



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

February 27, 2014

EQT PRODUCTION COMPANY
POST OFFICE BOX 280
BRIDGEPORT, WV 26330

Re: Permit Modification Approval for API Number 1706197 , Well #: 513766

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



17-06197
MOD

November 14, 2013

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

Re: API # 47-017-06197 (513766)

Dear Mr. Smith,

Attached is the corrected plat for the above listed well. We had spoken earlier about sidetracking this well because of a drilling problem and it was verbally approved for us to move the lateral portion of the well.

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

Sincerely,

A handwritten signature in blue ink, appearing to read 'Vicki Roark'.

Vicki Roark
Permitting Supervisor

Enc.

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NOV 18 2013

WV Department of
Environmental Protection

02/28/2014

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 017 County 8 District 669 Quadrangle

2) Operator's Well Number: 513766 Well Pad Name WEU8

3 Elevation, current ground: 1,091.0 Elevation, proposed post-construction: 1,068.0

4) Well Type: (a) Gas Oil

Other _____

(b) If Gas: Shallow Deep

Horizontal

5) Existing Pad? Yes or No: No

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):

Target formation is Marcellus at a depth of 6675 with the anticipated thickness to be 52 feet and anticipated target pressure of 4486 PSI

7) Proposed Total Vertical Depth: 6,796

8) Formation at Total Vertical Depth: Onondaga

9) Proposed Total Measured Depth: ~~11,264~~ 10,952 actual

10) Approximate Fresh Water Strata Depths: 113, 258, 283, & 638

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

12) Approximate Saltwater Depths: 1689 & 1838

13) Approximate Coal Seam Depths: 207 & 824

14) Approximate Depth to Possible Void (coal mine, karst, other): None Reported

15) Does land contain coal seams tributary or adjacent to, active mine? None Reported

16) Describe proposed well work: Drill and complete a new horizontal well. The vertical drill to go down to approximately depth of 6785'

Tagging the Onondaga not more than 100' then plug back to approximately 4217' and kick off the horizontal leg into the marcellus using a slick water frac.

17) Describe fracturing/stimulating methods in detail:

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). Stage lengths vary from 150 to 450 feet. Average approximately 400,000 gallons of water per stage. Sand sizes vary from 100 mesh to 20/40 mesh. Average approximately 400,000 pounds of sand per stage.

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 16.9±

19) Area to be disturbed for well pad only, less access road (acres): 9.9 ±

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CASING AND TUBING PROGRAM

20)

| 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 | 61 | 40 | 40 | 38 |
| Fresh Water | 13 3/8 | New | MC-50 | 54 | 736 | 736 | 648 |
| Coal | - | - | - | - | - | - | - |
| Intermediate | 9 5/8 | New | MC-50 | 40 | 2,981 | 2,981 | 1,165 |
| Production | 5 1/2 | New | P-110 | 20 | 10952 | 10952 | See Note 1 |
| Tubing | 2 3/8 | | J-55 | 4.6 | | | will be not 100' less than TD |
| Liners | | | | | | | |

| TYPE | Size | Wellbore Diameter | Wall Thickness | Burst Pressure | Cement Type | Cement Yield |
|--------------|--------|-------------------|----------------|----------------|--------------|--------------|
| Conductor | 20 | 24 | 0.635 | - | 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 | 3,590 | 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 | | | |
| Depth 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.

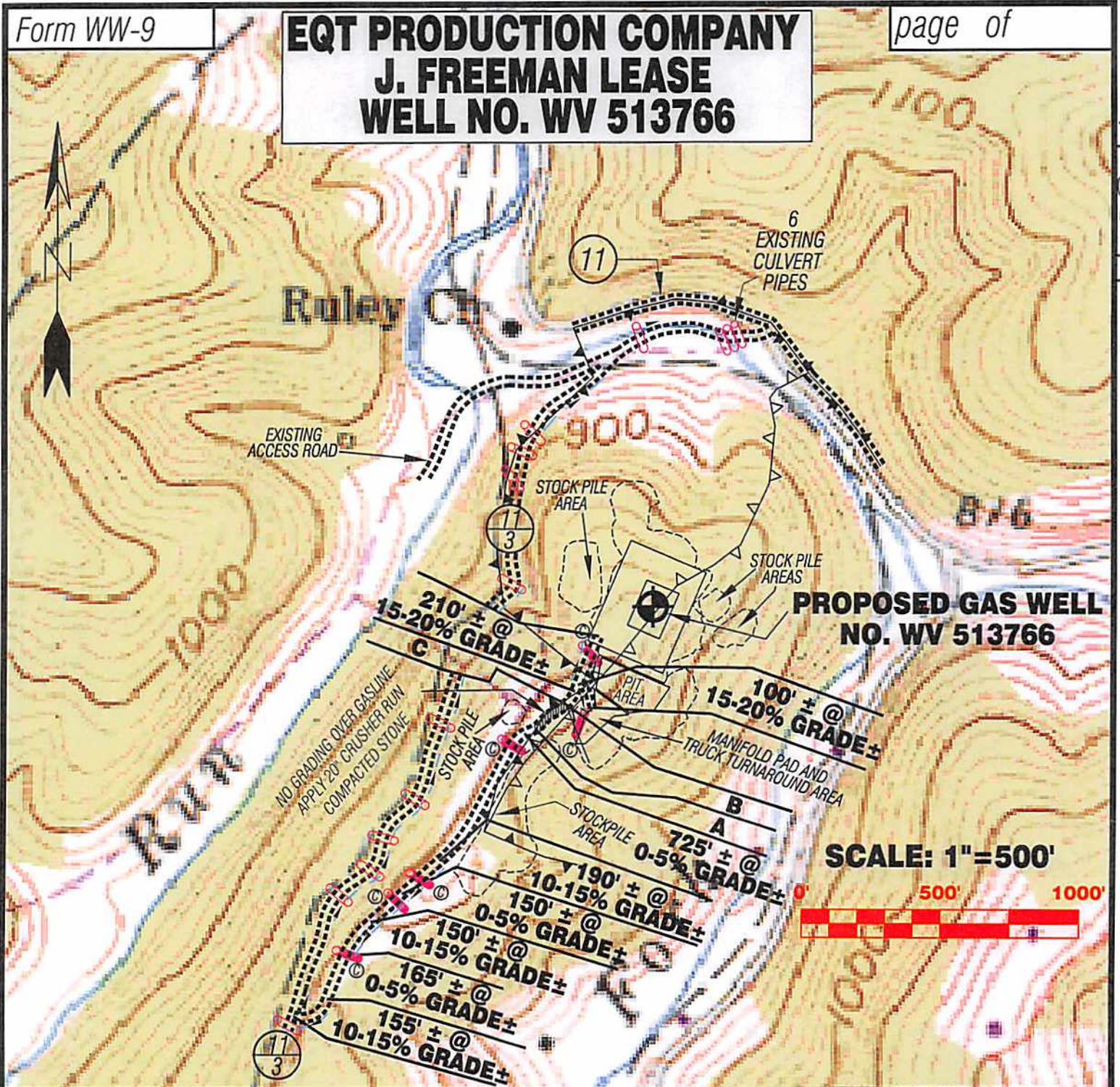
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Environmental Protection

**EQT PRODUCTION COMPANY
J. FREEMAN LEASE
WELL NO. WV 513766**

17-0619

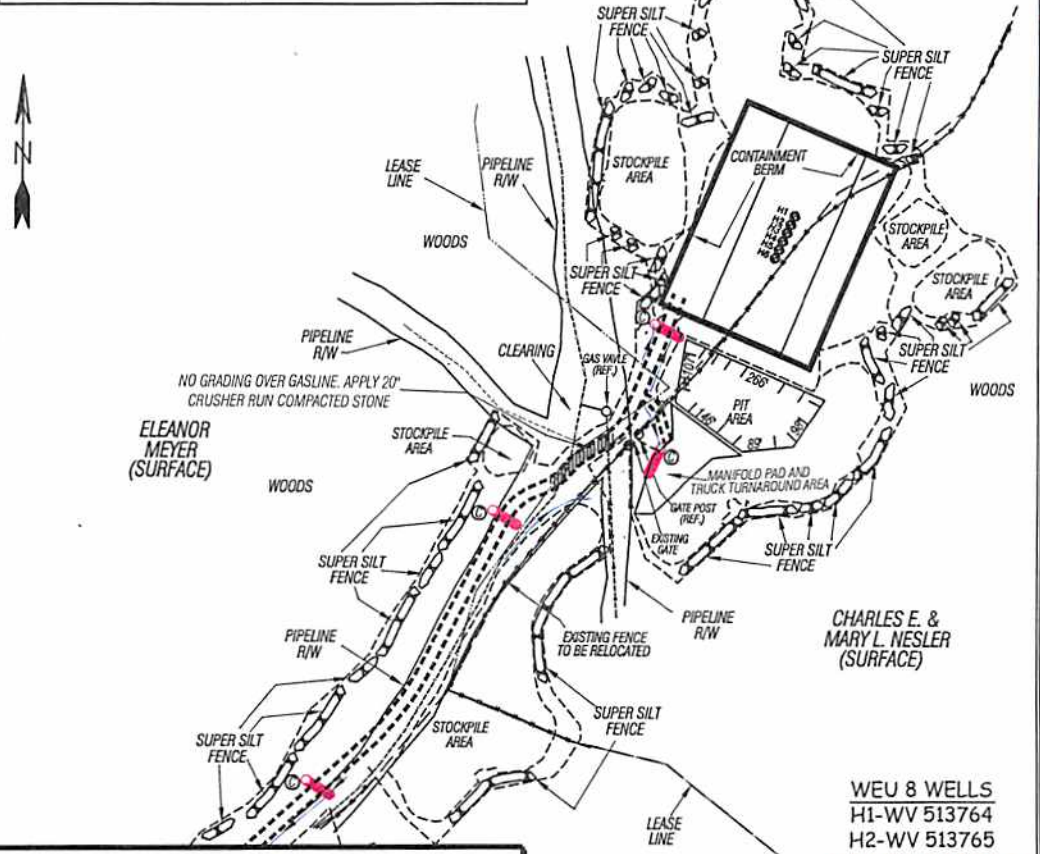


SCALE: 1"=500'



Detail Sketch for Proposed Well WV 513766

| | DISTANCE | GRADE |
|---|----------|--------|
| A | 40± | 10-15% |
| B | 140± | 5-10% |
| C | 55± | 10-15% |



ALL ROADS SHOWN HEREON ARE EXISTING UNLESS OTHERWISE NOTED AND SHALL BE MAINTAINED IN ACCORDANCE WITH WV D.E.P. OIL AND GAS BMP MANUAL ENTRANCES AT COUNTY/STATE ROADS SHALL BE MAINTAINED IN ACCORDANCE WITH WV D.O.T. REGULATION. SEPARATE PERMITS MAY BE REQUIRED BY THE D.O.T.

SEDIMENT BASINS (TRAPS) AND APPROPRIATE EROSION CONTROL BARRIERS ARE TO BE CONSTRUCTED AT ALL CULVERT AND CROSS DRAIN INLETS AND OUTLETS AS REQUIRED IN THE WV D.E.P. OIL AND GAS BMP MANUAL. FIELD CONDITIONS (ROCK OUTCROPS AND BEDROCK) MAY PROHIBIT INLET TRAPS BEING INSTALLED. WHEN THESE CONDITIONS EXIST ADDITIONAL EROSION CONTROL MEASURES SHALL BE EVALUATED AND UTILIZED AS NEEDED.

EARTHWORK CONTRACTORS ARE RESPONSIBLE FOR NOTIFICATION TO THE OPERATOR AND INSPECTOR PRIOR TO ANY DEVIATION FROM THIS PLAN.

TEMPORARY SEED & MULCH ALL SLOPES AFTER CONSTRUCTION OF LOCATION.

CUT & STACK ALL MARKETABLE TIMBER.

STACKED BRUSH MAY BE USED FOR SLOPE EROSION CONTROL.

APPLICATIONS FOR SEPARATE PLC PERMITS ON THE ACCESS ROAD STREAM CROSSINGS HAVE BEEN PREPARED (IF APPLIES).

Office of Oil and Gas
WV Department of Environmental Protection

02/28/2014

JAN 30 2014

LEGEND:
 (Red line with 'X') = EXISTING CULVERT
 (Red line with 'C') = PROPOSED CULVERT 12" MIN. UNLESS OTHERWISE NOTED
 (Red line with 'X' over stream) = PROPOSED STREAM CROSSING
 (Dashed line) = APPROXIMATE LIMITS OF DISTURBANCE

- WEU 8 WELLS
- H1-WV 513764
- H2-WV 513765
- H3-WV 513766**
- H4-WV 513767
- H5-WV 513768
- H6-WV 513769



SMITH LAND SURVEYING, INC.
P.O. BOX 150 GLENVILLE, WV, 26351
PH: (304)462-5634 FAX: (304)462-5656 E-MAIL: sls@slandsurvey.com

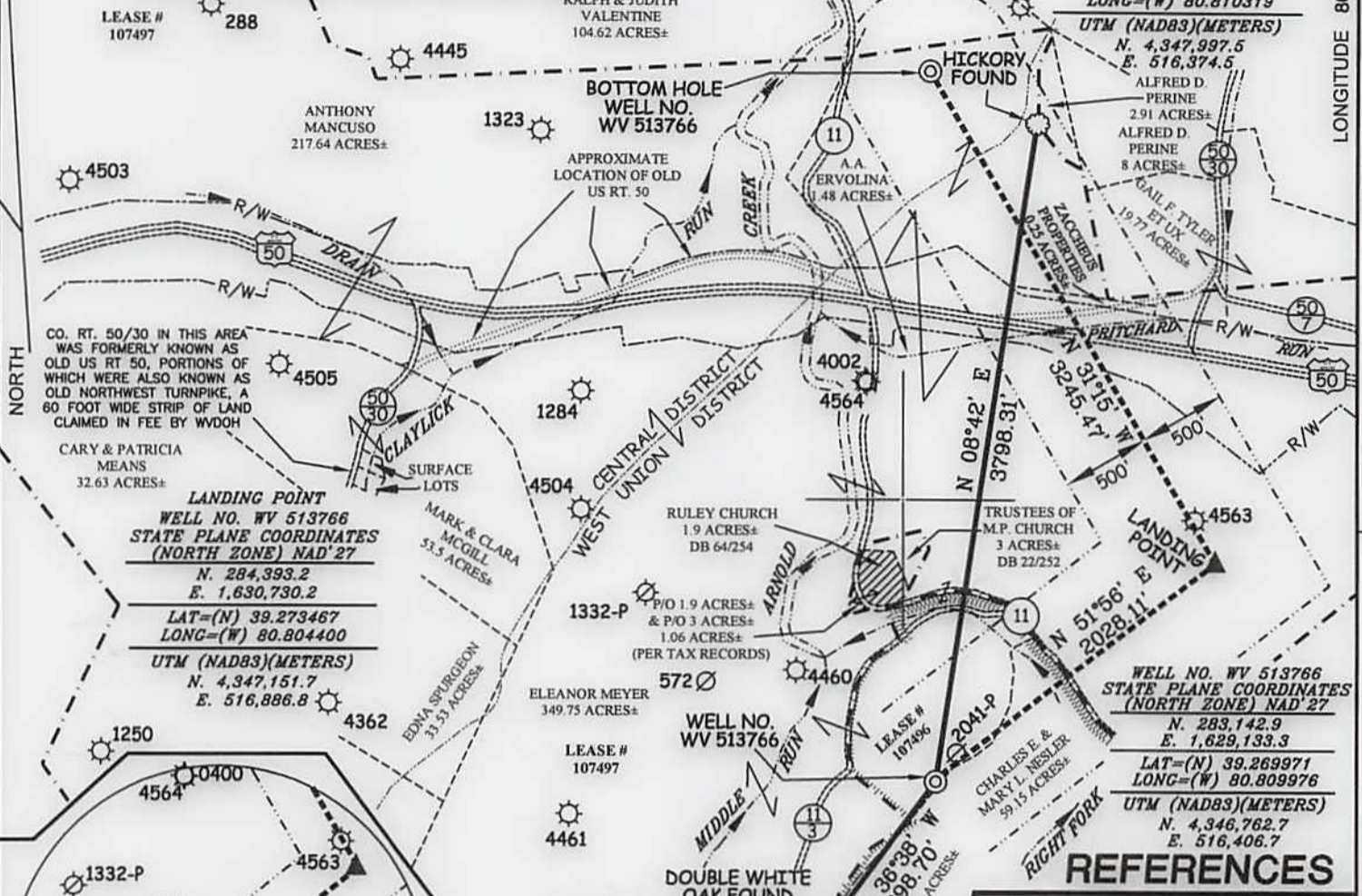
| | | | |
|--------------------|------------------|------------------|------------------------------------|
| DRAWN BY K.D.W. | FILE NO. 7746 | DATE 12/18/12 | CADD FILE: 7746REC\WV513765.dwg |
|--------------------|------------------|------------------|------------------------------------|

Not To Scale
TOPO SECTION OF WEST UNION 7.5'
USGS TOPO QUADRANGLE

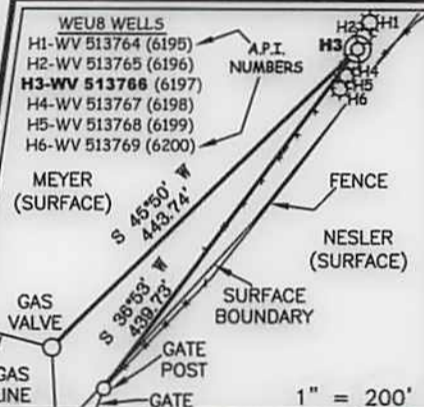
EQT PRODUCTION COMPANY J. FREEMAN LEASE 95 ACRES± WELL NO. WV 513766

LATITUDE 39°17'30"
 BOTTOM HOLE
 WELL NO. WV 513766
 STATE PLANE COORDINATES
 (NORTH ZONE) NAD '27
 N. 287,196.7
 E. 1,629,095.3
 LAT=(N) 39.281098
 LONG=(W) 80.810319
 UTM (NAD83)(METERS)
 N. 4,347,997.5
 E. 516,374.5

LONGITUDE 80°47'30"



REFERENCES



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. LEASE BOUNDARY SHOWN HEREON TAKEN FROM DB 41 PG 299, DB 112 PG 91, DB 10 PG 513 AND OTHER DEEDS/PLATS ON RECORD.
3. SURFACE OWNER AND ADJOINER INFORMATION TAKEN FROM THE ASSESSOR AND COUNTY CLERK RECORDS OF DODDRIDGE COUNTY IN JULY, 2013.
4. WELL LAT./LONG. (NAD'27) ESTABLISHED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK).
5. ORIGINAL PLAT DATED 12/18/12 REVISED 11/11/13 TO CHANGE BOTTOM HOLE AND LANDING POINT LOCATIONS AND CONFORM WITH NEW DEP REGULATIONS.
6. 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.



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 NOVEMBER 11, 20 13
 OPERATORS WELL NO. WV 513766
 API WELL NO. 47 — 017 — 06197 **H6A**
 STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1/2500 FILE NO. 7746P513766R2
 PROVEN SOURCE OF ELEVATION DGPS (SURVEY 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 1,070.9'(AS BUILT PAD ELEVATION) WATERSHED MIDDLE RUN AND ARNOLD CREEK
 DISTRICT WEST UNION COUNTY DODDRIDGE QUADRANGLE WEST UNION 7.5'

SURFACE OWNER ELEANOR MEYER ACREAGE 349.75±

ROYALTY OWNER J. FREEMAN HRS ET AL (95 AC.±) / LEWIS MAXWELL HEIRS (960 AC.±)

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 _____

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

COUNTY NAME PERMIT

02/28/2014