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west virginia department of environmental protection

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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](http://www.dep.wv.gov)

## PERMIT MODIFICATION APPROVAL

August 05, 2013

EQT PRODUCTION COMPANY  
POST OFFICE BOX 280  
BRIDGEPORT, WV 26330

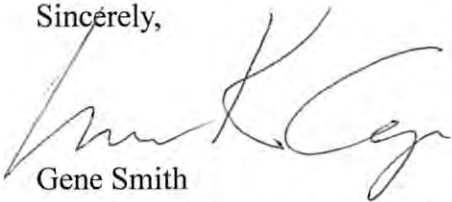
Re: Permit Modification Approval for API Number 1706052 , Well #: 513163 - CARR  
**extended lateral**

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



**API # 47-017-06052** *MoD*

**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	81#	40	40	38
Fresh Water	13 3/8	New	MC-50	54#	1,019	1,019	884
Coal	—	—	—	—	—	—	—
Intermediate	9 5/8	New	MC-50	40#	3,249	3,249	1,269
Production	5 1/2	New	P-110	20#	14,956	14,956	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
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			
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.

*Doug Newton*  
4-1-2013  
*JWC*  
4-1-13

RECEIVED  
Williams Co.  
APR 10 2013

08/09/2013

21) 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

22) 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.

23) 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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Ministry of Oil and Gas  
APR 01 2013  
Department  
Environmental Protection

08/09/2013

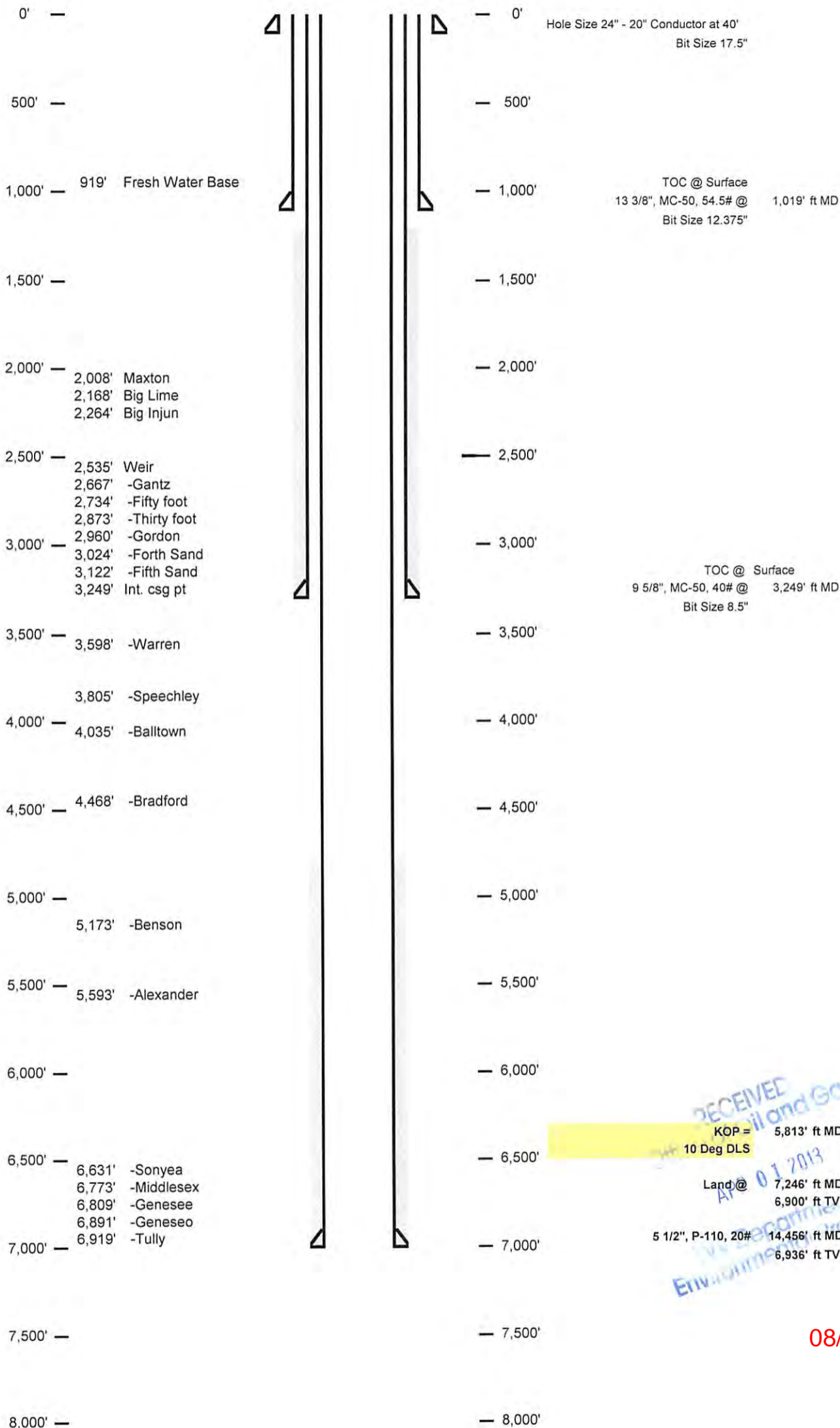
Well Schematic  
EQT Production

API 47-017-06052 MOD

Well Name 513163 (SMI27H2)  
County Doddridge  
State West Virginia

Elevation KB:  
Target  
Prospect  
Azimuth  
Vertical Section

1189
Geneseo
155
7659



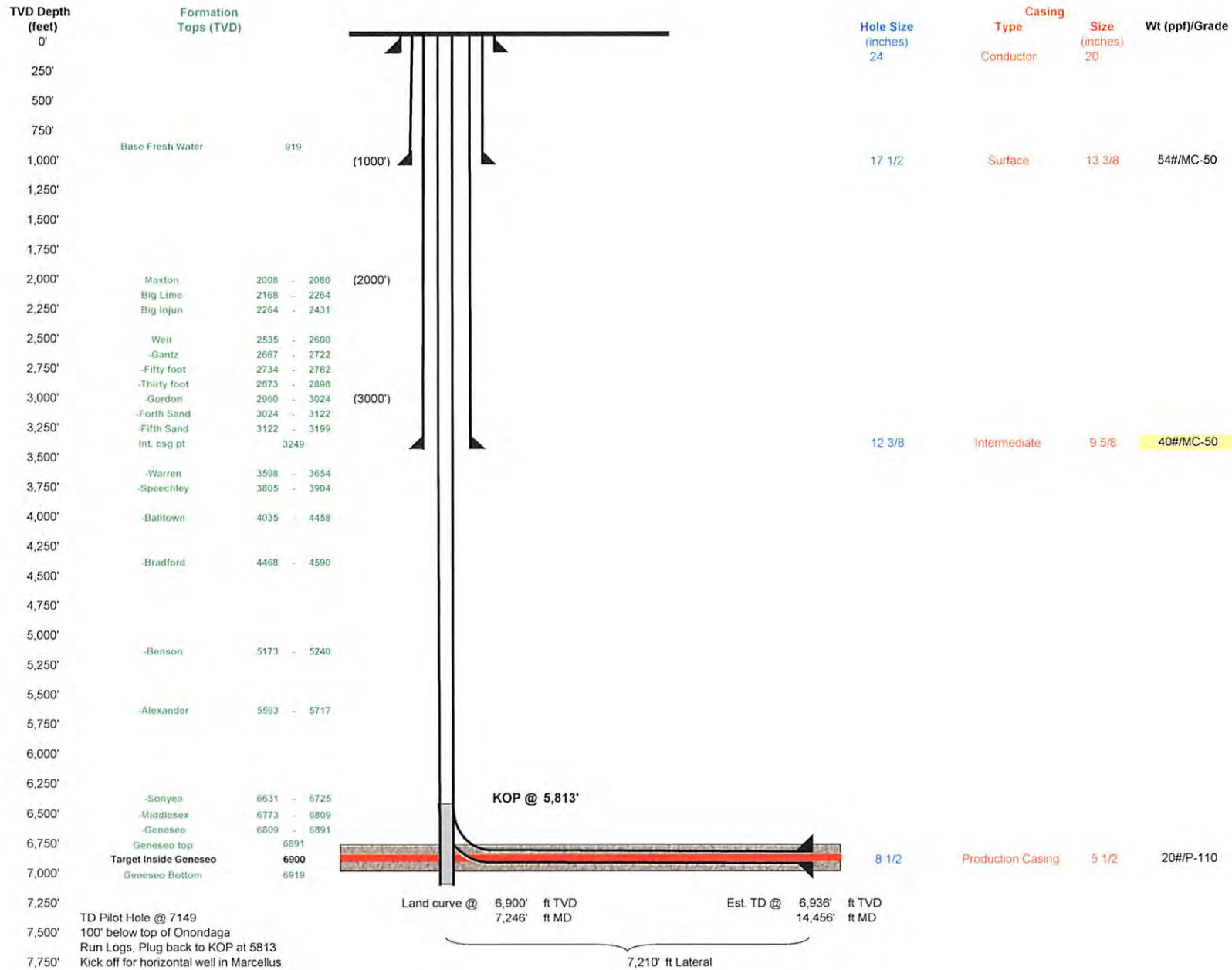
RECEIVED  
Oil and Gas  
APR 01 2013  
Environmental Protection

08/09/2013

17-GOS2 MOD

Well 513163 (SMI27H2)  
 EQT Production  
 Smithburg  
 Doddridge West Virginia

Azimuth 155  
 Vertical Section 7659



RECEIVED Office of Oil and Gas  
 8/10/2010 10:42 AM  
 RECEIVED DEPARTMENT OF ENVIRONMENTAL POLICY AND CULTURE  
 8/10/2010 10:42 AM

API 47-017-06052

A - M. BERAM (9.57 AC.±)  
B - C.L. IRWIN (15.13 AC.±)  
C - C.L. IRWIN (8.05 AC.±)

# EQT PRODUCTION COMPANY WELL NO. WV 513163 CARR LEASE 351 ACRES±

WELL NO. WV 513163  
STATE PLANE COORDINATES  
NORTH ZONE (NAD 27)  
N. 318,208.5  
E. 1,661,537.7

LAT=(N) 39.367479  
LONG=(W) 80.697182

UTM (NAD'83)(METERS)  
N. 4,357,610.4  
E. 526,100.6

LANDING POINT  
WELL NO. WV 513163  
STATE PLANE COORDINATES  
NORTH ZONE (NAD 27)  
N. 317,830.7  
E. 1,661,788.2

LAT=(N) 39.366451  
LONG=(W) 80.696278

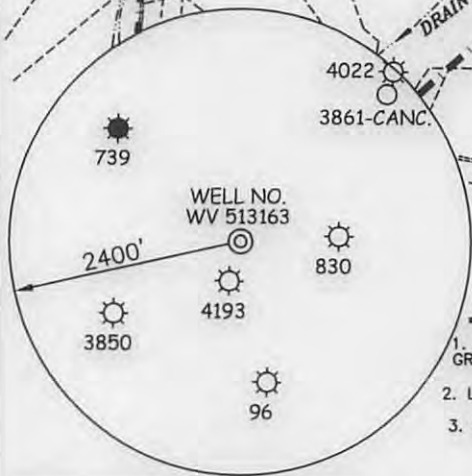
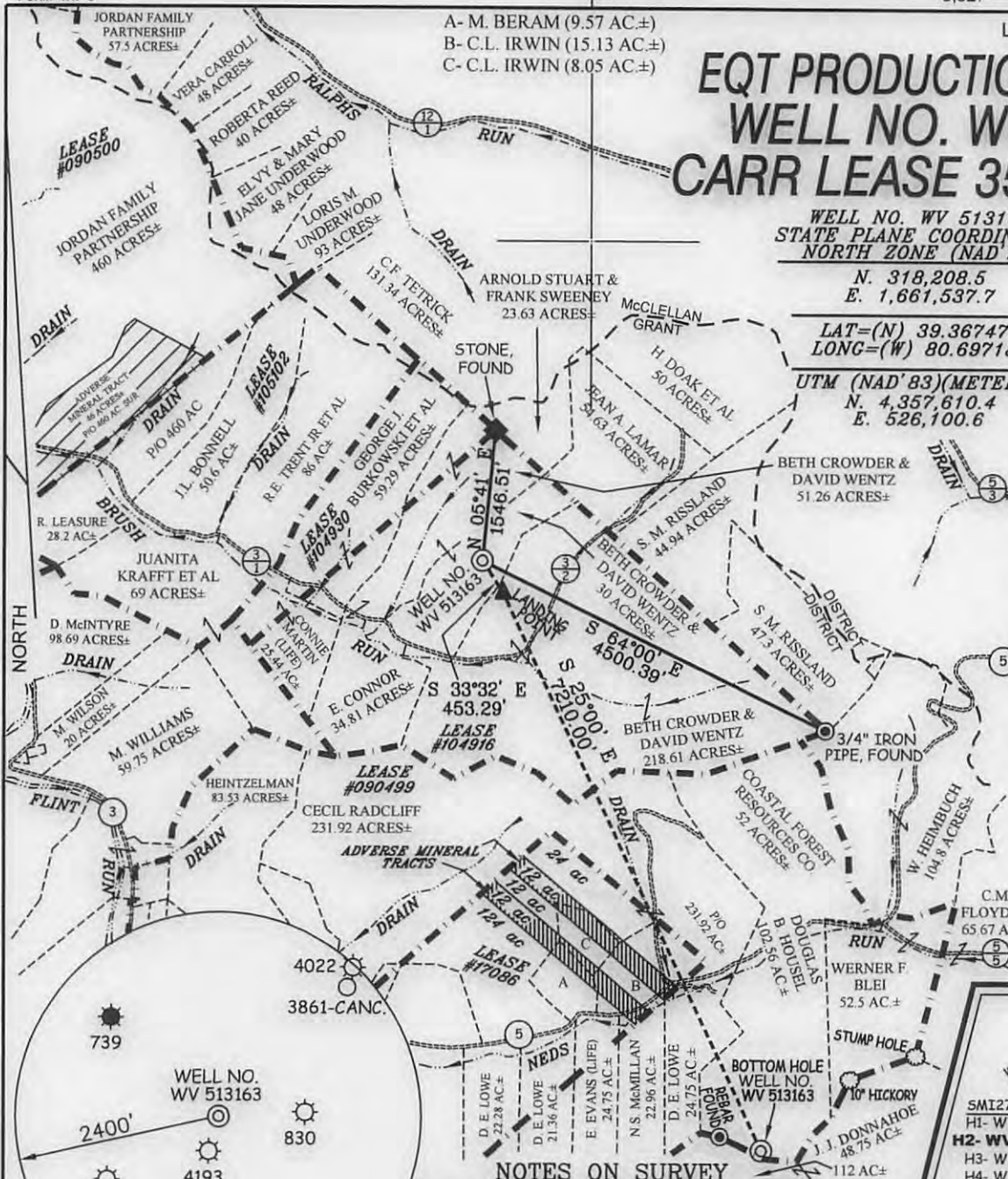
UTM (NAD'83)(METERS)  
N. 4,357,496.6  
E. 526,178.8

BOTTOM HOLE  
WELL NO. WV 513163  
STATE PLANE COORDINATES  
NORTH ZONE (NAD 27)  
N. 311,296.2  
E. 1,664,835.3

LAT=(N) 39.348622  
LONG=(W) 80.685197

UTM (NAD'83)(METERS)  
N. 4,355,521.4  
E. 527,140.3

## REFERENCES



### NOTES ON SURVEY

1. TIES TO WELLS, CORNERS & REFERENCES ARE BASED ON GRID NORTH FOR THE WV STATE PLANE COORDINATE SYSTEM NORTH ZONE NAD '27.
2. LEASE BOUNDARY SHOWN HEREON TAKEN FROM DEED BOOK 185 PAGE 459 & DEED BOOK 29 PAGE 255.
3. SURFACE OWNER AND ADJOINER INFORMATION TAKEN FROM THE ASSESSOR AND COUNTY CLERK RECORDS OF DODDRIDGE COUNTY IN JULY, 2011.
4. WELL LAT./LONG. (NAD'27) ESTABLISHED BY DGPS (SURVEY GRADE).
5. ORIGINAL PLAT DATED 07/26/11, REVISED 08/02/11 AND REVISED 09/23/11, REVISED 1/28/13 TO CHANGE ADDRESS, REFERENCE DETAIL AND LATERAL LENGTH ETC.



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 SEPTEMBER 23, 20 11  
 REVISED DATE JANUARY 28, 20 13  
 OPERATORS WELL NO. WV 513163  
 API WELL NO. 47-017-06052 MOD  
 STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 200 FILE NO. 7584P513163R2F2 (350-57)  
 PROVEN SOURCE OF ELEVATION 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  LIQUID INJECTION  WASTE DISPOSAL  IF "GAS" PRODUCTION  STORAGE  DEEP  SHALLOW

LOCATION: ELEVATION 1200' (GROUND) / 1.179' (PROPOSED) WATERSHED BRUSH RUN  
 DISTRICT GRANT COUNTY DODDRIDGE QUADRANGLE SMITHBURG 7.5'  
 SURFACE OWNER BETH CROWDER & DAVID WENTZ ACREAGE 30±  
 ROYALTY OWNER PATTY J. & R. KEITH CRIHFIELD (351 AC.±) / NEVA RITTER ET AL (907 AC.±) / EDISON RITTER ET AL (1607 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 GENESECO  
 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

08/09/2013

COUNTY NAME PERMIT