



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

May 01, 2014

EQT PRODUCTION COMPANY
POST OFFICE BOX 280
BRIDGEPORT, WV 26330

Re: Permit Modification Approval for API Number 10302940, Well #: 514566

Horizontal Extended

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



47 10302940
MOD

January 31, 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 (BIG367)514566, 47-10302940

Dear Mr. Smith,

Attached is a modification for the above well. EQT would like to extend the length of the horizontal section. A new WW-6B, well schematics and mylar plat are enclosed for your review.

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

Sincerely,

Vicki Roark
Permitting Supervisor-WV

Received

FEB 19 2014

Office of Oil and Gas
WV Dept. of Environmental Protection

Enc.

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

CASING AND TUBING PROGRAM

18)

| TYPE | Size | New or Used | Grade | Weight per ft. | FOOTAGE: for Drilling | INTERVALS: Left in Well | CEMENT: Fill-up (Cu.Ft.) |
|--------------|--------|-------------|-------|----------------|-----------------------|-------------------------|--|
| Conductor | 26 | New | MC-50 | 77 | 80 | 80 | 98 CTS |
| Fresh Water | 13 3/8 | New | MC-50 | 54 | 956 | 956 | 832 CTS |
| Coal | | | | | | | |
| Intermediate | 9 5/8 | New | MC-50 | 40 | 2,900 | 2,900 | 1134 CTS |
| Production | 5 1/2 | New | P-110 | 20 | 15,414 | 15,414 | 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./k) |
|--------------|--------|-------------------|----------------|----------------|--------------|--------------------------|
| Conductor | 26 | 30 | 0.312 | - | 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 | 3,600 | 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.

DMH
2-12-14

Received

FEB 19 2014

Office of Oil and Gas
WV Dept. of Environmental Protection

08/22/2014

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 6854', 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): 16.2

22) Area to be disturbed for well pad only, less access road (acres): 15.42

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.

Received

*Note: Attach additional sheets as needed.

FEB 19 2014

DmH
2-12-14

Page 3 of 3

Office of Oil and Gas
WV Dept. of Environmental Protection

08/22/2014



47 10302940
MOD

January 31, 2014

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

Re: Casing on BIG367(514566) 47-10302940

Dear Mr. Smith,

EQT is requesting the 13 3/8" surface casing to be set 50' below the deepest red rock show to cover potential red rock issues. The proposed casing set depth is above ground elevation. The reason for this is the red rock swells during drilling of the intermediate section causing many drilling problems such as but not limited to lost drilling assemblies and casing running issues.

In reviewing the BIG367, we would like to request to set the surface casing deeper on each well. The 13 3/8" casing will be set at a depth of approximately 956' KB (50' below the anticipated red rock show).

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

Sincerely,

Vicki Roark
Permitting Supervisor-WV

Enc.

DMH
2-12-14

Received

FEB 19 2014

Office of Oil and Gas
WV Dept. of Environmental Protection

08/22/2014

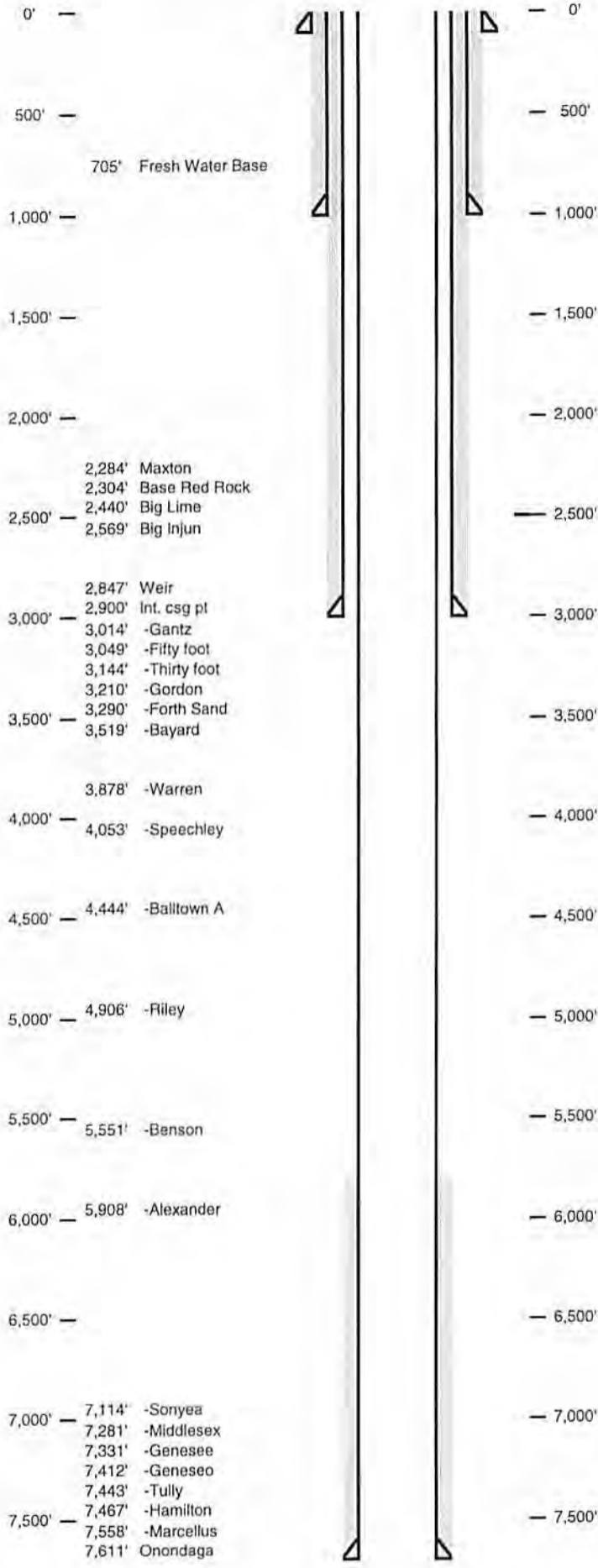
Well Schematic
EQT Production

4710302940

MOD

Well Name: 514566 (B) (510715)
County: Weirza
State: West Virginia

Elevation KB: 1456
Target: Marcellus
Prospect: 162
Azimuth: 7817
Vertical Section:



TOC @ Surface
13 3/8", MC-50, 54,5# @ 988' ft MD
Bit Size 12.375"

TOC @ Surface
9 5/8", MC-50, 40# @ 2,900' ft MD
Bit Size 8.5"

DmH
2-12-14

Received

FEB 19 2014

Office of Oil and Gas
WV Dept. of Environmental Protection

KOP = 6,854' ft MD
10 Deg DLS

Land @ 7,878' ft MD
7,574' ft TVD

5 1/2", P-110, 20# 14,914' ft MD
7,574' ft TVD

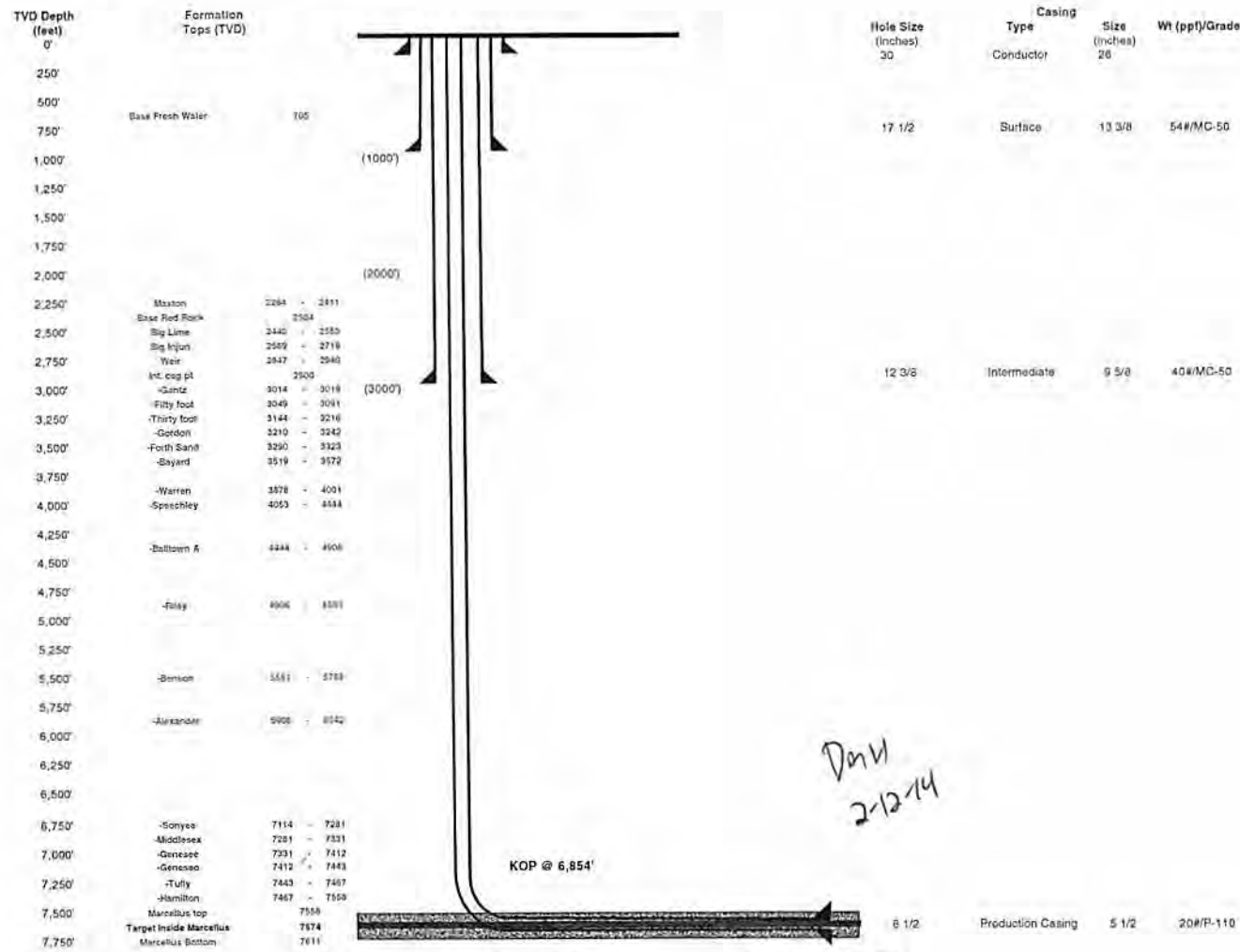
08/22/2014

4710302940

MOD

Well 514566 (BIG367H5)
 EQT Production
 Big Run
 Wetzel West Virginia

Azimuth 142
 Vertical Section 7817



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 6854'.
 Then kick of the horizontal leg into the Marcellus using a slick water frac.



Received

FEB 19 2014

Office of Oil and Gas
 WV Dept. of Environmental Protection

DnH
 2-12-14

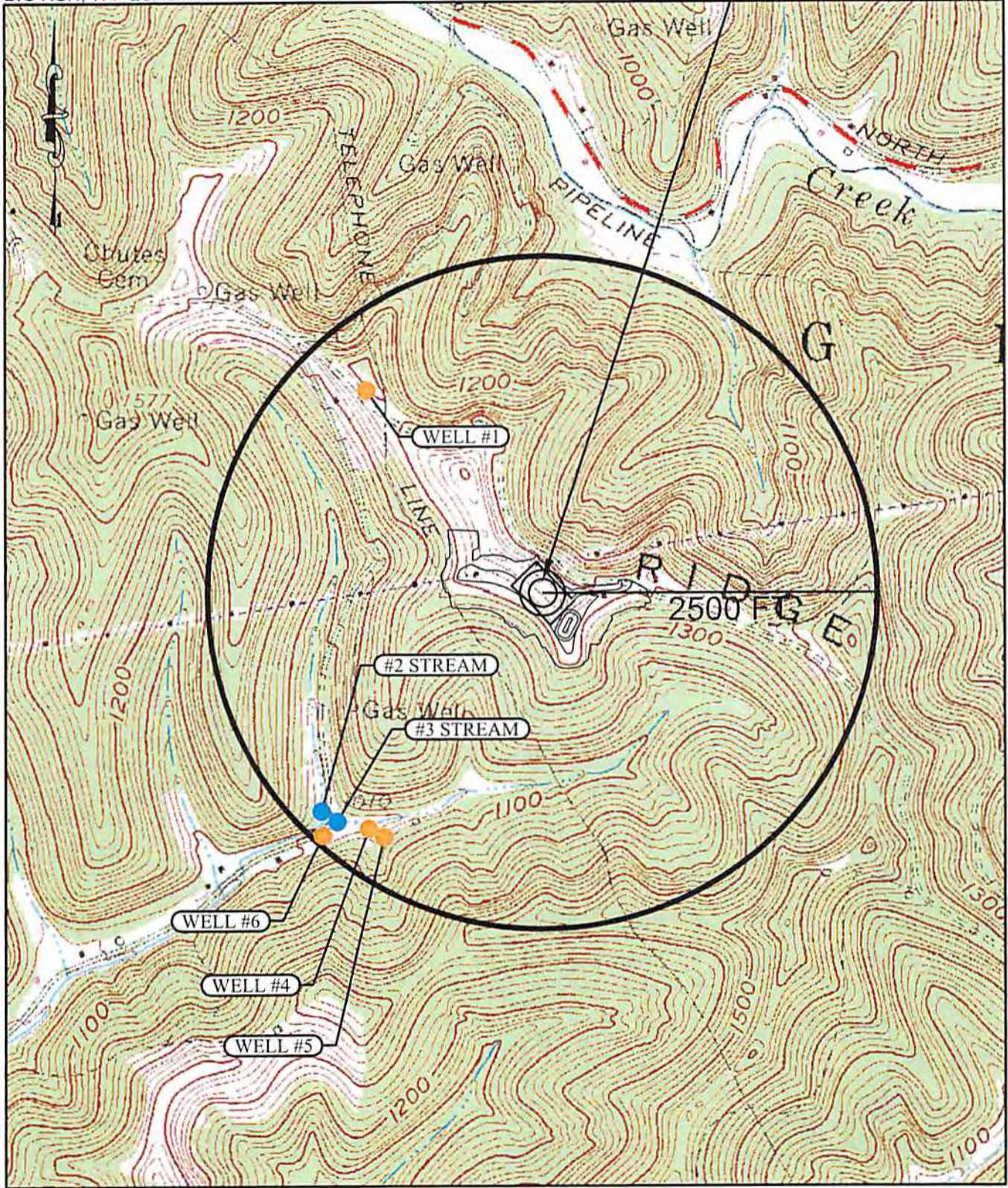
**EQT PRODUCTION
BIG 367 WELL PAD AND ACCESS ROAD
WETZEL COUNTY, WV**

103-02940

plat spotted

BIG RUN, WV QUAD MAP

PROJECT LOCATION



- EXISTING WELL
- EXISTING STREAM

1000 ft 0 1000 ft 2000 ft
VICINITY MAP SCALE

08/22/2014

RECEIVED
Office of Oil & Gas

SEP 12 2013

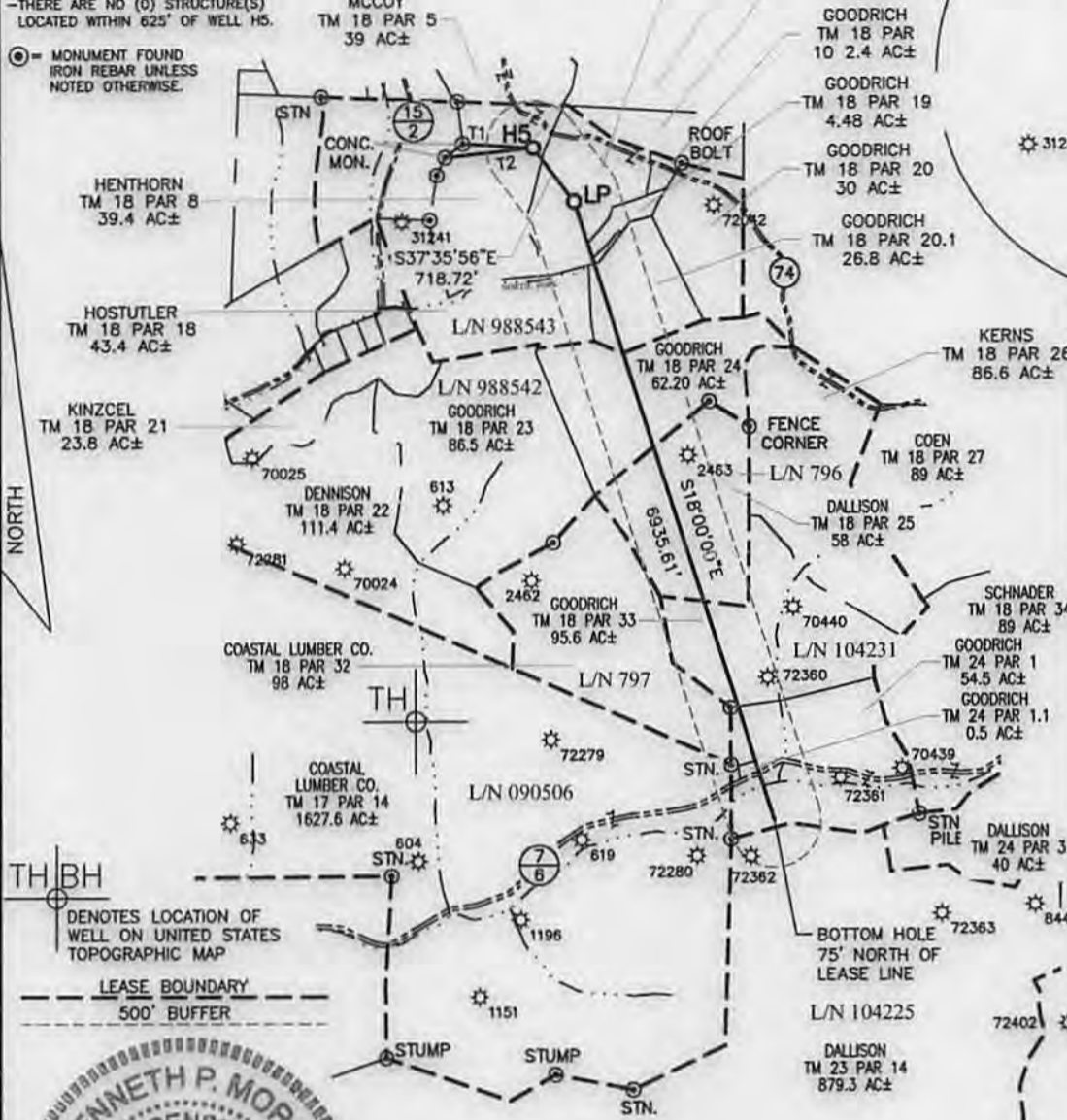
WV Department of
Environmental Protection

EQT WELL NO. 514566

NOTES:
-PLAT ORIENTATION, CORNERS, AND WELL REFERENCES ARE BASED UPON THE GRID NORTH MERIDIAN FOR THE WV STATE PLANE COORDINATE SYSTEM, NORTH ZONE NAD 27. WELL LOCATION REFERENCE TIES ARE BASED UPON THE MAGNETIC MERIDIAN.

-THERE ARE NO (0) WATER WELL(S) LOCATED WITHIN 250' OF WELL HS.
-THERE ARE NO (0) STRUCTURE(S) LOCATED WITHIN 625' OF WELL HS.

MONUMENT FOUND IRON REBAR UNLESS NOTED OTHERWISE.



USER: kpoth
LAYOUT: H5 (2)
PLOT DATE/TIME: 1/7/2014 - 2:24pm

WELL 514566 TOP HOLE STATE PLANE COORDINATES (NAD 27 NORTH ZONE)
N:386634.229
E:1695481.682
LAT:39.556594
LON:80.579854

WELL 514566 LAUNCH POINT STATE PLANE COORDINATES (NAD 27 NORTH ZONE)
N:386064.783
E:1695920.187
LAT:39.555045
LON:80.578274

WELL 514566 BOTTOM HOLE STATE PLANE COORDINATES (NAD 27 NORTH ZONE)
N:379468.628
E:1698063.640
LAT:39°32'13.227"
LON:80°34'13.422"

Professional Surveyor Seal for Kenneth P. Moran, No. 1333, State of West Virginia.

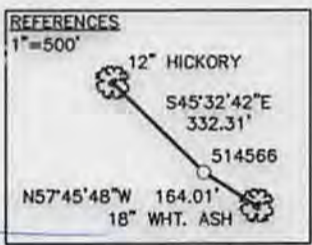


Table with 3 columns: LINE, BEARING, DIST.
T1 S86°35'44"E 760.37'
T2 N84°01'16"E 954.83'



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 RULES ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

FILE NO. 030-2259
SCALE: 1"=2000'
MINIMUM DEGREE OF ACCURACY: 1 in 2500
PROVEN SOURCE OF ELEVATION: OPUS SURVEY GRADE GPS

STATE OF WEST VIRGINIA DIVISION OF ENVIRONMENTAL PROTECTION OFFICE OF OIL & GAS

DATE JANUARY 3, 2014
OPERATOR'S WELL NO. 514566
API WELL NO. MOD
47 - 103 - 02940 H 6A
STATE COUNTY PERMIT

WELL TYPE: OIL [] GAS [x] LIQUID INJECTION [] WASTE DISPOSAL [] (IF "GAS"), PRODUCTION [x] STORAGE [] DEEP [] SHALLOW [x]
LOCATION: ELEVATION: EG: 1,474.6' PROP: 1,442.90' WATER SHED: NORTH FORK OF FISHING CREEK
DISTRICT: GRANT COUNTY: WETZEL
QUADRANGLE: BIG RUN ACREAGE: 39.4 AC±
SURFACE OWNER: DENCIL HENTHORN ET AL LEASE ACREAGE: 379.58 AC±
OIL & GAS ROYALTY OWNER: SHIBEN ESTATE, INC., CNX GAS CO., LLC LEASE NO. 988543/988542/798 104231

THRASHER THE THRASHER GROUP, INC. 800 WHITE OAKS BLVD. BRIDGEPORT, WV 26330 PHONE 304.227.2014

PROPOSED WORK: DRILL [x] CONVERT [] DRILL DEEPER [] REDRILL [] FRACTURE OR STIMULATE [x]
PERFORATE NEW FORMATION [] PLUG OFF OLD FORMATION [] OTHER PHYSICAL CHANGE IN WELL (SPECIFY)
PLUG AND ABANDON CLEAN OUT AND REPLUG
TARGET FORMATION: MARCELLUS SHALE ESTIMATED DEPTH: TVD/MD
WELL OPERATOR: EQT PRODUCTION DESIGNATED AGENT: REX C. RAY
ADDRESS: 115 PROFESSIONAL PLACE ADDRESS: 115 PROFESSIONAL PLACE BRIDGEPORT, WV 26330

CAD FILE: R:\030-2259 EQT BIG367 Well Pad and Access Rd\Survey\030-2259 BIG 367 -EQT 2000.dwg