



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

June 11, 2015

EQT PRODUCTION COMPANY
120 PROFESSIONAL PLACE
BRIDGEPORT, WV 26330

Re: Permit Modification Approval for API Number 10303036, Well #: 514419

Extend 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,

A handwritten signature in blue ink that reads "Gene Smith".

Gene Smith
Assistant Chief of Permitting
Office of Oil and Gas

Promoting a healthy environment.

06/12/2015



May 12, 2015

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

Re: Modification to 47-10303037, 47-10303036

Dear Mr. Smith,

Enclosed is a new WW-6B, schematics, WW-6A1, Rec plan and mylar plat for the above API #, signed by the inspector. EQT is requesting to modify the lateral length of this 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-WV

Enc.

Received
Office of Oil & Gas
JUN 04 2015

WW - 6B
(4/15)

API NO. 47 - 103 -
OPERATOR WELL NO. 514419
Well Pad Name: BIG333

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator: EQT Production Company
Operator ID: 306686 County: 103 District: 4 Quadrangle: 254

2) Operator's Well Number: 514419 Well Pad Name: BIG333

3) Farm Name/Surface Owner: Alex Hart et al Public Road Access: CR 20

4) Elevation, current ground: 1,452.0 Elevation, proposed post-construction: 1,452.0

5) Well Type: (a) Gas Oil Underground Storage
Other _____

(b) If Gas: Shallow Deep
Horizontal

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6) Existing Pad? Yes or No: yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
Target formation is Marcellus at a depth of 7635 with the anticipated thickness to be 51 feet and anticipated target pressure of 4831 PSI

8) Proposed Total Vertical Depth: 7,635

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 15,373

11) Proposed Horizontal Leg Length: 7,303

12) Approximate Fresh Water Strata Depths: 581, 753

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

14) Approximate Saltwater Depths: 2257, 2370, 2657

15) Approximate Coal Seam Depths: 743, 883, 919, 1011, 1240, 1333

16) Approximate Depth to Possible Void (coal mine, karst, other): None reported

17) 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: _____

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(4/15)

API NO. 47 - 103 -
OPERATOR WELL NO. 514419
Well Pad Name: BIG333

CASING AND TUBING PROGRAM

18)

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu.Ft.)
Conductor	26	New	Varies	Varies	80	80	98 C.T.S.
Fresh Water	13 3/8	New	MC-50	54	1,000	1,000	868 C.T.S.
Coal	12	-	-	-	-	-	-
Intermediate	9 5/8	New	MC-50	40	3,000	3,000	1,172 C.T.S.
Production	5 1/2	New	P-110	20	15,373	15,373	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							

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TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	26	30	0.5	-	18	Construction	1.18
Fresh Water	13 3/8	17 1/2	0.38	2,480	2184	* See Note 2	1.21
Coal							
Intermediate	9 5/8	12 3/8	0.395	3,590	3160	* See Note 2	1.21
Production	5 1/2	8 1/2	0.361	12,640	10112	-	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.

Note 2: Reference Variance 2014-17. (Attached)

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MOD

WW - 6B

API NO. 47 - 103 -

(10/14)

OPERATOR WELL NO. 514419

Well Pad Name: BIG333

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 6615.

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): No additional

22) Area to be disturbed for well pad only, less access road (acres): no additional

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 % Calcium Carbonate. Acid solubility.

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

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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.

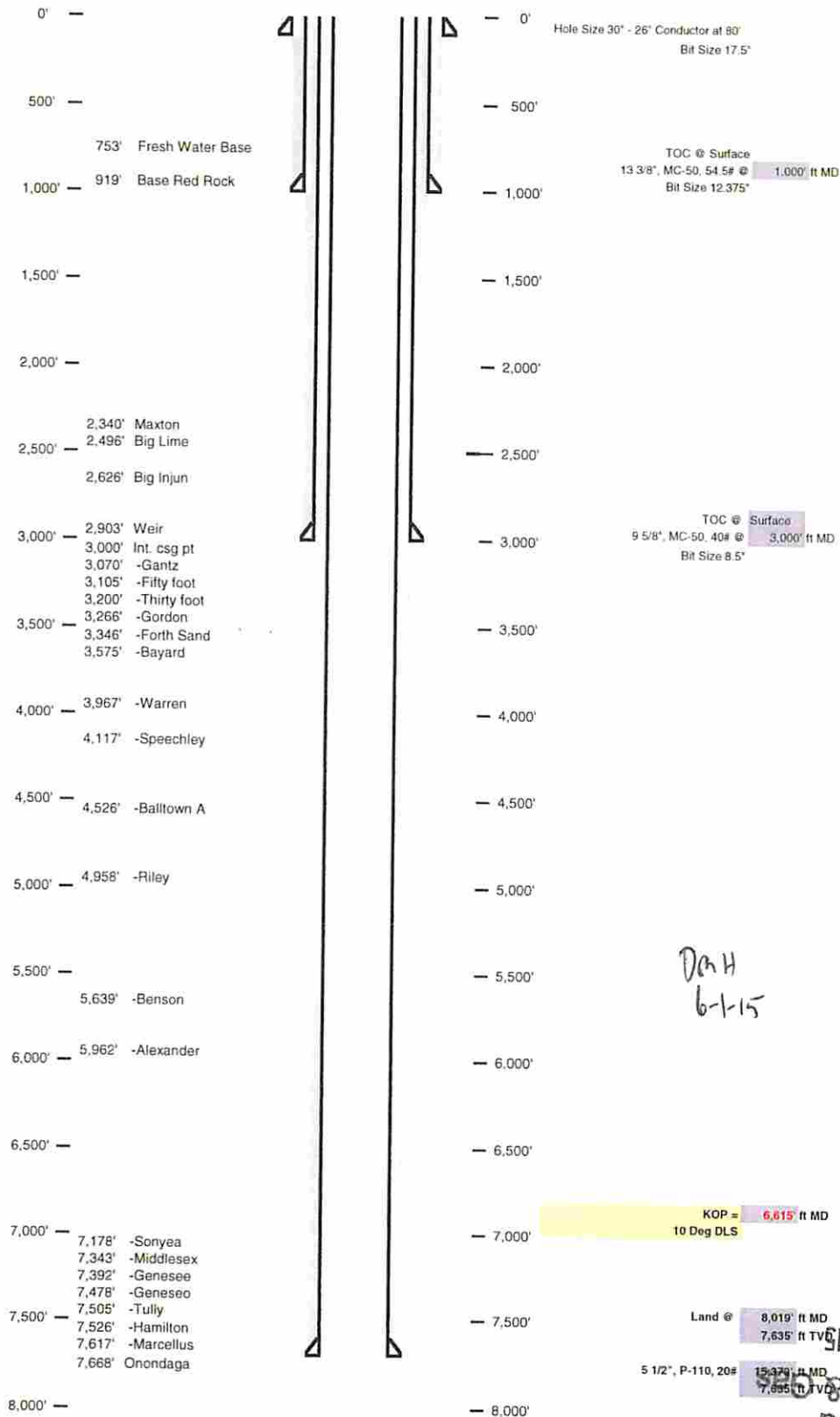
*Note: Attach additional sheets as needed.

Received Office of Oil & Gas JUN 04 2015

Well Schematic
EQT Production

Well Name: 514419 (B/G333144)
County: Wetzell
State: West Virginia

Elevation KB: 1465
Target: Marcellus
Prospect: Marcellus
Azimuth: 343
Vertical Section: 7802



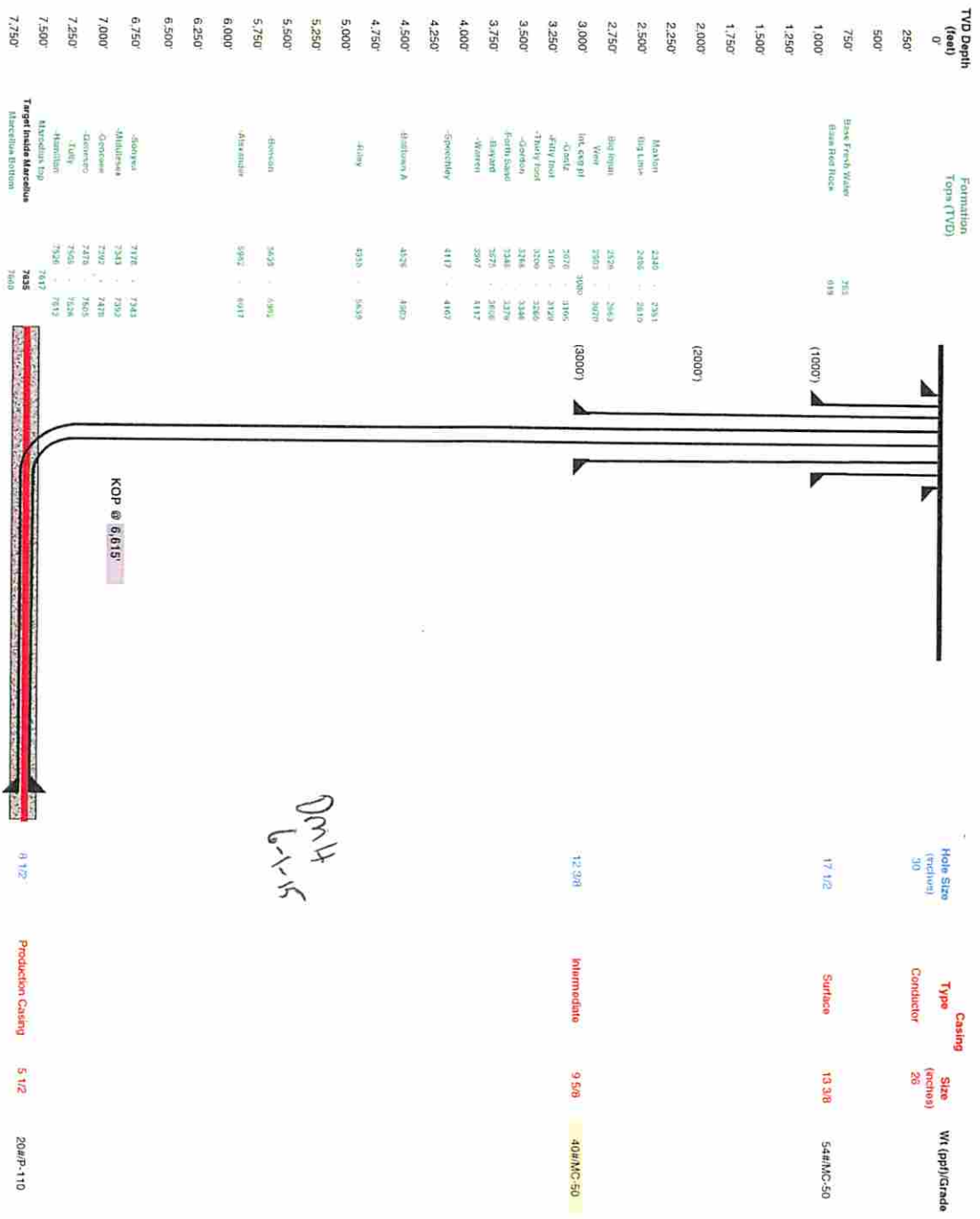
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JUN 04 2015

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Well 514419 (BIG333H4)
 EOT Production
 Big Run
 Weitzel
 West Virginia

Asmblh 343
 Vertical Section 7892



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 6,615'.
 Then kick off the horizontal log into the Marcellus using a slick water frac.

Land curve @ 7,695' H: TVD 7,695' H: MD
 8,019' H: MD
 Est. TD @ 7,695' H: TVD
 15,375' H: MD

Production Casing 5 1/2" 20#P-110

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**HART LEASE
BIG333 WELL NO.S
WV 514416 & WV 514419**

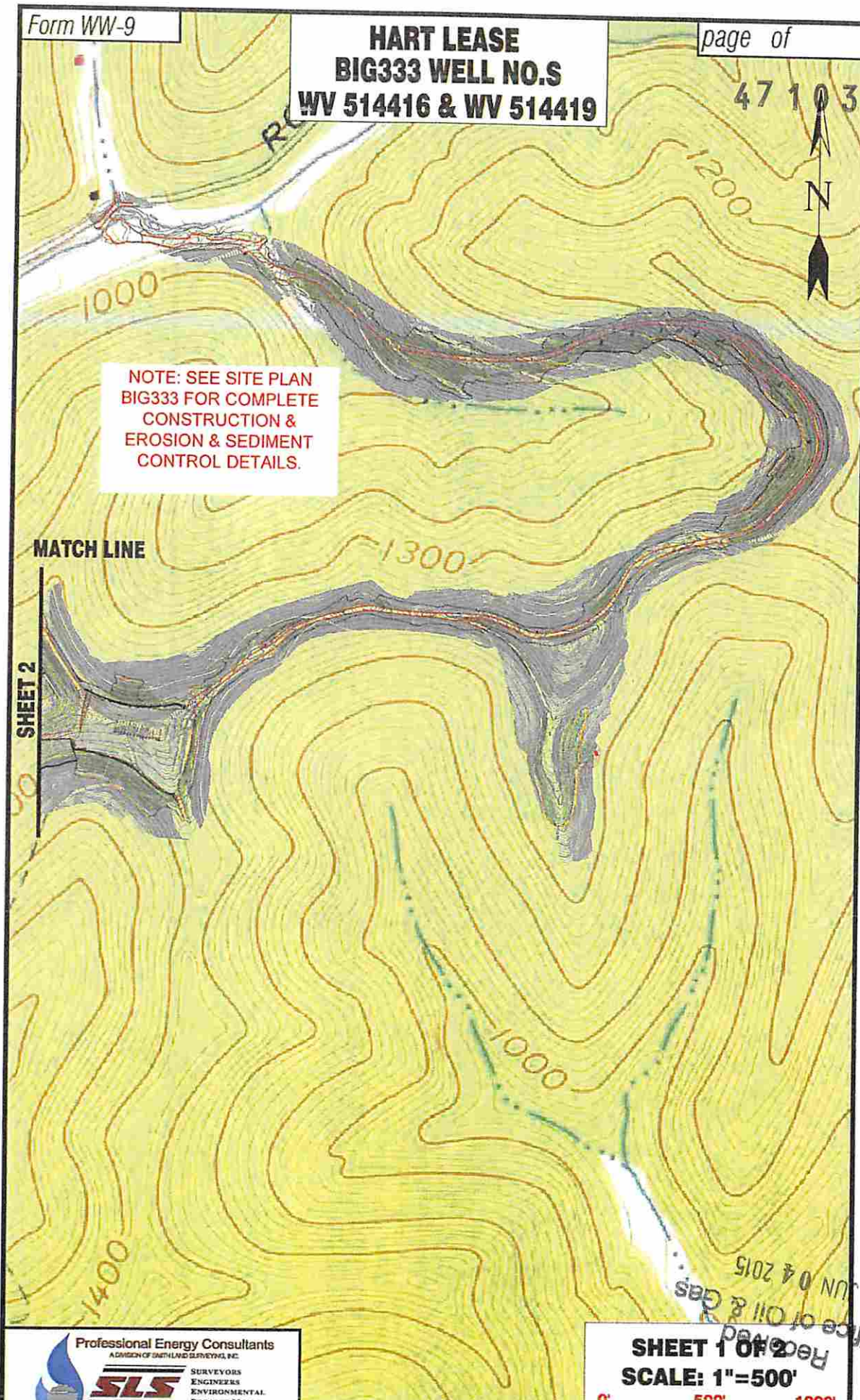
47 10 30 3036

MOD

**NOTE: SEE SITE PLAN
BIG333 FOR COMPLETE
CONSTRUCTION &
EROSION & SEDIMENT
CONTROL DETAILS.**

MATCH LINE

SHEET 2



Professional Energy Consultants
A DIVISION OF GATHLAND SURVEYING, INC.



SLS
SURVEYORS
ENGINEERS
ENVIRONMENTAL
PROJECT MGMT.

(304) 462-9854
WWW.SLSURVEYS.COM

DRAWN BY: K.D.W.	FILE NO. 7856	DATE 08-21-14	CADD FILE: 7856/PC/080333.dwg
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TOPO SECTIONS OF BIG RUN 7.5'
TOPO QUADRANGLE

SHEET 1 OF 2
SCALE: 1"=500'



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6-1-15

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HART LEASE BIG333 WELL NO.S WV 514416 & WV 514419

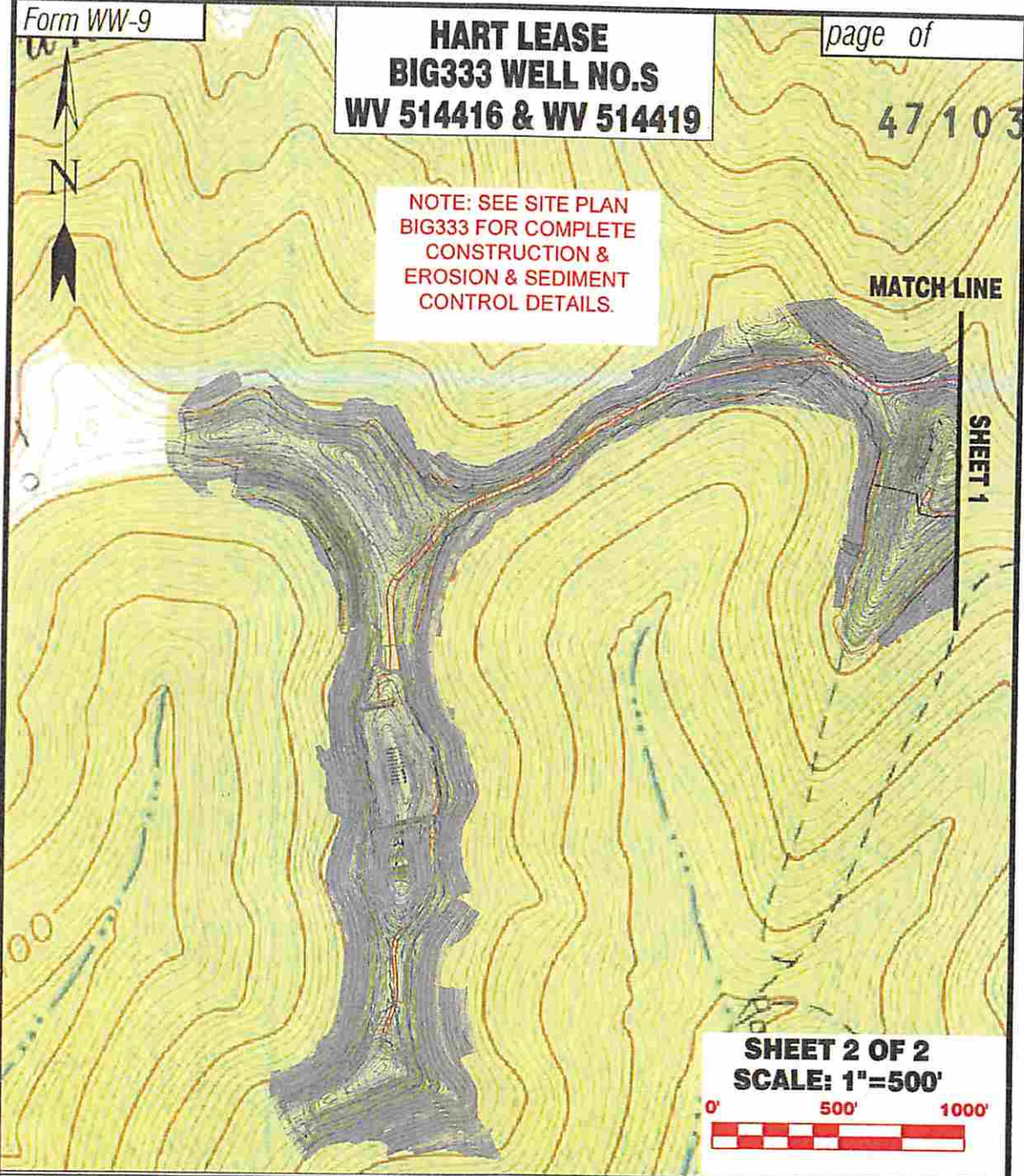
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MOD



NOTE: SEE SITE PLAN
BIG333 FOR COMPLETE
CONSTRUCTION &
EROSION & SEDIMENT
CONTROL DETAILS.

MATCH LINE

SHEET 1



SHEET 2 OF 2
SCALE: 1"=500'

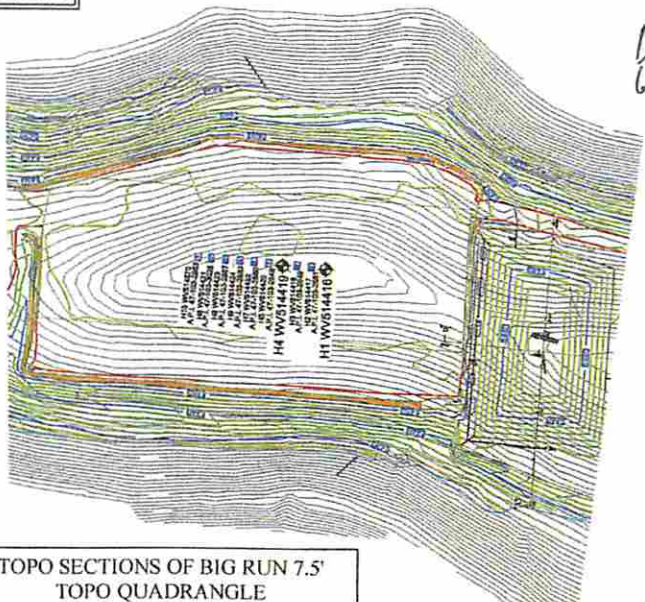


Detail Sketch for Proposed BIG333 Well No.s WV 514416 & WV 514419

NOTE: SEE SITE PLAN
BIG333 FOR COMPLETE
CONSTRUCTION &
EROSION & SEDIMENT
CONTROL DETAILS.



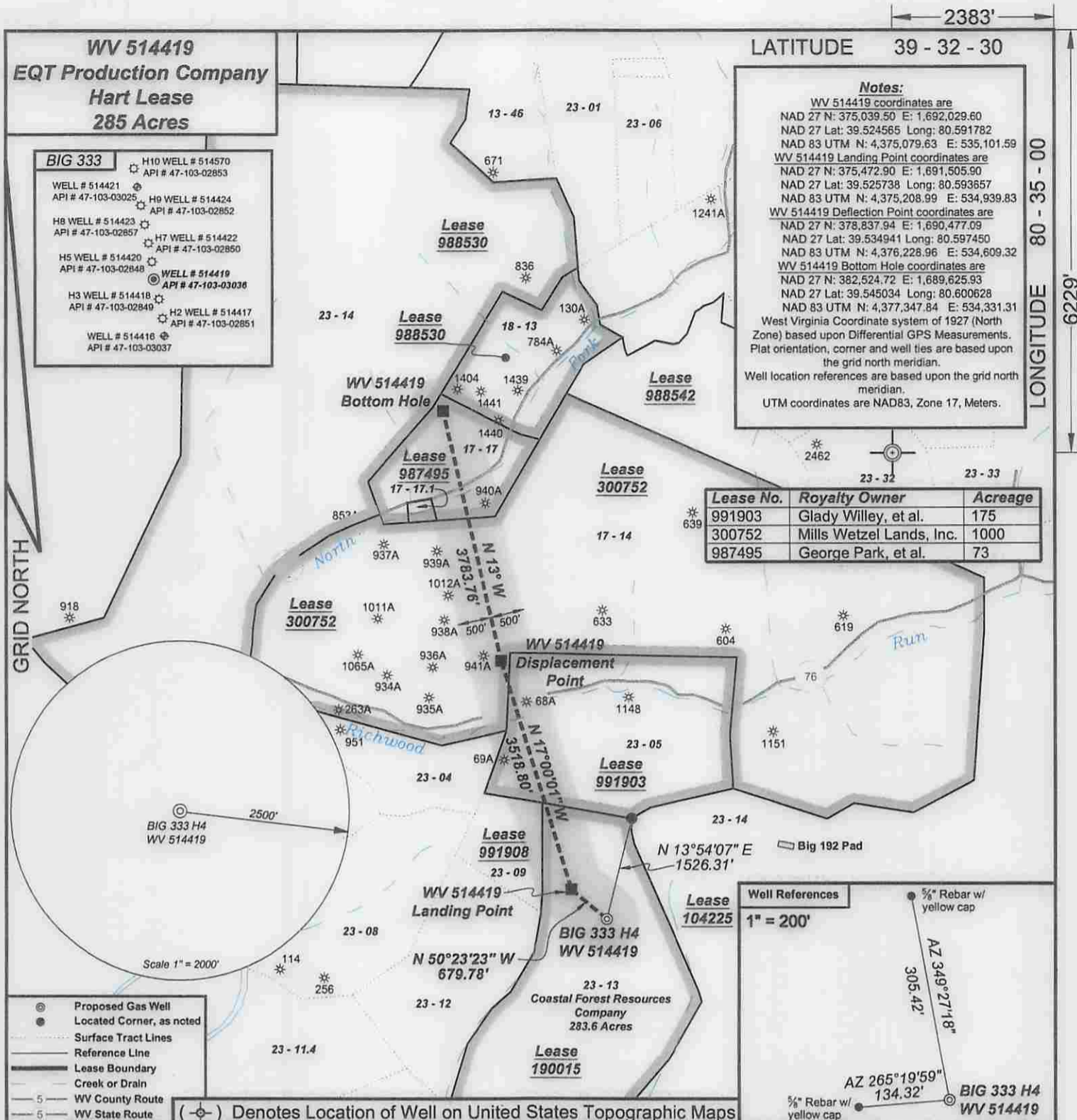
Not To Scale



DRAWN BY: K.D.W. FILE NO: 7856 DATE: 08-21-14 CADD FILE: 7856RECDG333.dwg

TOPO SECTIONS OF BIG RUN 7.5'
TOPO QUADRANGLE

06/12/2015



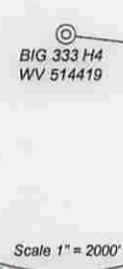
Notes:
 WV 514419 coordinates are
 NAD 27 N: 375,039.50 E: 1,692,029.60
 NAD 27 Lat: 39.524565 Long: 80.591782
 NAD 83 UTM N: 4,375,079.63 E: 535,101.59
 WV 514419 Landing Point coordinates are
 NAD 27 N: 375,472.90 E: 1,691,505.90
 NAD 27 Lat: 39.525738 Long: 80.593657
 NAD 83 UTM N: 4,375,208.99 E: 534,939.83
 WV 514419 Deflection Point coordinates are
 NAD 27 N: 378,837.94 E: 1,689,477.09
 NAD 27 Lat: 39.534941 Long: 80.597450
 NAD 83 UTM N: 4,376,228.96 E: 534,609.32
 WV 514419 Bottom Hole coordinates are
 NAD 27 N: 382,524.72 E: 1,689,625.93
 NAD 27 Lat: 39.545034 Long: 80.600628
 NAD 83 UTM N: 4,377,347.84 E: 534,331.31
 West Virginia Coordinate system of 1927 (North Zone) based upon Differential GPS Measurements. Plat orientation, corner and well ties are based upon the grid north meridian.
 Well location references are based upon the grid north meridian.
 UTM coordinates are NAD83, Zone 17, Meters.

Lease No.	Royalty Owner	Acreege
991903	Glady Willey, et al.	175
300752	Mills Wetzal Lands, Inc.	1000
987495	George Park, et al.	73

GRID NORTH

LATITUDE 39 - 32 - 30

LONGITUDE 80 - 35 - 00



Scale 1" = 2000'

- ⊙ Proposed Gas Well
- Located Corner, as noted
- Surface Tract Lines
- Reference Line
- Lease Boundary
- Creek or Drain
- 5 --- WV County Route
- 5 --- WV State Route

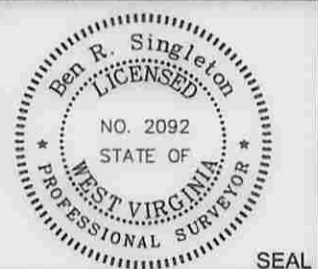
(⊙) Denotes Location of Well on United States Topographic Maps

Well References
 1" = 200'



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 Department of Environmental Protection.

Ben R. Singleton
 P.S. 2092



FILE NO: 33-15
 DRAWING NO: 33-15 BIG 333 H4
 SCALE: 1" = 2000'
 MINIMUM DEGREE OF ACCURACY: 1:2500
 PROVEN SOURCE OF ELEVATION: NGS CORS Station

STATE OF WEST VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL PROTECTION
 OIL AND GAS DIVISION

DATE: June 9 20 15
 OPERATOR'S WELL NO.: 514419
 API WELL NO
 47 - 103 - 03036 MOD
 STATE COUNTY PERMIT

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
 (IF GAS) PRODUCTION: STORAGE DEEP SHALLOW
 LOCATION: ELEVATION: As-Built - 1452' WATERSHED Aunty Run of South Fork Fishing Creek QUADRANGLE: Big Run
 DISTRICT: Grant COUNTY: Wetzel
 SURFACE OWNER: Coastal Forest Resources Co., d/b/a Coastal Timberlands Co.
 ROYALTY OWNER: Alex Hart, et al. LEASE NO: 190015 ACREAGE: 285±
 PROPOSED WORK: DRILL CONVERT DRILL DEEPER FRACTURE OR STIMULATE PLUG OFF OLD FORMATION
 PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL (SPECIFY)
 PLUG AND ABANDON CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus ESTIMATED DEPTH: TVD 6,602'

WELL OPERATOR: EQT Production Company DESIGNATED AGENT: Rex C. Ray
 ADDRESS: 115 Professional Place PO Box 280 ADDRESS: 115 Professional Place PO Box 280
 Bridgeport, WV 26330 Bridgeport, WV 26330

RECEIVED
 OFFICE OF ENVIRONMENTAL PROTECTION
 06/12/2015

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)**

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
Lease 190015			1/8 min pd	
	Alex Hart, et al	The Philadelphia Company of West Virginia		93/392
	The Philadelphia Company of West Virginia	Pittsburgh & West Virginia Gas Company		146/98
	Pittsburgh & West Virginia Gas Company	Equitable Gas Company		187/321
	Equitable Gas Company	Equitrans Inc.		71A/453
	Equitrans Inc.	EQT Production Company		192/19 Doddridge
Lease 991903			1/8 Min Pd	
	Ehnen Ray Wyatt, et al.	ALAMCO, Inc.		OG 57A/663
	ALAMCO, Inc.	Columbia Natural Resources, Inc.		DB 364/688
	Columbia Natural Resources, Inc.	Columbia Natural Resources, LLC		CB 12/624
	Columbia Natural Resources, LLC	Chesapeake Appalachia, LLC		DB 402/446
	Chesapeake Appalachia, LLC	EQT Production Company		OG 138A/374
Lease 300752			1/8 Min Pd	
	Mills-Wetzel Land, Inc.	Consolidated Gas Supply Corporation		LB 52A/421
	Consolidated Gas Supply Corporation	Consolidated Gas Transmission Corporation		LB 66A/69
	Consolidated Gas Transmission Corporation	Alamco Inc.		LB 70A/363
	Alamco Inc.	UMC Petroleum Corporation		LB 73A/656
	UMC Petroleum Corporation	Ashland Exploration Holdings, Inc.		LB 75A/170
	Ashland Exploration Holdings, Inc.	Blazer Energy Corporation		LB 77A/360
	Blazer Energy Corporation	Eastern States Oil and Gas		CB12/261
	Eastern States Oil and Gas Co.	EQT Production Co.		CB13/14
	Equitable Production Co.	EQT Production Company		CB13/14
Lease 987495			1/8 min pd	
	Alfred L. Arnett, et al.	EQT Production Company		LB 133A/124

Upon information and belief, Operator's lease and/or other real property rights permit it to conduct drilling operations for the subject well in the location shown on the plat, including under any public roads that the well lateral crosses.

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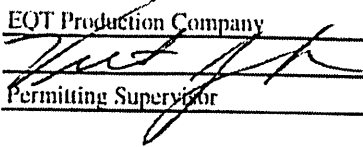
JUN - 9 2015

**Acknowledgement of Possible Permitting/Approval
In Addition to the Office of Oil and Gas**

The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, or nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

Well Operator: EQT Production Company
By: 
Its: Permitting Supervisor

Received

JUN - 9 2015

Office of Oil and Gas
WV Dept. of Environmental Protection