

BEFORE THE  
PUBLIC UTILITIES COMMISSION  
STATE OF SOUTH DAKOTA

**IN THE MATTER OF THE PETITION OF TRANSCANADA KEYSTONE PIPELINE, LP  
FOR ORDER ACCEPTING CERTIFICATION OF PERMIT ISSUED IN DOCKET HP09-  
001 TO CONSTRUCT THE KEYSTONE XL PIPELINE**

DOCKET HP14-001

SUPPLEMENTAL PREFILED TESTIMONY OF CHRISTOPHER HUGHES  
ON BEHALF OF THE COMMISSION STAFF  
AUGUST 3, 2015

1 Q. Keystone updated project specifications as they relate to Finding 63 in the Amended Final  
2 Decision and Order to operate at a maximum operating pressure of 1,307 psig with use of API  
3 5L X70 high-strength steel which results in a 0.465 inch nominal wall thickness for a design  
4 factor of 0.72. Does this change violate any requirements set forth in 49 CFR 195?

5 A. Yes. § 195.106 of 49 CFR 195 requires the internal design pressure of the pipe to be determined  
6 in accordance with the formula where the Internal Pressure equals two times the yield strength  
7 of the pipe multiplied by the nominal wall thickness divided by the nominal outside diameter.  
8 This in turn is multiplied by the Seam Joint Factor and the Design Factor. Applying this formula  
9 and using the proposed nominal wall thickness of 0.465 inches results in a maximum operating  
10 pressure of 1,302 psig. In order to operate at 1,307 psig, the nominal wall thickness will need to  
11 be 0.467 inches.

12 
$$\text{Internal Pressure} = \frac{2 * \text{Yield Strength} * \text{Nominal WT}}{\text{Nominal OD}} * \text{Joint Seam Factor} * \text{Design Factor}$$

13 
$$\text{Internal Pressure} = \frac{2 * 70,000 \text{ psig} * 0.465 \text{ in}}{36 \text{ in}} * 1.00 * 0.72 = 1,302 \text{ psig}$$

14 
$$\text{Nominal WT} = \frac{\text{Internal Pressure} * \text{Nominal OD}}{2 * \text{Yield Strength} * \text{Joint Seam Factor} * \text{Design Factor}}$$

15 
$$\text{Nominal WT} = \frac{1,307 \text{ psig} * 36 \text{ in}}{2 * 70,000 \text{ psig} * 1.00 * 0.72} = 0.46679 \text{ in} = 0.467 \text{ in nominal}$$