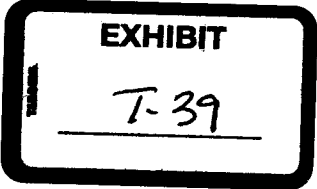


Keystone Pipeline Project – Analysis of Risk to Fargo Water Supply



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1.0 Summary of Testimony from Previous Hearing

Due to the terrain that largely prevents the transport of a spill, there are a limited number of locations where a hypothetical spill could possibly reach the Sheyenne River/Lake Ashtabula. The chance of a spill occurring in these areas is no more than one in 5,400 years. The probability of a large spill capable of reaching flowing stream channels further reduces the risk by approximately two orders of magnitude (i.e., in the order of one in every 500,000 years). If the highly improbable sequence of events occurred and allowed a spill to enter tributary channels leading to the Sheyenne River, emergency response procedures would limit the dispersal and cleanup oil, thereby limiting effects to water quality. Operators of downstream water supply wells and surface water intakes would be notified and shutdown until contamination had past. Any adverse affects to water quality would be transient and temporary. Consequently, this analysis indicates that adverse affects to public water supplies are improbable and unlikely to cause water quality concerns.

2.0 City of Fargo’s Water Supply

The City of Fargo utilizes the Red River of the North for its primary drinking water supply with backup from the Sheyenne River. (City of Fargo website: <http://www.ci.fargo.nd.us/Residential/CityServices/Healthservices/EnvironmentalHealth/Drinkingwater/>). Water from the Lake Ashtabula is transported from the Baldhill Dam area to Fargo via the Sheyenne River, a distance of more than 236 miles. Water intakes then transport the water from the Sheyenne River where it enters the City of Fargo’s water supply system.

As discussed in my prior testimony, it is highly improbable that a spill would ever reach Lake Ashtabula or the Sheyenne River. However, assuming that this did occur, a spill would need to travel approximately 236 miles¹ prior to reaching the water intake for the City of Fargo along the Sheyenne River. If the spill occurred above Lake Ashtabula, the spill would have to travel a minimum of 15 miles along the surface of Lake Ashtabula prior to the reaching the Baldhill Dam. Assuming a spreading rate of 1,000 feet per hour (American Petroleum Institute 1999), it would take over 3 days for the spill to reach the Baldhill Dam. Consequently, Keystone would have sufficient time to detect and contain the spill well before oil ever reached Baldhill Dam.

If a spill occurred and reached the Sheyenne River, the oil would be transported downstream until it was contained by emergency response crews. Distance from the Sheyenne River crossing to Fargo’s intake along the Sheyenne River. The City of Fargo estimates that it takes approximately 14 days during normal flows for water to arrive at the Fargo intake from Baldhill Dam when Fargo orders water from this source (Grubb 2007).

¹ River miles measured by GIS from Baldhill Dam to the Sheyenne River intake. The U.S. Army Corps of Engineers (USACE) states that the distance to the confluence with the Red River is 271 miles (USACE 2007).

Keystone's emergency response procedures would contain oil well before any oil would reach Fargo. If Fargo was required to use the Sheyenne River due to drought conditions, low flows are expected in the Sheyenne River. Reduced flows would increase transit time providing additional time for protection of Fargo's water supply.

Finally, if a spill was to occur and the spill had the potential to reach the Sheyenne River, Keystone would notify downstream water officials to ensure that intake structures were shutdown to prevent any contamination entering the water system. Water officials would not reopen water intake structures until the potential hazard had passed.

It should be noted that there are existing hazardous liquid pipelines that cross both the Sheyenne and Red rivers above the City of Fargo (**Table 1**). Many of these pipelines have successfully operated for decades and many transport liquids with much higher concentrations of BTEX compounds that could affect water quality.

In summary, the chance of a spill capable of affecting Lake Ashtabula is highly improbable and the potential for impacts to the City of Fargo's backup water supply is negligible.

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In summary, the chance of a spill capable of affecting Lake Ashtabula is highly improbable and the potential for impacts to the City of Fargo's backup water supply is negligible.

Table 1 Summary of Existing Pipelines Crossing Upstream of Fargo, North Dakota.

Drainage	Pipeline	Pipe Diameter	Material Transported
Sheyenne River	Cenex	8 inches	Refined Petroleum Products ¹
Sheyenne River	Dome / Cochin	12 inches	Natural Gas Liquids
Sheyenne River	Amoco / Magellan	8 inches	Refined Petroleum Products
Sheyenne River	Dome / Cochin	12 inches	Natural Gas Liquids
Sheyenne River	Williams / Magellan	6 inches	Refined Petroleum Products
Red River	Cenex	8 inches	Refined Petroleum Products
Red River	BP / Magellan	6 inches	Refined Petroleum Products
Red River	Portal	16 inches	Crude oil
Red River	Dome / Cochin	12 inches	Natural Gas Liquids

¹Refined petroleum products include gasoline, jet fuels, diesel, and other products.

3.0 Conclusion and Recommendation

Due to concerns about potential impacts to water resources, Keystone has conducted an assessment of the potential impacts of a hypothetical crude oil spill in the Lake Ashtabula and the Sheyenne River area. This assessment evaluated four hypothetical transport routes from the Keystone Pipeline to these waterbodies: 1) subsurface transport, 2) overland transport, 3) transport down dry stream channels, and 4) transport down flowing stream channels. The analysis concluded that the only viable transport route to Lake Ashtabula and the Sheyenne River is via a flowing stream channel. If water was flowing, 12 intermittent streams could potentially act as conduits for transporting crude oil to the Sheyenne River / Lake Ashtabula. The chance of any size spill occurring near a flowing intermittent or perennial stream leading to the Sheyenne River / Lake Ashtabula is no more than one in 5,400 years. Because large spills (thousands of barrels) are uncommon, the chance of a large spill capable of actually reaching the stream channel and being transported downstream is even more remote by two orders of magnitude (i.e., no more than once in 500,000 years).

Water from Lake Ashtabula is the backup water supply for Fargo. Assuming that a series of improbable events occurred and that a spill did reach Lake Ashtabula, the oil still would have to be transported a minimum of 15 miles downstream within Lake Ashtabula plus an additional 239 miles along the Sheyenne River, taking an estimated 7 days before it could potentially reach the City of Fargo's intake (Walaker 2007). Keystone's emergency response procedures would contain oil well before any oil would reach Fargo and Keystone would notify downstream water officials to ensure that intake structures were shutdown to prevent any contamination entering the water system.

In summary, the chance of a spill capable of affecting Lake Ashtabula or the Sheyenne River is highly improbable and the potential for impacts to the City of Fargo's backup water supply is negligible. As evidence of the safety of pipelines, there are multiple existing pipelines that cross the City of Fargo's primary and secondary water supplies for decades.

Based upon the analysis provided in this report, the Keystone Pipeline poses minimal risk to Lake Ashtabula, the Sheyenne River, and the City of Fargo's water supply.

References

- American Petroleum Institute. 1999. Fate and Environmental Effects of Oil Spills in Freshwater Environments. API Publication 4675.
- Minnesota Pollution Control Agency. 2007. Natural Attenuation of Groundwater. Internet website: <http://www.pca.state.mn.us/water/groundwater/natural-attenuation.html>.
- Pipeline and Hazardous Materials Safety Administration. 2007. Distribution, Transmission, and Liquid Accident and Incident Data. Website (downloaded on October 25, 2007): <http://ops.dot.gov/stats/IA98.htm>
- U.S. Army Corps of Engineers (USACE). 2007. Website (downloaded on October 29, 2007): <http://www.mvp.usace.army.mil/docs/rec/ashtabula.pdf>
- Walaker, D. 2007. Mayor of Fargo, phone communication with J. Rauh of the Keystone Pipeline. October 26, 2007.