PERMIT MODIFICATION APPROVAL

February 21, 2014

EQT PRODUCTION COMPANY
POST OFFICE BOX 280
BRIDGEPORT, WV 26330

Re: Permit Modification Approval for API Number 1706252, Well #: 514320
Changed Azimuth and Formation

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
Regulatory/Compliance Manager
Office of Oil and Gas
October 24, 2013

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

Re: Modification of 47-103-06252 (514320)

Dear Mr. Smith,

Attached is a modification to the above well. The well is being modified from a Marcellus well to a Geneseeo with a change in the azimuth. The top hole has NOT changed from the original permit and no new leases were affected. I am enclosing a new WW-6B, well schematics and a mylar plat.

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

Sincerely,

Vicki Roark  
Permitting Supervisor-WV

Enc.
cc: Derek Haught  
P.O. Box 85  
Smithville, WV 26178

02/28/2014
STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
W.VA. CODE 522-6A - WELL WORK PERMIT APPLICATION

Well Operator: EGT Production Company
Operator ID: 514320
Well Pad Name: CPT11
Elevation, current ground: 1,130.0
Elevation, proposed post-construction: 1,111.0
Well Type: (a) Gas  •  Oil  •  Underground Storage
(b) If Gas: Shallow  •  Deep  •  Horizontal
Existing Pad? Yes or No: Yes
Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
Target formation is Genesee at a depth of 6443 with the anticipated thickness to be 40 feet and anticipated target pressure of 4691 psi

Proposed Total Vertical Depth: 6,666
1) Formation at Total Vertical Depth: Genesee
3) Method to Determine Fresh Water Depth: Elaborate wells
4) Approximate Saltwater Depths: 1389, 1661
5) Approximate Coal Seam Depths: 852, 1204
6) Approximate Depth to Possible Void (coal mine, karst, other): None reported

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:

Page 1 of 3
### CASING AND TUBING PROGRAM

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<th>New or Used</th>
<th>Grade</th>
<th>Weight per ft</th>
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**Packers**

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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.
19) Describe proposed well work, including the drilling and plugging back of any pilot holes:

Drill and complete a new horizontal well in the Genesee formation. The vertical drill to go down to an approximate depth of 8668.

Then kick off the horizontal leg into the Genesee 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 0.2%) of chemicals (including 15% hydrochloric acid, spotting 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 900,000 barrels of water per stage. Sand sizes vary from 150 mesh to 20/40 mesh. Average approximately 205,000 pounds of sand per stage.

21) Total area to be disturbed, including roads, stockpile area, pits, etc. (acres): 43.82

22) Area to be disturbed for well pad only, less access road (acres): 15.68

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 I Cement):** 0.3% Calcium Chloride

**Intermediate (Type I Cement):** 0.5% Calcium Chloride. Silt is used in shallow, low temperature formations to speed the setting of cement slurries.

**Production:** 0.5% Calcium Chloride (not filtrate)

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

**Toll (Type III Cement):** 0.25-0.40% Lignosulfonate (Retarder). Lengthens thickening time.

**Cement:** 60% Calcium Carbonate. Acid solubility.

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

25) Proposed borehole conditioning procedures:

**Surface:** Circulate hole clean (Approximately 30-45 minutes) rotting & 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 the 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) rotting & 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:** Hop marker sweeps with no plug to determine actual hole washout. Calculate a gauge hole 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 16 minutes.

*Note: Attach additional sheets as needed.*