BEFORE THE SOUTH DAKOTA PUBLIC UTILITIES COMMISSION

DOCKET NO. HP07-001

IN THE MATTER OF THE APPLICATION OF TRANSCANADA KEYSTONE PIPELINE, LP FOR A PERMIT UNDER THE SOUTH DAKOTA ENERGY CONVERSION AND TRANSMISSION FACILITY ACT TO CONSTRUCT THE KEYSTONE PIPELINE PROJECT

Surrebuttal Testimony of William Walsh on Behalf of the Staff of the South Dakota Public Utilities Commission

November 28, 2007

Q. State your name and occupation.

A. My name is William Walsh. My business address is 7135 Janes Avenue, Woodridge, Illinois, 60517. I am employed as a Senior Project Manager by EN Engineering, an engineering and consulting firm specializing in pipeline design services for the oil and gas industry.

Q. Did you provide direct testimony in this proceeding?

A. Yes.

Q. In surrebuttal, to whose rebuttal are you responding?

A. I am responding to the rebuttal testimony of TransCanada Engineer Meera Kothari and TransCanada Coordinator of Oil Movements, Brian Thomas.

Q. Ms. Meera Kothari, in Section 5 of her rebuttal, points out that the calculations for pipe wall thickness is incorrectly based on X80 grade pipe where Keystone is using X70 grade pipe for the project. Can you comment?

A. Ms. Kothari correctly provides the pipe wall thicknesses for the X70 design as 0.429 inches for the .72 design factor and 0.386 inches for the 0.80 design factor. I acknowledge the correction and thank her for bringing the point to my attention. The corrected design calculations based upon the X70 grade pipe are presented

below. The 10% reduction in wall thickness between the .72 and .80 design factors remains unchanged.

80% SMYS design

- SMYS of the steel = 70,000 pounds per square inch (psi)
- OD = 30 inches
- Maximum Operating Pressure (MOP) = 1440 psi
- Design Factor F = 0.80
- Pipe Wall Thickness = 0.386 inches

72% SMYS design

- SMYS of the steel = 70,000 pounds per square inch (psi)
- OD = 30 inches
- Maximum Operating Pressure (MOP) = 1440 psi
- Design Factor F = 0.72
- Pipe Wall Thickness = 0.429 inches

(0.386" – 0.429") / 0.429" = -0.10 = 10% wall thickness reduction

Q. Ms. Kothari, in Section 6 of her rebuttal, discusses the use of API 5L Product Level Specification 2 in the Keystone project. Can you comment?

A. TransCanada is required by Condition 2 of the 80% SMYS Special Permit to use the requirements of API 5L Product Level Specification 2 in areas where the 80% SMYS allowance is permitted.

Q. Ms. Kothari, in Section 7 of her rebuttal, discusses depth of cover for the pipeline as specified in 49 CFR 195.248. Can you comment?

A. The specification for depth of cover for buried liquid pipelines is 36" for normal excavation and 30" for rock excavation. TransCanada is required by Condition 20 of the 80% SMYS Special Permit to maintain a minimum depth of cover of 48" in all areas except consolidated rock in areas where the 80% SMYS allowance is permitted.

Q. Ms. Kothari, in Section 9 of her rebuttal, indicates that the pipe wall thickness for the Missouri River crossing is 0.622 inches. Can you comment?

A. Ms. Kothari indicated in her response to Data Request 6-19 that the wall thickness at the Missouri River crossing was 0.622 inches. The 0.611 inches reported in my testimony was a typographical error. I acknowledge the correction and thank her for bringing the point to my attention. The hydrostatic test pressure at the Missouri River crossing of 1981 psi for the 30 inch diameter, 0.622 inches, X70 grade pipe results in a stress in the pipe wall that is 68% of SMYS, not 60% as stated in my testimony.

Q. Ms. Kothari, in Section 11 of her rebuttal, indicates that the method of calculating outflow is conservative. Can you comment?

A. As stated in my testimony, the calculation for outflow was based on equations presented in the Frequency-Volume Study filed with the Keystone Siting Application. My request in the testimony was for Keystone to provide the

assumptions that are used to produce the plot of spill volume estimates shown in Figure 2 of the response to Data Request 2-14. These assumptions apparently reduce the conservatism of the equations used in the Frequency-Volume Study, resulting in lesser estimated spill volumes. The rebuttal testimony of Mr. Thomas addresses the assumptions in more detail.

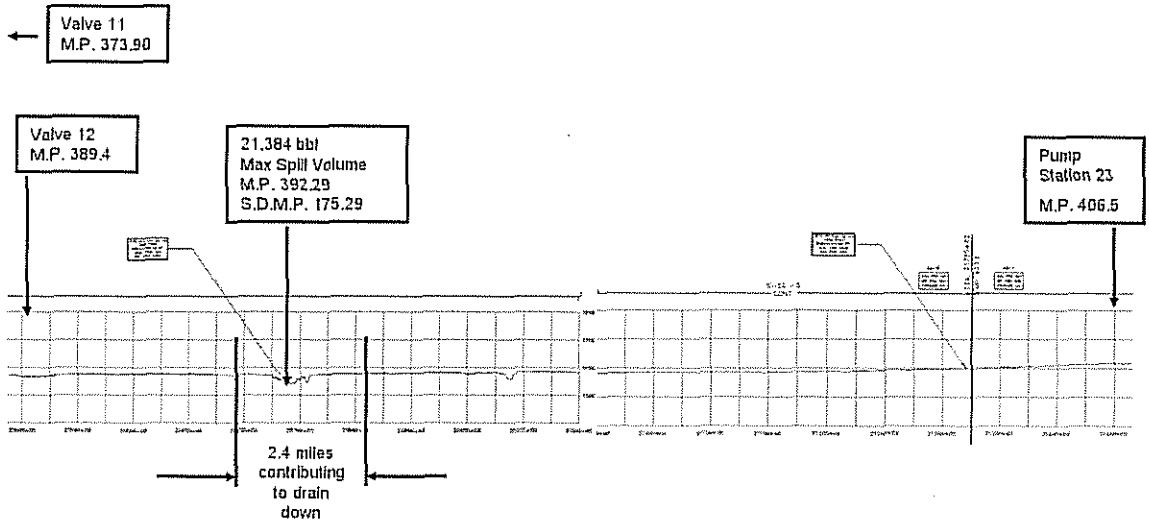
I would like to emphasize that these spill volumes are based on a 10 inch diameter hole in the pipe, similar to what might be caused during excavation damage. The depth of cover of 48 inches required reduces the likelihood of such an occurrence.

Mr. Thomas indicates that the leak model has been revised from that presented in the 'Frequency- Volume Study' submitted with the initial siting application. The model still consists of a dynamic phase and a static phase. The dynamic phase refers to the period of the release prior to pump shutdown and valve closure. The static phase accounts for the draining of the product after isolation.

The dynamic phase leak rate is determined by the pressure at the leak site based on the hydraulic profile and the corresponding pipeline flow rate. The maximum leak rate is equal to the flow rate – the pipeline can not leak more product than is flowing through the pipe. At locations on the pipeline where the pressure is below approximately 70 psi (near the suction side of a pumping station), the leak rate is determined by the orifice equation and may be lower than the flow rate. Mr. Thomas presents an example at South Dakota M.P. 175.29 (= M.P 392.29

total pipeline) using a pipeline flow rate of 591,000 barrels per day. The leak rate during the dynamic phase is based on a 21 minute shutdown period. The product escaping during this time is estimated to be 8,619 barrels based on the flow rate. This is a reasonable estimate for the dynamic phase.

The amount of product escaping during the static phase is based on the volume between valve locations. All the volume is allowed to escape except that volume trapped due to the elevation profile. In the example, of the 41.4 miles between Pump Station 23 (M.P. 406.5 – total pipeline) and isolation valve 11 (M.P. 373.90 – total pipeline), all but 2.4 miles are trapped due to the elevation profile. This converts into a volume of 12,765 barrels released during the static phase from drain down. The total spill volume is estimated as 21,384 barrels - 8,619 barrels during the dynamic phase and 12,765 barrels during the static phase. The figure below illustrates the situation on the hydraulic profile sheet provided by Keystone in response to Data Request 6-35.



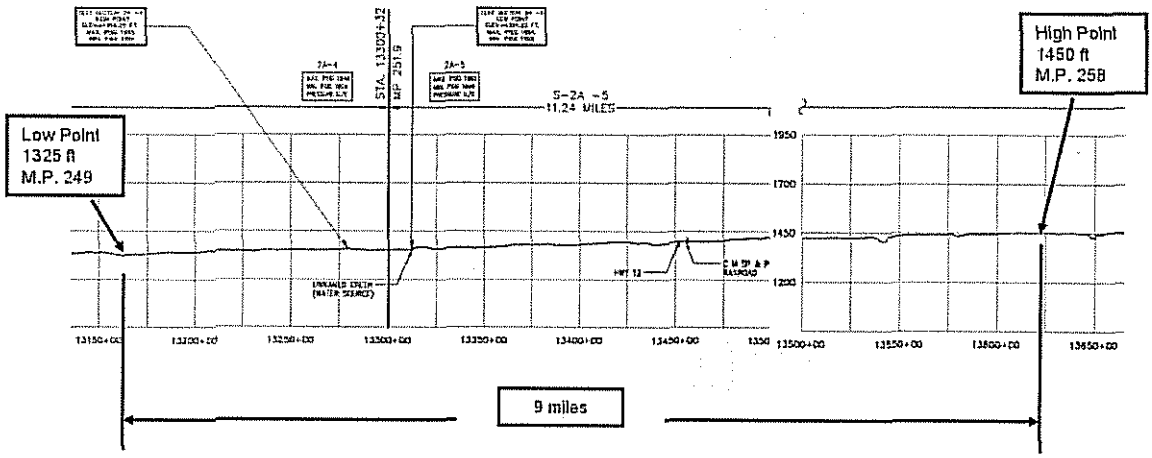
The figure assumes that South Dakota M.P 1 used in Mr. Thomas's rebuttal is equal to M.P. 217 based on the total pipeline. The example location South Dakota M. P. 175.29 would correspond to pipeline M.P. 392.29. If the mile post number conversion is correct, the pipeline segment lies between Valve 12 at M.P. 389.4 and pump station 23 at M. P. 406.5 as shown above.

The rebuttal testimony of Mr. Thomas includes a plot showing the maximum calculated spill volume along the pipeline in South Dakota assuming a pipeline flow rate of 591,000 barrels per day. The maximum spill volume corresponds to the example location above (South Dakota M.P. 175.29) of 21,384 barrels.

The example illustrates the following:

- At pipeline locations where no static phase discharge volume is expected, the maximum spill volume is the dynamic phase release volume of 8,619 barrels. This would correspond to locations at high local elevations. The plot of maximum calculated spill volume shows that this value is the minimum volume expected.
- The maximum estimated spill volume results from a static phase (drain down) release of 2.4 pipeline miles of product. This is the estimated maximum at any point along the pipeline in South Dakota.

In my original testimony, I stated that the estimated leak value estimates were low, particularly for pipeline regions in the northern portion of the state. The revised estimates are lower still. Below is a plot of the pipeline segment on the hydraulic profile plot from M.P. 249 to M.P. 258. The difference in elevation is 125 feet between the locations. The gradual slope is relatively constant between these 2 locations. The Keystone model suggests that the total volume of drain down is less than 2.4 miles for this segment even if a leak occurred at the low point.



It is not obvious that any of the pipeline volumes shown above would be trapped due to the elevation profile. I therefore repeat my request that Keystone submit the assumptions used in the calculations of the spill volumes for review prior to the hearing. These assumptions may include criteria for determining what constitutes a trapped volume due to an elevation profile or any vacuum or siphon effects.

Q. Does this conclude your testimony?

A. Yes it does.