



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

December 29, 2015

EQT PRODUCTION COMPANY
120 PROFESSIONAL PLACE
BRIDGEPORT, WV 26330

Re: Permit Modification Approval for API Number 10303122, Well #: 513921

Extended Lateral to Lease Line

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
Assistant Chief of Permitting
Office of Oil and Gas

Promoting a healthy environment.

01/01/2016



December 29, 2015

Ms. Laura Adkins
West Virginia Department of Environmental Protection
Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304

Re: Modification of 47-103-03122

Dear Ms. Adkins,

Enclosed is an updated WW-6B, schematics, rec plan, and mylar plat. EQT would like to revise the length of the lateral. The top hole has not changed. There were no new leases added. This is the modification that Todd Klaner spoke with you about on 12/28/15.

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.

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	MC-50	77	40	40	49 C.T.S.
Fresh Water	13 3/8	New	J-55	54.5	974	974	847 C.T.S.
Coal	-	-	-	-	-	-	-
Intermediate	9 5/8	New	A-500	40	2,765	2,765	1,079 C.T.S.
Production	5 1/2	New	P-110	20	13,313	13,313	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 (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	0.312	-	18	Construction	1.18
Fresh Water	13 3/8	17 1/2	0.38	2,730	2184	* See Note 2	1.21
Coal							
Intermediate	9 5/8	12 3/8	0.395	3,950	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)

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 to go down to an approximate depth of 6851. 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 internal casing pressure is 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): 0.15

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.

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.

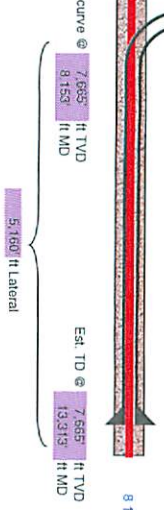
*Note: Attach additional sheets as needed.

Well 513921 (BIG192H17)
 EOT Production
 Big Run
 Watzel
 West Virginia

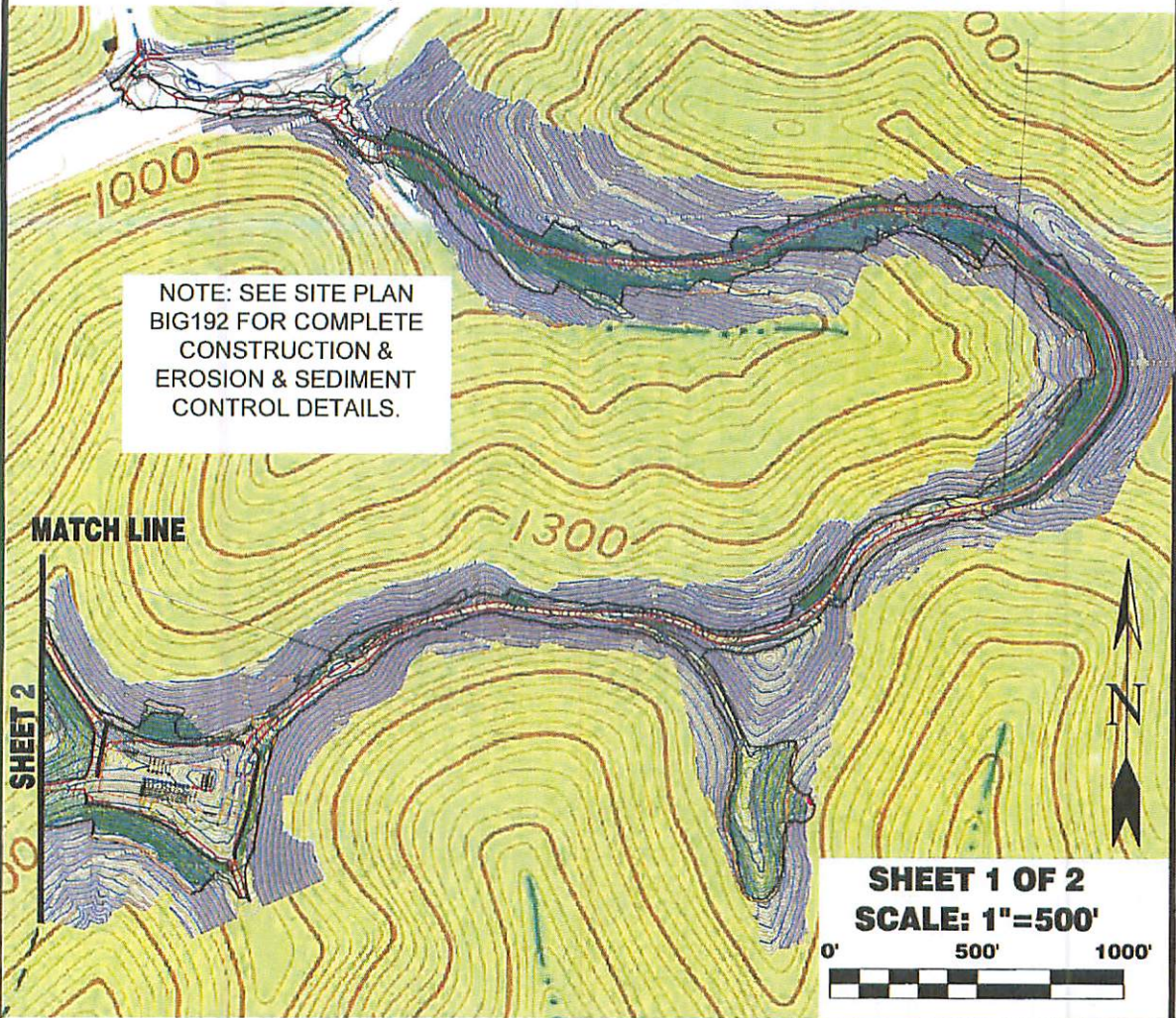
Admum 144.42
 Vertical Section 5155

TVD Depth (feet)	Formation Tops (TVD)	Hole Size (inches)	Casing Type	Casing Size (inches)	WT (ppf)/Grade
250'		30	Conductor	26	77#/MC-50
500'					
750'	Blaw Fresh Water Base Bed Rock	17 1/2	Surface	13 3/8	54.5#/J-55
1,000'					
1,250'					
1,500'					
1,750'					
2,000'					
2,250'					
2,500'	Maxton Big Lime Big Injun Int. cas pt Wet	12 3/8	Intermediate	9 5/8	40#/A-500
2,750'					
3,000'	-Gantz -Filly foot -Thirty foot -Gordon -Forth Sand -Bayard				
3,250'					
3,500'					
3,750'					
4,000'	-Wetran -Speckley				
4,250'					
4,500'	-Bathorn A				
4,750'					
5,000'	-Riley				
5,250'					
5,500'					
5,750'	-Benton -Alexander				
6,000'					
6,250'					
6,500'					
6,750'	-Scriva -Middlesex -Genesee -Gensico -Tully -Hamilton				
7,000'					
7,250'					
7,500'					
7,750'					

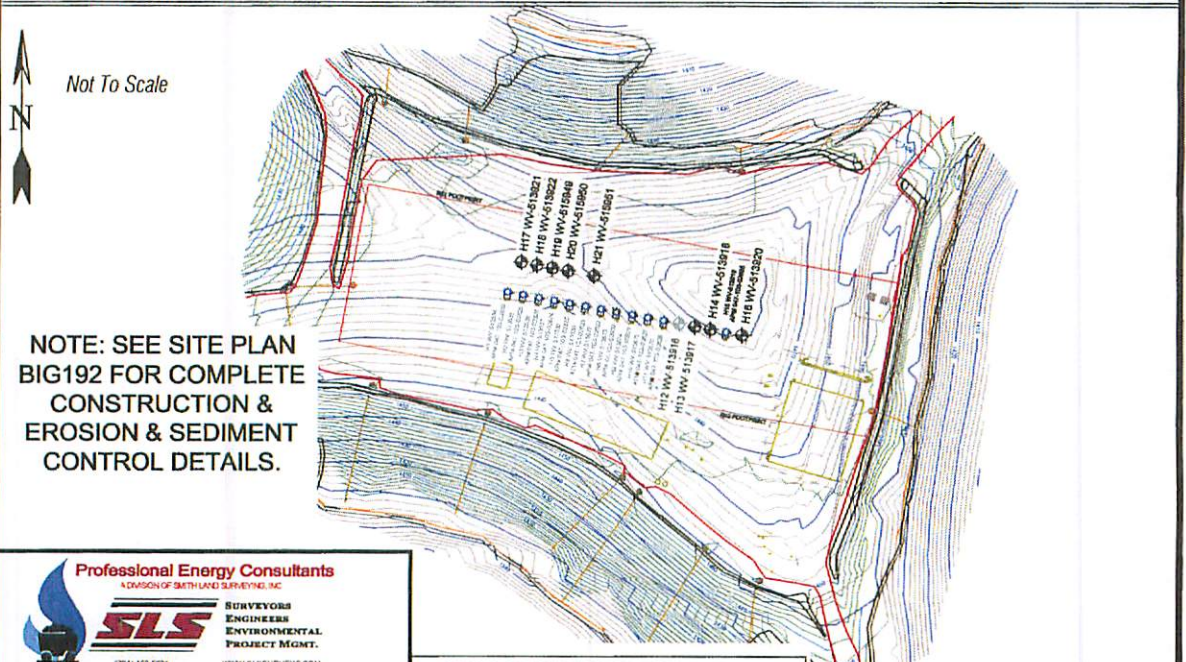
Proposed Well Work:
 Drill and complete a new horizontal well in the Marcellus formation.
 The vertical drill to go down to an approximate depth of 6851'.
 Then kick off the horizontal leg into the Marcellus using a slick water frac.



BIG192 WELL NO.S WV 513916, WV 513917, WV 513918, WV 513920, WV 513921, WV 513922, WV 515949, WV 515950 & WV 515951



Detail Sketch for Proposed BIG192 Well No.s WV 513916, WV 513917, WV 513918, WV 513920, WV 513921, WV 513922, WV 515949, WV 515950 & WV 515951



Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYING, INC.

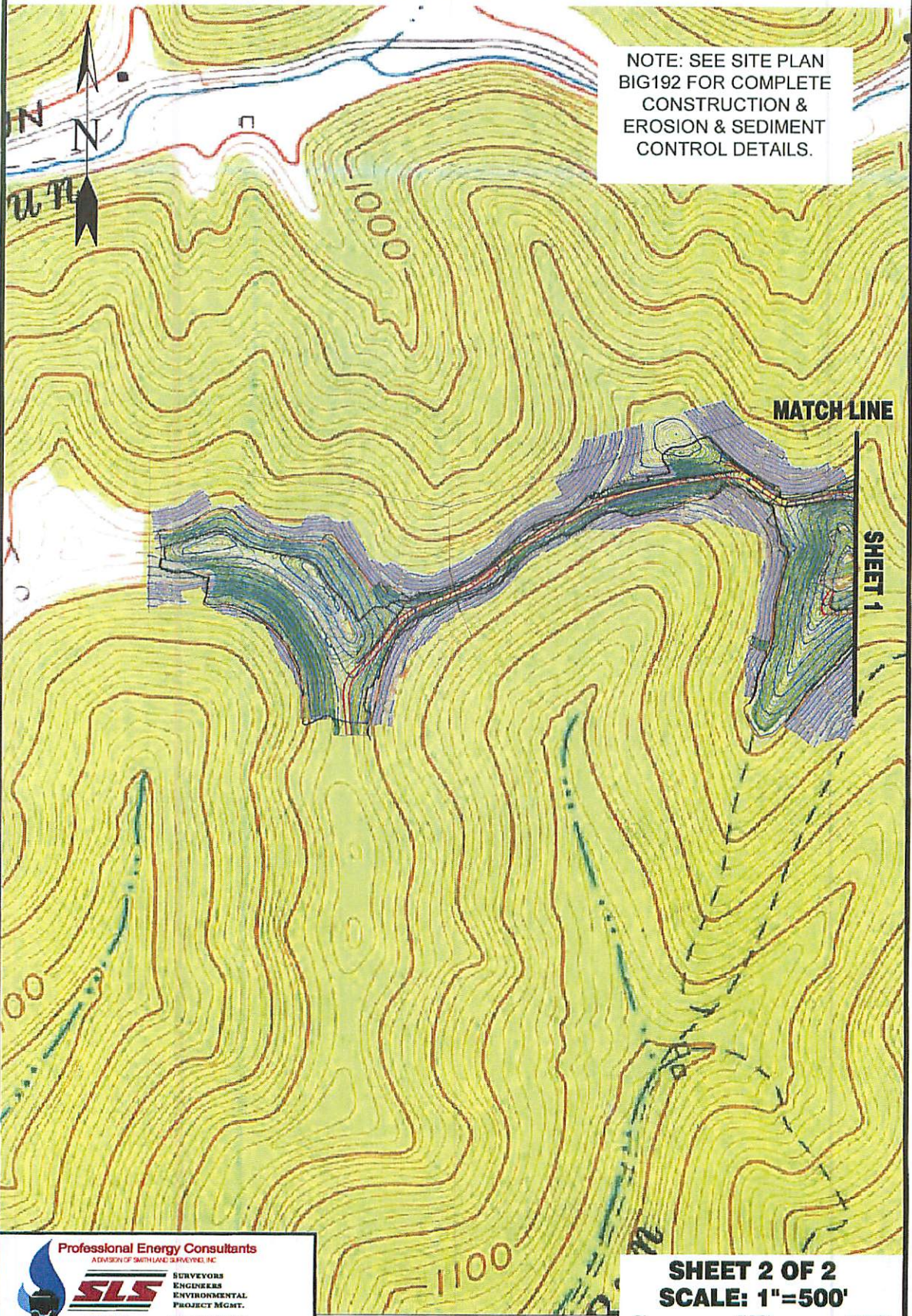
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ENVIRONMENTAL
PROJECT MGMT.

(304) 462-9234
WWW.SLSURVEYS.COM

DRAWN BY K.D.W.	FILE NO. 7797	DATE 02-24-15	CADD FILE: 7797REC01912L.dwg
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TOPO SECTIONS OF BIG RUN 7.5' TOPO QUADRANGLE

BIG192 WELL NO.S WV 513916, WV 513917, WV 513918, WV 513920, WV 513921, WV 513922, WV 515949, WV 515950 & WV 515951



NOTE: SEE SITE PLAN BIG192 FOR COMPLETE CONSTRUCTION & EROSION & SEDIMENT CONTROL DETAILS.

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13841 452 5634 WWW.SLSURVEYS.COM

DRAWN BY K.D.W.	FILE NO. 7797	DATE 02-24-15	CADD FILE: 7797REC031929L.dwg
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TOPO SECTIONS OF BIG RUN 7.5'
TOPO QUADRANGLE

SHEET 2 OF 2
SCALE: 1"=500'



0' 500' 1000'



December 29, 2015

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

Re: Modification of 47-103-03122

Dear Mr. Smith,

Upon information and belief, Operator's (EQT) lease and/or other real property rights permit it to conduct drilling operations for the subject well in the location shown on the plat dated 12/28/15, including under any public roads that the well lateral crosses.

Sincerely,

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

Vicki Roark
Permitting Supervisor-WV

Enc.

LEGEND

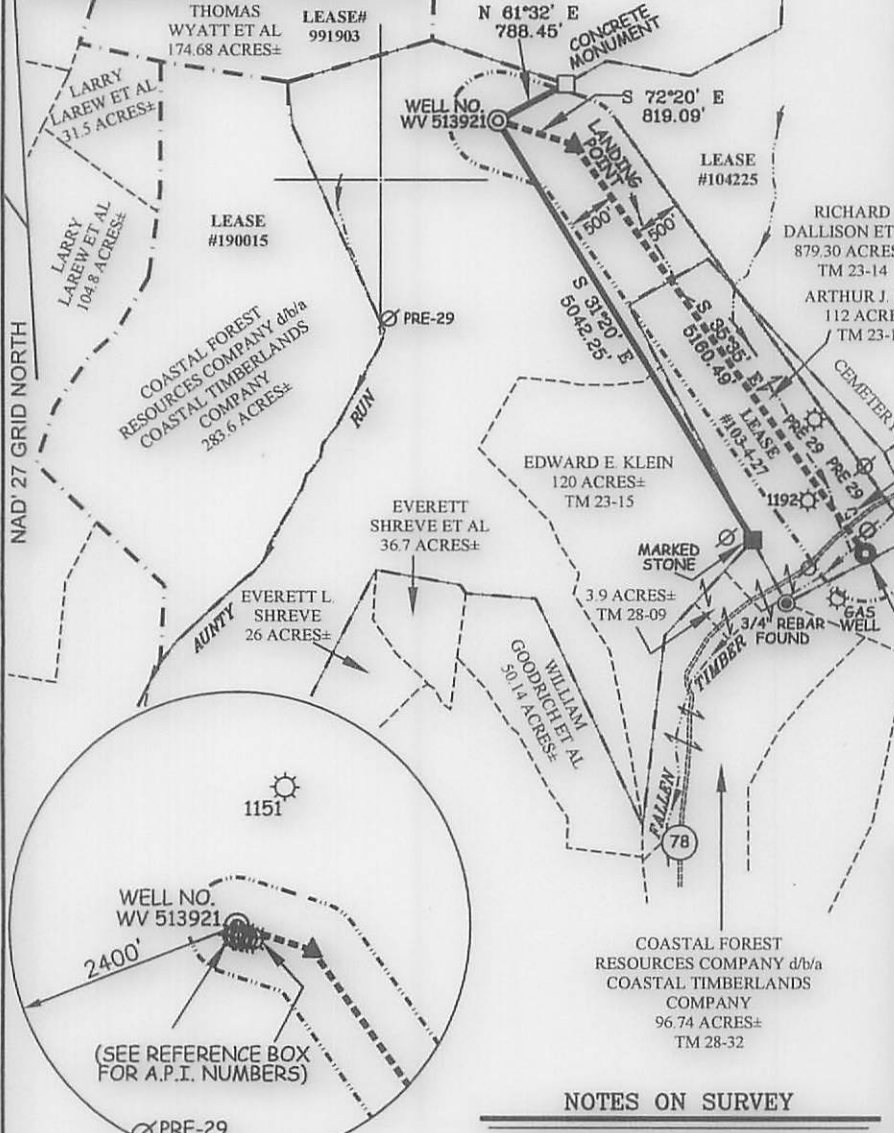
LEASE LINE	---
SURFACE LINE	----
WELL LATERAL	- - - -
OFFSET LINE	----
TIE LINE	----
CREEK	~~~~~
ROAD	====
COUNTY ROUTE	====
PROPOSED WELL	⊙
PLUGGED WELL	⊙
EXISTING WELL	⊙
TAX MAP-PARCEL	00-00

COASTAL FOREST RESOURCES COMPANY d/b/a COASTAL TIMBERLANDS COMPANY
1,627.6 ACRES±
TM 17-14

**EQT PRODUCTION COMPANY
ROBINSON LEASE
1,100 ACRES±
WELL NO. WV 513921**

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)

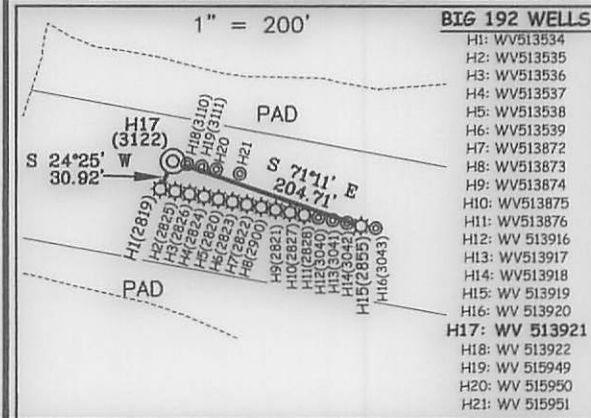
NAD'27 S.P.C.(FT)	N. 376,142.08	E. 1,694,574.82
NAD'27 GEO.	LAT-(N) 39.527677	LONG-(W) 80.582807
NAD'83 UTM (M)	N. 4,375,428.50	E. 535,871.43
LANDING POINT		
NAD'27 S.P.C.(FT)	N. 375,893.44	E. 1,695,355.26
NAD'27 GEO.	LAT-(N) 39.527020	LONG-(W) 80.580030
NAD'83 UTM (M)	N. 4,375,356.72	E. 536,110.47
BOTTOM HOLE		
NAD'27 S.P.C.(FT)	N. 371,696.62	E. 1,698,358.14
NAD'27 GEO.	LAT-(N) 39.515597	LONG-(W) 80.569208
NAD'83 UTM (M)	N. 4,374,093.40	E. 537,046.622



ROYALTY OWNERS

VIRGINIA A. ICE ET AL	110 AC±	LEASE NO. 103-4-27
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REFERENCES



NOTES ON SURVEY

1. NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS ≥ 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.

Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYING, INC.
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SURVEYORS
ENGINEERS
ENVIRONMENTAL
PROJECT MGMT.
D(041) 462-6434
WWW.SLSSURVEYS.COM

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. 849 *C. Victor Moyers*



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
DATE MAY 05, 20 15
REVISED 07/21/15 & 12/28/15
OPERATORS WELL NO. WV 513921
API WELL NO. 47 - 103 - 03122 MOD
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 200 FILE NO. 7797P513921R2
HORIZONTAL & VERTICAL CONTROL DETERMINED BY 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 1,452' (PAD ELEVATION) WATERSHED AUNTY RUN OF SOUTH FORK FISHING CREEK
DISTRICT GRANT COUNTY WETZEL QUADRANGLE BIG RUN 7.5'

SURFACE OWNER RICHARD DALLISON ET AL ACREAGE 879.30±
ROYALTY OWNER ED BROOME, INC ET AL ACREAGE 1,100± LEASE NO. 104225

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 TVD 7,631'

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

LATITUDE 39°35'30"

WELL NO. WV 21321
1,100 ACRES ±
ROBINSON LEASE
EQT PRODUCTION COMPANY

(2 P.C. NORTH ZONE) (TUM) ZONE 17 NORTH)
 NAD 83 UTM (M) N. 432,428.50 E. 282,871.43
 NAD 83 GEO. LAT (N) 39.527777 LONG (W) 80.882807
 NAD 83 UTM (M) N. 372,883.44 E. 1,662,322.58
 NAD 83 GEO. LAT (N) 39.527020 LONG (W) 80.880030
 NAD 83 UTM (M) N. 432,326.72 E. 282,110.47
 NAD 83 GEO. LAT (N) 39.527020 LONG (W) 80.880030
 NAD 83 UTM (M) N. 371,888.62 E. 1,668,322.14
 NAD 83 GEO. LAT (N) 39.515292 LONG (W) 80.892508
 NAD 83 UTM (M) N. 432,409.40 E. 282,048.622

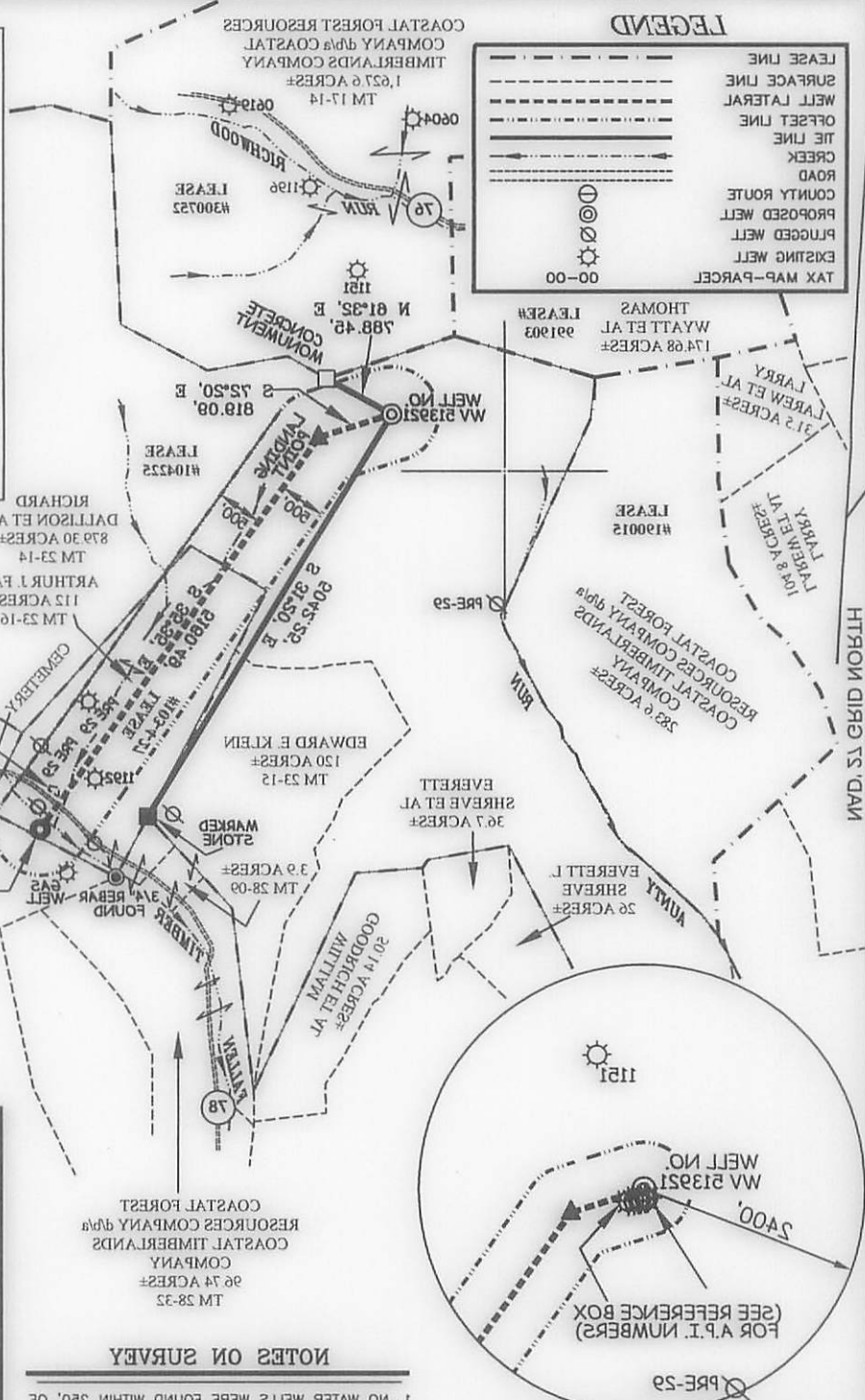
BOTTOM HOLE
 NAD 83 UTM (M) N. 371,888.62 E. 1,668,322.14
 NAD 83 GEO. LAT (N) 39.515292 LONG (W) 80.892508

LANDING POINT
 NAD 83 UTM (M) N. 372,883.44 E. 1,662,322.58
 NAD 83 GEO. LAT (N) 39.527020 LONG (W) 80.880030

LONGITUDE 80°35'30"

LEGEND

- LEASE LINE
- SURFACE LINE
- WELL LATERAL
- OFFSET LINE
- THE LINE
- CREEK
- ROAD
- COUNTY ROUTE
- PROPOSED WELL
- PLUGGED WELL
- EXISTING WELL
- TAX MAP-PARCEL



ROYALTY OWNERS

VIRGINIA A. ICE ET AL	110 AC ±	LEASE NO. 103-4-21
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REFERENCES

BIG 125 WELLS

1" = 200'

H17: WV 21321
 H16: WV 21320
 H15: WV 21319
 H14: WV 21318
 H13: WV 21317
 H12: WV 21316
 H11: WV 21315
 H10: WV 21314
 H9: WV 21313
 H8: WV 21312
 H7: WV 21311
 H6: WV 21310
 H5: WV 21309
 H4: WV 21308
 H3: WV 21307
 H2: WV 21306
 H1: WV 21305

NOTES ON SURVEY

1. NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS ≤ 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 825' OF THE CENTER OF PROPOSED WELL PAD.

Professional Energy Consultants
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 (304) 483-8824
 WWW.PECONSULTANTS.COM

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
 DATE MAY 08
 REVISED 07/21/12 & 12/28/12
 OPERATORS WELL NO. WV 21321
 API NO. 47
 STATE WV
 COUNTY BRIDGEPORT
 PERMIT HVA 103-03192



I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAN 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. 849
 C. Victor Moyers

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

MINIMUM DEGREE OF ACCURACY 1:200
 SCALE 1" = 2000'
 HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK)

WELL: OIL GAS LIQUID WASTE IF STORAGE DEEP SHALLOW

TYPE: OIL GAS LIQUID WASTE

LOCATION: ELEVATION 1452' (PAD ELEVATION) WATERSHED AUNTY RUN OF SOUTH FORK FISHING CREEK

DISTRICT GRANT COUNTY WETZEL QUADRANGLE BIG RUN 7.5' ACREAGE 879.30± ACREAGE 1,100± LEASE NO. 104225

SURFACE OWNER RICHARD DALLISON ET AL
 ROYALTY OWNER ED BROOME, INC ET AL

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 TVD 7,631'

WELL OPERATOR: EQT PRODUCTION COMPANY
 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330

DESIGNATED AGENT: REX C. RAY
 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330

6107/07/10

Adkins, Laura L

From: Adkins, Laura L
Sent: Tuesday, December 29, 2015 2:51 PM
To: 'Roark, Vicki'
Subject: 103-03122 Modification

Vicki,

Looks like the only thing I need for this modification approval is a letter or a 6A1 stating that you have rights to the minerals under the road. The original permit didn't include the lateral drilling beneath the road.

Thank you,

Laura

Laura L. Adkins

Environmental Resource Specialist III
Permit Review
WVDEP Office of Oil and Gas
601 57th Street, SE
Charleston, WV 25304
304-926-0499 ext. 1495