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 Brenda Winkler on behalf of the
Staff of the South Dakota Public Utilities Commission

November 28, 2007

BEFORE THE SOUTH DAKOTA PUBLIC UTILITIES COMMISSION

SURREBUTTAL TESTIMONY OF BRENDA WINKLER

Q: Please state your name and occupation.

A: Brenda L. Winkler, PG, Project Manger, Bay West Inc., Whitefish, MT 59937

Q: Did you provide direct testimony in this proceeding?

A: Yes.

Q: To whose testimony are you responding?

A: I am responding to the direct testimony of David Wade and Curt Hohn, and the rebuttal testimony of Heidi Tillquist.

Q: Mr. David Wade, General Manger, BDM Rural Water System, Inc expressed concerns about the Middle James aquifer. "This is our only source of drinking water and could easily become contaminated in the event of a crude oil or fuel spill. The Middle James aquifer is very close to the surface in the proposed crossing area. Most recharge to the James aquifer is by percolation of precipitation in ranges 58 and 59 W of T 128 N. This puts the proposed pipeline directly through the most important part of our drinking water source." Can you comment?

A: Although the Middle James Aquifer was not identified as a High Consequence Area (HCA) in the Draft Environmental Impact Statement (DEIS), the Middle James Aquifer could be considered a potential hydrogeologic sensitive area in northern Brown County where there is approximately 6 to 7 miles of Aeolian Sand deposits present at the ground surface. The Aeolian Sands have an average thickness of 45 feet and could be hydraulically connected to the water bearing zone of the Middle James Aquifer.

The Middle James Aquifer is a drinking water resource within the proposed pipeline corridor that is mainly located within Lacustrine silt and clay deposits. The water bearing zone of the Middle James Aquifer occurs in the lenticular sand and gravel deposits located within the Lacustrian silts and clays. The Middle James Aquifer is described as an artesian aquifer that is fed by the lower bedrock aquifers and, in Brown County, by the Elm aquifer to the west. In addition to the hydrologic connection from the Elm and

bedrock aquifer the Middle James also receives recharge from percolation of precipitation through the Lacustrine Silts and Clays.

Review of the *Geology and Water Resources of Marshall County, South Dakota,* South Dakota Geological Survey (SDGS), 1975, which is adjacent to Brown County, indicates that the Middle James Aquifer is not under artesian conditions and that the water bearing sands and gravels are in contact with the Aeolian Sand deposits. Therefore, it is possible that the Aeolian Sand deposits in Brown County are also in contact with the water bearing sands and gravels. If this geologic condition exists, the Middle James Aquifer could be potentially sensitive to a crude oil release. Review of the lithological cross section completed by the SDGS, Figure 13 (G-G') *Geology and Water Resources of Brown County, South Dakota,* indicates clay and silt deposits (< 1 meter) separate the sand units. In addition, this cross section along with a review of the bedrock maps of Brown County indicate that there is approximately 60 to 70 feet of separation between the land surface and the first occurrence of the Middle James Aquifer. Based on this degree of separation the risk to the aquifer is reduced.

With the exception of the 6 to 7 miles of Aeolian Sand deposits present in northern Brown County, a majority of the proposed pipeline route crosses Lacustrian and Glacial Till deposits primarily consisting of silts and clays. Groundwater is generally present in water bearing sand and gravel lenses and buried stream channels that are present within these Lacustrian and Glacial Till deposits. The silts and clays will typically inhibit the downward migration of groundwater and/or contaminants to any underlying groundwater adding a layer of protection for the water table aquifer in the event a release occurs.

Q: Mr. Curt Hohn, at page 2 of his testimony stated that "One of the few sources of quality water in the area is the glacial drift area that makes up the James Aquifer and the Deep James Aquifer located along the west edge of Marshall, Day and Clark Counties." Is the answer the same as it was for Mr. David Wade?

A: Yes.

Q: Mr. Curt Hohn, at page 12 of his testimony stated that "..the aquifer ranges from 8 to 50 feet from the soil surface and offers a reliable water supply..." Can you comment on this?

A: Although the water table is measured in some areas near the surface it is generally measured within the Lacustrine and Glacial Till silts and clays. Potable groundwater is obtained from the water bearing sand and gravel lenses and buried stream channels that are present within these Lacustrian and Glacial Till deposits. The silts and clays will typically inhibit the downward migration of groundwater and/or contaminants to any underlying water bearing sands and gravel zones, thereby adding a layer of protection in the event a release occurs.

Q: Ms. Heidi Tillquist, at page 6 of her rebuttal testimony responded to Mr. David Wades concerns regarding the Middle James Aquifer and concludes that any contamination would move away from, not toward the BDM water supply area and that the James Aquifer is generally confined under 50 to 100 feet of clay or till along the ROW through Marshall County and that groundwater contamination of the James Aquifer is unlikely due to the depth of the aquifer and due to the presence of confining layers. Can you comment?

A: Although the pipeline may be downgradient of (water moves away from) the BDM water supply area, it may be upgradient of (water moves towards) other users. In addition, the Middle James Aquifer could be considered a hydrogeologic sensitive area in northern Brown County where there is approximately 6 to 7 miles of Aeolian Sand deposits present at the ground surface that could be hydraulically connected to the Middle James Aquifer. Although the Middle James aquifer may not be considered a HCA, Keystone should consider voluntarily identifying this sensitive area in their integrity management plan and appropriately planning to further protect this resource.

Other areas of the proposed pipeline route have Glacial Till deposits primarily consisting of silts and clays that will add a layer of protection for resource groundwater aquifers in the event a release occurs.

Q: Ms. Heidi Tillquist, at page 8 of her rebuttal testimony responded to your concerns regarding geologically sensitive areas, the Niobrara formation in particular. Can you comment?

A: Subsequent discussions with Derik Isles, South Dakota Geologic Survey (SDGS) confirm there are no karst features and/or karst areas within the proposed pipeline route. The map that was included in the DEIS was an older regional United States Geological Survey map which identified geologic units that contained rock types seen in karst areas. However, karst areas do not exist in South Dakota in association with the Niobrara Formation.

Q: Does this conclude your testimony?

A: Yes it does.