



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

PERMIT MODIFICATION APPROVAL

July 20, 2015

EQT PRODUCTION COMPANY
120 PROFESSIONAL PLACE
BRIDGEPORT, WV 26330

Re: Permit Modification Approval for API Number 8510087, Well #: WV 512427

Extend Lateral

Oil and Gas Operator:

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.

Please call James Martin at 304-926-0499, extension 1654 if you have any questions.

Sincerely,

Gene Smith
Assistant Chief of Permitting
Office of Oil and Gas

Promoting a healthy environment.

07/24/2015



July 8, 2015

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

Re: Modification of 085-10087

Dear Mr. Smith,

Enclosed is an updated WW-6B, schematics, WW-6A1, rec plan and mylar plat. EQT would like to modify the length of the lateral. The top hole has not changed.

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

Sincerely,

A handwritten signature in black ink, appearing to read 'Vicki Roark', written in a cursive style.

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
Operator ID 306686 County 085 District 4 Quadrangle 526

2) Operator's Well Number: 512427 Well Pad Name OXF122

3) Farm Name/Surface Owner: W.M. Adams Public Road Access: Co Rt 22/3

4) Elevation, current ground: 1,111.0 Elevation, proposed post-construction: 1,111.0

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 Thicknesses and Associated Pressure(s):
Target formation is Marcellus at a depth of 6494 with the anticipated thickness to be 54 feet and anticipated target pressure of 2190 PSI

8) Proposed Total Vertical Depth: 6494

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 18785

11) Proposed Horizontal Leg Length: 11,734

12) Approximate Fresh Water Strata Depths: 236

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

14) Approximate Saltwater Depths: N/A

15) Approximate Coal Seam Depths: 929

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

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

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

7-15-15
David [Signature]

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CASING AND TUBING PROGRAM

18)

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.)
Conductor	20	New	MC-50	81	40	40	38 C.T.S.
Fresh Water	13 3/8	New	MC-50	54	1,059	1,059	917 C.T.S.
Coal	-	-	-	-	-	-	-
Intermediate	9 5/8	New	MC-50	40	2,982	2,982	1,163 C.T.S.
Production	5 1/2	New	P-110	20	18,785	18,785	See Note 1
Tubing	2 3/8		J-55	4.6			May not be run, if run will be set 100' less than TD
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	0.375	-	18	Construction	1.18
Fresh Water	13 3/8	17 1/2	0.38	2,480	2,184	* See Note 2	1.21
Coal							
Intermediate	9 5/8	12 3/8	0.395	3,590	3,160	* See Note 2	1.21
Production	5 1/2	8 1/2	0.361	12,640	10,112	-	1.27/1.86
Tubing							
Liners							

Packers

Kind:	N/A			
Sizes:	N/A			
Depths Set:	N/A			

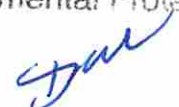
Note 1: EQT plans to bring the TOC on the production casing cement job 1,000' above kick off point, which is at least 500' above the shallowest production zone, to avoid communication.

Note 2: Reference Variance 2014-17. (Attached)

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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. The vertical drill to go down to an approximate depth of 5000'.

Then kick off the horizontal leg into the Marcellus formation using a slick water frac.

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 average approximately 8500 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): 29.51

22) Area to be disturbed for well pad only, less access road (acres): 18.14

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 spaced every 1000' from KOP to Int csg shoe

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

Surface (Type 1 Cement): 0-3% Calcium Chloride

Used to speed the setting of cement slurries.

0.4% flake. Loss Circulation Material (LCM) is used to combat the loss of the cement slurry to a thief zone.

Intermediate (Type 1 Cement): 0-3% Calcium Chloride. Salt is used in shallow, low temperature formations to speed the setting of cement slurries. 0.4% flake. Loss Circulation Material (LCM) is used to combat the loss of whole drilling fluid or cement slurry (not filtrate) to a thief zone.

Production:

Lead (Type 1 Cement): 0.2-0.7% Lignosulfonate (Retarder). Lengthens thickening time.

0.3% CFR (dispersant). Makes cement easier to mix.

Tail (Type H Cement): 0.25-0.40% Lignosulfonate (Retarder). Lengthens thickening time.

0.2-0.3% CFR (dispersant). This is to make the cement easier to mix.

60 % Calcuim Carbonate. Acid solubility.

0.4-0.6% Halad (fluid loss). Reduces amount of water lost to formation.

25) Proposed borehole conditioning procedures. Surface: Circulate hole clean (Approximately 30-45 minutes) rotating & reciprocating

one full joint until cuttings diminish at surface. When cuttings returning to surface diminish, continue to circulate an additional 5

minutes. To ensure that there is no fill, short trip two stands with no circulation. If there is fill, bring compressors back on

and circulate hole clean. A constant rate of higher than expected cuttings volume likely indicates washouts that will not clean up.

Intermediate: Circulate hole clean (Approximately 30-45 minutes) rotating & reciprocating one full joint until cuttings diminish at

surface. When cuttings returning to surface diminish, continue to circulate an additional 5 minutes. If foam drilling, to enhance

hole cleaning use a soap sweep or increase injection rate & foam concentration.

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.

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*Note: Attach additional sheets as needed.

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Page 3 of 3

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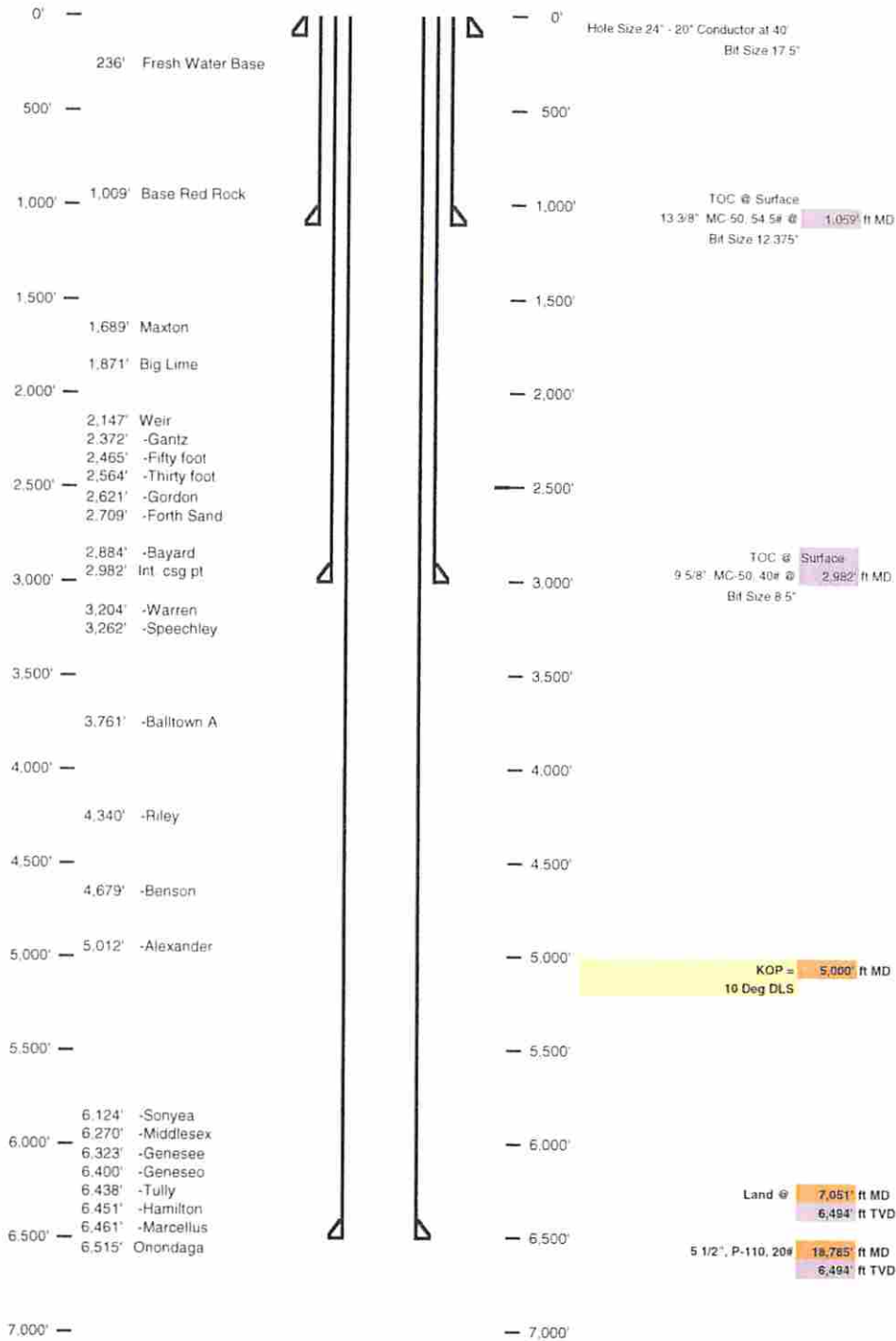
4708510087 MOD

Well Schematic
EQT Production

Well Name: 512427 (OXF122H2)
County: Ritchie
State: West Virginia

Elevation KB:
Target
Prospect
Azimuth
Vertical Section

1124
Marcellus
161
11849



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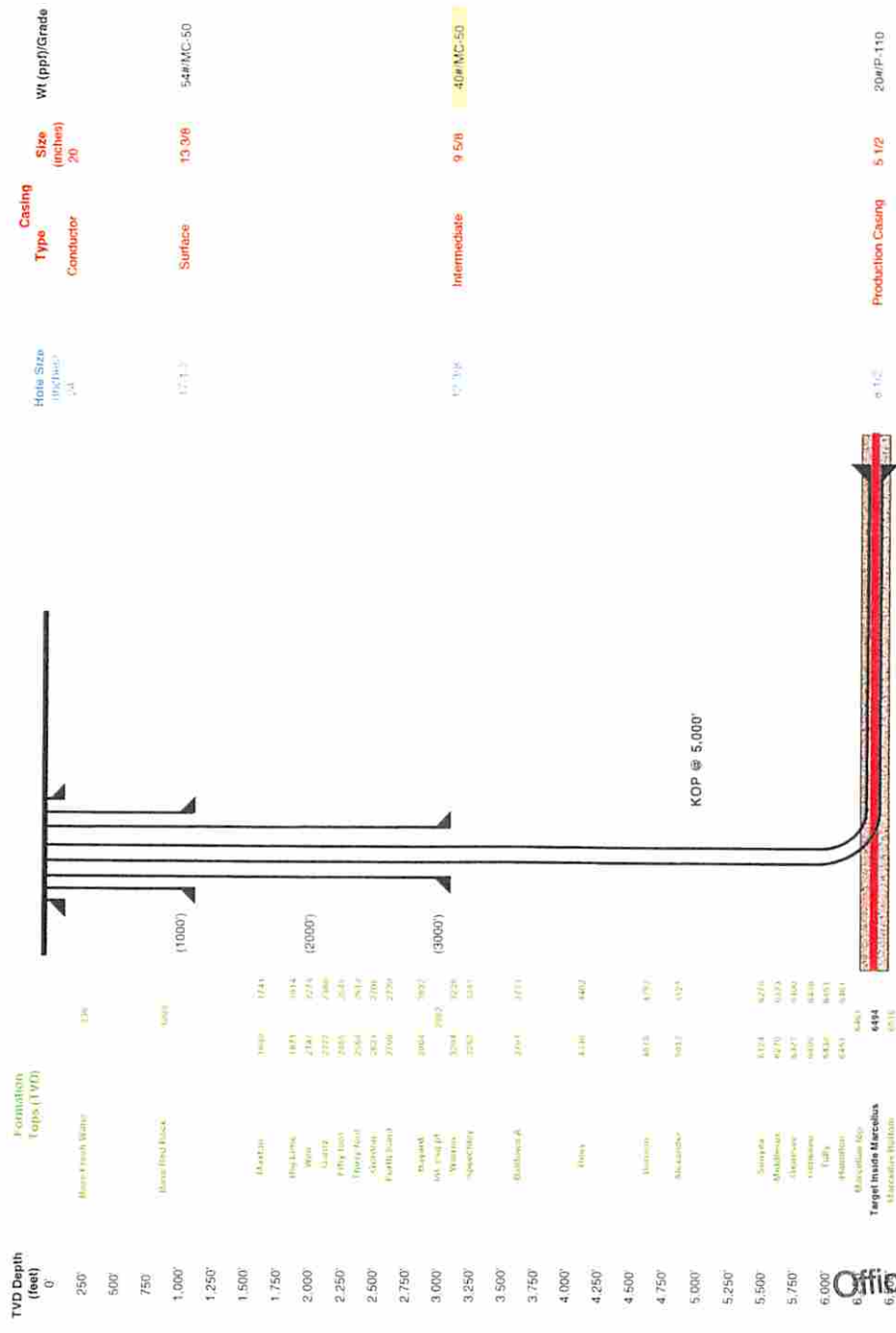
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Well 512427 (OXF122H2)
 EOT Production
 Oxford Quad
 Ritchie West Virginia

Altitude 161
 Vertical Section 1169



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W.M. ADAMS LEASE OXF122 WELLS

08510087
MOD

NOTE: SEE SITE PLAN
OXF122 FOR COMPLETE
CONSTRUCTION &
EROSION & SEDIMENT
CONTROL DETAILS.



Oil Well

Gas Well

1210

MATCH LINE

1231

1265

TRAIL

Professional Energy Consultants
ADVISORS OF SCIENCE SERVING INC.

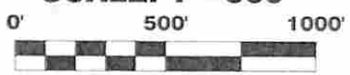


SLS
SURVEYORS
ENGINEERS
ENVIRONMENTAL
PROJECT MGMT

200-962-9234
WWW.SLS-PLAN.COM

TOPO SECTIONS OF OXFORD 7.5'
TOPO QUADRANGLE

SHEET 1 OF 2
SCALE: 1"=500'



DRAWN BY K.D.W.	FILE NO 6817	DATE 07-02-15	CADD FILE: 6817REPLAN.dwg
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gml
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W.M. ADAMS LEASE OXF122 WELLS

MDA

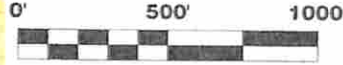
NOTE: SEE SITE PLAN
OXF122 FOR COMPLETE
CONSTRUCTION &
EROSION & SEDIMENT
CONTROL DETAILS.



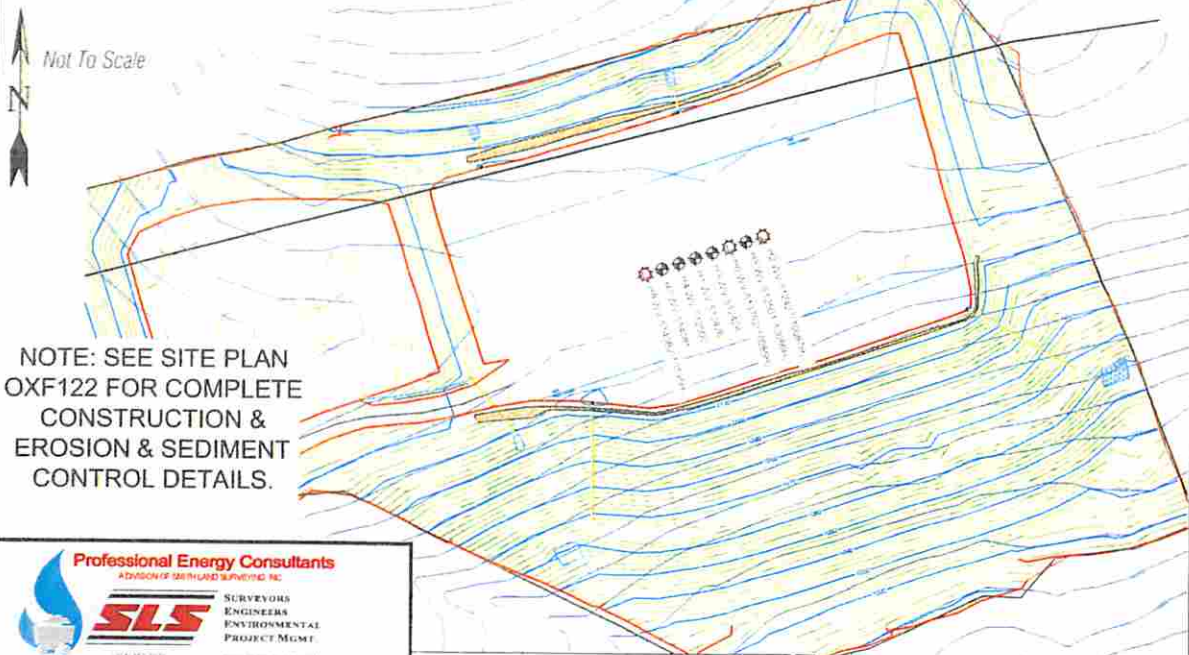
**DRIDGE-
RITCHIE
CO**

MATCH LINE

**SHEET 2 OF 2
SCALE: 1"=500'**



Detail Sketch for Proposed OXF122 Well No's WV 512426, WV 512427, WV 512428, WV 512500, WV 512501, WV 513762, WV 514081 & WV 514082



NOTE: SEE SITE PLAN
OXF122 FOR COMPLETE
CONSTRUCTION &
EROSION & SEDIMENT
CONTROL DETAILS.

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TOPO SECTIONS OF OXFORD 7.5'
TOPO QUADRANGLE

DRAWN BY: K.D.W.	FILE NO: 6811	DATE: 07-02-15	CADD FILE: 6811ECPAN.dwg
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[Signature]
07/24/2015

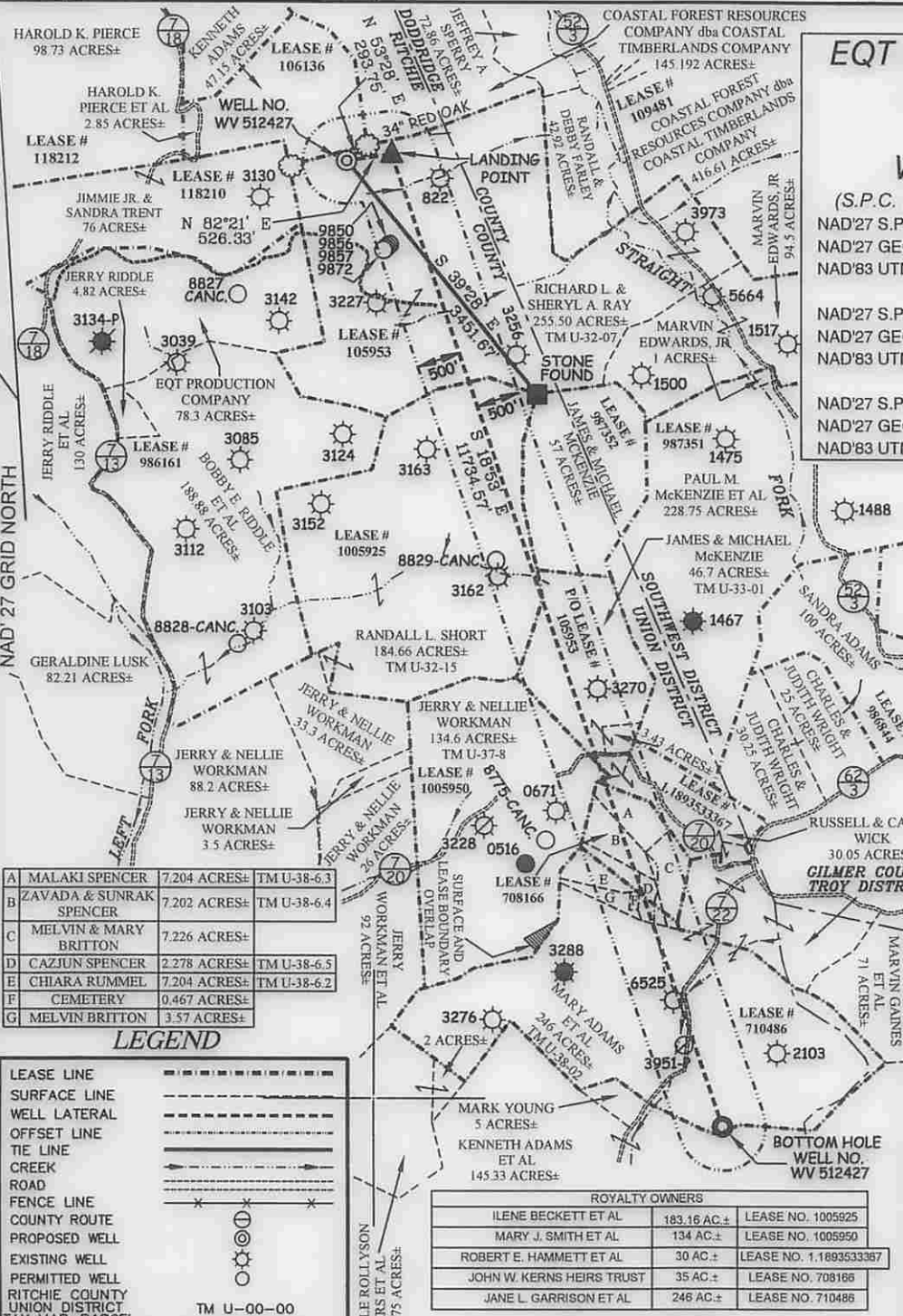
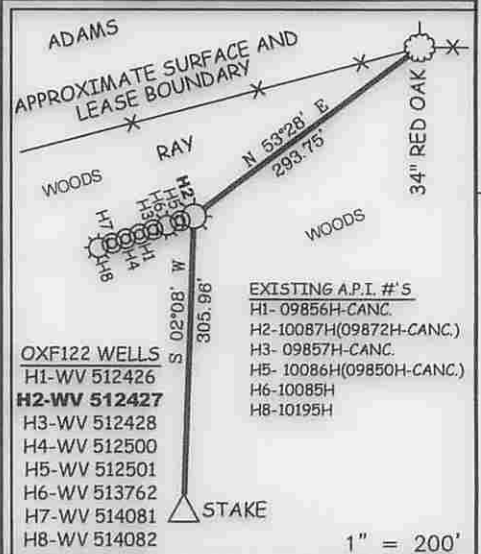
**EQT PRODUCTION COMPANY
W.M. ADAMS LEASE
402 ACRES±
WELL NO. WV 512427**

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)

NAD'27 S.P.C.(FT)	N. 233,088.47	E. 1,622,454.07
NAD'27 GEO.	LAT.(N) 39.132286	LONG.(W) 80.830946
NAD'83 UTM (M)	N. 4,331,479.83	E. 514,626.35
LANDING POINT		
NAD'27 S.P.C.(FT)	N. 233,158.56	E. 1,622,975.71
NAD'27 GEO.	LAT.(N) 39.132500	LONG.(W) 80.829111
NAD'83 UTM (M)	N. 4,331,503.84	E. 514,784.90
BOTTOM HOLE		
NAD'27 S.P.C.(FT)	N. 222,055.42	E. 1,626,773.11
NAD'27 GEO.	LAT.(N) 39.102171	LONG.(W) 80.815153
NAD'83 UTM (M)	N. 4,328,140.68	E. 515,998.20



REFERENCES



A	MALAKI SPENCER	7,204 ACRES±	TM U-38-6.3
B	ZAVADA & SUNRAK SPENCER	7,202 ACRES±	TM U-38-6.4
C	MELVIN & MARY BRITTON	7,226 ACRES±	
D	CAZJUN SPENCER	2,278 ACRES±	TM U-38-6.5
E	CHIARA RUMMEL	7,204 ACRES±	TM U-38-6.2
F	CEMETERY	0.467 ACRES±	
G	MELVIN BRITTON	3.57 ACRES±	

LEGEND

LEASE LINE	---
SURFACE LINE	- - - -
WELL LATERAL	---
OFFSET LINE	---
TIE LINE	---
CREEK	~ ~ ~ ~
ROAD	=====
FENCE LINE	x x x x
COUNTY ROUTE	① ② ③
PROPOSED WELL	① ② ③
EXISTING WELL	④ ⑤ ⑥
PERMITTED WELL	⑦ ⑧ ⑨
ITCHIE COUNTY UNION DISTRICT	⑩ ⑪ ⑫
TAX MAP-PARCEL	⑬ ⑭ ⑮

TM U-00-00

ROYALTY OWNERS

ILENE BECKETT ET AL	183.16 AC±	LEASE NO. 1005925
MARY J. SMITH ET AL	134 AC±	LEASE NO. 1005950
ROBERT E. HAMMETT ET AL	30 AC±	LEASE NO. 1,189,353,336,7
JOHN W. KERNS HEIRS TRUST	35 AC±	LEASE NO. 708186
JANE L. GARRISON ET AL	246 AC±	LEASE NO. 710486

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.

Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYING, INC.

**SURVEYORS
ENGINEERS
ENVIRONMENTAL
PROJECT MGMT.**

(304) 487-5834 WWW.SLSURVEYORS.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.



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.

DATE DECEMBER 12, 20 13

REVISED JULY 02, 20 15

OPERATORS WELL NO. WV 512427

API WELL NO. 47 - 085 - 10087

STATE WEST VIRGINIA COUNTY MITCHELL PERMIT 10087

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 6811P512427R3

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 <input type="checkbox"/>	GAS <input checked="" type="checkbox"/>	INJECTION <input type="checkbox"/>	WASTE DISPOSAL <input type="checkbox"/>	IF "GAS" PRODUCTION <input checked="" type="checkbox"/>	STORAGE <input type="checkbox"/>	DEEP <input type="checkbox"/>	SHALLOW <input checked="" type="checkbox"/>		
LOCATION:	ELEVATION	<u>1,111'(PAD ELEVATION)</u>	WATERSHED	<u>STRAIGHT FORK</u>	QUADRANGLE	<u>OXFORD 7.5'</u>				
SURFACE OWNER	<u>RICHARD L. & SHERYL A. RAY</u>		ACREAGE	<u>255.50±</u>						
ROYALTY OWNER	<u>HAUGHT FAMILY TRUST ET AL</u>		ACREAGE	<u>402±</u>	07/24/2015					
PROPOSED WORK:	DRILL <input checked="" type="checkbox"/>	CONVERT <input type="checkbox"/>	DRILL DEEPER <input type="checkbox"/>	REDRILL <input type="checkbox"/>	FRACTURE OR STIMULATE <input checked="" type="checkbox"/>	PLUG OFF OLD FORMATION <input type="checkbox"/>	PERFORATE NEW FORMATION <input type="checkbox"/>	PLUG AND ABANDON <input type="checkbox"/>	CLEAN OUT AND REPLUG <input type="checkbox"/>	OTHER <input type="checkbox"/>
PHYSICAL CHANGE IN WELL (SPECIFY)			TARGET FORMATION	<u>MARCELLUS</u>						
			ESTIMATED DEPTH	<u>TVD 6,461'</u>						

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

**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	
✓ <u>105953</u>	William Adams, et ux	The Philadelphia Company of West Virginia	Min 1/8 pd	LB29/244	
	The Philadelphia Company of West Virginia	Pittsburgh and West Virginia Gas Company		LB55/362	
	Pittsburgh and West Virginia Gas Company	Equitable Gas Company		LB126/473	
	Equitable Gas Company	Equitrans, Inc.		LB201/253	
	Equitrans, Inc.	Equitable Production-Eastern States, Inc.		LB234/830	
	Equitable Production-Eastern States, Inc.	Equitable Production Company		DB281/346	Doddridge
	Equitable Production Company	EQT Production Company		DB281/346	Doddridge
✓ <u>1005925</u>	Delphia G. Taylor and George H. Taylor	Hope Natural Gas Company	Min 1/8 pd	LB81/263	
	Hope Natural Gas Company	Consolidated Gas Supply Corp.		LB151/436	
	Consolidated Gas Supply Corp.	Consolidated Gas Transmission Corp.		LB169/756	
	Consolidated Gas Transmission Corp.	CNG Development Co.		LB176/601	
	CNG Development Co.	CNG Producing Co.		CB1096/124	Delaware
	CNG Producing Co.	Dominion Exploration & Production, Inc.		CB82/07	Delaware
	Dominion Exploration & Production, Inc.	Dominion Transmission, Inc.		LB251/621	
	Dominion Transmission, Inc.	CONSOL Energy Holdings, LLC		LB251/648	
	CONSOL Energy Holdings, LLC	CONSOL Gas Co.		CB6/576	
	CONSOL Gas Co.	CNX Gas Co., LLC		CB6/634	
	CNX Gas Co., LLC	EQT Production Co.		LB279/333	
✓ <u>1005950</u>	James E. Spurgeon, et al	Claron Dawson and C. Crane	Min 1/8 pd	LB127/239	
	Claron Dawson and C. Crane	Sancho Oil and Gas Corp.		LB232/172	
	Sancho Oil and Gas Corp.	Stephen D. Ward		LB232/174	
	Stephen D. Ward	Antero Resources Appalachian Corp.		LB256/22	
	Antero Resources Appalachian Corp.	EQT Production Company		DB282/379	
✓ <u>1.189353337</u>	W. M. Lipscomb, et ux	Carnegie Natural Gas Company	Min 1/8 pd	LB46/187	
	Carnegie Natural Gas Company	Carnegie Production Company		LB228/859	
	Carnegie Production Company/USX	Equitable Resources Inc.		See attached	
	Equitable Resources Inc.	Equitable Production Co.		DB274/471	
	Equitable Production Co.	EQT Production Company		DB281/346	Doddridge

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708166

O. S. Garner
 A. B. Burrows, et ux
 Carnegie Natural Gas Company
 Carnegie Production Company/USX
 Equitable Resources Inc.
 Equitable Production Co.

A. B. Burrows, et ux
 Carnegie Natural Gas Company
 Carnegie Production Company
 Equitable Resources Inc.
 Equitable Production Co.
 EQT Production Company

Min 1/8 pd

LB41/95
 LB46/185
 LB228/859
 See attached
 DB274/471
 DB281/346 Doddridge

710486

Lewis Garrison, et ux
 Carnegie Natural Gas Company
 Ca
 Equitable Resources Inc.
 Equitable Production Co.

Carnegie Natural Gas Company
 Carnegie Production Company
 Equitable Resources Inc.
 Equitable Production Co.
 EQT Production Company

Min 1/8 pd

LB42/4
 LB228/859
 See attached
 DB274/471
 DB281/346 Doddridge

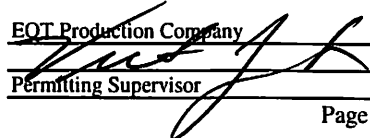
Upon information and belief, Operator's lease and/or other real property rights permit it to conduct drilling operations for the subject well in the location shown on the plat, including under any public roads that the well lateral crosses.

**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: 
 Its: Permitting Supervisor

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