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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

September 17, 2015

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

Re: Permit Modification Approval for API Number 900164, Well #: OV ROYALTY TRUST  
LLC BRK 8H  
**6B - Revised saltwater depth**

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".

Gene Smith  
Assistant Chief of Permitting  
Office of Oil and Gas

Promoting a healthy environment.

9/18/2015

4700900164 Mod

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

1) Well Operator: SWN Production Co., LLC 494512924 009-Brooke 1-Buffalo Steubenville East  
Operator ID County District Quadrangle

2) Operator's Well Number: OV Royalty Trust LLC BRK 8H Well Pad Name: OV Royalty Trust PAD

3) Farm Name/Surface Owner: The Trust of Gene Valentine Public Road Access: Rabbit Hill Road

4) Elevation, current ground: 1181' Elevation, proposed post-construction: 1181'

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 Associated Pressure(s):  
Target Formation- Marcellus, Target Top TVD- 5747', Target Base TVD- 5790' Anticipated Thickness- 43', Associated Pressure- 3750

8) Proposed Total Vertical Depth: 5775'

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 10,379'

11) Proposed Horizontal Leg Length: 3744'

12) Approximate Fresh Water Strata Depths: 53'

13) Method to Determine Fresh Water Depths: from nearby water wells

14) Approximate Saltwater Depths: 1145'

15) Approximate Coal Seam Depths: 230'-245'

16) Approximate Depth to Possible Void (coal mine, karst, other): Void Expected from 230'-245'

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: \_\_\_\_\_

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WW-6B  
(10/14)

4700900164  
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Office of Oil and Gas

SEP 17 2015

API NO. 47- 09

OPERATOR WELL NO. OV Royalty Trust LLC BRK 01

Well Pad Name: OV Royalty Trust PAD

WV Department of  
Environmental Protection

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	J-55	54.5#	345'	345'	287 sx/CTS
Coal	9 5/8"	New	J-55	40#	1549'	1549'	599 sx/CTS
Intermediate	7"	New	J-55	20#	If Needed	If Needed	If Needed/As Needed
Production	5 1/2"	New	HCP-110	20#	10,379'	10,379'	Lead 1011 ex fall 1057 sz100' inside
Tubing	2 3/8"	New	P-110	4.7#	Approx. 5775'	Approx. 5775'	
Liners							

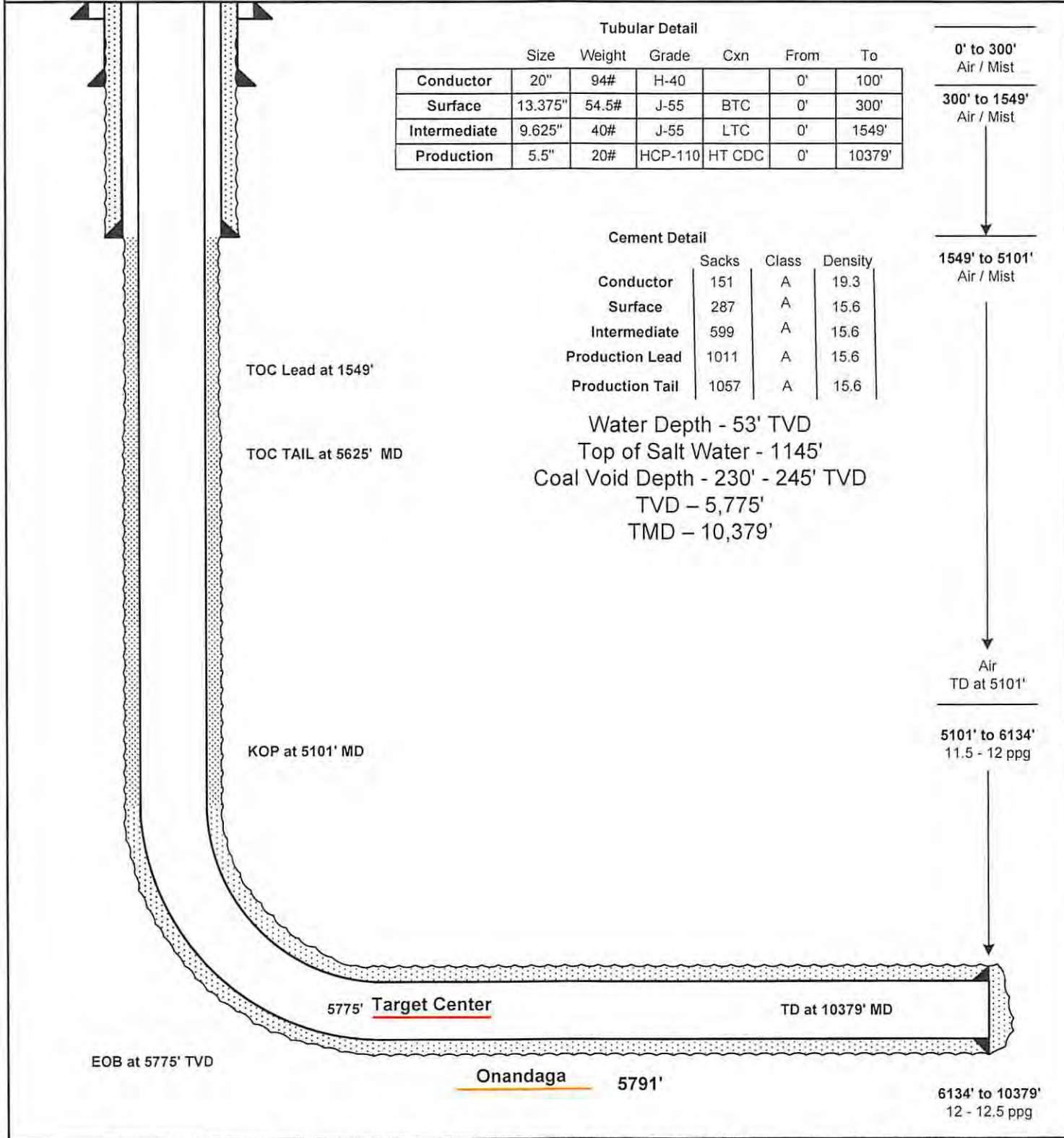
TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Max. Associated Surface Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	30"	0.25	2120	81	Class A	1.19/50% Excess
Fresh Water	13 3/8"	17.5"	0.380	2740	633	Class A	1.19/50% Excess
Coal	9 5/8"	12 1/4"	0.395	3950	1768	Class A	1.19/50% Excess
Intermediate	7"	8 3/4"	0.317	4360	3250	Class A	1.20/15% Excess
Production	5 1/2"	8 3/4"	0.361	12360	9500	Class A	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:				

4700900164 *md*

Southwestern Energy Company		Proposed Drilling Program	
Well	: OV ROYALTY TRUST LLC B BRK 8	Re-entry:Rig	TBD
Field	: PANHANDLE FIELD	Prospect	: PANHANDLE
County	: BROOKE	State	: WV
SHL	: 40.285726 Latitude -80.584281 Longitude		
BHL	: 40.27506997 Latitude -80.57982072 Longitude		
KB Elev	: 1203 ft MSL	KB	: 26 ft AGL
		GL Elev	: 1177 ft MSL



NOTE: This drawing was created for the Reentry Rig. The depths and lengths shown in the plat are referenced to Reentry Rig RKB.