



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 17, 2013

EQT PRODUCTION COMPANY
POST OFFICE BOX 280
BRIDGEPORT, WV 26330

Re: Permit Modification Approval for API Number 10302734, Well #: 513925 EQT PRODUCTIC
move and extend horizontal leg

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



October 30, 2013

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

Re: Modification of 47-10302734

Dear Mr. Smith,

Attached is a modification to the above well. The top hole has NOT changed from the original application however, we have moved the horizontal leg and extended it. I am enclosing a new WW-6B, WW-6A1, well schematics and a mylar plat.

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

Sincerely,

A handwritten signature in black ink, appearing to read 'Vicki Roark', written over a light blue horizontal line.

Vicki Roark
Permitting Supervisor-WV

Enc.

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OCT 31 2013

WV Department of
Environmental Protection

4710302734 Mod

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
W.VA. CODE §22-6A - WELL WORK PERMIT APPLICATION

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

Operator's Well Number: 513925 Well Pad Name: BIG190

Farm Name/Surface Owner: Mills-Wetzel Public Road Access: CR 15/2

Elevation, current ground: 1,473.5 Elevation, proposed post-construction: 1,473.5

Well Type: (a) Gas Oil Underground Storage

Other _____

(b) If Gas: Shallow Deep

Horizontal

Existing Pad? Yes or No: YES

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11-13-13

Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
Target formation is Marcellus at a depth of 7525 with the anticipated thickness to be 62 feet and anticipated target pressure of 4764 PSI

Proposed Total Vertical Depth: 7,525
Formation at Total Vertical Depth: Marcellus
Proposed Total Measured Depth: 14,215
Proposed Horizontal Leg Length: 5,354
Approximate Fresh Water Strata Depths: 672, 677, 744
Method to Determine Fresh Water Depth: By offset wells
Approximate Saltwater Depths: n/a
Approximate Coal Seam Depths: 411, 1204, 1222
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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103-02734
 47 10302734
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WV-6B
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CASING AND TUBING PROGRAM

3)

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: for Drilling	INTERVALS: Left in Well	CEMENT: Fill-up (Cu.Ft.)
conductor	20	New	Varies	Varies	40	40	38
fresh Water	13 3/8	New	MC-50	54	844	844	738
soal							
intermediate	9 5/8	New	MC-50	40	3,474	3,474	1,366
production	5 1/2	New	P-110	20	14,215	14,215	See Note 1
tubing	2 3/8		J-55	4.6			May not be run, if run will be set 100' less than TD
packers							

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./k)
conductor	20	24	0.635	-	Construction	1.18
fresh Water	13 3/8	17 1/2	0.380	2,485	1	1.21
soal						
intermediate	9 5/8	12 3/8	0.395	3,600	1	1.21
production	5 1/2	8 1/2	0.361	12,640	-	1.27/1.86
tubing						
packers						

Packers

DMH
 11-13-17

ind:	N/A			
izes:	N/A			
epths 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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103-02734

47 10302734

Mod

W - 6B

/13)

3) 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 5654'. Then kick off the horizontal leg into the Marcellus using a slick water frac.

3) 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 surface water sources. This water is mixed with sand and a small percentage (less than 0.3%) of chemicals (including 15% Hydrochloric acid, surfactant, 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.

1) Total area to be disturbed, including roads, stockpile area, pits, etc. (acres): no additional disturbance

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

3) 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

4) 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.
Addition:
Ad (Type 1 Cement): 0.2-0.7% Lignosulfonate (Retarder). Lengthens thickening time.
3% CFR (dispersant). Makes cement easier to mix.
Tail (Type H Cement): 0.25-0.40% Lignosulfonate (Retarder). Lengthens thickening time.
2-0.3% CFR (dispersant). This is to make the cement easier to mix.
1) % Calcuim Carbonate. Acid solubility.
4-0.6% Halad (fluid loss). Reduces amount of water lost to formation.

5) 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 the cleaning use a soap sweep or increase injection rate & foam concentration.
Addition: 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.

DmH 11-13-13

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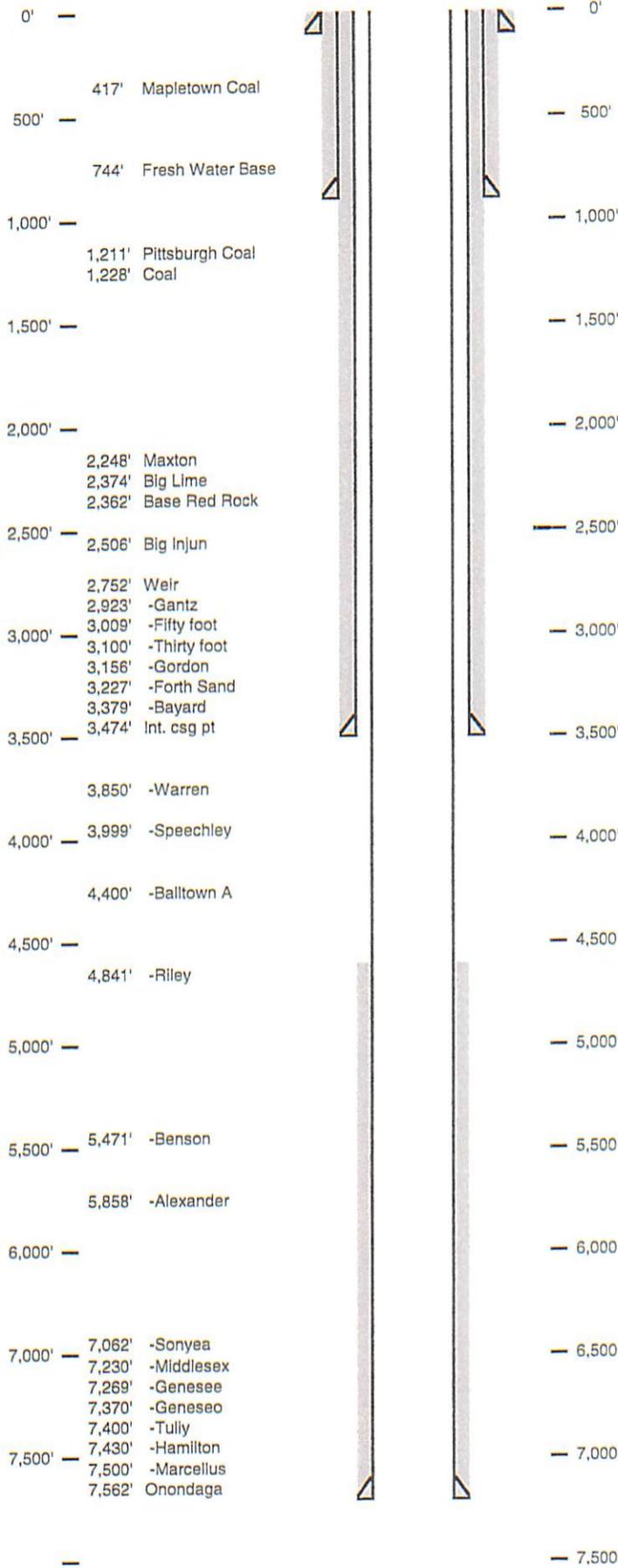
Mod

Well Schematic
EQT Production

Well Name: 513925 (BIG190H9)
County: Wetzel
State: West Virginia

Elevation KB:
Target
Prospect
Azimuth
Vertical Section

1482
Marcellus
342
5764.5



Hole Size 24" - 20" Conductor at 40'
Bit Size 17.5"

TOC @ Surface
13.375", 54.5#, MC-50, New @ 844' ft MD
Bit Size 12.375"

TOC @ Surface
9.625", 40#, MC-50, New @ 3,474' ft MD
Bit Size 8.5"

*DMA
#-17-13*

KOP = 5,654' ft MD
10 Deg DLS

Land @ 8,362' ft MD
7,525' ft TVD

5.5", 20#, P-110, New @ 13,715' ft MD
7,491' ft TVD

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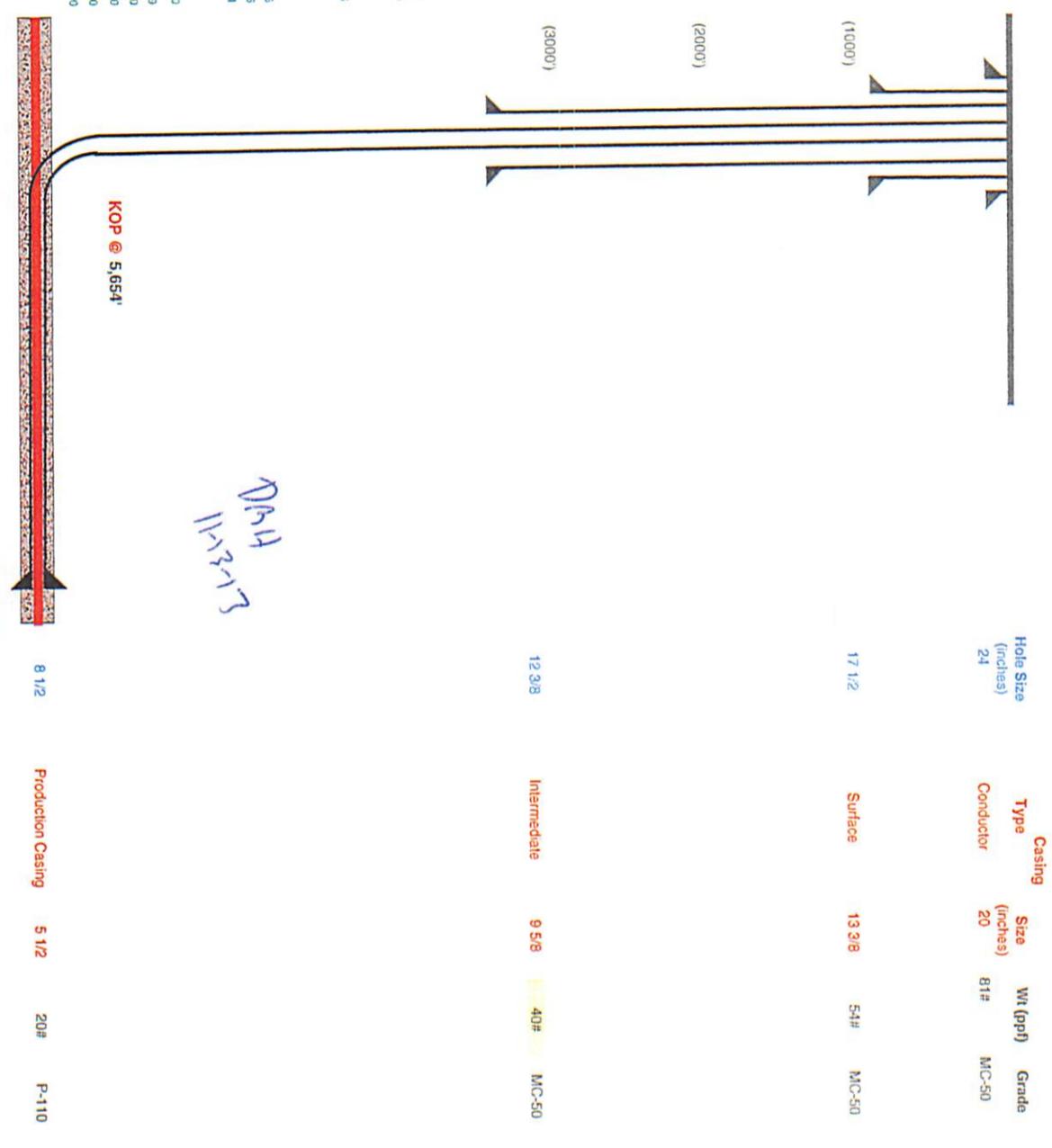
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Well 513925 (BIG190H9)
 EOT Production
 Pine Grove
 Weizel
 West Virginia

Admuth 342
 Vertical Section 5754.5

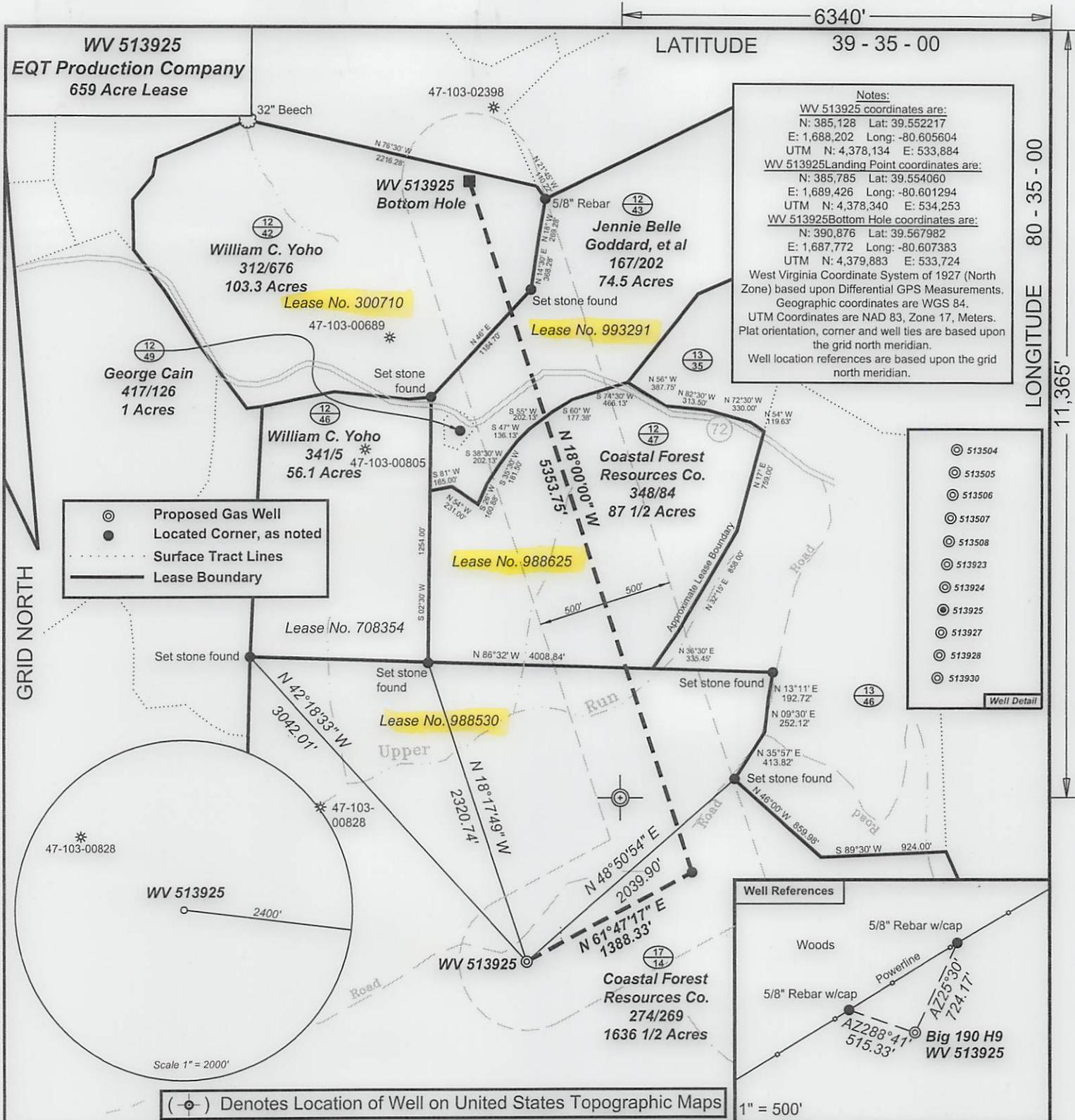
TVD Depth (feet)	Formation Tops (TVD)	Formation	Admuth	Vertical Section	Hole Size (inches)	Casing Type	Casing Size (inches)	WT (ppf)	Grade
0					24	Conductor	20	81#	MC-50
250'		Maplewood Coal	417		17 1/2	Surface	13 3/8	54#	MC-50
500'		Base Fresh Water	744						
750'		Pittsburgh Coal	1211						
1000'		Coal	1228						
1250'									
1500'									
1750'									
2000'		Marston	2213	2303					
2250'		Big Luma	2374	2471					
2500'		Base Red Rock	2382						
2750'		Big blun	2505	2752					
3000'		Wear	2752	2804					
3250'		Gantz	2923	2968					
3500'		Filly foot	3009	3041					
3750'		Thirty foot	3100	3153					
4000'		Gordon	3158	3225					
4250'		Forth Sand	3227	3253					
4500'		Bayard	3379	3421					
4750'		hit csg pt	3474						
5000'		Warren	3850	3956					
5250'		Speedley	3999	4046					
5500'									
5750'		Balltown A	4400	4695					
6000'									
6250'		Riley	4841	4936					
6500'		Benson	5171	5226					
6750'		Alexander	5358	6021					
7000'									
7250'		Sony's	7062	7230					
7500'		Middlesex	7230	7269					
7750'		Goness	7289	7370					
8000'		Goness	7370	7400					
8250'		Tully	7400	7430					
8500'		Hamilton	7130	7500					
8750'		Marcellus top	7500						
9000'		Target Inside Marcellus	7525						
9250'		Onondaga	7582						

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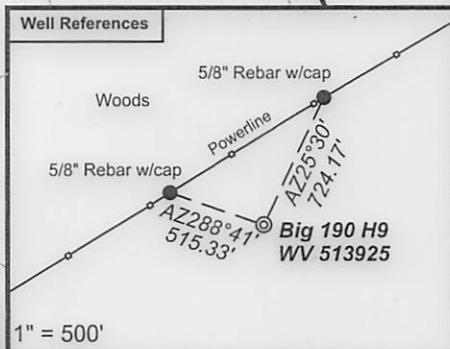
Run Logs, Plug back to KOP at 5654
 Kick off for horizontal well in Marcellus

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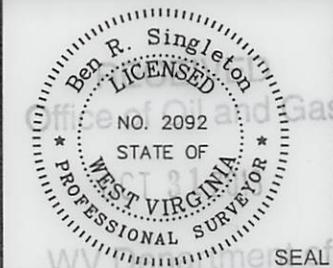
Notes:
 WV 513925 coordinates are:
 N: 385,128 Lat: 39.552217
 E: 1,688,202 Long: -80.605604
 UTM N: 4,378,134 E: 533,884
 WV 513925 Landing Point coordinates are:
 N: 385,785 Lat: 39.554060
 E: 1,689,426 Long: -80.601294
 UTM N: 4,378,340 E: 534,253
 WV 513925 Bottom Hole coordinates are:
 N: 390,876 Lat: 39.567982
 E: 1,687,772 Long: -80.607383
 UTM N: 4,379,883 E: 533,724
 West Virginia Coordinate System of 1927 (North Zone) based upon Differential GPS Measurements.
 Geographic coordinates are WGS 84.
 UTM Coordinates are NAD 83, Zone 17, Meters.
 Plat orientation, corner and well ties are based upon the grid north meridian.
 Well location references are based upon the grid north meridian.

- ⊙ 513504
 - ⊙ 513505
 - ⊙ 513506
 - ⊙ 513507
 - ⊙ 513508
 - ⊙ 513923
 - ⊙ 513924
 - ⊙ 513925
 - ⊙ 513927
 - ⊙ 513928
 - ⊙ 513930
- Well Detail



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: 196-34-G-10
 DRAWING NO: 196-10 Big 190 H9 Plat.dwg
 SCALE: 1" = 1000'
 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: October 23, 2013
 OPERATOR'S WELL NO. WV 513925
 API WELL NO. 47-103-02734
 STATE COUNTY PERMIT

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
 (IF GAS) PRODUCTION: STORAGE DEEP SHALLOW

LOCATION: ELEVATION: 1473.5' (As-built) WATERSHED: Upper Run and North Fork QUADRANGLE: Big Run
 DISTRICT: Grant COUNTY: Wetzel

SURFACE OWNER: Coastal Forest Resources Co. f/k/a Coastal Lumber Company ACREAGE: 1,636.5
 ROYALTY OWNER: Mills-Wetzel Land, Inc., Piney Holdings Inc. et. al., Barbara Ann Roche et. al., James Douglas White et. al. LEASE NO: 988530, 988625, 993291, 300710 ACREAGE: 659, 87.5, 74.5, 103.3

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=7,800 MD=15,550

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