



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 02, 2014

EQT PRODUCTION COMPANY
POST OFFICE BOX 280
BRIDGEPORT, WV 26330

Re: Permit Modification Approval for API Number 8510096 , Well #: 515278

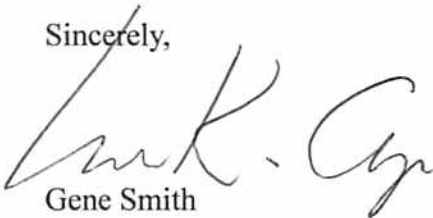
Extended freshwater casing

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,

for 
Gene Smith
Regulatory/Compliance Manager
Office of Oil and Gas

Promoting a healthy environment.



July 1, 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 47-08510093, 08510094, 08510095, 08510096, 08510097

Dear Mr. Smith,

EQT would like to modify the depth of the fresh water casing (13 3/8") from 973' to 1075'. This will be below the current elevation of 1119' due to the potential show of red rock. I have enclosed a new WW-2B, well schematics, and rec plan for your review.

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'.

Vicki Roark
Permitting Supervisor-WV

Enc.

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	1	Quadrangle	539
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2) Operator's Well Number: 515278 Well Pad Name: PEN15

3) Farm Name/Surface Owner : Dewayne Britton et ux Public Road Access: WV74

4) Elevation, current ground: 1,119.0 Elevation, proposed post-construction: 1,119.0

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 6395' with the anticipated thickness to be 50 feet and anticipated target pressure of 4176 PSI

8) Proposed Total Vertical Depth: 6,395
9) Formation at Total Vertical Depth: Marcellus
10) Proposed Total Measured Depth: 12,980
11) Proposed Horizontal Leg Length: 3,350
12) Approximate Fresh Water Strata Depths: 83, 163, 242, 394, 770, 873
13) Method to Determine Fresh Water Depth: By offset wells
14) Approximate Saltwater Depths: 1652, 1943, 2521
15) Approximate Coal Seam Depths: 14, 273, 379, 744
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: _____

DAL
4-2-14

CASING AND TUBING PROGRAM

1B)

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: for Drilling	INTERVALS: Left in Well	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	1,075	1,075	931 C.T.S.
Coal							
Intermediate	9 5/8	New	MC-50	40	5,330	5,330	2,092 C.T.S.
Production	5 1/2	New	P-110	20	12,980	12,980	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	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./ft)
Conductor	20	24	0.375	-	Construction	1.18
Fresh Water	13 3/8	17 1/2	0.38	2,480	1	1.21
Coal						
Intermediate	9 5/8	12 3/8	0.395	3,580	1	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.

David Wilson
7-1-14

(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 3973'.

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): no additional disturbance

22) Area to be disturbed for well pad only, less access road (acres): ±.3 ac

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.

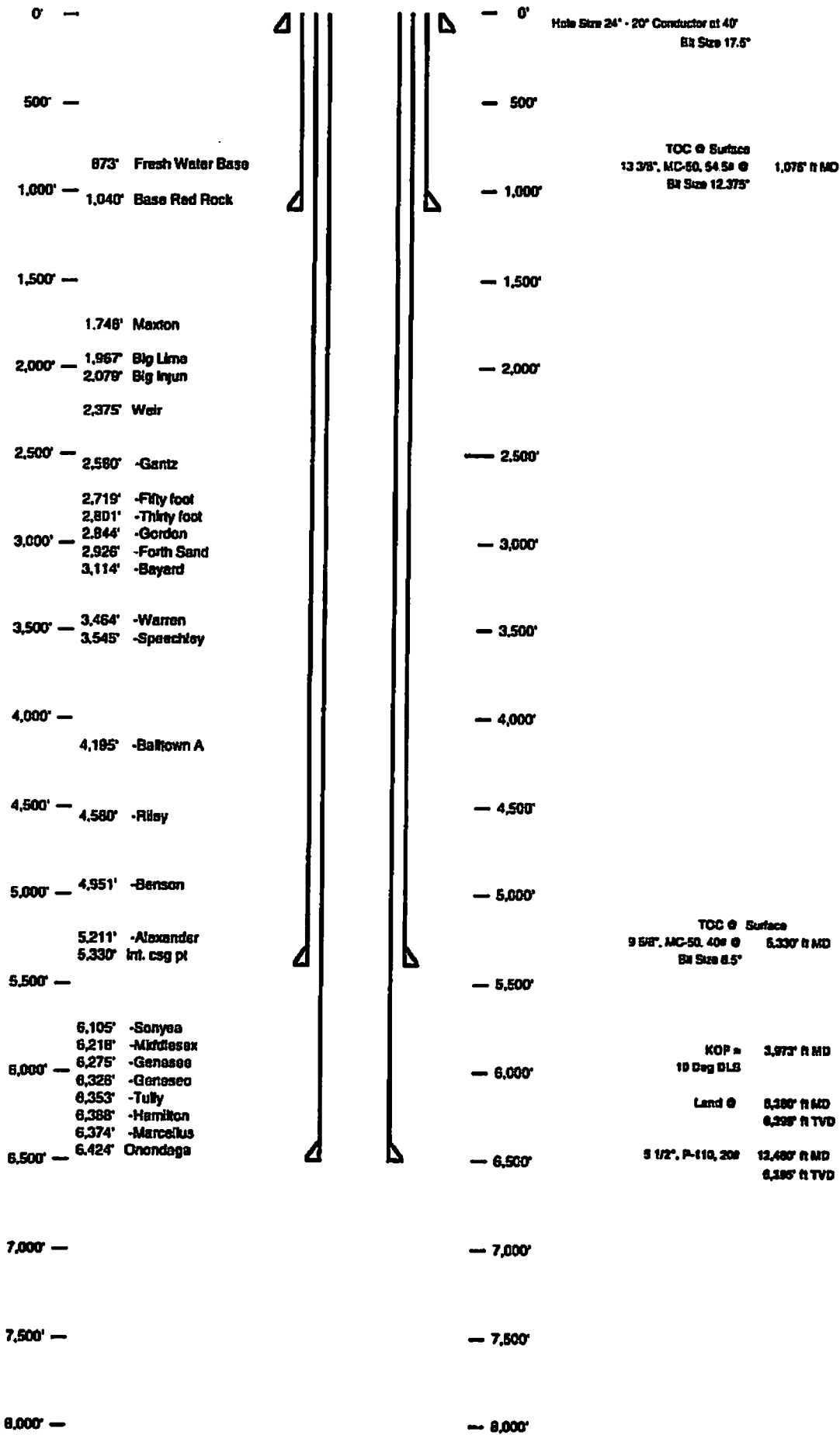
*Note: Attach additional sheets as needed.

Well Schematic
EQT Production

Well Name: 515279 (PEN15H9)
County: Ritchie
State: West Virginia

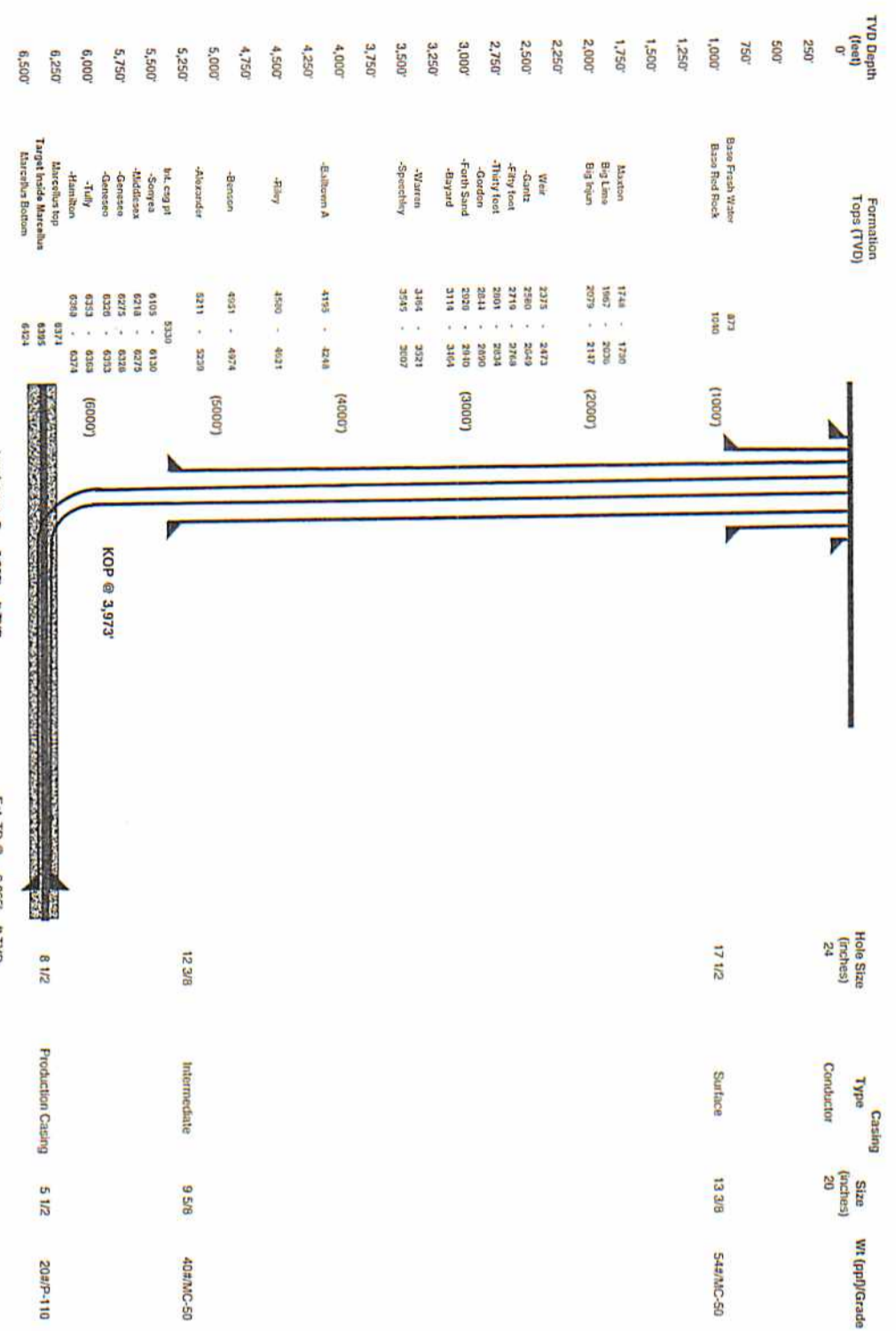
Elevation KB:
Target
Prospect
Azimuth
Vertical Section

1132
Marcellus
335
4453

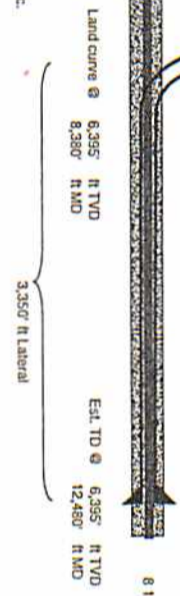


4708510096

Well 515278 (PEN15H9)
 EQ1 Production
 Pennsboro
 Ritchie
 West Virginia
 Ashmuth 335
 Vertical Section 443



Proposed Well Work
 Drill and complete a new horizontal well in the Marcellus formation.
 The vertical drill to go down to an approximate depth of 3973'.
 Then kick off the horizontal leg into the Marcellus using a slick water frac.



[Handwritten signature]

TAYLOR LEASE PEN 15 WV 515275, WV 515276, WV 515277 WV 515278 & WV 515279 WELL PAD



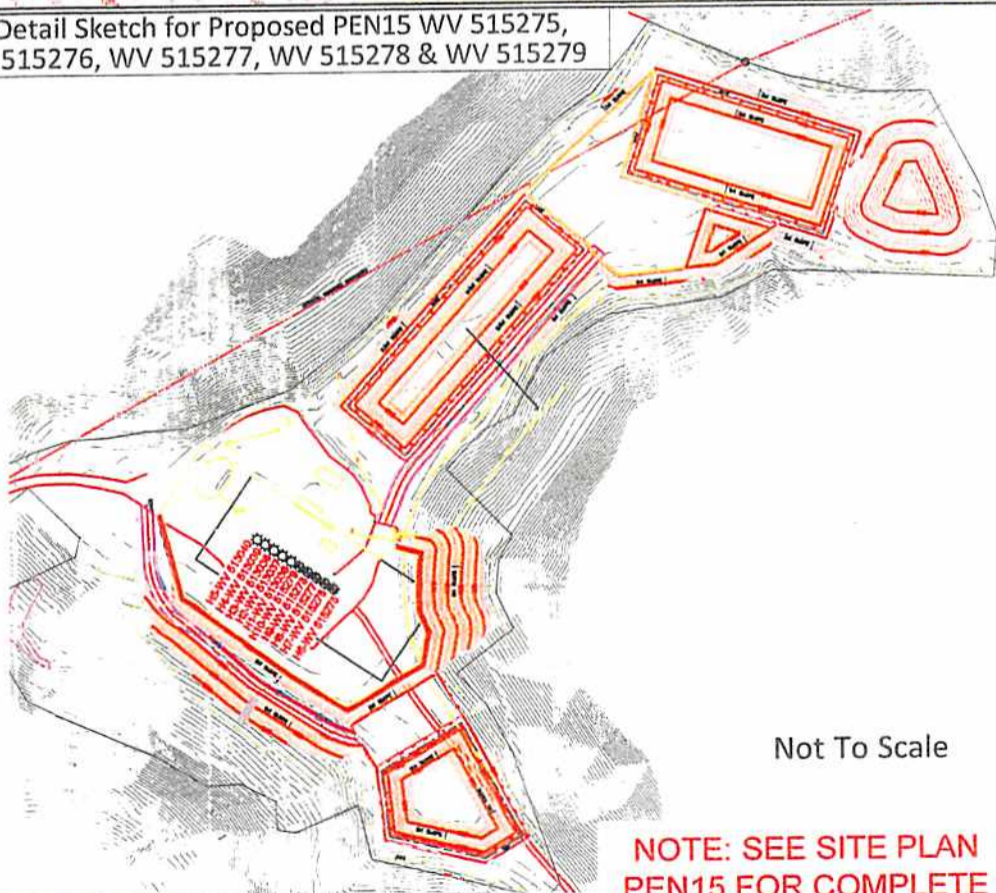
Pumping Station

Oil

Run

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

Detail Sketch for Proposed PEN15 WV 515275, WV 515276, WV 515277, WV 515278 & WV 515279



Not To Scale

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

RECEIVED
Office of Oil and Gas
MAR 28 2014

SCALE: 1"=500'



TOPO SECTION OF PENNSBORO 7.5' USGS TOPO QUADRANGLE

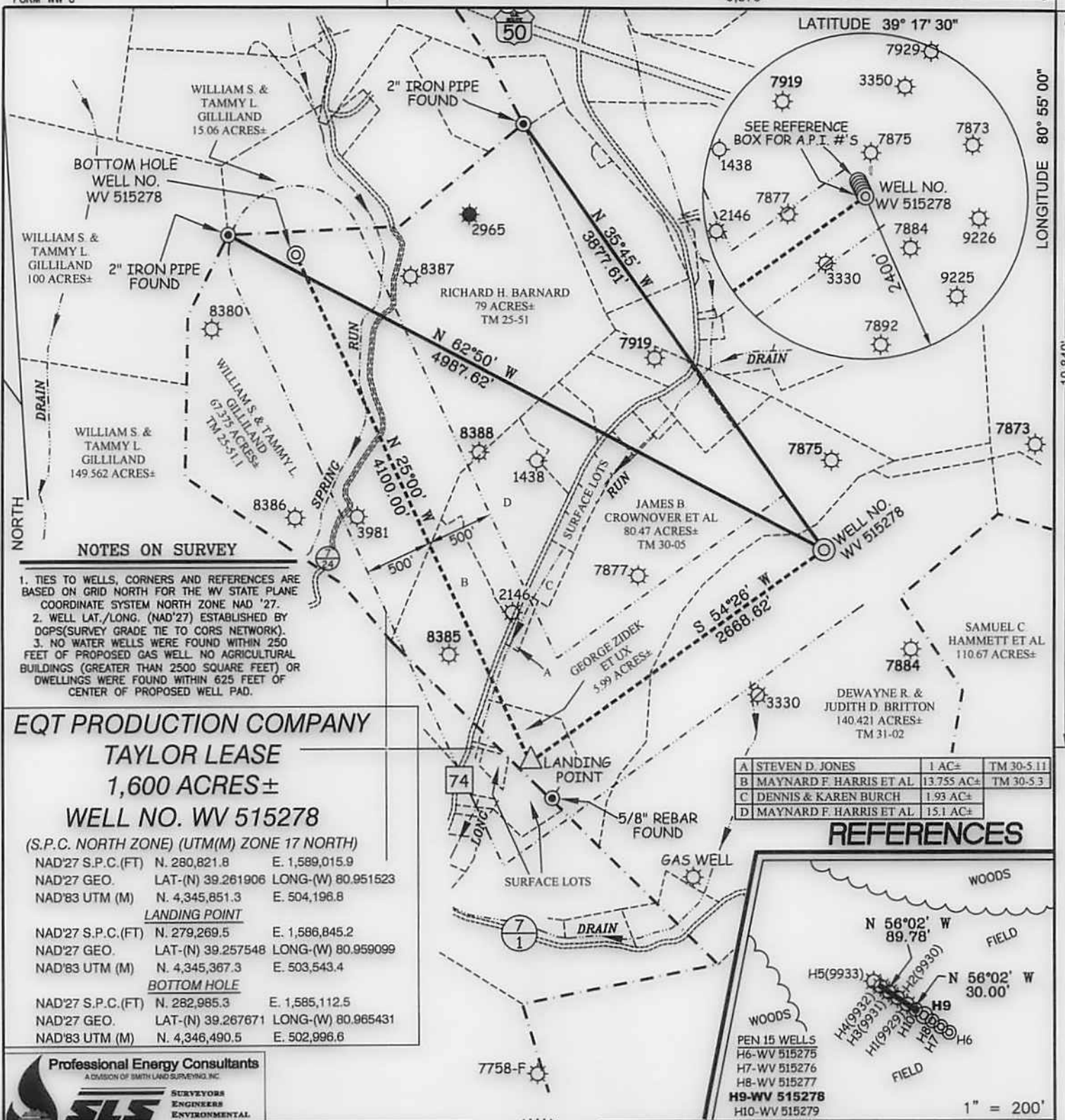
Professional Energy Consultants
A DIVISION OF SMITHLAND SURVEYING, INC.



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DRAWN BY K.D.W.	FILE NO. 7496	DATE 01-31-14	CADD FILE: 7496REC-PEN15.dwg
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NOTES ON SURVEY

1. TIES TO WELLS, CORNERS AND REFERENCES ARE BASED ON GRID NORTH FOR THE WV STATE PLANE COORDINATE SYSTEM NORTH ZONE NAD '27.
2. WELL LAT./LONG. (NAD'27) ESTABLISHED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK).
3. 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 625 FEET OF CENTER OF PROPOSED WELL PAD.

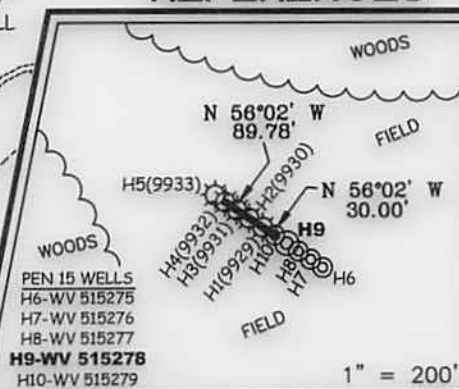
**EQT PRODUCTION COMPANY
TAYLOR LEASE
1,600 ACRES±
WELL NO. WV 515278**

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

NAD'27 S.P.C.(FT)	N. 280,821.8	E. 1,589,015.9
NAD'27 GEO.	LAT-(N) 39.261906	LONG-(W) 80.951523
NAD'83 UTM (M)	N. 4,345,851.3	E. 504,196.8
LANDING POINT		
NAD'27 S.P.C.(FT)	N. 279,269.5	E. 1,586,845.2
NAD'27 GEO.	LAT-(N) 39.257548	LONG-(W) 80.959099
NAD'83 UTM (M)	N. 4,345,367.3	E. 503,543.4
BOTTOM HOLE		
NAD'27 S.P.C.(FT)	N. 282,985.3	E. 1,585,112.5
NAD'27 GEO.	LAT-(N) 39.267671	LONG-(W) 80.965431
NAD'83 UTM (M)	N. 4,346,490.5	E. 502,996.6

A	STEVEN D. JONES	1 AC±	TM 30-5.11
B	MAYNARD F. HARRIS ET AL	13.755 AC±	TM 30-5.3
C	DENNIS & KAREN BURCH	1.93 AC±	
D	MAYNARD F. HARRIS ET AL	15.1 AC±	

REFERENCES



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

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ENGINEERS
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PROJECT MGMT.

(304) 842-8834
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. 677 *Gregory A. Smith*

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
DATE JANUARY 10 , 20 14
REVISED FEBRUARY 10 , 20 14
OPERATORS WELL NO. WV 515278
API WELL NO. 47 - 85 - 10096 H6A
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 200 FILE NO. 7496P515278R
PROVEN SOURCE OF ELEVATION DGPS (SUVERY 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 LIQUID INJECTION WASTE DISPOSAL IF "GAS" PRODUCTION STORAGE DEEP SHALLOW

LOCATION: ELEVATION 1,119 (PAD ELEVATION) 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 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 6395 TUD

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