

**STATE OF NORTH DAKOTA
PUBLIC SERVICE COMMISSION**

TRANSCANADA KEYSTONE PIPELINE, LP

CASE No. PU-06-421

30-INCH CRUDE OIL PIPELINE/CAVALIER TO SARGENT COUNTIES

SITING APPLICATION

OAH CASE No. 20070181

**TESTIMONY OF HEIDI TILLQUIST
IN SUPPORT OF APPLICATIONS**

FOR A CORRIDOR CERTIFICATE AND ROUTE PERMIT

HEIDI TILLQUIST, BEING FIRST DULY SWORN, ON OATH, DEPOSES AND STATES AS FOLLOWS:

1. My name is Heidi Tillquist. I am employed as an environmental toxicologist and project manager with ENSR in Fort Collins, Colorado. ENSR is providing environmental consulting services to TransCanada Keystone Pipeline, L.P. (Keystone) with respect to the Keystone Pipeline project.
2. I am filing this testimony on behalf of Keystone, in support of its applications for a Certificate of Corridor Compatibility and a Route Permit for the proposed Keystone project.
3. I am attaching a copy of my resume and professional qualifications.
4. On April 10, 2007, Keystone filed an application for a Certificate of Corridor Compatibility and an application for a Route Permit, pursuant to the North Dakota Energy Conversion and Transmission Facility Siting Act, North Dakota Century Code, Chapter 49-22.

5. By its applications, Keystone seeks authorization to site and construct a 30-inch crude oil pipeline and appurtenant facilities, which will deliver crude oil from an oil supply hub near Hardisty, Alberta, Canada to Wood River and Patoka, Illinois and Cushing Oklahoma.
6. The pipeline will enter North Dakota at the North Dakota/Canada border in Cavalier County and will extend in a southerly direction, exiting the State at the South Dakota border in Sargent County. The length of the pipeline in North Dakota will be approximately 218 miles.
7. Keystone's applications address the elements required by the North Dakota Century Code. The Corridor Certificate application is organized pursuant to the North Dakota Public Service Commission's (Commission) "Application Guidelines for a Certificate of Corridor Compatibility."
8. I am responsible for the following portions of Keystone's application for a Certificate of Corridor Compatibility:
 - a. Section D.2.c.ii(6). – Selection Criteria, Human Health and Safety. Location and Design. I am responsible for the portions of this section that address risk assessment and environmental consequence analysis.
 - b. Section D.2.c.ii(7). – Selection Criteria, Animal Health and Safety. I am responsible for the portion of this section addressing the risk of an accidental crude oil release and potential impacts.

Heidi Tillquist, M.S.

Years Experience: 17

Technical Specialties

- Risk Assessment
- Environmental Toxicology
- Fisheries Biology
- Wildlife Biology

Professional History

- ENSR
- U.S. Fish and Wildlife Service
- Lovelace Inhalation Research Institute
- U.S. Forest Service

Education

- MS (Environmental Toxicology) Colorado State University
- BS (Fishery and Wildlife Biology) Colorado State University

Professional Registrations and Affiliations

- Certified Fisheries Professional, American Fisheries Society
- Certified Wildlife Biologist, The Wildlife Society
- Society of Environmental Toxicology and Chemistry

Representative Project ExperiencePipeline Experience

Keystone Pipeline Project, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Missouri, and Illinois. Keystone is proposing to construct a 1,372 mile pipeline system in the U.S. to transport Canadian crude oil to refinery destinations in the mid-western U.S. Keystone has prepared technical documents that were filed with the Department of State, the lead federal agency for the EIS. Ms. Tillquist is responsible for conducting a risk assessment for accidental releases from the pipeline system, including estimates of the probability of occurrence base on Office of Pipeline Safety data bases and sensitive area maps; estimates of potential toxicological effects on wildlife, fisheries, domestic livestock, and humans from crude oil releases; and estimates of oil spill recovery rates in terrestrial and aquatic systems.

EXHIBIT

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Shell Pipeline Company, New Mexico Products Pipeline EIS, New Mexico and Texas. Shell proposed to convert and reverse the flow of an existing 406-mile crude oil pipeline to transport refined petroleum products (i.e., gasoline, diesel, jet fuel). System conversion also entailed the construction of two new pipeline extensions (about 100 miles total), pump stations, pressure reducing stations, miscellaneous appurtenances, and associated electrical transmission lines. The project would affect portions of New Mexico and Texas, involving many local, state, federal, and tribal jurisdictions. Due to public concern, a probabilistic risk assessment evaluated risk to humans and the environment that could result from the accidental release from the pipeline and its facilities. Pipeline safety was identified as one of the key issues due to the existing pipe's age (45 years old) and its composition (pre-1970 electric resistance welded [ERW] pipe). Historically, pre-1970 ERW pipe has a higher than expected rate of failure. Due to the extreme scrutiny of this project and high probability for litigation, the BLM requested that the pipeline's structural integrity be carefully evaluated. Information from various sources (e.g., previous hydrostatic test; leak history; pipeline repairs; magnetic particle inspection; burst test; close interval survey) were compiled and integrated into a risk assessment where the time-to-failure was calculated, based on Shell's proposed hydrostatic test pressures and proposed operating cycles (frequency and magnitude). The probability of a failure due to pressure reversal and stress-induced cracking was determined to be low. Presuming the pipe passes the pre-operational hydrostatic test and in-line inspection, the elevated hydrostatic test pressures and low frequency, low-magnitude operating cycles proposed by Shell in High Consequence Areas would provide sufficient protection to reasonably ensure the safety of nearby residences and environmental resources.

The EIS also evaluated the potential consequences of a release. Risk statistics were generated from the Office of Pipeline Safety (OPS) database and the potential impacts to sensitive resources were identified. Results indicate that alternatives to the proposed project, including No Action, Pipe Replacement, and Pipe Reroute, would pose greater risks to the public and environment. Moreover, the risk was not distributed equally along the pipeline route. For the pipeline alternatives, risk to environmentally sensitive areas (e.g., groundwater aquifers, residential areas) was disproportionately higher than for other less-sensitive areas along the pipeline. Ms. Tillquist conducted the risk assessment for the EIS, served on the Pipeline Safety Technical Panel, and acted as the Project Manager for this project.

Questar, Williams, Kern River Pipeline Companies, Environmental Impact Statement Preparation for Natural Gas and Crude Oil Pipelines, Utah, Colorado, New Mexico. This EIS incorporated information from three different pipelines. In the first proposal, Williams proposed to convert an existing crude oil pipeline to refined petroleum product service as well as construct new pipeline extensions. The entire project would extend about 500 miles through portions of New Mexico, Colorado, and Utah. In the second

and third proposals, Questar and Kern River proposed to simultaneously build natural gas transmission pipelines within a portion of the same corridor in Utah. ENSR prepared a third-party EIS for the BLM, the lead agency. Primary issues included petroleum spills, natural gas releases, and conflicts with inventoried roadless areas in National Forests. Due to increased public concern regarding the safety of pipelines, national US Department of Transportation incident databases were assessed and used to estimate the probability of future releases. Additionally, adverse effects to sensitive environmental receptors, including residential areas and endangered fish species, were evaluated.

At the BLMs request, ENSR conduct a detailed risk assessment as part of the NEPA process. The structural integrity of the existing pipe and the operational procedures proposed for the entire pipe system were evaluated to ensure the protection of public safety and the environment. The assessment process integrated operational and environmental factors that could affect the safe operation of the pipeline (e.g., cathodic protection measures, internal inspections, ongoing surveillance, leak detection capabilities, operational pressures and cycles, designed safety features, and emergency response capabilities). Geological hazards (e.g., seismicity, landslides) were examined to identify areas along the pipe that might be exposed to additional physical stress. Environmentally sensitive areas (e.g., drinking water recharge area, residential areas, threatened and endangered species habitat) were also incorporated into the analysis. This information was integrated into a comprehensive risk assessment framework that also estimated the probability of an incident (spill, injury, fatality, fire, or explosion) based on the existing pipe's leak history and national statistics. Once the probability of an event was estimated, the potential consequences of a release to sensitive resources were quantified. Based on the assessment, the potential risks to public safety and drinking water sources were considered among the highest priority risks. While no additional safety mitigation was required for the natural gas pipelines, the BLM and Williams met to jointly discuss the analysis, the areas of potential risk from a liquid spill, and discuss potential mitigation. Ultimately, Williams modified their operational plans to further reduce the hazard to these sensitive areas to the satisfaction of BLM technical staff. Ms. Tillquist conducted the risk assessment for the EIS and acted as the Assistant Project Manager for this project.

Entrega Gas Pipeline Inc., Entrega Pipeline Project EIS, Colorado, Wyoming.

Entrega Gas Pipeline Inc. (a subsidiary of EnCana Oil and Gas) proposed to construct and operate a 327.5-mile 36- to 42-inch-diameter natural gas transmission pipeline. The pipeline would transport up to 1.5 Bcfd of natural gas from the Piceance Basin in Colorado to interconnections in Wamsutter and near Cheyenne, Wyoming. ENSR was preparing the EIS as a third-party contractor to the FERC and the BLM was a cooperating agency. Major issues included potential impacts to threatened and endangered species (water depletion issues), noxious weed management, and socioeconomic impacts. Because Western Interstate Company (a subsidiary of El Paso Corporation) also proposed to build a large diameter pipeline from the Piceance Basin to

Wamsutter, cumulative impacts were also an issue. Ms. Tillquist served as the Project Manager on this project.

Wyoming Interstate Company, Piceance Basin Expansion Project EIS, Colorado, Wyoming. Wyoming Interstate Company (WIC, a subsidiary of El Paso Corporation) proposes to construct and operate a 141.7-mile 36-inch-diameter natural gas pipeline. The pipeline would transport up to 350 MMcf of natural gas from the Piceance Basin in Colorado to interconnections near Wamsutter, Wyoming. ENSR is preparing the EIS as a third-party contractor to the FERC and the BLM is a cooperating agency. Major issues include potential impacts to threatened and endangered species (water depletion issues), noxious weed management, and socioeconomic impacts. Because Entrega Pipeline Company Inc.(a subsidiary of EnCana Oil and Gas) also proposes to build a large diameter pipeline from the Piceance Basin to Wamsutter, cumulative impacts are also an issue. Ms. Tillquist serves as the Project Coordinator for this project.

Questar Natural Gas Company, Preparation of the Southern Trails Natural Gas Pipeline Environmental Impact Statement (EIS)/Environmental Impact Report (EIR), California, Arizona, Utah, and New Mexico. Questar proposed to convert a 600-mile crude oil pipeline to the Southern Trail natural gas pipeline. Construction resulting from the proposed extensions, reroutes, realignments, and replacements affected portions of California, Arizona, Utah, and New Mexico and involved many local, state, federal, and tribal jurisdictions. ENSR prepared this third-party EIS/EIR for the Federal Energy Regulatory Commission (FERC). Ms. Tillquist participated in project coordination, wrote several technical sections, and provided technical review of the EIS.

El Paso Energy, Federal Energy Regulatory Commission (FERC) Application to Convert a Crude Oil Pipeline to Natural Gas Pipeline, Texas, New Mexico, Arizona. ENSR coordinated El Paso Energy's Line 2000 application to the FERC for the conversion of an existing approximately 800-mile crude oil pipeline to natural gas service. This conversion project affected lands within Texas, New Mexico, and Arizona. ENSR's duties included the preparation of FERC resource reports, an applicant-prepared biological assessment (BA), applicant-prepared environmental assessment (EA), and 404 permit. Project management activities including project budgeting, coordinating office staff and field survey crews, and creation and maintenance of a database detailing over 300 construction sites and activities.

Newfield Exploration Company, Castle Peak and Eightmile Flat Oil Expansion Project, Utah. ENSR was contracted by the BLM's Vernal Field Office to prepare a third-party EIS for a proposed expansion of oil field development operations in the Uintah Basin area of northeastern Utah. The study area covers approximately 110 sections or 65,500 acres. Inland is proposing to expand its existing waterflood oil recovery operations by drilling up to 900 additional wells in the Castle Peak and Eightmile Flat areas of the greater Monument Butte-Myton Bench oil and gas

production region. Important issues associated with this project included cumulative effects to raptor species in the Uintah Basin, air quality, and effects on sensitive species, such as the mountain plover and hookless cactus. ENSR also prepared a Biological Assessment for the U.S. Fish and Wildlife Service as part of the project permitting requirements. Ms. Tillquist evaluated the effects of habitat fragmentation on wildlife resources.

Risk Assessment – Oil and Gas Emphasis

Inland Resources, Natural Gas Liquid Pipeline Environmental Assessment, Wyoming. Inland Resources plans to develop an area for natural gas liquids extraction. As part of the development, a new pipeline would be constructed which would cross a tributary to the Green River in Utah, which contains several endangered fish species. At the request of the BLM and US Fish and Wildlife Service, the potential hazard posed by the pipeline was evaluated by assessing the likelihood of a spill, attenuation rates, and dilution potential. Additionally, cumulative risk from other natural gas liquid pipelines within the same drainage was also estimated. Based on the pipelines location, volume of natural gas liquids, probability of failure, and likelihood of downstream transport, the assessment showed that no impacts to endangered fish species would be anticipated.

American Petroleum Institute (API), Fate and Environmental Effects of Oil Spills in Freshwater Environments. ENSR prepared a report for API describing the fate and effects of oil spills in freshwater environments. This report summarizes and documents potential environmental effects from inland oil spills into fresh surface waters. It identifies, describes, and compares the behavior, fate, and ecological implications of crude oil and petroleum products in inland waters. The document is intended to provide basic information necessary for the formulation of spill response strategies that are tailored to the specific chemical, physical, and ecological constraints of a given spill situation. The report describes the relevant features of various inland spill habitat types, discusses the chemical characteristics of oils and the fate processes that are dependent thereon, summarizes reported ecological and toxicological effects results both generally and with specific reference to distinct organism groupings, and, finally, in the context of case histories from past spills, highlights some of the considerations, difficulties, and elements of success of presently available spill response techniques.

Bolivian National Government, Evaluation of the Transredes Petroleum Product Spill, Bolivia. Following a pipeline rupture on the Rio Desaguadero, the spatial extent and environmental effects of hydrocarbon contamination was evaluated by chemical analysis of environmental media and laboratory toxicity tests. These data were then used in a risk assessment to evaluate the potential risk to aquatic biota, terrestrial herbivores (cattle, sheep, and endangered vicunas), and human receptors.

Reliant Energy, Pipeline and Facility Decommissioning Evaluation, New Jersey and Pennsylvania. Reliant owned a 10-mile pipeline that had been used to transport fuel oil #6 (historically) and fuel oil #2 (currently). The company also owned a related facility with breakout tanks and aboveground piping. Reliant was considering temporarily (1 to 3 years) suspending the transport of oil through the pipeline and facility and, perhaps, totally abandoning these assets. Alternatively, Reliant could choose to reactivate the pipeline after a temporary suspension. Ms. Tillquist evaluated the federal, state, and local regulations that govern the temporary suspension, reactivation, and abandonment processes. Additionally, she identified technical issues that would be associated with each process. Finally, ENSR provided Reliant with a range of anticipated costs associated with each of these activities.