



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
(304) 926-0450
fax: (304) 926-0452

Austin Caperton, Cabinet Secretary
www.dep.wv.gov

Thursday, October 25, 2018
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

SWN PRODUCTION COMPANY, LLC
POST OFFICE BOX 12359

SPRING, TX 773914954

Re: Permit Modification Approval for MICHAEL RATCLIFFE OHI 5H
47-069-00252-00-00

Modified Casing Program

SWN PRODUCTION COMPANY, LLC

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.

If there are any questions, please feel free to contact me at (304) 926- 0450.

A handwritten signature in blue ink, appearing to read 'James A. Martin', is written over a blue ink stamp.

James A. Martin
Chief

Operator's Well Number: MICHAEL RATCLIFFE OHI 5H
Farm Name: MICHAEL T. RATCLIFFE
U.S. WELL NUMBER: 47-069-00252-00-00
Horizontal 6A New Drill
Date Modification Issued: October 25, 2018

Promoting a healthy environment.

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

1) Well Operator: SWN Production Co., LLC Operator ID 494512924 County 069-Ohio District Liberty Bethany Bethany Quadrangle

2) Operator's Well Number: Michael Ratcliffe OHI 5H Well Pad Name: Michael Ratcliffe OHI Pad

3) Farm Name/Surface Owner: Mark Hickman Public Road Access: Dallas Pike

4) Elevation, current ground: 1281' Elevation, proposed post-construction: 1281'

5) Well Type (a) Gas Oil Underground Storage
Other
(b) If Gas Shallow Deep
Horizontal

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Target Formation- Marcellus, Target Top TVD- 6321', Target Base TVD- 6363', Anticipated Thickness- 42', Associated Pressure- 3807

8) Proposed Total Vertical Depth: 6345'

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 12621'

11) Proposed Horizontal Leg Length: 5829.81'

12) Approximate Fresh Water Strata Depths: 401'

13) Method to Determine Fresh Water Depths: from nearby water wells, salinity profile and logs

14) Approximate Saltwater Depths: 754'

15) Approximate Coal Seam Depths: 610'

16) Approximate Depth to Possible Void (coal mine, karst, other): Possible Void 610'

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes No

(a) If Yes, provide Mine Info: Name: _____
Depth: _____
Seam: _____
Owner: _____

C. J. [Signature] 8-8-18

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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	20"	New	H-40	94#	100'	100'	CTS
Fresh Water	13 3/8"	New	H-40	48#	665'	665'	622 sx/CTS
Coal							
Intermediate	9 5/8"	New	J-55	36#	1995'	1995'	749 sx/CTS
Production	5 1/2"	New	HCP-110	20#	12621'	12621'	load 631st Tail 1529x inside intermediate
Tubing							
Liners							

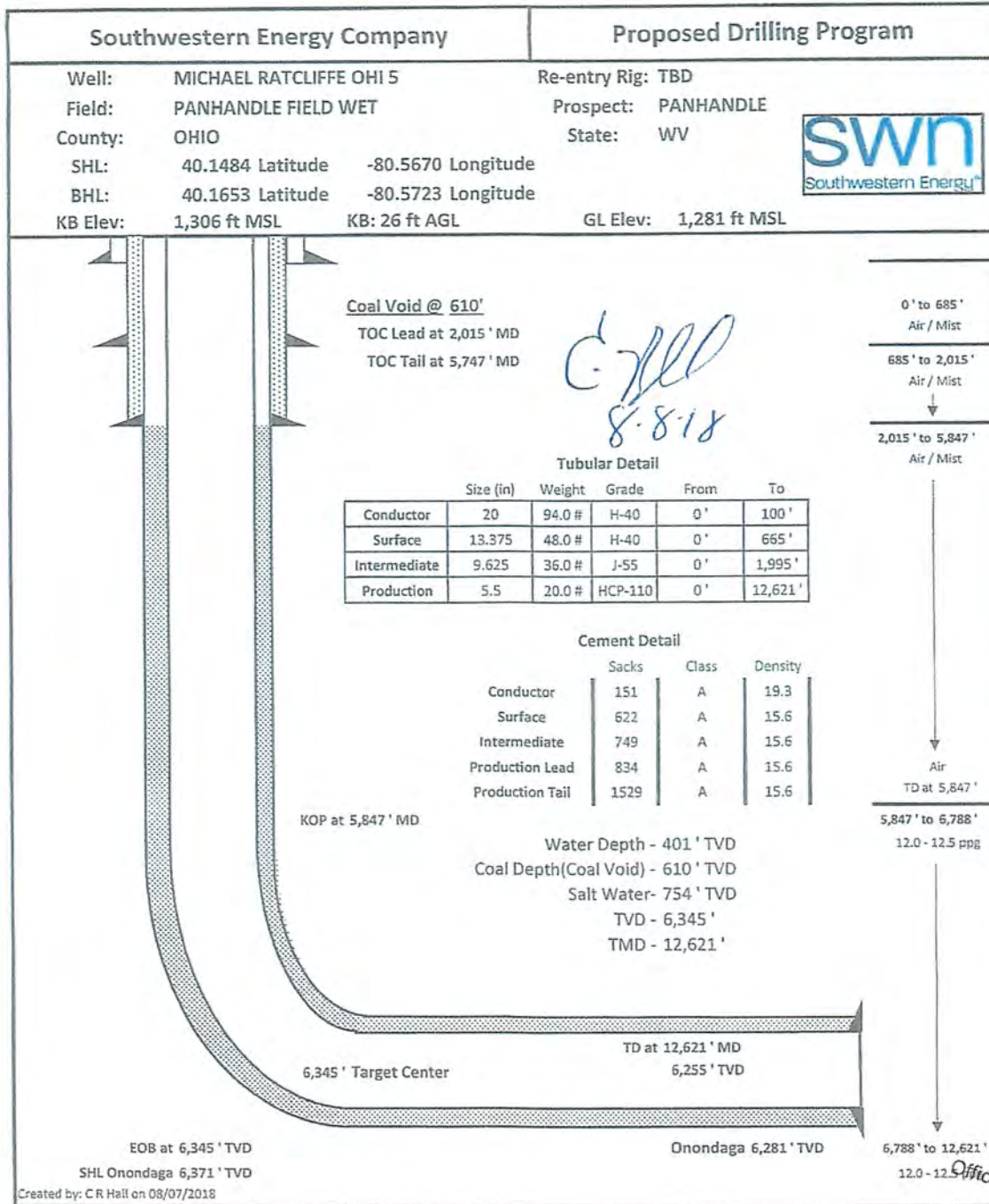
Call 8-8-12

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	20"	30"	0.25	2120	81	Class A	1.19/50% Excess
Fresh Water	13 3/8"	17.5"	0.380	2740	633	Class A	1.19/50% Excess
Coal							
Intermediate	9 5/8"	12 1/4"	0.395	3950	1768	Class A	1.19/50% Excess
Production	5 1/2"	8 3/4"	0.361	12360	9500	Class A	1.20/50% Excess
Tubing							
Liners							

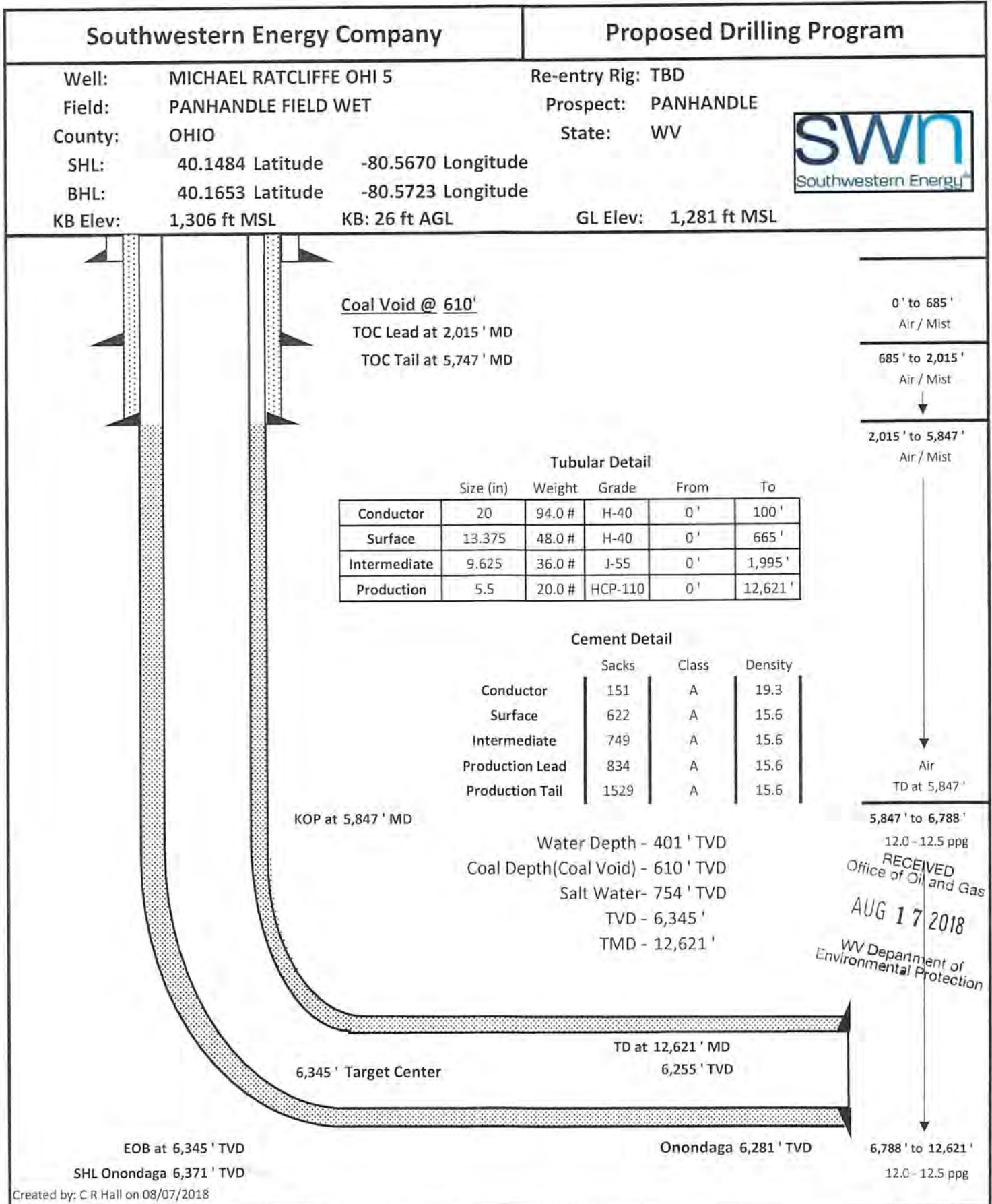
PACKERS

Kind:				
Sizes:				
Depths Set:				

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69-00252 mud

SWN Production Company, LLC
P O Box 12359
Spring, Texas 77391-2359
www.swn.com

August 14, 2018

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

RE: Modification: Michael Ratcliff OHI 5H

Dear Ms. Adkins

Enclosed please find the updated 6B and WBD for the above captioned well. We are changing the BOFW and TOSW. This well is situated on the Radcliffe's property, in Ohio County, West Virginia.

If you have any questions or desire additional information, please me at 304-884-1613.

Thank you.

Sincerely,

Brittany Woody
Regulatory Analyst
Southwestern Energy Production Company, LLC

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