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

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

\[
\text{Internal Pressure} = \frac{2 \times \text{Yield Strength} \times \text{Nominal WT}}{\text{Nominal OD}} \times \text{Joint Seam Factor} \times \text{Design Factor}
\]

\[
\text{Internal Pressure} = \frac{2 \times 70,000 \text{ psig} \times 0.465 \text{ in}}{36 \text{ in}} \times 1.00 \times 0.72 = 1,302 \text{ psig}
\]

\[
\text{Nominal WT} = \frac{\text{Internal Pressure} \times \text{Nominal OD}}{2 \times \text{Yield Strength} \times \text{Joint Seam Factor} \times \text{Design Factor}}
\]

\[
\text{Nominal WT} = \frac{1,307 \text{ psig} \times 36 \text{ in}}{2 \times 70,000 \text{ psig} \times 1.00 \times 0.72} = 0.46679 \text{ in} = 0.467 \text{ in nominal}
\]