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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

CHESAPEAKE APPALACHIA, L.L.C.  
POST OFFICE BOX 6070  
CHARLESTON, WV 25362

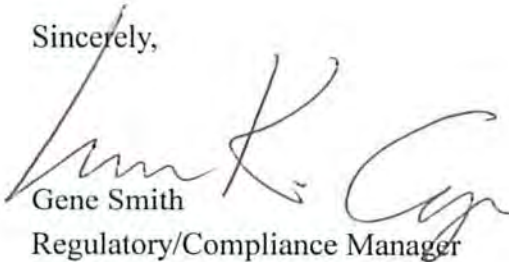
Re: Permit Modification Approval for API Number 5101606 , Well #: FORK RIDGE MSH 201H  
**shortened lateral**

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

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

1) Well Operator: Chesapeake Appalachia, LLC 494477557 51-Marshall 1-Cameron 370-Glen Easton  
Operator ID County District Quadrangle

2) Operator's Well Number: Fork Ridge MSH 201H Well Pad Name: Fork Ridge MSH Pad  
*API# 47-051-01606*

3 Elevation, current ground: 1391' Elevation, proposed post-construction: 1391'

4) Well Type: (a) Gas  Oil   
Other   
(b) If Gas: Shallow  Deep   
Horizontal

5) Existing Pad? Yes or No: Yes

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):  
Target formation-Marcellus, Target top TVD- 6787', Target base TVD-6838', Anticipated thickness- 51', Associated Pressure -4276

7) Proposed Total Vertical Depth: 6804'

8) Formation at Total Vertical Depth: Marcellus

9) Proposed Total Measured Depth: 12,600'

10) Approximate Fresh Water Strata Depths: 661'

11) Method to Determine Fresh Water Depth: From the DE Contour Map

12) Approximate Saltwater Depths: 1047'

13) Approximate Coal Seam Depths: 961'

14) Approximate Depth to Possible Void (coal mine, karst, other): None that we are aware of.

15) Does land contain coal seams tributary or adjacent to, active mine? yes

16) Describe proposed well work:  
Drill and stimulate any potential zones between and including the Benson to the Marcellus. \*\*If we should encounter a void, place basket above and below void area - balance cement to bottom of void and grout from basket to surface. Run casing not less than 20' below void nor more than 50' below void.  
(\*If freshwater is encountered deeper than anticipated it must be protected, set casing 50' below and cts)

17) Describe fracturing/stimulating methods in detail:  
Well will be perforated within the target formation and stimulated with a slurry of water, sand, and chemical additives at a high rate. This will be performed in stages with the plug and perf method along the wellbore until the entire lateral has been stimulated within the target formation. All stage plugs are then drilled out and the well is flowed back to surface.  
The well is produced through surface facilities consisting of high pressure production units, vertical separation units, water and oil storage tanks.

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 70.6

19) Area to be disturbed for well pad only, less access road (acres): 5.5

**RECEIVED**  
**Office of Oil & Gas**  
*DMM*  
*12-28-13*  
**West Virginia Department of Environmental Protection**

20)

CASING AND TUBING PROGRAM

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill -up (Cu. Ft.)
Conductor	20"	New	J-55	94#	100'	100'	CTS
Fresh Water	13 3/8"	New	J-55	54.5#	761'	761'	700 SX/CTS
Coal	9 5/8"	New	J-55	40#	2460'	2460'	920 SX/CTS
Intermediate	7"	New	P-110	20#	If Needed	If Needed	If Needed/As Needed
Production	5 1/2"	New	P-110	20#	12,600'	12,600'	Lead 1080 sx Tail 1060 sx/100' inside intermediate
Tubing	2 3/8"	New	N-80	4.7#	Approx. 7274'	Approx. 7274'	
Liners							

DmH 12-28-12

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
Conductor	20"	30"	0.25"	2120	15.6 ppg	1.19/50% Excess
Fresh Water	13 3/8"	17.5"	0.380	2740	15.6 ppg	1.19/50% Excess
Coal	9 5/8"	12 1/4"	0.395	3950	15.6 ppg	1.19/50% Excess
Intermediate	7"	8 3/4"	.0317	4360	15.6 ppg	1.20/15% Excess
Production	5 1/2"	8 3/4"	0.361	12360	15.6 ppg	1.20/15% Excess
Tubing	2 3/8"	4.778"	0.190			
Liners						

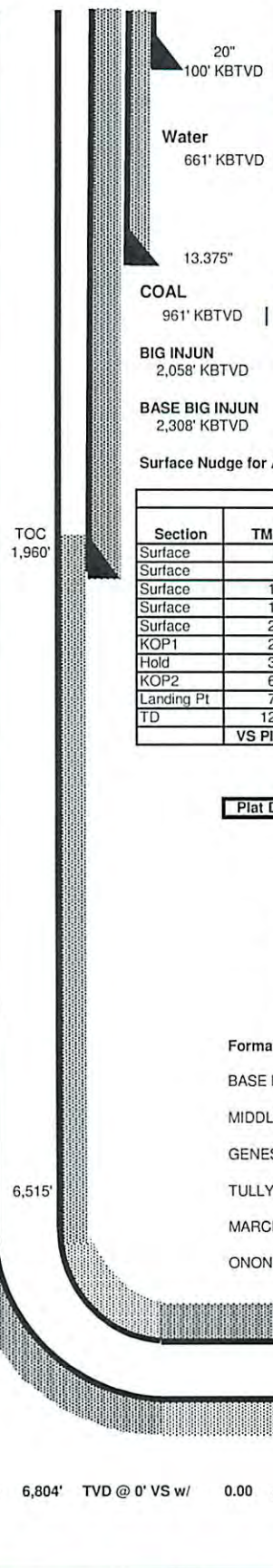
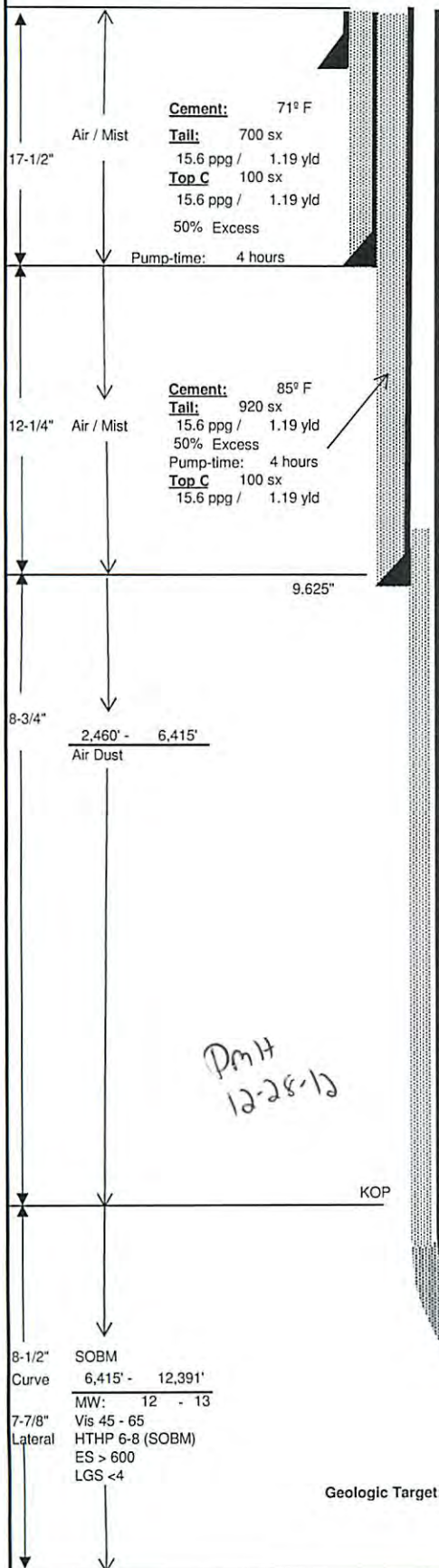
PACKERS

Kind:	10K Arrowset AS1-X		
Sizes:	5 1/2"		
Depths Set:	Approx. 6,197'		

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JAN 4 2013  
WW Department of  
Environmental Protection

08/09/2013

		<b>Well Name:</b> Fork Ridge MSH 201H	<b>Drilling Rig:</b> N/A
<b>Drilling Engineer:</b> TBD	<b>Formation:</b> Marcellus	<b>Directional Drilling:</b> N/A	<b>Drilling Mud:</b> N/A
<b>Superintendent:</b> N/A	<b>County, State:</b> Marshall, WV	<b>Cement Surface:</b> N/A	<b>Cement Longstrings:</b> N/A
<b>Asset Manager:</b> N/A	<b>Surface Latitude:</b> 39.871443	<b>Surface Longitude:</b> -80.638635	<b>Wellhead:</b> N/A
<b>Geologist:</b> N/A	<b>BH Latitude:</b> 39.884579	<b>BH Longitude:</b> -80.650197	<b>AFE #:</b> N/A
<b>Land:</b> N/A	<b>KB Elevation:</b> 1411'	<b>Ground Elevation:</b> 1391'	



Wellhead Equipment	
Tree Description	Blanking Cap
Tubing Head **	Blanking Cap
'B' Section	11" x 5M x 7-1/16" 10M
'A' Section	9-5/8" SOW x 11" 5M

\*\* Space out such that Blanking Cap is no more than 30" above grade.

Casing Detail						
	Size	Wt	Grd	Conn.	From:	To:
Surface	13.375	54.5 #	J-55	STC	0'	761'
Interm	9.625	40 #	J-55	LTC	0'	2,460'
Prod	5.5	20 #	P-110	GBCD	0'	12,391'

Report any water or gas flows. Catch liquid sample if possible.

Casing Design						
	Size	ID	Coll	Burst	Tens	MU torq
Surface	13.375	12.615	1130	2740	514	5140
Interm	9.625	8.835	2570	3950	520	5200
Prod	5.5	4.778	12200	12360	641	8530

Surface Nudge for Anti-Collision purposes.

Directional Drilling Details								
Section	TMD	Inc.	Azimuth	TVD	BUR	DLS	+N-S	+E-W
Surface	0.00'	0.00	0.00	0.00'	0.00	0.00	0.0'	0.0'
Surface	500'	0.00	0.00	500'	0.00	0.00	0.0'	0.0'
Surface	1,000'	0.00	0.00	1,000'	0.00	0.00	0.0'	0.0'
Surface	1,500'	0.00	0.00	1,500'	0.00	0.00	0.0'	0.0'
Surface	2,000'	0.00	0.00	2,000'	0.00	0.00	0.0'	0.0'
KOP1	2,558'	0.00	0.00	2,558'	0.00	0.00	0.0'	0.0'
Hold	3,482'	18.48	246.66	3,466'	2.00	2.00	-58.5'	-135.7'
KOP2	6,515'	18.48	246.66	6,343'	0.00	0.00	-439.4'	-1,018.4'
Landing Pt	7,274'	90.00	339.97	6,804'	9.43	12.00	-43.6'	-1,326.5'
TD	12,391'	90.00	339.97	6,804'	0.00	0.00	4,764.3'	-3,079.3'
VS Plane	339.97						VS Length	5,530.82'

Lateral Length ==> 5,117.50'

Plat Date 11/12/12

Logging Program		
Run	Log Type	Interval
1	TBD	TBD
2	TBD	TBD

Mudlogger operational at Surface

Formation Depths (TVD)	
BASE BIG INJUN	2,308'
MIDDLESEX	6,569'
GENESEO	6,651'
TULLY	6,670'
MARCELLUS	6,791'
ONONDAGA	6,842'

Cement: 123° F  
 Lead: 1,080 sx  
 15.6 ppg / 1.20 yld  
 Tail: 1,060 sx  
 15.6 ppg / 1.20 yld  
 15% Excess  
 Pump-time: 5 hours

Geologic Target: 6,804' TVD @ 0° VS w/ 0.00 degrees/100 ft Up-dip

PBHL 5.5"  
 TMD: 12,391'  
 TVD: 6,804'  
 Inclination: 90.00 deg

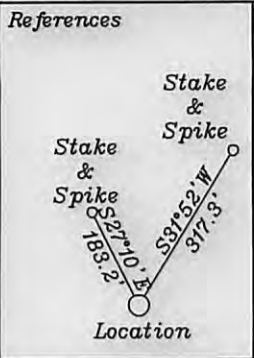
Gyro the 1st well on the pad at KOP.  
 Ensure all Surveys are referenced to Grid North!!

RECEIVED 08/09/2013  
 Office of Oil & Gas

JAN 4 2013

Drawn by: TBD  
 Date: 12/13/2012

WV Department of Environmental Protection



LATITUDE 39-52-30 N (TH)  
LATITUDE 39-55-00 N (BH)

Bottom Hole 7,217'

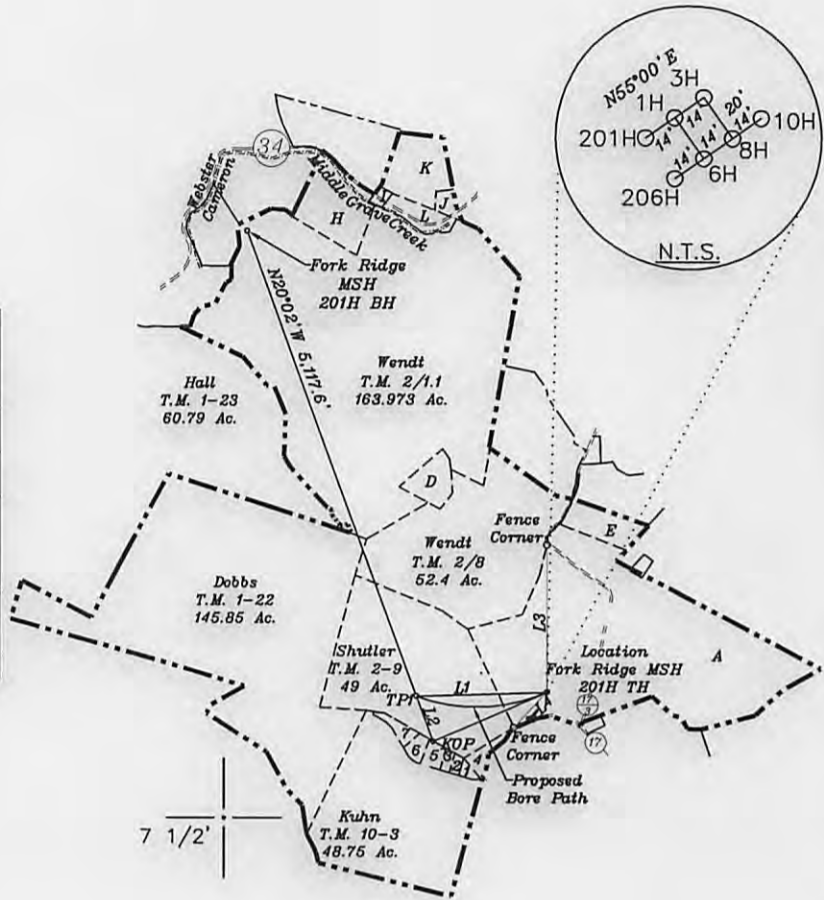
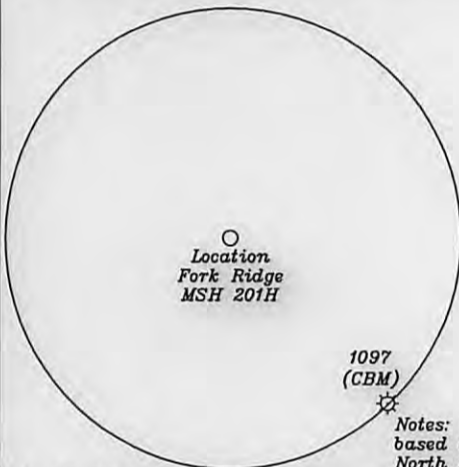
7 1/2'

Top Hole 1,247'

- A- Consolidation Coal Company T.M. 2-12 94.67 Ac.
- D- Wendt T.M. 2/1 4.34 Ac.
- E- Myers T.M. 2/12.1 4 Ac.
- F- W. Poling T.M. 16-15 11.87 Ac.
- H- Kidd T.M. 16-10.2 11.59 Ac.
- I- Hoge T.M. 16-10.1 10.674 Ac.
- J- Poling T.M. 16-16.1 0.99 Ac.
- K- Poling T.M. 16-16 8.08 Ac.
- L- Poling T.M. 16-10.3 3.354 Ac.

<b>Top Hole</b>
NAD 27-39.871443 N, 80.638635 W
UTM NAD 83 (Meters)-4413559.9 N, 530920.6 E
State Plane NAD 27-501540.0 N, 1680415.3 E
<b>KOP</b>
NAD 27-39.869990 N, 80.642740 W
UTM NAD 83 (Meters)-4413397.3 N, 530570.2 E
State Plane NAD 27-501025.5 N, 1679256.6 E
<b>TPI</b>
NAD 27-39.871274 N, 80.643371 W
UTM NAD 83 (Meters)-4413539.5 N, 530515.7 E
State Plane NAD 27-501495.3 N, 1679085.4 E
<b>Bottom Hole</b>
NAD 27-39.884579 N, 80.650197 W
UTM NAD 83 (Meters)-4415013.9 N, 529926.1 E
State Plane NAD 27-506365.9 N, 1677231.6 E

NORTH



LONGITUDE 80-37-30 W  
Bottom Hole 11,598'

- L1- S88°04'W 1330.8' - TPI
- L2- N20°02'W 500.0' - KOP
- L3- S00°29'E 1510.7' - F.C.
- L4- N43°02'E 512.9' - F.C.

- 1- Schultz T.M 10-3.3 0.53 Ac.
- 2- Schultz T.M 10-3.2 0.46 Ac.
- 3- Schultz T.M 10-3.6 0.51 Ac.
- 4- Hall T.M 10-3.1 1.62 Ac.
- 5- Shuttler T.M 10-3.7 1.18 Ac.
- 6- Shuttler T.M 10-3.5 1.058 Ac.
- 7- Shuttler T.M 10-3.4 1.312 Ac.

Notes: Ties to wells and corners are based on State Plane Grid North-WV North Zone NAD 27.

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS

FILE NO. \_\_\_\_\_  
DRAWING NO. 1  
SCALE 1" = 2000'  
MINIMUM DEGREE OF ACCURACY 1 in 2500  
PROVEN SOURCE OF ELEVATION GPS  
submeter unit

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 ENVIROMENTAL PROTECTION.

(SIGNED) David L Jackson  
R.P.E. \_\_\_\_\_ L.L.S. 708



STATE OF WEST VIRGINIA  
Division of Environmental Protection  
OFFICE OF OIL AND GAS

DATE December 18, 2012  
OPERATOR'S WELL NO. Fork Ridge MSH 201H  
API WELL NO. \_\_\_\_\_

WELL TYPE: OIL \_\_\_ GAS X LIQUID INJECTION \_\_\_ WASTE DISPOSAL \_\_\_ STATE 47 COUNTY 51 PERMIT H6A 1606 MOD  
(IF "GAS") PRODUCTION X STORAGE \_\_\_ DEEP \_\_\_ SHALLOW X

LOCATION: ELEVATION 1391' WATER SHED Middle Grave Creek  
DISTRICT Cameron COUNTY Marshall  
QUADRANGLE Glen Easton 7 1/2' (TH) Moundsville 7 1/2' (BH)

SURFACE OWNER Consolidation Coal Company ACREAGE 94.67  
OIL & GAS ROYALTY OWNER Consolidation Coal Company LEASE ACREAGE 577.593 ac.  
LEASE NO. 1-284746-000 to 003 & 005(TM 2/12,8,9,&12.1), 1-312544-001 to 003(TM 10/3,3.7&3.5), 1-284746-004  
LEASE NO. (TM 1/22), 1-286494-000(TM 2/1.1)

PROPOSED WORK: DRILL X CONVERT \_\_\_ DRILL DEEPER \_\_\_ REDRILL \_\_\_ FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION \_\_\_ PERFORATE NEW FORMATION X OTHER PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_

PLUG AND ABANDON \_\_\_ CLEAN OUT AND REPLUG \_\_\_  
TARGET FORMATION Marcellus ESTIMATED DEPTH TVD 6,804'+ Horizontal Leg, 12,391'  
WELL OPERATOR Chesapeake Appalachia, L.L.C. DESIGNATED AGENT Eric B. Gillespie  
ADDRESS P.O. Box 18496 Oklahoma City, OK 73154-0496 ADDRESS P.O. Box 6070 Charleston, WV 25362

08/09/2013



Danielle Southall  
Regulatory Technician I

January 3, 2013

VIA UPS

Ms. Laura Cooper  
Office of Oil & Gas  
601 57<sup>th</sup> Street  
Charleston, WV 25304

Re: Proposed New Well Fork Ridge MSH 201H API #47-051-01606

Dear Ms. Cooper:

Enclosed please find a modification request for the above captioned well. We would like to shorten the lateral. This well is situated on the Fork Ridge property, in Cameron District, Marshall County, West Virginia.

If you have any questions or require additional information, please contact me at 304-517-1416 ext. 86024.

Sincerely,

Chesapeake Appalachia, LLC

  
Dee Southall

Enclosure(s)

RECEIVED  
Office of Oil & Gas  
JAN 4 2013  
WV Department of  
Environmental Protection