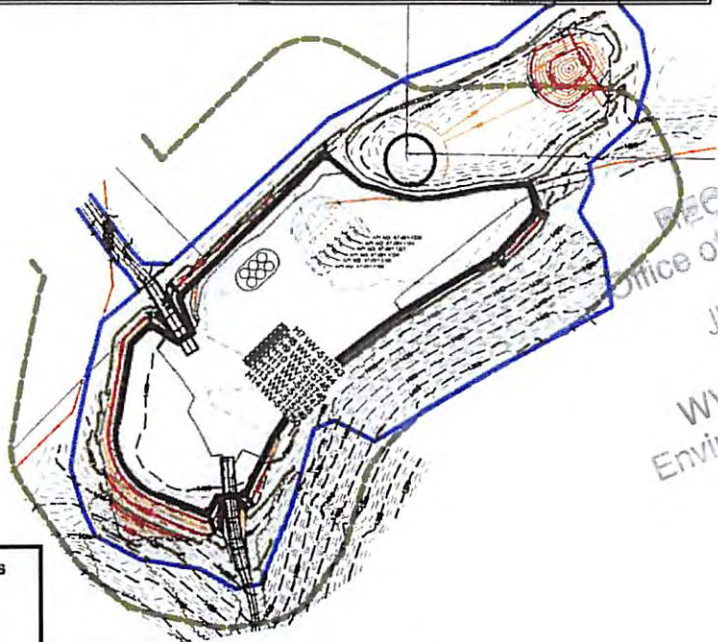
RSM118 WELL NO.S WV 515743, WV 515744, WV 515745
WV 515746, WV 515747, WV 515748, WV 515749 & WV 515750



Detail Sketch for Proposed RSM118 Well No.s WV 515743, WV 515744, WV 515745, WV 515746, WV 515747, WV 515748, WV 515749 & WV 515750

Not To Scale

NOTE: SEE SITE PLAN RSM118 FOR COMPLETE CONSTRUCTION & EROSION & SEDIMENT CONTROL DETAILS.



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(304) 482-8834
WWW.SLSURVEYS.COM

DRAWN BY: K.D.W. FILE NO.: 7265 DATE: 01-13-15 CADD FILE: 7265RSM118REC.dwg

TOPO SECTIONS OF ROSEMONT 7.5' TOPO QUADRANGLE

01/06/2017

47-091-01320