



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

September 17, 2015

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

Re: Permit Modification Approval for API Number 900162, Well #: OV ROYALTY TRUST
LLC BRK 1H
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 For".

Gene Smith
Assistant Chief of Permitting
Office of Oil and Gas

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 494512924 009-Brooke 002-Cross 620- Stuebenville
Operator ID County District Quadrangle

2) Operator's Well Number: OV Royalty Trust LLC BRK 1H Well Pad Name: OV Royalty Trust LLC 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

4700900162 Mod

8) Proposed Total Vertical Depth: 5770'

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 14,511'

11) Proposed Horizontal Leg Length: 7739'

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
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SEP 17 2015

API NO. 47- 09

OPERATOR WELL NO. OV Royalty Trust LLC DRX 11

Well Pad Name: OV Royalty Trust LLC 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#	14,511'	14,511'	<small>Lead 1033 or 101 1818 or 1007 inside</small>
Tubing	2 3/8"	New	P-110	4.7#	Approx. 5770'	Approx. 5770'	
Liners							

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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:				

Well : OV ROYALTY TRUST LLC BRK 1 Re-entry Rig : TBD
 Field : PANHANDLE FIELD Prospect : PANHANDLE
 County : BROOKE State : WV
 SHL : 40.28577299 Latitude -80.58436 Longitude
 BHL : 40.30592487 Latitude -80.5976482 Longitude
 KB Elev : 1203 ft MSL KB : 26 ft AGL GL Elev : 1177 ft MSL



Tubular Detail						
	Size	Weight	Grade	Cxn	From	To
Conductor	20"	94#	H-40		0'	100'
Surface	13.375"	54.5#	J-55	BTC	0'	300'
Intermediate	9.625"	40#	J-55	LTC	0'	1549'
Production	5.5"	20#	HCP-110	HT CDC	0'	14511'

Cement Detail			
	Sacks	Class	Density
Conductor	151	A	19.3
Surface	287	A	15.6
Intermediate	599	A	15.6
Production Lead	1033	A	15.6
Production Tail	1949	A	15.6

Water Depth - 53' TVD
 Top of Salt Water - 1145' TVD
 Coal Void Depth - 230' - 245' TVD
 TVD - 5,770'
 TMD - 14,511'

0' to 300'
Air / Mist

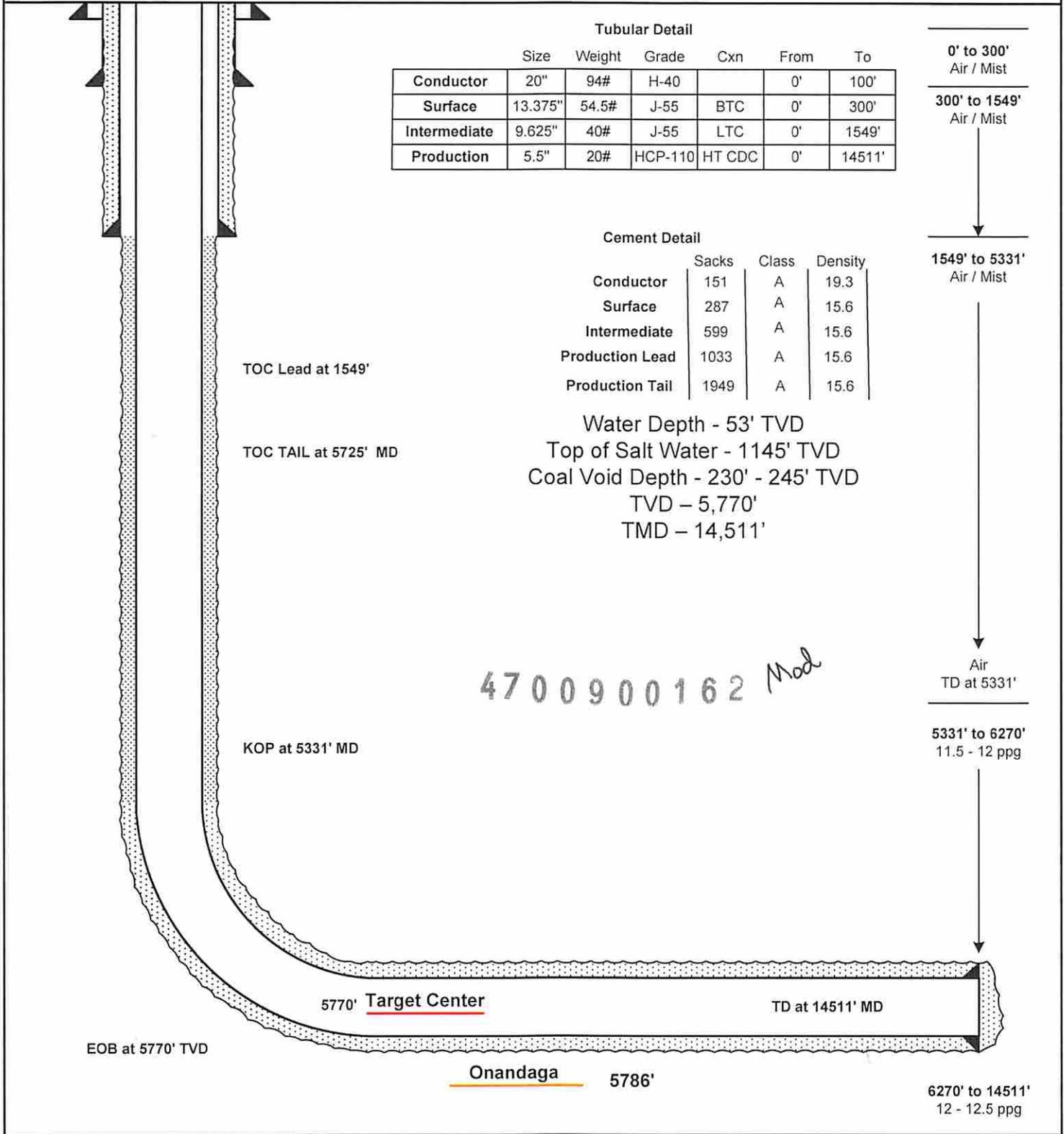
300' to 1549'
Air / Mist

1549' to 5331'
Air / Mist

Air
TD at 5331'

5331' to 6270'
11.5 - 12 ppg

6270' to 14511'
12 - 12.5 ppg



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