



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

January 02, 2015

EQT PRODUCTION COMPANY
303 SAND CUT ROAD
CLARKSBURG, WV 26301

Re: Permit Modification Approval for API Number 8510133 , Well #: 513757

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



4708510133

October 30, 2014

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

Re: Modification of OXF163, 513756, 513757, 513759, 513760
API#47-085-10132, 10133, 10135, 10136

Dear Mr. Smith,

Attached is a modification of the lateral length for the above 4 API numbers. Included is a new WW-6B, well schematics, WW-6A1, mylar plat and rec plan.

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

Sincerely,

Vicki Roark
Permitting Supervisor-WV

Enc.

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STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
W.VA. CODE §22-6A - WELL WORK PERMIT APPLICATION

1) Well Operator: EQT Production Company

Operator ID	085	District	4	Quadrangle	526
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2) Operator's Well Number: 513757 Well Pad Name: OXF163

3) Farm Name/Surface Owner : Pierce Public Road Access: CR 7/18

4) Elevation, current ground: 1,175.0 Elevation, proposed post-construction: 1,158.5

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

(b) If Gas: Shallow Deep
Horizontal

6) Existing Pad? Yes or No: No

7) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
Target formation is Marcellus at a depth of 6527' with the anticipated thickness to be 53 feet and anticipated target pressure of 2190 PSI

8) Proposed Total Vertical Depth: 6,527

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth 14,918

11) Proposed Horizontal Leg Length 7,310

12) Approximate Fresh Water Strata Depths: 173, 450, & 514

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

14) Approximate Saltwater Depths: 1,153

15) Approximate Coal Seam Depths: No Coal Seams Present

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?

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

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CASING AND TUBING PROGRAM

18)

<u>TYPE</u>	<u>Size</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft.</u>	<u>FOOTAGE: for Drilling</u>	<u>INTERVALS: Left in Well</u>	<u>CEMENT: Fill- up (Cu.Ft.)</u>
Conductor	20	New	MC-50	81	40	40	38 C.T.S.
Fresh Water	13 3/8	New	MC-50	54	1,055	1,055	914 C.T.S.
Coal	-	-	-	-	-	-	-
Intermediate	9 5/8	New	MC-50	40	2,955	2,955	1,152 C.T.S.
Production	5 1/2	New	P-110	20	14,918	14,918	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							

<u>TYPE</u>	<u>Size</u>	<u>Wellbore Diameter</u>	<u>Wall Thickness</u>	<u>Burst Pressure</u>	<u>Cement Type</u>	<u>Cement Yield (cu. ft./k)</u>
Conductor	20	24	0.375	-	Construction	1.18
Fresh Water	13 3/8	17 1/2	0.38	2,480	* See Note 2	1.21
Coal	-	-	-	-	-	-
Intermediate	9 5/8	12 3/8	0.395	3,590	* See Note 2	1.21
Production	5 1/2	8 1/2	0.361	12,640	-	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.

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(3/13)

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 5569'. Then kick off the horizontal leg into the marcellus 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 treating pressures are 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): 24.6

22) Area to be disturbed for well pad only, less access road (acres): 14.6

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 % Calcium 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.

*Note: Attach additional sheets as needed.

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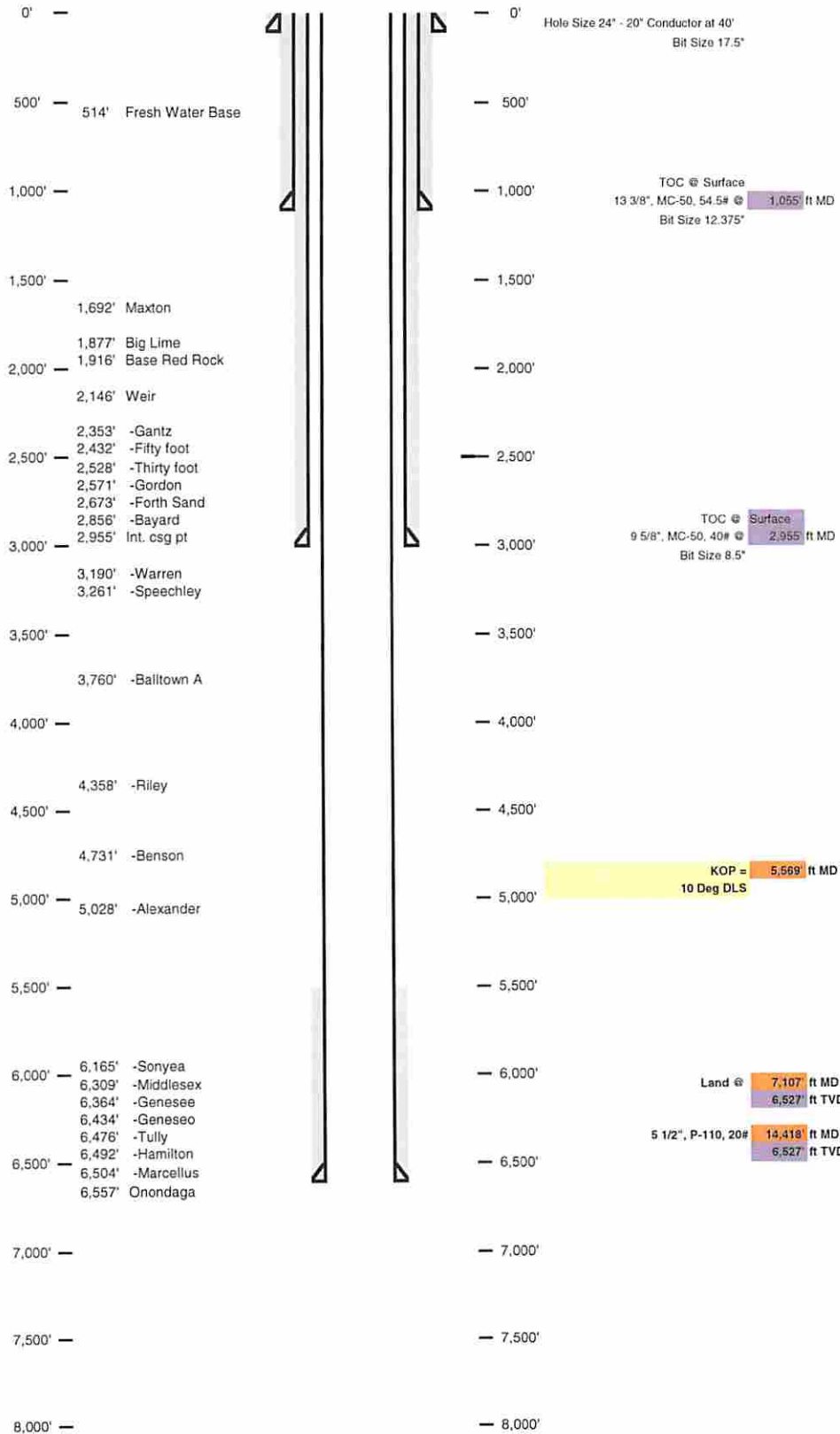
Page 3 of 3
NOV 03 2014

WV Department of
Environmental Protection
11/02/2015

Well Schematic
EQT Production

Well Name 513757 (DXF163H2)
County Ritchie
State West Virginia

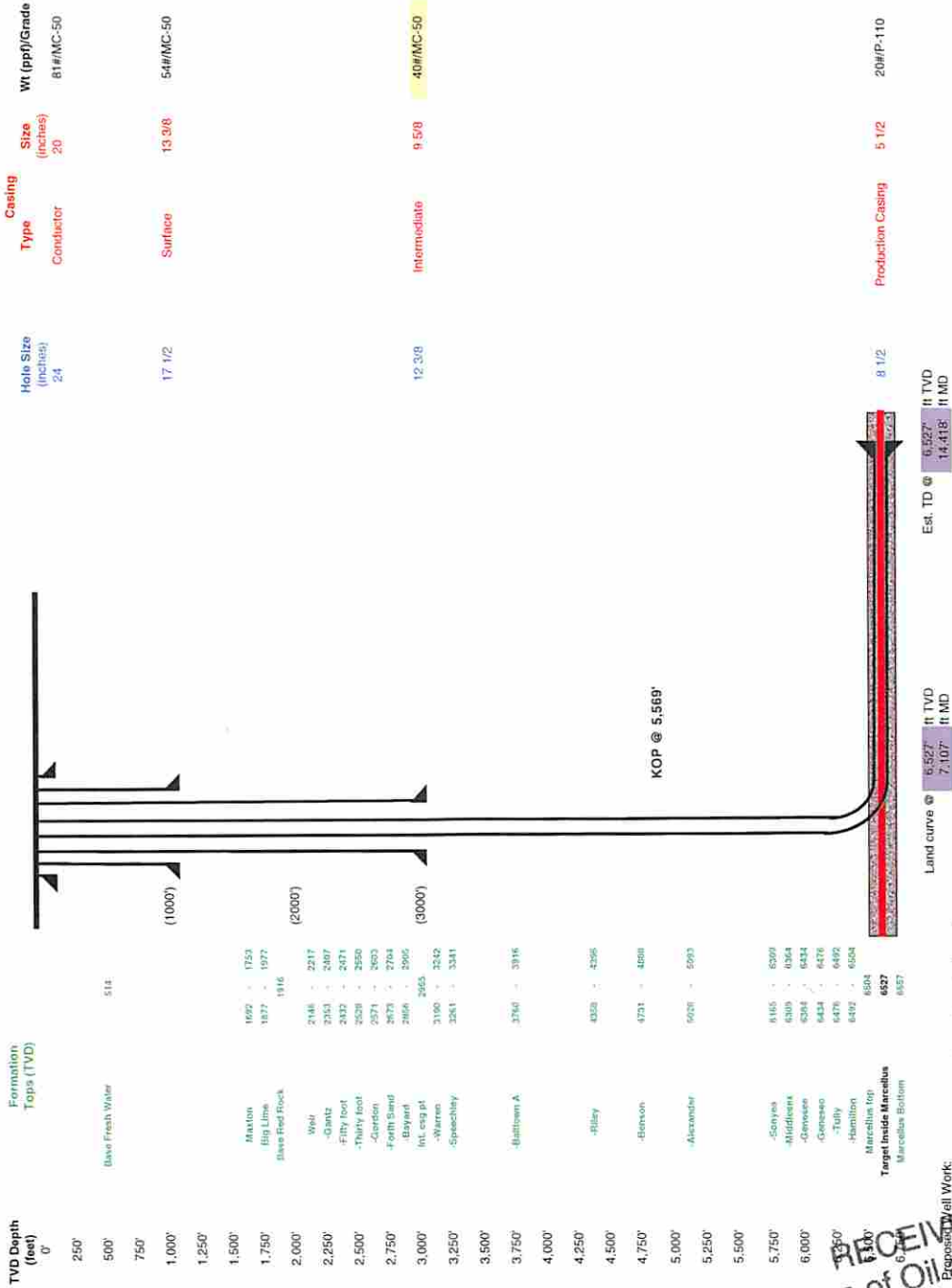
Elevation KB: 1169
Target Marcellus
Prospect
Azimuth 162
Vertical Section 7809



4708510133 MOD

Well 513757 (OXF163H2)
 EOT Production
 Oxford Ritchie West Virginia

Azimuth 162
 Vertical Section 7809



Land curve @ 6,527' ft TVD
 7,107' ft MD
 7,310' ft Lateral

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March 18, 2014

Nabors Completion & Production Services Company
1380 Route 286 Hwy E #121
Indiana PA 15701

Re: Cement Variance Request

Dear Sir or Madam,

This agency is approving a variance request for the cement blend listed below to be used on surface and coal protection strings for the drilling of oil and gas wells in the state of West Virginia. The variance cannot be used without requesting its use on a permit application and approval by this agency:

- Type 1 (2% Calcium Chloride-Accelerator, 0.25% Super Flake-Lost Circulation, 5.2% Water, 94% Type "1" Cement)

If you have any questions regarding this matter feel free to contact me at 304-926-0499, ext. 1653.

Sincerely,

A handwritten signature in black ink that reads "James Peterson" followed by a stylized set of initials.

James Peterson
Environmental Resources Specialist / Permitting

Promoting a healthy environment.

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Office of Oil and Gas

NOV 03 2014

WV Department of
Environmental Protection
09/02/2015



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Charleston, WV 25304
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**BEFORE THE OFFICE OF OIL AND GAS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OF WEST VIRGINIA**

IN THE MATTER OF A VARIANCE FROM) ORDER NO. 2014 - 17
REGULATION 35 CSR § 4-11.4/11.5/14.1)
AND 35 CSR § 8-9.2.h. 4/5/6/8 OF THE)
THE OPERATIONAL)
REGULATIONS OF CEMENTING OIL)
AND GAS WELLS)

REPORT OF THE OFFICE

Nabors Completion & Production Services Co. requests approval of a different cement blend for use in cementing surface and coal protection casing of oil and gas wells.

FINDINGS OF FACT

- 1.) Nabors Completion & Production Services Co. proposes the following cement blend:
 - 2% Calcium Chloride (Accelerator)
 - 0.25 % Super Flake (Lost Circulation)
 - 94% Type "1" Cement
 - 5.20 % Water

- 2.) Laboratory testing results indicate that the blend listed in Fact No.1 will achieve a 500 psi compressive strength within 6 hours and a 2,435 psi compressive strength within 24 hours.

Promoting a healthy environment.

CONCLUSIONS OF LAW

Pursuant to Articles 6 and 6A, Chapter 22 of the Code of West Virginia, the Office of Oil and Gas has jurisdiction over the subject matter embraced in said notice, and the persons interested therein, and jurisdiction to promulgate the hereinafter prescribed Order.

Pursuant to 35 CSR § 4-11.5 and 35 CSR § 8-9.2.h.8 the Chief of the Office of Oil and Gas may approve different cement blends upon the well operator providing satisfactory proof that different cement types are adequate.

ORDER

It is ordered that Nabors Completion & Production Services Co. may use the cement blend listed in Findings of Fact No.1 for the cementing of surface and coal protection casing of oil and gas wells in the State as may be requested by oil and gas operators. The waiting time on the cement blend shall be 8 hours. The cement blend shall be mixed in strict accordance with the specifications for each blend and weight measurements made on-site to assure the cement slurries meet the minimum weight specifications. A sample shall be collected and, if after 8 hours the cement is not set up, additional time will be required. Nabors Completion & Production Services Co. shall keep a record of cement blend jobs in which the cement blend approved under this order is to be used and made available to the Office of Oil and Gas upon request.

Dated this, the 18th day of March, 2014.

IN THE NAME OF THE STATE OF WEST VIRGINIA

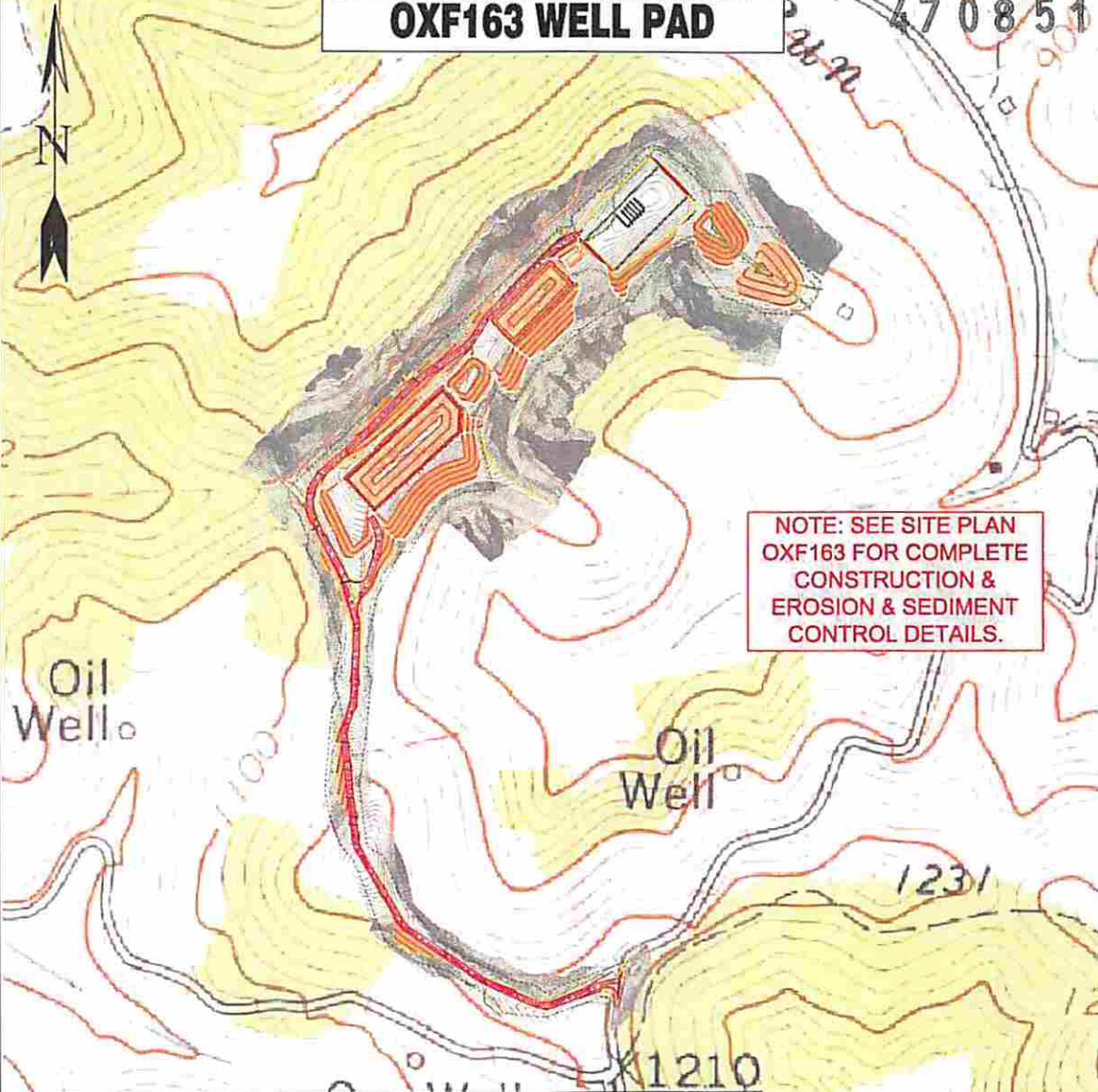
OFFICE OF OIL AND GAS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OF THE STATE OF WEST VIRGINIA



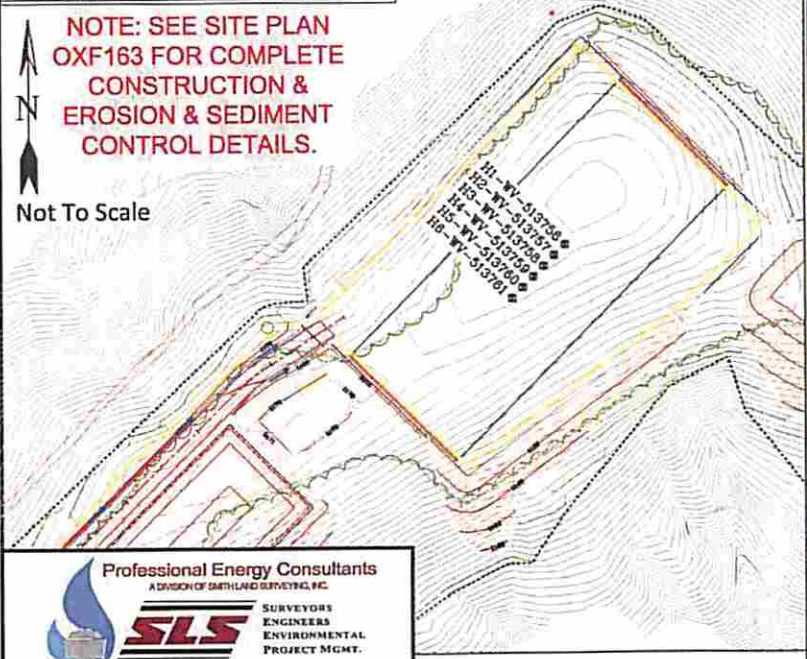
James Martin, Chief
Office of Oil and Gas

J.E. PIERCE ET AL LEASE OXF163 WELL PAD

47 08 51 01 33 MOD



Detail Sketch for Proposed OXF163 Wells



OXFORD QUAD
AUBURN QUAD

Professional Energy Consultants
A DIVISION OF GAITHERLAND SURVEYING, P.C.

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ENGINEERS
ENVIRONMENTAL
PROJECT MGMT.

(204) 462-8634
WWW.SLSURVEYS.COM

SCALE: 1"=500'



DRAWN BY K.G.M.	FILE NO. 7698	DATE 05-23-14	CADD FILE: 7698REC163.dwg
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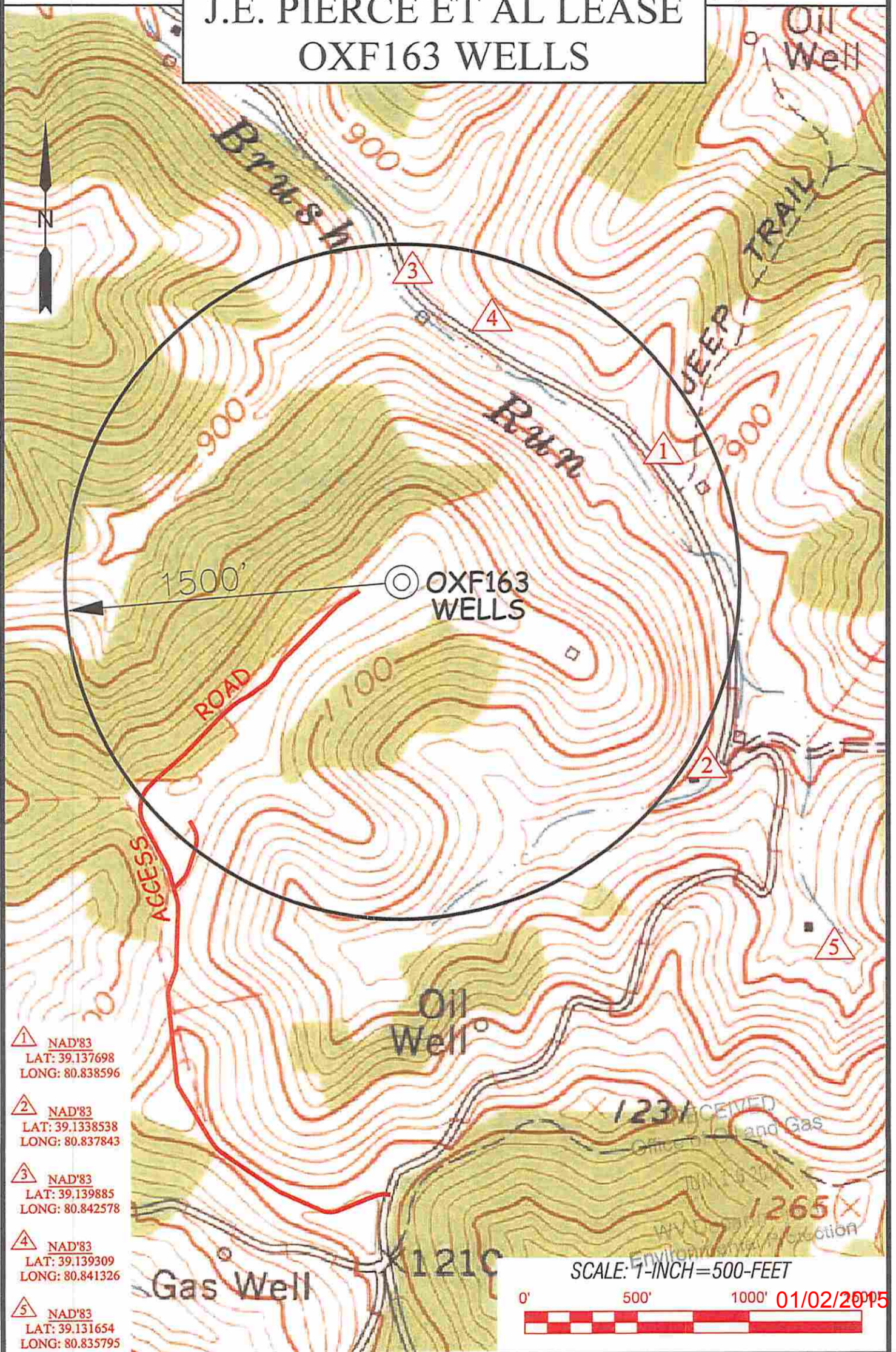
TOPO SECTION OF OXFORD 7.5' AND
AUBURN 7.5' USGS TOPO QUADRANGLE

01/02/2015

WATER SAMPLES

J.E. PIERCE ET AL LEASE OXF163 WELLS

page of



① NAD'83
LAT: 39.137698
LONG: 80.838596

② NAD'83
LAT: 39.1338538
LONG: 80.837843

③ NAD'83
LAT: 39.139885
LONG: 80.842578

④ NAD'83
LAT: 39.139309
LONG: 80.841326

⑤ NAD'83
LAT: 39.131654
LONG: 80.835795

SCALE: 1-INCH=500-FEET



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

SLS
SURVEYORS
ENGINEERS
ENVIRONMENTAL
PROJECT MGMT.

1926-1928 W. 10th St.
PO BOX 1000
MARTINSBURG, WV 26150

DRAWN BY: K.D.W. FILE NO: 7698 DATE: 06/10/14 CADD FILE: 7698W5OXF163A.dwg

TOPO SECTIONS OF:
OXFORD, WV 7.5' QUAD

DISTRICT	COUNTY	TAX MAP-PARCEL NO.
UNION	RITCHIE	32-03

OPERATOR:
EQT PRODUCTION COMPANY
115 PROFESSIONAL PLACE
P.O. BOX 280
BRIDGEPORT, WV 26330

ROYALTY OWNERS		
B.M. PIERCE ET UX	84.50 AC.±	LEASE NO. 118210
CRAIG H. WILLIAMS	243.83 AC.±	LEASE NO. 987447
J.P. SMITH ET UX	130 AC.±	LEASE NO. 107857
SHIRLEY & RUTH RIDDLE HEIRS AND/OR ASSIGNS	272 AC.±	LEASE NO. 986161

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.

**EQT PRODUCTION COMPANY
J.E. PIERCE ET AL LEASE
108 (98.73±) ACRES±
WELL NO. WV 513757**

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

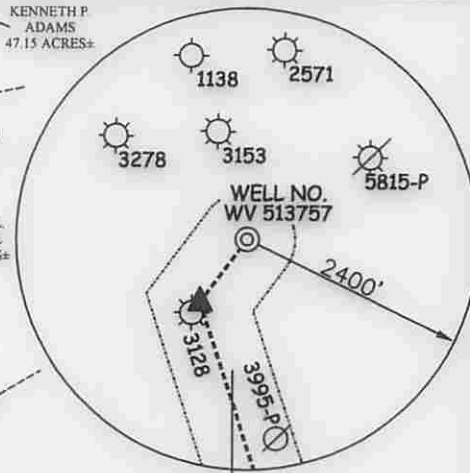
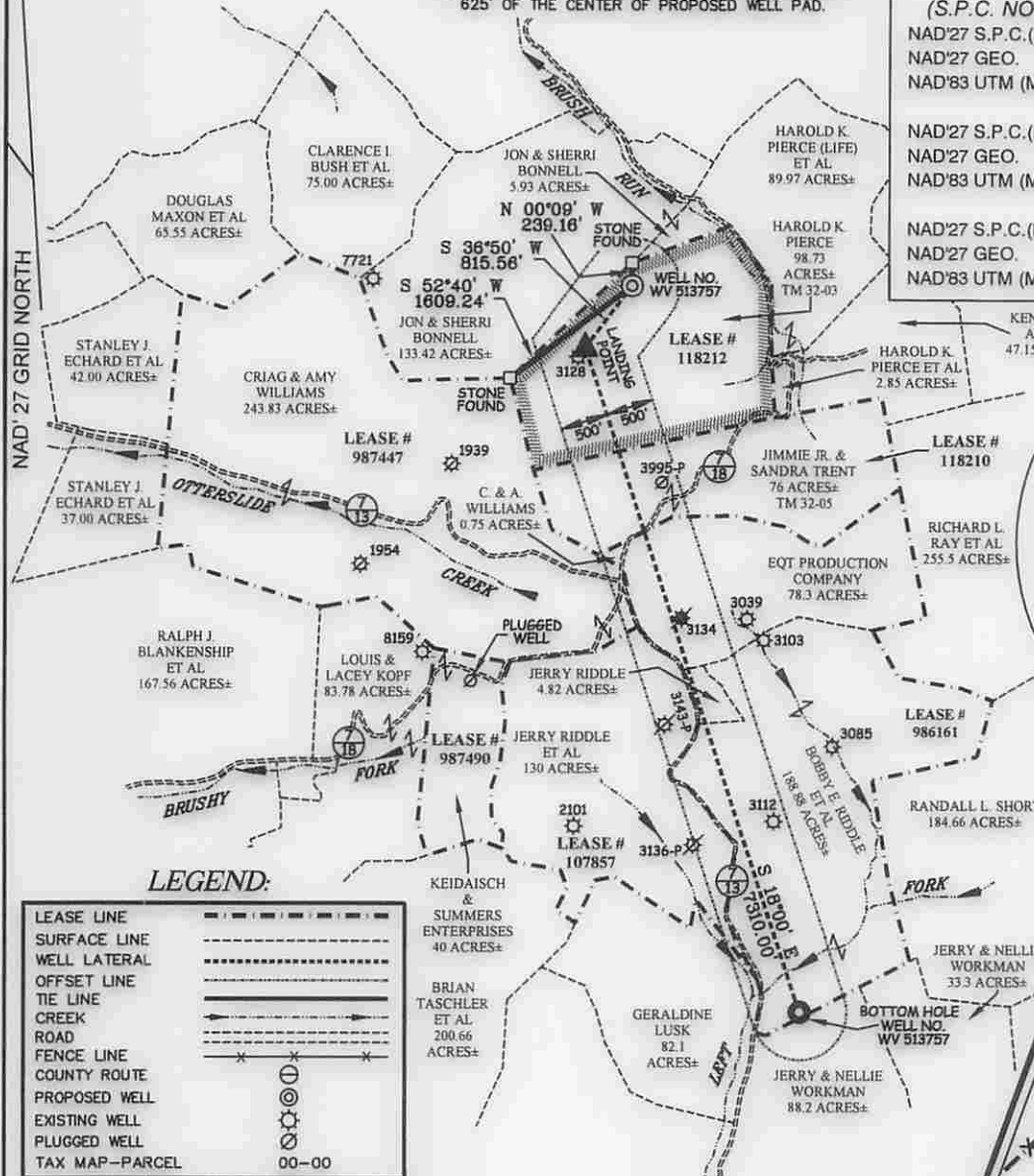
NAD'27 S.P.C.(FT) N. 234,487.9 E. 1,619,117.6
 NAD'27 GEO. LAT-(N) 39.135992 LONG-(W) 80.842780
 NAD'83 UTM (M) N. 4,331,889.2 E. 513,602.8

LANDING POINT

NAD'27 S.P.C.(FT) N. 233,835.1 E. 1,618,628.8
 NAD'27 GEO. LAT-(N) 39.134179 LONG-(W) 80.844468
 NAD'83 UTM (M) N. 4,331,687.8 E. 513,457.2

BOTTOM HOLE

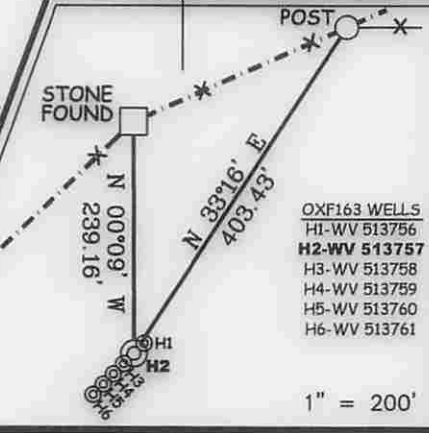
NAD'27 S.P.C.(FT) N. 226,882.9 E. 1,620,887.7
 NAD'27 GEO. LAT-(N) 39.115186 LONG-(W) 80.836142
 NAD'83 UTM (M) N. 4,329,581.4 E. 514,180.7



LEGEND:

LEASE LINE	---
SURFACE LINE	----
WELL LATERAL	-----
OFFSET LINE	-----
TIE LINE	-----
CREEK	~~~~~
ROAD	=====
FENCE LINE	-----
COUNTY ROUTE	-----
PROPOSED WELL	⊙
EXISTING WELL	⊙
PLUGGED WELL	⊙
TAX MAP-PARCEL	00-00

REFERENCES



Professional Energy Consultants
 A DIVISION OF SMITH LAND SURVEYING, INC.
SLS
 SURVEYORS
 ENGINEERS
 ENVIRONMENTAL
 PROJECT MGMT.
 (304) 467-6634 WWW.SLSURVEYS.COM

I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAN 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. 849 *C. Victor Moyers*

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
 DATE MAY 27 , 20 14
 REVISED 08/22/14 & 10/27/14
 OPERATORS WELL NO. WV 513757
 API WELL NO. 47-085-1040133
 STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 7698P513757R3
 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 INJECTION WASTE DISPOSAL IF "GAS" PRODUCTION STORAGE DEEP SHALLOW

LOCATION: ELEVATION 1,175(GROUND) 1,158.5(PROPOSED) WATERSHED BRUSH RUN OF MIDDLE FORK
 DISTRICT UNION COUNTY RITCHIE QUADRANGLE OXFORD 7.5'
 SURFACE OWNER HAROLD K. PIERCE ACREAGE 98.73±
 ROYALTY OWNER J.E. PIERCE ET AL ACREAGE 108± (98.73±)
 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 TVD 6495'

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

01/02/2015

COUNTY NAME PERMIT