



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

November 10, 2015

SWN PRODUCTION COMPANY, LLC
POST OFFICE BOX 12359
SPRING, TX 773914954

Re: Permit Modification Approval for API Number 5101853, Well #: OE BURGE U MSH 501
H
Revised Burst Pressure for 5 1/2" casing

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 black ink that reads "Gene Smith" followed by a stylized flourish.

Gene Smith
Assistant Chief of Permitting
Office of Oil and Gas

Promoting a healthy environment.

11/13/2015

SWN

Southwestern Energy[®]

PO Box 1300
Jane Lew, WV 26378
PHONE: (832) 796-1610

November 9, 2015

4710511853 MOD

Ms. Laura Adkins
Office of Oil & Gas
601 57th Street
Charleston, WV 25304

RE: Modification O.E. Burge U MSH 501H API # 47-051-01853

Dear Ms. Adkins

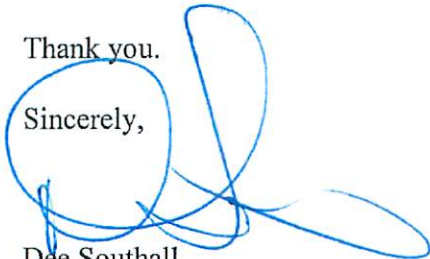
Enclosed please find a modification request for the above captioned well. We would like to modify the narrative #20 on page 3 of the Application to Drill and revise the burst pressure for the 5 ½" casing.

This well is situated on the O.E. Burge property, in Liberty District, Marshall County, West Virginia.

If you have any questions or desire additional information, please me at 304-884-1614.

Thank you.

Sincerely,



Dee Southall
Regulatory Supervisor
Southwestern Energy Production Company, LLC
PO Box 1300
Jane Lew, WV 26378

RECEIVED
Office of Oil and Gas

NOV 10 2015

WV Department of
Environmental Protection

$\frac{R^2}{A} \rightarrow V^+$

The Right People doing the Right Things,

11/13/2015

WW-6B
(10/14)

API NO. 47- 51 -
OPERATOR WELL NO. OE Burge U MSH 601H
Well Pad Name: OE Burge MSH Pad

18)

CASING AND TUBING PROGRAM

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.)/CTS
Conductor	30"	New	J-55	234#	100'	100'	CTS
Fresh Water	20"	New	J-55	94#	300'	300'	635 sx/CTS
Coal	13 3/8"	New	L-80	68#	2613'	2613'	2300 sx/CTS
Intermediate	9 5/8"	New	P110	53.5#	10,300'	10,300'	1139 sx/CTS
Production	5 1/2"	New	HCP-110	23#	21,169'	21,169'	Lead 999 cu ft 2047 cu/100' back to top
Tubing							
Liners							

4710511853 MoV

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Max. Associated Surface Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	30"	30"	0.75	2780	81	Class A	1.19/50% Excess
Fresh Water	20"	24"	0.438	2110	633	Class A	1.19/50% Excess
Coal	13 3/8"	17.5"	0.33	2730	1768	Class A	1.19/50% Excess
Intermediate	9 5/8"	12 1/4"	0.395	5750	3898	Class A	1.68/1.25
Production	5 1/2"	8 3/4"	0.415	16512	9918	Class A	1.68/1.25
Tubing							
Liners							

RECEIVED
Office of Oil and Gas

NOV 10

WV Department of
Environmental Protection

PACKERS

Kind:	10K Arrowset AS1-X			
Sizes:	5 1/2"			
Depths Set:				

WW-6B
(10/14)

API NO. 47-51 -
OPERATOR WELL NO. OE Burgo U MSH 601H
Well Pad Name: OE Burgo MSH Pad

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

Drill to the Trenton and then plug back with solid cement from TD to the kick off point and then drill horizontally into the Utica. **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'-75' below void. (*If freshwater is encountered deeper than anticipated it must be protected, set casing 50'-75' below and cts.)

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Well will be perforated within the target formation and stimulated with a slurry of water, proppant (sand and/or ceramic) 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 within the target formation has been stimulated. All stage plugs are then prepared for production by being drilled out or using large internal bore plugs 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 as needed. The maximum anticipated pressure and rate is 13,760 psi net pressure @ 100 barrels per minute.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 13.4

22) Area to be disturbed for well pad only, less access road (acres): 7.6

23) Describe centralizer placement for each casing string:

All casing strings will be ran with a centralizer at a minimum of 1 per every 3 joints of casing.

24) Describe all cement additives associated with each cement type:

See Attachment ***

RECEIVED
Office of Oil and Gas
NOV 10 2015
WV Department of
Environmental Protection

25) Proposed borehole conditioning procedures:

All boreholes will be conditioned with circulation and rotation for a minimum of one bottoms up and continuing until operator is satisfied with borehole conditions.

47 105 11853 NOV

*Note: Attach additional sheets as needed.