



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

May 08, 2014

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-10302980, issued to EQT PRODUCTION COMPANY, is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

In addition to the applicable requirements of this permit, and the statutes and rules governing oil and gas activity in WV, this permit may contain specific conditions which must be followed. Permit conditions are attached to this cover letter.

Per 35CSR-4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926-0499 ext. 1654.

James Martin
Chief

Operator's Well No: 514562
Farm Name: HENTHORN, DENCIL ET AL
API Well Number: 47-10302980
Permit Type: Horizontal 6A Well
Date Issued: 05/08/2014

Promoting a healthy environment.

05/09/2014

47 10302980

PERMIT CONDITIONS

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

CONDITIONS

1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACOE). Through this permit, you are hereby being advised to consult with USACOE regarding this proposed activity.
2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than fifty (50) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the fill material shall be within plus or minus 2% of the optimum moisture content as determined by the standard proctor density test, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort. Each lift must meet 95 % compaction of the optimum density based on results from the standard proctor density test of the actual soils used in specific engineered fill sites. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.
4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.
5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations*, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.
6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.
7. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.
8. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.

05/09/2014

CASING AND TUBING PROGRAM

16)

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	81	80	80	98 C.T.S.
Fresh Water	13 3/8	New	MC-50	64	856	856	832 C.T.S.
Coal							
Intermediate	9 5/8	New	MC-50	40	2,900	2,900	1,134 C.T.S.
Production	5 1/2	New	P-110	20	18,004	18,004	See Note 1
Tubing	2 3/8		J-65	4.6			May not be set, if not will be set 100' from TD
Liners							

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. Ft.)
Conductor	26	30	0.312	-	Construction	1.18
Fresh Water	13 3/8	17 1/2	0.36	2,480	1	1.21
Coal						
Intermediate	9 5/8	12 3/8	0.395	3,590	1	1.21
Production	5 1/2	5 1/2	0.361	12,840	-	1.27/1.88
Tubing						
Liners						

Packings

Kind:	N/A			
Sizes:	N/A			
Depths Set:	N/A			

Note 1: ECIT 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.

Dm h
3-6-14

Checked by: [Signature]
Date: 05/09/2014
05/09/2014
Environmental Protection

(3/13)

10) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill and complete a new horizontal well in the Genesee Formation. The vertical drill to go down to an approximate depth of 6672'. 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 0.5%) of chemicals (including 16% Hydrochloric acid, gelling agent, gel breaker, friction reducer, biocide, acid 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): 18.20 ±

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 I 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 I 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 I Cement): 0.2-0.7% Uronofonate (Retarder). Lengthens thickening time.

0.3% CFF (dispersant). Makes cement easier to mix.

Tail (Type H Cement): 0.25-0.40% Uronofonate (Retarder). Lengthens thickening time.

0.2-0.3% CFF (dispersant). This is to make the cement easier to mix.

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) 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 mat 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.

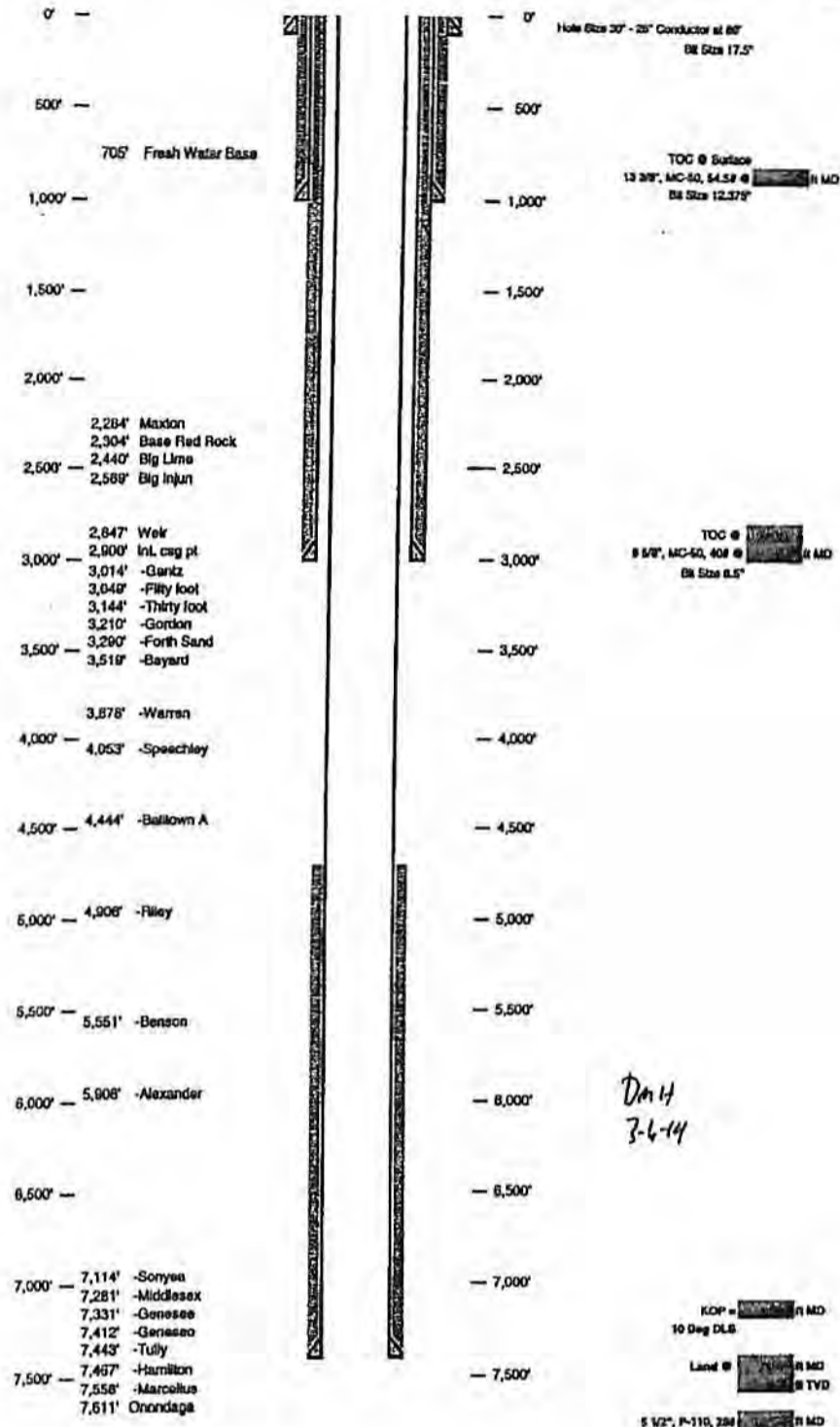
DM 11 3-6-14

100-01-10110
05/09/2014
Environmental Protection

Well Schematic
EQT Production

Well Name: [REDACTED]
County: [REDACTED]
State: West Virginia

Elevation (ft): [REDACTED]
Target: [REDACTED]
Prospect: [REDACTED]
Azimuth: [REDACTED]
Vertical Section: [REDACTED]



WW-9
(549)

Page 1 of 1
API No. 47 - 103 - 0
Operator's Well No. 514582

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

Fluids/Cuttings Disposal & Reclamation Plan

Operator Name BIG367 OP Code _____

Watershed (HUC10) North Fork of Fishing Creek Quadrangle Big Run 7.5'

Elevation 1442.9 County Wetzel District Grant

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes x No _____

Will a pit be used? Yes: _____ No: X

If so please describe anticipated pit waste: _____

Will a synthetic liner be used in the pit? Yes _____ No X If so, what ml.? 60

Proposed Disposal Method For Treated Pit Wastes:

- _____ Land Application
- _____ • Underground Injection (UIC Permit Number 0014, 8462, 4037)
- _____ Reuse (at API Number _____)
- _____ • Off Site Disposal (Supply form WW-9 for disposal location)
- _____ Other (Explain _____)

Will closed loop system be used? Yes, The closed loop system will remove drill cuttings from the drilling fluid. The drill cuttings are then prepared for transportation to an off-site disposal facility.

Drilling medium anticipated for this well? Air, freshwater, oil based, etc.
Air is used to drill the top-hole sections of the wellbore.
Saltwater, intermediate, and Pilot hole sections, water based
mud is used to drill the curve and lateral.

If oil based, what type? Synthetic, petroleum, etc

Additives to be used in drilling medium? MILBAR, Viscosifier, Alkalinity Control, Lime, Chloride Salts, Rate Filtration Control, Deflocculant, Lubricant, Detergent, Deforming, Walnut Shell, X-Cide, SOLTEX Terra. Of the listed chemicals the following are generally used when drilling on site: lubricant, detergent, deforming. Water based fluids use the following chemicals: MILBAR, viscosifier, alkalinity control, lime, chloride salts, rate filtration control, deflocculant, lubricant, detergent, deforming, walnut shell, x-cide, SOLTEX terra

DH
3-6-14

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. Landfill
- If left in pit and plan to solidify what medium will be used? (Cement, Lime, sawdust) n/a
- Landfill or offsite name/permit number? See Attached List

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

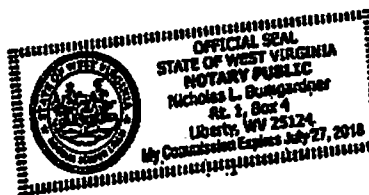
I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature _____
Company Official (Typed Name) Victoria J. Roark
Company Official Title Permitting Supervisor

Subscribed and sworn before me this 10 day of FEBRUARY, 20 14

Notary Public

My commission expires 6/27/2018



05/09/2014

Handwritten notes and stamps at the bottom right of the page.

WW-9

Operator's Well No. 514562

Proposed Revegetation Treatment: Acres Disturbed 16.2± Prevegetation pH 6
 Lime 3 Tons/acre or to correct to pH 6.5
 Fertilize type _____
 Fertilizer Amount 13 lbs/acre (500 lbs minimum)
 Mulch 2 Tons/acre

Seed Mixtures

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
KY-31	40	Orchard Grass	15
Alsike Clover	5	Alsike Clover	5
Annual Rye	15		

Attach:
 Drawing(s) of road, location, pit and proposed area for land application.

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: [Signature]

Comments: _____

Title: Oil + Gas Inspection Date: 7-6-14

Field Reviewed? () Yes () No

05/09/2014
 11:27:03 AM
 [Faint circular stamp]



Where energy meets innovation.™

Site Specific
Safety and Environmental Plan
For

EQT BIG367 Pad
Jacksonburg
Wetzel County, WV

For Wells:

514562 _____

Date Prepared:

July 23, 2013

[Signature]
EQT Production
Permitting Supervisor
Title
2-21-14
Date

[Signature]
WV Oil and Gas Inspector
Oil + Gas Inspector
Title
3-6-14
Date

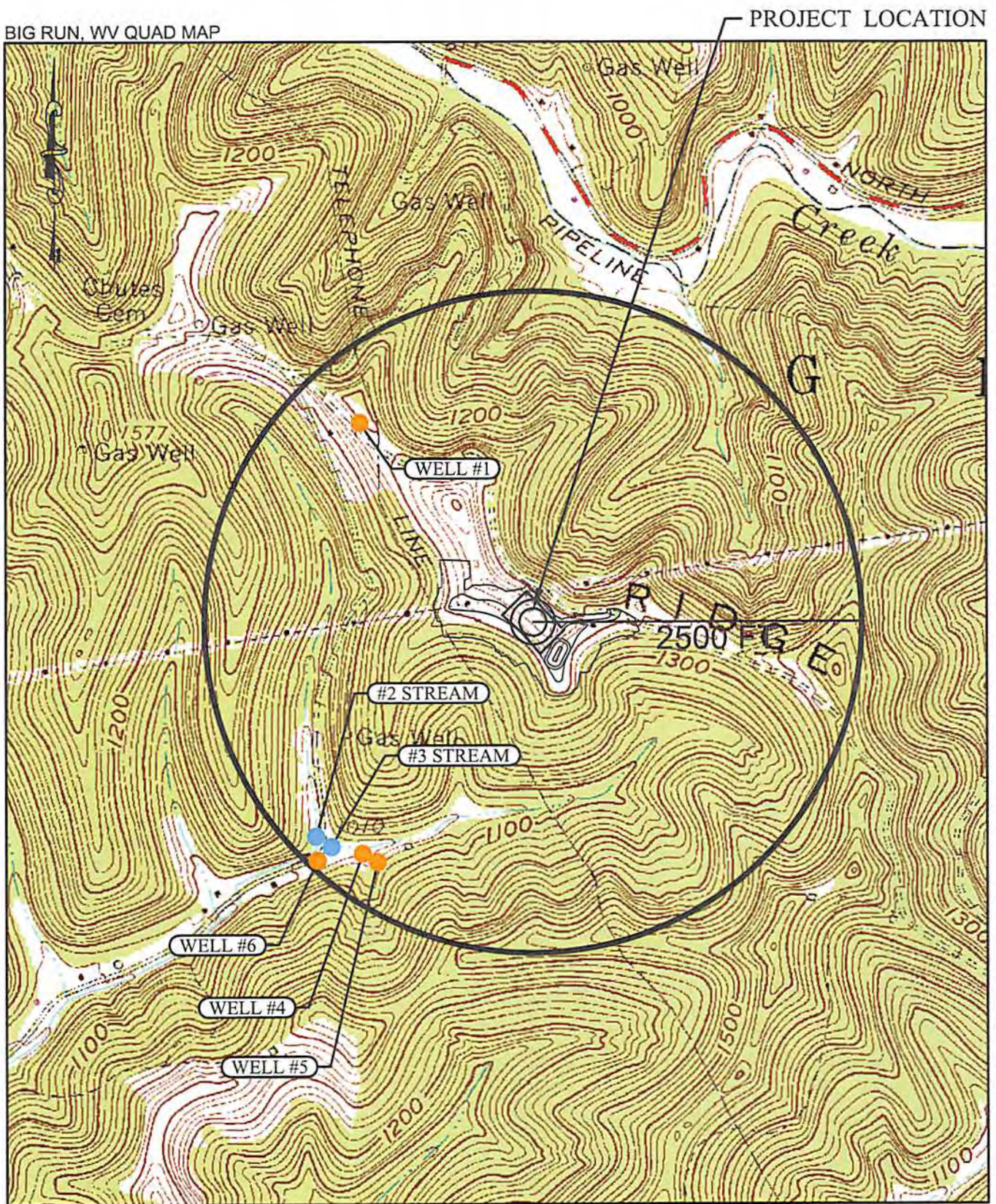
05/09/2014

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05-09-2014

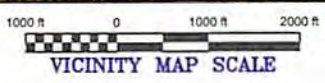
Plant spotted ✓

47 10 30 29 80

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



- EXISTING WELL
- EXISTING STREAM



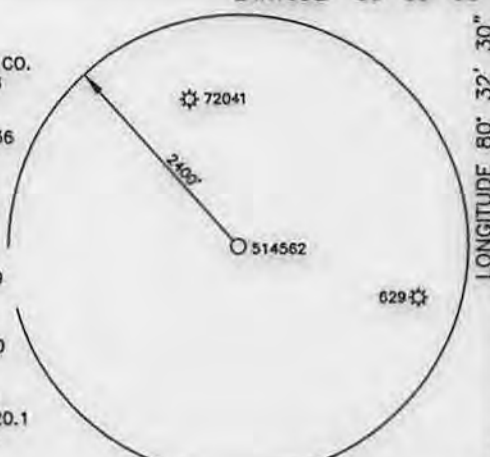
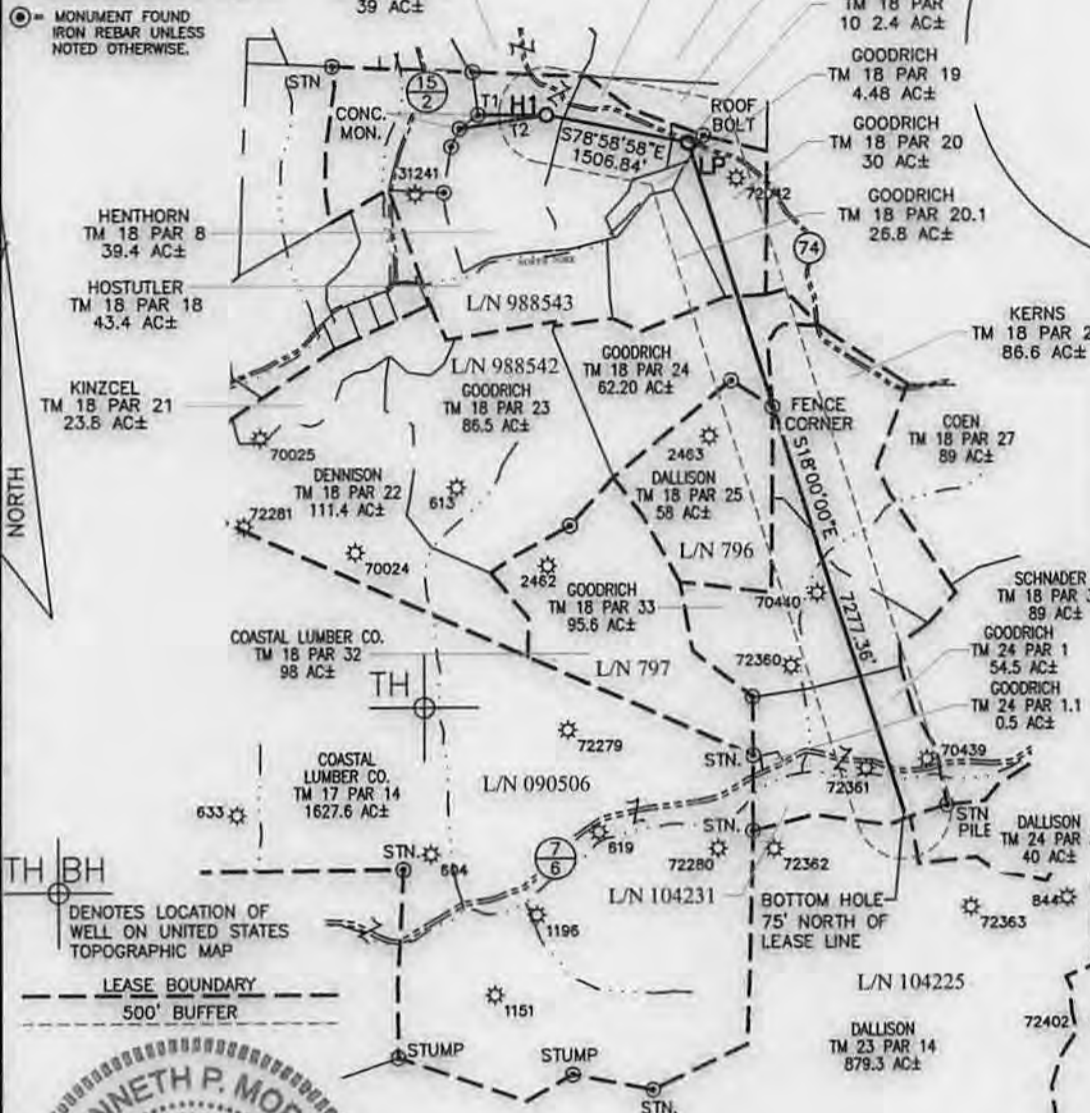
RECEIVED 05/09/2014
Office of Oil and Gas

FEB 24 2014

WV Department of
Environmental Protection

EQT WELL NO. 514562

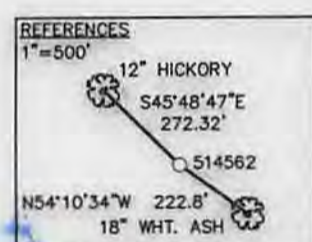
NOTES:
 -PLAT ORIENTATION, CORNERS, AND WELL REFERENCES ARE BASED UPON THE GRID NORTH MERIDIAN FOR THE WV STATE PLANE COORDINATE SYSTEM, NORTH ZONE NAD 27. WELL LOCATION REFERENCE TIES ARE BASED UPON THE MAGNETIC MERIDIAN.
 -THERE ARE NO (O) WATER WELL(S) LOCATED WITHIN 250' OF WELL H1.
 -THERE ARE NO (O) STRUCTURE(S) LOCATED WITHIN 625' OF WELL H1.
 ○ = MONUMENT FOUND IRON REBAR UNLESS NOTED OTHERWISE.



WELL 514562 TOP HOLE STATE PLANE COORDINATES (NAD 27 NORTH ZONE)
 N:386677.150
 E:1695439.735
 LAT:39.556711
 LON:80.580004
UTM COORDINATES (NAD 83-METER)
 N:4378642.535
 E:536081.507

WELL 514562 LAUNCH POINT STATE PLANE COORDINATES (NAD 27 NORTH ZONE)
 N:386389.150
 E:1696918.785
 LAT:39.555969
 LON:80.574747
UTM COORDINATES (NAD 83-METER)
 N:4378562.326
 E:536533.583

WELL 514562 BOTTOM HOLE STATE PLANE COORDINATES (NAD 27 NORTH ZONE)
 N:379467.967
 E:1699167.857
 LAT:39.537042
 LON:80.566480
UTM COORDINATES (NAD 83-METER)
 N:4376465.158
 E:537253.903



LINE	BEARING	DIST.
T1	S89°49'17"E	717.10'
T2	N81°05'07"E	459.40'

KENNETH P. MORAN P.S. 1333
 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 13, 2014
 OPERATOR'S WELL NO. 514562
 API WELL NO. 47 - 103 - 02980
 STATE COUNTY PERMIT

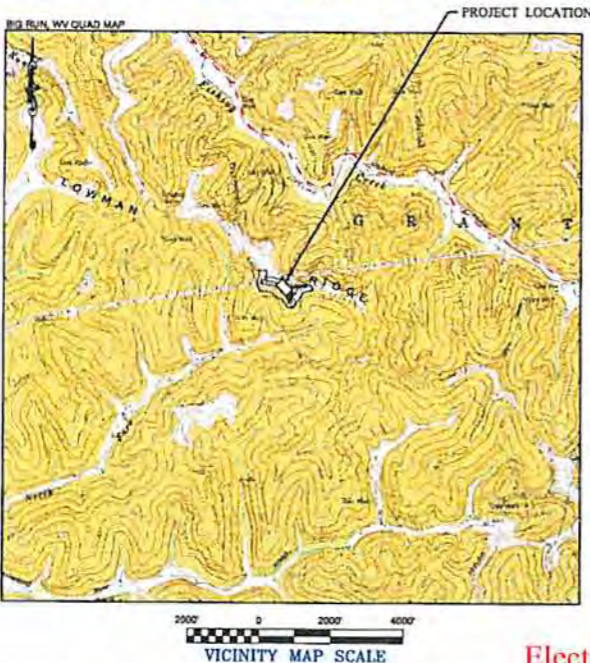
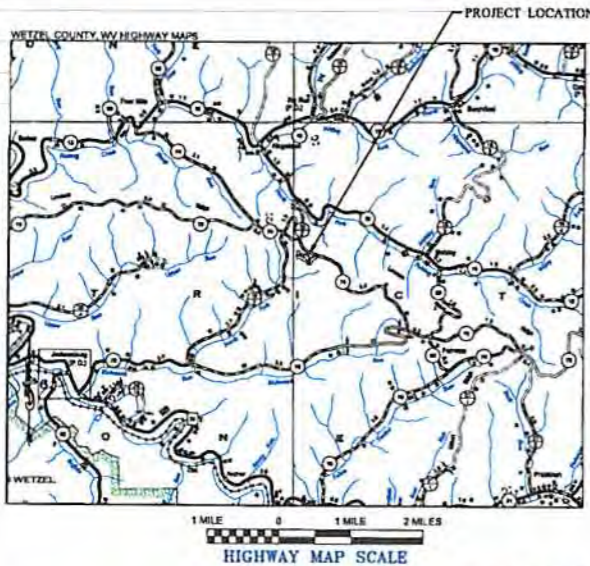
WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL (IF "GAS"), PRODUCTION STORAGE DEEP SHALLOW
LOCATION: ELEVATION: EG: 1,475.5' PROP: 1,442.90' WATER SHED: NORTH FORK OF FISHING CREEK
 DISTRICT: GRANT COUNTY: WETZEL
 QUADRANGLE: BIG RUN ACREAGE: 39.4 AC±
 SURFACE OWNER: DENCIL HENTHORN ET AL LEASE ACREAGE: 406.90 AC±
 OIL & GAS ROYALTY OWNER: SHIBEN ESTATE, INC., CNX GAS CO., LLC LEASE NO. 988543/988542/104231
PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE
 PERFORATE NEW FORMATION PLUG OFF OLD FORMATION OTHER PHYSICAL CHANGE IN WELL (SPECIFY) _____



PLUG AND ABANDON _____ CLEAN OUT AND REPLUG _____
 TARGET FORMATION: GENESEO ESTIMATED DEPTH: TVD/MD

WELL OPERATOR: EQT PRODUCTION DESIGNATED AGENT: REX C. RAY
 ADDRESS: 115 PROFESSIONAL PLACE ADDRESS: 115 PROFESSIONAL PLACE
 BRIDGEPORT, WV 26330 BRIDGEPORT, WV 26330

CAD FILE: R:\030-2259 EQT BIG367 Well Pad and Access Rd\Survey\030-2259 BIG 367 -EQT 2000.dwg
 PLOT DATE/TIME: 1/11/2014 - 11:07am
 LAYOUT: H1
 USER: kpoth



ACCESS ROAD BEGINNING
WV83-N Northing: 386776.5902 ft.
WV83-N Easting: 1664875.3261 ft.
LAT: N 39.556904°, 39°33'24.85"
LONG: W 80.577613°, 80°34'39.41"
UTM83-17 Northing: 4378664.971 m.
UTM83-17 Easting: 536286.813 m.

WELL PAD CENTER
WV83-N Northing: 386476.6598 ft.
WV83-N Easting: 1664037.0841 ft.
LAT: N 39.556609°, 39°33'23.79"
LONG: W 80.579873°, 80°34'47.54"
UTM83-17 Northing: 4378631.280 m.
UTM83-17 Easting: 536092.875 m.

FLOWBACK PIT CENTER
WV83-N Northing: 386437.5161 ft.
WV83-N Easting: 1664223.3159 ft.
LAT: N 39.555959°, 39°33'21.45"
LONG: W 80.579202°, 80°34'45.13"
UTM83-17 Northing: 4378559.401 m.
UTM83-17 Easting: 536150.827 m.

EQT PRODUCTION CONSTRUCTION PLANS FOR BIG367H1, BIG367H2, BIG367H3, BIG367H4, BIG367H5, BIG367H6, BIG367H7, & BIG367H8 WELL PAD & ACCESS ROAD

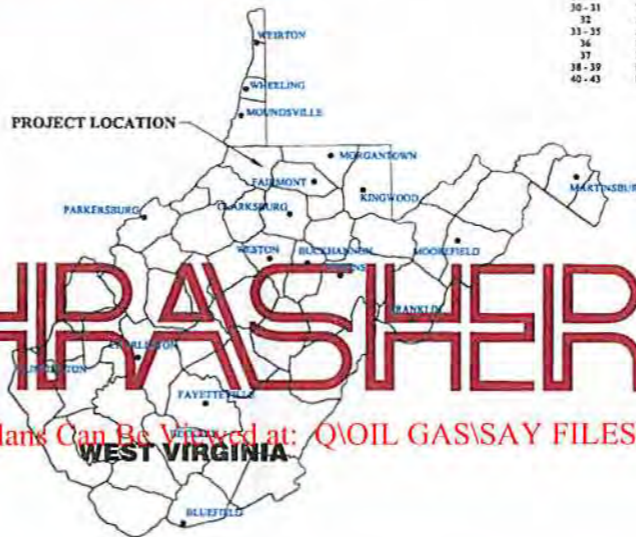
APPROVED
WVDEP OOG
SAY 11/6/2013

WETZEL COUNTY, WV SEPTEMBER 2013

- API#10302937
- API#10302938
- API#10302939
- API#10302940
- API#10302941
- API#10302942
- API#10302943

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7	FLOWBACK FIT AND STAGING AREA LAYOUT
8	WELL PAD GEOMETRIC LAYOUT
9	TANK PAD & TOPSOIL STOCKPILE #1 LAYOUT
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40-43	DETAILS



APPROVED FOR PERMITS DATE: 9/5/13 BY: RM
 APPROVED FOR BID DATE: BY:
 APPROVED FOR CONSTRUCTION DATE: BY:

REVISION NUMBER	REVISED SHEETS	BY	DATE	DESCRIPTION

Borehole Name	WGS-84 Latitude	WGS-84 Longitude	WV83-N Northing	WV83-N Easting	WV27-NF Northing	WV27-NF Easting	UTM83-17 (Meter) Northing	UTM83-17 (Meter) Easting
BIG367H1	N 39 556721	W 80 548304	386625 757	1664014 208	386677 150	1665439 715	4378642 536	536081 507
BIG367H2	N 39 556681	W 80 579917	386679 017	1664024 890	386666 413	1665430 216	4378639 320	536084 795
BIG367H3	N 39 556652	W 80 579927	386664 302	1664031 171	386655 607	1665440 099	4378636 304	536088 023
BIG367H4	N 39 556623	W 80 579931	386653 577	1664043 453	386644 959	1665471 181	4378632 898	536091 250
BIG367H5	N 39 556594	W 80 579854	386642 847	1664056 131	386634 229	1665481 642	4378629 873	536094 498
BIG367H6	N 39 556565	W 80 579816	386632 116	1664066 616	386623 497	1665492 143	4378626 457	536097 746
BIG367H7	N 39 556536	W 80 579779	386621 386	1664077 098	386612 767	1665502 626	4378623 241	536100 994
BIG367H8	N 39 556507	W 80 579741	386610 658	1664087 579	386602 037	1665513 207	4378620 025	536104 242

Electronic Version of Plans Can Be Viewed at: Q:\OIL GAS\SAY FILES\REVIEWS

EQT Where energy meets innovation.

PHONE (304) 624-4108 **THRASHER** (FAX) (304) 624-7831
 THE THRASHER GROUP, INC.
 30 COLUMBIA BOULEVARD - CLARKSBURG, WV 26301

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