

STATE OF NORTH DAKOTA
PUBLIC SERVICE COMMISSION

**TransCanada Keystone Pipeline, LP
30-Inch Crude Oil Pipeline/Cavalier to Sargent
Counties
Siting Application**

Case No. PU-06-421

FINDINGS OF FACT, CONCLUSIONS OF LAW AND ORDER

February 21, 2008

Appearances

Commissioners Susan E. Wefald, Tony Clark, and Kevin Cramer.

Thomas D. Kelsch and Todd D. Kranda, Kelsch Kelsch Ruff & Kranda, 103 Collins Avenue, Mandan, ND 58554 on behalf of the Applicant TransCanada, Keystone Pipeline, LP.

Nicholas R. Delaney, Rinke Noonan US Bank Plaza, Suite 300, St. Cloud MN 56302 on behalf of Interveners Dakota Resource Council, Ramona Klein, Merle and Linette Kratochvill, Janie and John Capp, and Mark Novak.

Janie and John Capp, 12466 60th ST NE, Lankin, ND 58250, Interveners.

Erik R. Johnson City Attorney Fargo, 505 Broadway St N Ste 206 Fargo, ND 58102 and John M. Dingess and Pat Madsen Duncan, Ostrander & Dingess PC 3600 S Yosemite St Ste 500 Denver CO 80237-1829, on behalf of the City of Fargo.

Matthew Shimanek, Hammarback, Dusek & Associates, PLC 712 DeMers Ave. East Grand Forks, MN 56721, and Jana M. Linderman (IA #AT00004750) Plains Justice 100 1st Street SW Cedar Rapids, Iowa 52404 on behalf of Interveners Dakota Resource Council, Ramona Klein, Merle and Linette Kratochvill, Janie and John Capp, and Mark Novak.

William W. Binek, Chief Counsel, Public Service Commission, 600 East Boulevard, Bismarck, North Dakota 58505, on behalf of the Public Service Commission.

Patrick Fahn, Utility Analyst, Public Service Commission, 600 East Boulevard, Bismarck, North Dakota 58505 on behalf of the Public Service Commission.

Al Wahl, Administrative Law Judge, Office of Administrative Hearings, 1707 North 9th Street, Bismarck, ND 58501-1882, as Procedural Hearing Officer.

Preliminary Statement

On April 11, 2007 TransCanada Keystone Pipeline, LP (Keystone) filed an application for a certificate of public convenience and necessity (PCN) under N.D.C.C. Chapter 49-03.1 to construct and operate the Keystone Pipeline in Cavalier, Pembina, Walsh, Nelson, Steele, Barnes, Ransom, and Sargent Counties of North Dakota. The crude oil pipeline route is specifically shown by route maps included in Keystone's application. Approximately 218 miles of the Keystone Pipeline is located in North Dakota, Case No. PU-07-152.

On April 11, 2007 Keystone filed an application for a waiver of procedures and time schedules, and consolidated applications for a certificate of corridor compatibility and a route permit authorizing construction of the Keystone Pipeline, Case No. PU-06-421.

Keystone requests the Commission waive the procedures set forth in N.D.C.C. §§ 49-22-08 and 49-22-08.1 to allow for a single consolidated application for Corridor Certificate and Route Permit.

On May 2, 2007 the Commission deemed the application of Keystone complete and issued a Notice of Filing and Notice of Hearing scheduling a public hearing for Monday, July 23, 2007 in Valley City and for Tuesday, July 24, 2007 in Park River, North Dakota.

The issues to be considered in this proceeding are:

1. Will the location, construction, and operation of the proposed pipeline produce minimal adverse effects on the environment, natural resources, and upon the welfare of the citizens of North Dakota?
2. Is the proposed pipeline compatible with the environmental preservation and the efficient use of resources?
3. Will the proposed pipeline corridor and route minimize adverse human and environmental impact while ensuring continuing system reliability and integrity and ensuring that

energy needs are met and fulfilled in an orderly and timely fashion?

4. Is it appropriate for the Commission to waive the procedures as requested in the application including the request for a single consolidated application for Corridor Certificate and Route Permit?

On June 21, 2007 Gary R. Leistico and Nicholas R. Delaney, Attorneys at Law, on behalf of the Dakota Resource Council, filed a request to postpone the hearings until completion of the United States Department of State Environmental Impact Study (EIS) and the related comment period. As an alternative, the Dakota Resource Council requested that the Commission's approval of the application be postponed until after completion of the EIS and related comment period, after which the Dakota Resource Council would request an additional hearing to discuss environmental related concerns.

On June 27, 2007 the Commission denied Dakota Resource Council's request to postpone the hearings and to postpone approval of the application.

On July 11, 2007 Nicholas Delaney, Attorney at Law, filed a Petition to Intervene on behalf of The Dakota Resource Council, Ramona Klein, Merle and Linette Kratochvill, John and Janie Capp, and Mark Novak. The Dakota Resource Council is a non-profit membership based organization which seeks to, among other things, preserve the environmental integrity of North Dakota. A number of its members are landowners who will be affected by the proposed project. The Petitioners own property which will be affected by the proposed project.

On July 12, 2007 John and Janie Capp requested to intervene on their own behalf. John and Janie Capp own land that will be affected by the proposed project.

On July 13, 2007 the Commission granted the requests to intervene by The Dakota Resource Council, Ramona Klein, Merle and Linette Kratochvill, John and Janie Capp, and Mark Novak.

The hearing was continued to September 5, 2007 at the Commission Hearing Room in Bismarck.

On October 23, the City of Fargo filed a motion to intervene as a Party in the above action and to re-open the hearing.

On October 24, 2007 the Commission passed a motion to extend to December 12, 2007 the time for designation of a corridor and route.

On November 7, 2007 the Commission issued a Notice of Intent to Consider Information not Presented at a Hearing to incorporate items from the public input file for consideration in this proceeding.

On November 7, 2007 the Commission issued an order granting intervention to the City of Fargo and reopened the proceeding. The Commission limited the scope of the reopened proceeding, as authorized under Section 69-02-02-05 of the North Dakota Administrative Code, to the safety and public health issues relating to the water supply of the City of Fargo from Lake Ashtabula and the Sheyenne River.

The parties agreed to a hearing date and the Commission issued an Order on November 8, 2007 determining that an emergency exists under the circumstances of this proceeding and that hearing be scheduled on an expedited basis as authorized under N.D.C.C. § 49-22-13(4), and scheduling the hearing for November 27, 2007.

On November 27, 2007 the Commission passed a Motion to extend time to designate route and corridor to a date to be determined at a future time.

On December 20, 2007 Keystone and Fargo filed a Settlement Stipulation resolving Fargo's intervention in this proceeding. On December 26, 2007 Fargo filed a Motion to Withdraw as Party Intervenor.

On January 14, 2008 Administrative Law Judge Al Wahl issued an order granting leave to withdraw as intervenor to the City of Fargo effective December 20, 2007.

On January 17, 2008 Keystone filed a letter and drawing confirming that horizontal directional drilling (HDD) will be used for installation of the pipe at the Sheyenne River crossing.

On January 22, 2008 Keystone filed a letter stating it will install 0.72 pipe instead of 0.80 pipe in the area of the Fordville Aquifer from mile post 45.6 to mile post 47.9, and in the Lake Ashtabula area from mile post 126.7 to mile post 128.1.

On January 23, 2008 the Commission issued a notice of intent to consider, pursuant to N.D.C.C. § 28-32-25, the information filed by Keystone on January 17 and 22, 2008.

On January 29, 2008 Keystone filed a copy of a waiver of the 500 foot buffer zone avoidance area requirement for a residence signed by Albert and Gloria Wittenberg.

On January 30, 2008 the Commission issued a notice of intent to consider, pursuant to N.D.C.C. § 28-32-25, the information filed by Keystone on January 29, 2008.

On January 29, 2008 John Capp and Janie Capp filed e-mail comments in response to the January 23, 2008 notice of intent to consider information.

On February 6, 2008 Janie Capp filed e-mail comments in response to the January 23, 2008 notice of intent to consider information.

On February 6, 2008 intervenors Dakota Resource Council, Janie and John Capp, Ramona Klein, Linette and Merle Kratochvil and Mark Novak filed e-mail comments in response to the January 23, 2008 notice of intent to consider information.

Having allowed all interested persons an opportunity to be heard and having heard, reviewed and considered all testimony and evidence presented, the Commission makes the following:

Findings of Fact

1. As proposed, the Keystone Pipeline project in the State of North Dakota would constitute approximately 218 miles of 30-inch crude oil pipeline, five pumping stations, a total of 13 main line valves and four check valves. The pipeline is designed for a maximum allowable operating pressure of 1,440 pounds per square inch gauge.
2. There are approximately 2,124 miles of hazardous liquid pipelines in North Dakota. Approximately 1,024 miles of the total are crude oil pipelines.
3. The Keystone Pipeline's purpose is to transport Canadian crude oil from the Western Canadian Sedimentary Basin to markets in the United States. The project would commence at the crude oil supply hub near Hardisty, Alberta, Canada, and extend to Wood River and Patoka, Illinois. Initially, the pipeline will have a nominal capacity to transport 435,000 barrels of oil per day (bpd). Subsequently, the pipeline will be extended to a terminal at Cushing, Oklahoma and the nominal capacity will be expanded to 591,000 bpd. The length of the proposed facility in the United States is approximately 1,078 miles from the Canadian border to Patoka and an additional 294 miles for the Cushing Extension. The pipeline will enter North Dakota at the Canadian/North Dakota border in Cavalier County and will extend in a southerly

direction passing through eight counties, exiting the state at the South Dakota border in Sargent County.

4. Meera Kothari, a professional engineer responsible for pipeline design and pipeline integrity for the Keystone Pipeline project, stated that pipelines are the safest method of transporting crude oil and that transporting 435,000 bpd would require 7,000 trucks every day. The Commission agrees.

5. Keystone is required to obtain a Presidential Permit from the United States Department of State (DOS) to authorize the construction of pipeline facilities across the United States border pursuant to the authority delegated to DOS by the President of the United States under Executive Order No. 13337. DOS is responsible for preparing an Environmental Impact Statement (EIS) for the entire project as required by the National Environmental Policy Act (NEPA). To comply with NEPA, the principal objectives of the EIS are to identify and assess potential impacts on the environment that would result from the proposed project; describe and evaluate reasonable alternatives; identify the preferred alternative; identify and recommend specific mitigation measures; and facilitate public and agency involvement in identifying significant environmental impacts. The final draft EIS concluded that the proposed project, if designed, constructed, and operated in accordance with the project description and the mitigation measures proposed by Keystone, and additional permit conditions, would result in limited adverse environmental impacts.

6. The Keystone Pipeline utilizes a conversion of a natural gas line in Canada running from Alberta, Canada to a point north of eastern North Dakota. Keystone states that the use of this converted gas line has both economic and environmental benefits. Keystone states that the use of the existing natural gas line in Canada defined where the project enters North Dakota. Keystone states that the location of a suitable crossing of the Missouri River at Yankton, South Dakota defined where the project exits North Dakota at the South Dakota border.

7. Keystone considered locating the pipeline within the Interstate Highway 29 (I-29) right-of-way or adjacent to the I-29 right-of-way. According to the North Dakota Department of Transportation Policy Manual, location of the Keystone Pipeline within the I-29 right-of-way would not be permitted. Keystone contends that a pipeline route adjacent to the I-29 right-of-way would need to go around numerous overpasses, interchanges, and urban or developed areas further increasing the length and impact of the pipeline. Keystone states that a route along I-29 is not consistent with points Keystone has proposed for the United States/Canada border crossing location and the Missouri River crossing point.

8. Keystone considered a pipeline route adjacent to the existing Alliance Pipeline route. Keystone states such a route would be longer than the proposed route by over 100 miles.

9. We find that alternatives to the proposed route considered by Keystone would not minimize adverse effects and would likely increase the number of landowners affected and the environmental impact.

Pipeline Integrity

10. Kothari testified that she is responsible for ensuring the pipeline is designed, constructed, and operated in accordance with the Department of Transportation Pipeline and Hazardous Material Safety Administration (PHMSA) regulation at Title 49 Code of Federal Regulations Part 195 (49 CFR 195), and the American Society of Mechanical Engineer Standard B-31.4, Pipeline Transportation Systems of Liquid Hydrocarbons. She is also responsible for the development of a pipeline management plan.

11. 49 CFR 195 prescribes safety standards and reporting requirements for pipeline facilities used in the transportation of hazardous liquids or carbon dioxide. 49 CFR 195 prescribes design requirements for pipeline systems including the pipe, valves, fittings, and flanges; prescribes minimum requirements for constructing pipeline systems including field inspection of materials, pipeline location, pipe bending, welding, repair or removal of unacceptable welds, testing of welds, cover over the pipeline, ditch backfilling, valve installation and location, installation of pumping equipment; prescribes minimum requirements for pipeline pressure testing without leakage; prescribes minimum requirements for operator qualification of individuals performing pipeline facility tasks; and prescribes minimum requirements for protecting steel pipelines against corrosion including qualifications for supervisors, pipe coating, cathodic protection, monitoring of external corrosion control, mitigation of internal corrosion, protection against atmospheric corrosion, repair or replacement of corroded pipe, and corrosion control record keeping.

12. 49 CFR 195 prescribes minimum requirements for operating and maintaining pipeline systems after construction including the requirement for a manual of written procedures for conducting normal operations and maintenance activities and handling abnormal operations and emergencies. The procedural manual must be prepared before initial operations of a pipeline system commence. Normal operations and maintenance activities include a determination of which pipeline facilities are located in areas that would require an immediate response by the operator to prevent hazards to the public if the facilities failed or malfunctioned and minimizing the potential for such

hazards. Normal operations and maintenance activities also include abandoning pipeline facilities by safe disconnection from the operating pipeline system, purging of combustibles, and sealing abandoned facilities left in place. 49 CFR 195 also requires a written integrity management program that addresses the risks on each segment of pipeline in a high consequence area.

13. Kothari testified that, to safeguard against manufacturing defects, Keystone qualifies all pipe mills and steel manufacturers using a formal qualification process consistent with the industry and international standards to which quality control is managed in the industry. The pipe is engineered with stringent chemical requirements. Each batch of pipe is mechanically tested to prove its strength, fracture control and fracture propagation property. Pipe in the mill is hydrostatically tested for seam defects. Pipe seams are inspected using ultrasonic instruments and visually inspected. Coating is applied in the mill and the coating plants have similar quality control procedures.

14. Kothari testified that, to safeguard against construction defects, Keystone follows industry guidelines for overland transportation and barging over water. The pipe is examined selectively once offloaded from railcars using ultrasonic techniques. Pipe welds performed at the construction site are non-destructively inspected. One hundred percent of the girth welds are inspected. An electronic device called a holiday detector or jeep will traverse along the pipe to check for any nick or damage to the coating and repair it before the pipe is put into the trenches. Any defects in the coating are repaired prior to lowering the pipe into the ditch. At completion of construction, the pipeline is filled with water and pressurized 125% of its maximum operating pressure to test pipeline integrity including leaks. Any pipe that fails under hydrostatic testing is removed and replaced and the pipeline is again tested. At completion of construction, Keystone utilizes an in-line inspection tool (caliper pig) to check for dents or ovalities. Defects are removed. Three years after the pipeline has been placed into operation, Keystone will conduct another in-line inspection to ensure the integrity of the pipeline, and will investigate any anomalies found by this inspection.

15. To safeguard against external corrosion, a fusion bond epoxy (FBE) coating is applied to the pipe. In addition, Keystone will install a cathodic protection system to prevent corrosion in the event any damaged pipe coating is not detected and repaired. Kothari also testified that in the 28 years that TransCanada has been using FBE coating, there have been no leaks on this type of pipeline using FBE coating coupled with cathodic protection. Keystone has stipulated with the City of Fargo to install additional cathodic protection test stations at the contributory pipeline segments associated with the seven intermittent stream crossings between milepost 104.9 and 128, specifically at or near mileposts 104.9, 111, 112.8, 113.2, 126.8, 127.5, and 128.

16. To safeguard against internal corrosion, Keystone's tariff will restrict the amount of solid and water that is acceptable in the crude oil transported. Keystone periodically uses cleaning tools to push out any water at low points.

17. To detect both internal and external corrosion, Keystone periodically uses in-line inspection tools outfitted with sensors that can detect metal loss on internal and external pipe walls. With respect to the contributory pipeline segments associated with the seven intermittent stream crossings between milepost 104.9 and 128 (specifically at or near mileposts 104.9, 111, 112.8, 113.2, 126.8, 127.5, and 128), Keystone has stipulated with the City of Fargo to perform a high resolution in-line inspection for internal and external corrosion within the first three years of operation and to re-inspect within 5 years of the initial inspection.

18. To safeguard against third-party damage to the pipeline system, Keystone will conduct air patrols per PHMSA pipeline safety regulations, which is 26 times a year, not to exceed three weeks apart. Keystone will also participate in the State One-Call program, install marker signs, and implement a public awareness program.

19. To safeguard against overpressure of the pipeline, the Keystone Pipeline will utilize a Supervisory Control and Data Acquisition (SCADA) system. The SCADA system includes automatic operations to remotely prevent line overpressure and also allows a pipeline operator to remotely control pipeline valves. The SCADA system monitors and electronically reports flow, pressure, temperature, and other data to the control center located in Calgary, Alberta, Canada.

20. Brian J. Thomas, President of BRIWEST Energy Ltd. providing consulting services with respect pipeline construction and operation of the Keystone Pipeline project, testified that the SCADA system is comprised of three components: (i) equipment installed at the pump stations and valve sites; (ii) a communications link so the equipment can speak to the host system in the control center at Calgary; and (iii) the host system installed in the operations control center in Calgary that allows the operator to remotely control and operate the pipeline. The Calgary operations control center is manned every day of the year, 24 hours a day. The system includes a fully redundant "hot standby" system that can be utilized in the event of trouble with the primary system. In the event of a communications failure, equipment installed at the pump stations will take over.

21. The record indicates 5 pump stations located approximately 40 to 50 miles apart at mileposts 33.1, 76.2, 123.7, 170.9, and 217.7. Keystone proposes to have 13 mainline valves located approximately 15 to 20 miles apart. Some of the mainline valves are at the pump stations. Ten of the mainline valves are automated SCADA operated

valves, and are able to be closed from a remote location. SCADA operated valves close within three minutes of an emergency shutdown. Three mainline valves are manually operated. Automated valves are located upstream of the Pembina River, the Tongue River, the Sheyenne River, and the Lone Tree Lake. An automated valve is located near the Fordville Aquifer and near an aquifer in Sargent County. An automated valve is located between the second and third pump station to reduce the length of pipe section out of service for maintenance. Also, Keystone has stipulated with the City of Fargo to install a SCADA operated valve at milepost 131.

22. In addition to the mainline valves, Keystone proposes to install four check valves along the length of the pipeline in North Dakota. The check valves are installed downstream of river crossings in locations where the rivers are 100 feet wide at the high water mark and also in other areas that require additional protection. Check valves are located downstream of the Pembina River, the Tongue River, the Sheyenne River, and the Lone Tree Lake. Check valves operate instantaneously and without supervision in the event of a loss of pressure in the pipeline.

23. Thomas testified that Keystone uses a number of methods to detect a leak on the pipeline. The first system consists of the operators monitoring the system from the Calgary control center. They monitor the flow information coming back from the remote locations and typically are capable of detecting leaks of 25 to 30 percent of the pipeline flow rate. The second system is a software-based, volume-balance system that looks at the volume going into the system and out of the system and compares the two. The volume-balance system is capable of detecting leaks down to a limit of about five percent. The third system is a computational pipeline monitoring system that divides the pipeline into smaller segments bounded by flow measurement equipment. It measures volume into and out of a segment every few seconds and looks for discrepancies. Any discrepancies are added up quickly and an alarm will sound. Keystone estimates that leaks of 1.5 to 2 percent of pipeline flow would be detected by the computational monitoring system within 140 minutes. Leaks of just less than 1.5 percent of the pipeline flow would be discovered in less than 90 days.

24. In addition, leaks may be detected by direct observation during aerial and ground patrols. Through awareness programs, the public and landowners are encouraged to report leaks and other events that may suggest a threat to the integrity of the pipeline.

25. Thomas testified that Keystone will prepare and submit a complete Emergency Response Plan to the PHMSA. Keystone maintains a 24-hour response or contact phone number which is posted on all of the right-of-way signs, facility signs, published within all of Keystone's public awareness materials and provided annually to all property owners along the pipeline route.

Exclusion and Avoidance Areas

26. North Dakota Administrative Code Chapter 69-06-08, sets forth certain criteria to guide the Commission in evaluating the suitability of granting an application for a certificate of corridor compatibility and route permit. The criteria as set forth in North Dakota Administrative Code Section 69-06-08-02, are classified as Exclusion Areas, Avoidance Areas, Selection Criteria and Policy Criteria. A transmission facility route must not be sited within an Exclusion Area. A transmission facility route must not be sited within an Avoidance Area unless the applicant shows under the circumstances there are no reasonable alternatives. In determining whether an Avoidance Area shall be designated for a facility, the Commission may consider, among other things, the proposed management of adverse impacts; the orderly siting of facilities; system reliability and integrity; the efficient use of resources; and alternative routes. In accordance with the Commission's Section Criteria, a transmission route shall be approved if it is demonstrated that no significant adverse impacts will result from the location, construction, and maintenance of the transmission facility. In accordance with the Commission's Policy Criteria, preference may be given to an applicant demonstrating certain benefits of the transmission facility.

27. Keystone evaluated a corridor width of one-mile for the exclusion, avoidance, selection and policy criteria of the Commission.

Exclusion Areas

28. The proposed route of the Keystone Pipeline crosses no exclusion areas as defined by the North Dakota Public Service Commission.

Avoidance Areas

29. The proposed route of the Keystone Pipeline will cross avoidance areas as defined by the Commission including 0.8 miles of the Tetrault Woods State Forest in Pembina County, 19 residences within five hundred feet, one parcel of irrigated land at milepost 204 to 204.5, and potential cultural resource sites.

Tetrault Woods State Forest

30. The proposed alignment of the Keystone Pipeline Project where it crosses the Pembina River near Walhalla is east of the area generally considered the Pembina Gorge. The proposed route will cross the Pembina River at the Tetrault Woods State Forest. The Tetrault Woods State Forest is a Commission designated avoidance area.

While not classified as a Wild, Scenic, or Recreational river and therefore not a Commission designated avoidance area, the Pembina River is listed on the National Rivers Inventory (NRI) maintained by the National Park Service. State and federal agencies must avoid or mitigate actions that would adversely affect designated NRI river segments. The Pembina River is identified as having Outstandingly Remarkable Values in the Scenery, Geology and Wildlife categories.

31. Keystone initially proposed an open cut crossing for the Pembina River. Keystone has testified that, in working with the North Dakota Forest Service, construction techniques and mitigation procedures were developed to avoid forested areas. Horizontal directional drilling (HDD) will be used to drill under the Pembina River and Tetrault Woods State Forest as indicated by Exhibit T28, a drawing of the HDD proposal. The drawing shows the start point and end point of the directional drill, the pipeline depth will be a minimum of 35 feet under the river and 40 feet under the trees in the adjacent area. The pipeline will not impact the forested areas of the Tetrault Woods State Forest or the Pembina River.

32. We agree with the use of HDD in the Pembina River crossing area as proposed by Keystone and the location as shown by Exhibit T28. The construction, operation and maintenance of the Keystone Pipeline must not impact the Pembina River or the forested areas of the Pembina River crossing or the Tetrault Woods State Forest.

500 Foot Buffer

33. Under N.D.C.C. § 49-22-05.1, areas within five hundred feet of an inhabited rural residence are designated avoidance areas. The five hundred foot avoidance area criteria for an inhabited rural residence may be waived by the owner of the inhabited rural residence in writing. Michael Koski, project director of the consulting team assigned to the Keystone project, testified that twenty-three residences are potentially located within the 500 foot avoidance area. Of these, 18 residence owners had signed written waivers of the 500 foot avoidance area. Koski stated that reroutes and route refinement of the project has resulted in the movement of the line to a point greater than 500 feet away from four of those residences. Exhibit T-14 consisted of copies of the "Waiver of 500 Foot Buffer Zone Avoidance Area Requirement" documents signed by the 18 residence owners. On January 29, 2008 Keystone filed a copy of a waiver of the 500 foot buffer zone avoidance area requirement for the 19th residence.

Irrigated Land

34. Regarding the parcel of irrigated land crossed by the proposed route of the Keystone Pipeline, Keystone indicates that North Dakota Administrative Code § 69-06-

08-102 (h) exempts underground transmission facilities such as the buried Keystone pipeline from analysis for impacts to irrigated land. However, Keystone will coordinate with landowners during construction to minimize irrigation and drainage systems disruptions and compensate for damages and resulting lost production. Keystone will repair, replace, or compensate landowners where irrigation or drainage systems are damaged by construction.

Cultural Resources

35. Keystone commissioned research and investigations and worked with federal and North Dakota governmental officials relating to the impact of the location, construction, and operation of the proposed pipeline on health and welfare, natural resources, and the environment. Keystone worked with federal, state and local agencies to avoid cultural resources, biological resources, wetlands, grasslands and other areas of interest to the agencies.

36. Keystone commissioned field surveys to determine the locations of prehistoric and historic cultural resources that could be affected by surface disturbance during pipeline construction. During 2006, Class I, Class II and Class III cultural resource investigations were completed. The Class I literature and files search was one mile wide centered on the proposed pipeline centerline. The Class II reconnaissance level vehicular survey covered 100% of the proposed pipeline route. The Class III cultural resource pedestrian inventory included a 31% sample of the proposed pipeline route, 300 feet wide centered on the proposed pipeline centerline. In addition to the pedestrian survey, 46 shovel test probes were excavated at locations with potential for buried cultural deposits.

37. As a result of the cultural resource evaluations, Keystone proposes to avoid 9 of the cultural sites by reroute of the pipeline. The Commission is uncertain whether the route proposed in the application includes the reroutes avoiding the 9 cultural sites. Also Keystone will bore underneath 10 historic period railroad segments that are potentially eligible for the National Register. 26 other cultural sites in the corridor will not be affected unless Keystone's pipeline route proposal changes. Four cultural sites remain unevaluated and the effect of the Keystone project has not been determined.

38. The record in this proceeding also indicates possible cultural resources located on properties of Francis Bures and Vaughn Zacharias. Keystone has provided amendments to its original proposed route as shown in Exhibit T16 at the Bures property and as shown in Exhibit T17 at the Zacharias property for the purpose of avoiding possible cultural resources. The reroutes will not impact any of the cultural sites identified by the Class I, II or III surveys.

39. The Commission finds the measures proposed by Keystone are adequate provided requirements of the State Historic Preservation Office (SHPO) are followed. However, any route changes necessitated by requirements of the SHPO must be filed with the Commission and approved prior to the start of construction.

40. The Commission has considered the proposed management of adverse impacts, the orderly siting of facilities, system reliability and integrity, the efficient use of resources, and alternative sites and finds Keystone's corridor and route proposal has adequately considered avoidance areas.

Aquifers

41. The proposed Keystone Pipeline route will pass through areas where shallow and surficial aquifers exist from mile post marker 6.7 to 7.3, mile post marker 8.0 to 11.8, mile post marker 12.5 to 16.0, and mile post marker 29.5 to 29.7 all in Pembina County; from mile post marker 119.2 to 121.3 and mile post marker 123.1 to 123.9 in Steele County; from mile post marker 123.9 to 124.3 and 124.3 to 125.1 in Barnes County; and from mile post marker 192.9 to 193.3, mile post marker 196.8 to 198.1, mile post marker 202.0 to 206.4, mile post marker 206.4 to 207.2, and mile post marker 207.2 to 208.3 all in Sargent County.

42. Heidi Tillquist, Environmental Toxicologist and Project Manager with ENSR providing consulting services for the Keystone Pipeline project, testified that approximately 80% of the aquifers along the proposed Keystone Pipeline route are overlain by low permeability soils and confining materials that would inhibit the infiltration of crude oil in the event of a pipeline leak. The majority of aquifers are more than 50 feet deep, so the majority of aquifers crossed by the pipeline have a low susceptibility to contamination.

43. Tillquist testified that studies show that if a spill reaches an aquifer, the extent of contamination is small in area. At a Bemidji, Minnesota spill where 10,000 barrels (42,000 gallons) were released, the plume of BTEX moved 170 yards from the crude oil source over a 20-year period. BTEX is a group of volatile organic compounds - benzene, toluene, ethylbenzene and xylene - found in petroleum hydrocarbons. Tillquist stated that the BTEX compounds are highly soluble in water and tend to be the most toxic.

44. Tillquist testified that in 500 sites with BTEX contamination, the Environmental Protection Agency found that BTEX moves slower than the groundwater because of natural attenuation, i.e. microbes eating the hydrocarbons. At these 500 sites, 75% of

BTEX plume moved less than 250 feet from the source of contamination and in 80% of the cases the plume was stable or decreasing in size.

45. Tillquist testified that the evaporation of lighter compounds in crude oil is quicker and more efficient than the dissolution of BTEX compounds into the water column regarding the consequence of a crude oil spill.

Fordville Aquifer Area

46. Terril Borgeson, 6307 Highway 32, Park River, North Dakota testified that the Walsh Water District, the City of Park River, the City of Minto, and numerous farms and ranches depend on the Fordville Aquifer as their main source of water. Borgeson testified that the North Dakota State Water Commission has an in-depth study of the Fordville Aquifer that had been done for the City of Park River when they bought the government wells and obtained a grant for a municipal water system out of the aquifer. The report is titled *Water Supply Investigation for the City of Park River, Fordville Aquifer, Walsh County, North Dakota, by Jon C. Patch, P.E., Hydrologist, 2002*. Intervenor witness Jim Horner, geologist with the North Dakota Department of Health, Division of Water Quality and Groundwater Protection, testified that the City of Cavalier draws all its water supply from groundwater wells located in the Fordville Aquifer.

47. Tillquist testified that a pipeline would have to leak thousands of barrels in order to get out of the pipeline trench and mobilize further. The dirt replaced in the pipeline trench over the top of the pipeline is not as compacted as the virgin ground on either side. Small leaks don't leave the right-of-way, but migrate to the surface following the path of least resistance of the less compacted soil. In addition to subsurface transport, a leak that is large enough to exit the trench can mobilize by overland transport or stream flow.

48. Tillquist testified that the margin of the Fordville Aquifer at its closest point is approximately three linear miles from the proposed Keystone Pipeline route. The groundwater wells in the Fordville Aquifer are 6.5 miles from the proposed Keystone Pipeline route. The soils in the area are permeable with infiltration rates of 0.4 to 12.6 feet per day. The depth of the groundwater in the Fordville Aquifer is 0 to 30 feet and averages 20 feet.

49. Concerning subsurface transport, Tillquist testified that the crude oil would not migrate, but BTEX contaminants in crude oil are soluble in water, like groundwater, and the water will mobilize the BTEX contaminants. BTEX contaminants can move hundreds of feet but not 3 miles. Subsurface transport is not a viable exposure route. In addition, emergency response teams would be responding to contain and mitigate the spill.

50. Concerning overland transport, Tillquist testified that most leaks would be contained within the pipeline trench or slightly adjacent to it, but with a very large leak following terrain downhill, the crude oil will spread laterally and pool in depressions. In the absence of steep terrain and channels, the movement of crude oil is limited to a few hundred feet to no more than a half mile. Crude oil adheres to soils and vegetation thus reducing the amount of oil that continues to move along. There is a 200 foot drop in elevation from the pipeline over the three miles to the outer edge or margin of the aquifer, calculated as a 1.3 percent slope and described by Tillquist as relatively flat. Tillquist testified that this slope would not significantly enhance overland transport and overland transport is not a viable exposure route. In addition, emergency response teams would be responding to contain and mitigate the spill.

51. In the Fordville aquifer area, there are 23 intermittent streams and two perennial streams. Intermittent streams do not flow all the time and movement of crude oil down dry channels is like overland transport, typically limited to no more than a half-mile in the event of a large spill. The shortest distance of travel in an intermittent channel from the pipeline route to the margin of the Fordville aquifer approximately 3.5 miles.

52. Crude oil is capable of moving further when facilitated by flowing water. The streams in the Fordville Aquifer area can be categorized into those that lose water to the Fordville Aquifer and those that gain water from the Fordville Aquifer. Regarding BTEX contaminants, Tillquist's testimony was that for streams that gain water from the Fordville Aquifer, oil and dissolved constituents have no chance of getting into the aquifer since all the water would be coming out of the aquifer and pushing into the streams. For streams that lose water to the Fordville Aquifer, oil and dissolved constituents would have a chance of getting into the aquifer. The losing streams include the North Branch of the Forest River, a perennial stream, and 8 intermittent streams between and including mile post markers 45.7 and 47.8.

53. As the crude oil is transported by water in a stream, the oil floats on top of the water surface and adheres to vegetation and soils at the margins of the stream. The shortest stream distance from the pipeline to the margin of the Fordville Aquifer is on an intermittent stream, and is approximately 4.1 miles. Based on terrain and stream velocity, it would take 2.0 hours plus or minus 30 minutes for the crude oil on this intermittent stream to reach the margin of the Fordville Aquifer. Continuing along this intermittent stream, the distance from the margin of the Fordville Aquifer to the surficial portion of the aquifer closest to the public wells is approximately 5 miles. The distance from this point on the stream to the public wells is approximately 1 mile. If oil from a leak large enough, thousands of barrels, was to get out of the trench and mobilized enough to get to a stream channel and then travel approximately 9.1 miles in the stream to point

closest to the public wells, the dissolved constituents (e.g. BTEX compounds) would then have to be transported subsurface in the aquifer approximately 1 mile through the aquifer to reach the well intakes. Tillquist testified that the BTEX compounds would likely move only hundreds of feet and the constituents of oil that do not dissolve and have a high affinity to soil would be confined by the aquifer soils and materials.

54. We find that neither the Fordville Aquifer nor the public wells in the Fordville Aquifer will likely be exposed to crude oil contamination or BTEX contamination by means of surface transport, stream transport, or subsurface transport or any combination of those transport mechanisms.

55. Keystone is proposing to locate a check valve near mile post marker 49, which is south of the losing stream area of the Fordville Aquifer. Check valves operate instantaneously and without supervision in the event of a loss of pressure in the pipeline. If a leak in the losing reach area is detected and the pipeline pumps are shutdown, the check valve will close and prevent a reverse flow of product.

56. Horner agreed with Tillquist the proposed pipeline route in the Fordville Aquifer area is safe, but that it would be safer for a pipeline route to the west. Drainage would be the same, but it is further away and gives a little more travel time.

57. At the direction of the Commission, Keystone engaged Richard Kuprewicz of Accufacts, Inc., an independent pipeline consulting firm providing pipeline design and operation analysis services, to provide a review of external leak detection systems and make a recommendation concerning pipeline leak detection. Accufacts reported that Keystone's current design approach using internal computer-based leak detection (computational pipeline monitoring - CPM) is better suited than external leak detection systems to identify high-rate pipeline releases.

58. In Accufacts' opinion, external leak detection systems such as fiber optic monitoring, hydrocarbon electric sensing cable, carbon vapor monitoring, and acoustic emission monitoring are intended to more quickly identify slow rate or seepage releases than conventional right-of-way inspections, patrols, or CPM. Such external leak detection systems should be considered as complementing CPM leak detection in those few ultra-sensitive areas where the environment can quickly spread low rate releases. The report states that external leak detection systems are not warranted on the Keystone Pipeline in North Dakota, even in the Fordville Aquifer area, because the pipeline is not located in an ultra-sensitive area. Less than 0.1% of the approximately 200,000 miles of liquid transmission pipeline in the United States currently incorporate real-time computer-based external leak detection systems.

59. The Accufacts report recommended that the CPM system should clearly incorporate separate alarming to rapidly identify high-rate releases, and include long term accumulated gain/loss balance computer trending alarms to help identify lower rate releases that can generate slowly expanding underground release plumes that might spread from the pipeline right-of-way with time. Keystone stated that it will implement systems to incorporate accumulated gain/loss trending as recommended by Accufacts. The Accufacts report also stated that a competent oil spill response plan should outline key contingency steps to protect/recover aquifers that may be impacted from a pipeline; and that Keystone's oil spill response plans are advised to recognize all aquifers that they might affect and clearly outline the critical steps that would be taken to limit spill impact as well as remediate the aquifer from a release.

60. The use of external vapor detectors is not a general practice that is used in the pipeline industry. Accufacts concluded that because of the various factors, (i.e. distance from Keystone Pipeline, low gradient of terrain between the pipeline and aquifer, soil conditions, as well as characteristics of the crude oil blends), a low rate leak or a seepage leak is not a legitimate threat to the Fordville Aquifer.

61. Under a Special Permit received from the PHMSA, Keystone was provided a waiver of the regulations of the Office of Pipeline Safety in 49 C.F.R. § 195.106. Under the waiver, Keystone is allowed to design, construct and operate the Keystone Pipeline in certain areas at hoop stresses up to 80 percent of the specified minimum yield strength of the pipe (0.80 pipe) rather than 72 percent of the of the specified minimum yield strength of the pipe (0.72 pipe). Keystone must use 0.72 pipe, which is thicker wall pipe, in locations including high population areas, highway crossings, railroad crossings, road crossings, within pump stations, at mainline valve assemblies, at pigging facilities and at measurement facilities.

62. By its January 22, 2008 letter, Keystone informed the Commission that it will install a continuous length of 0.72 pipe, instead of 0.80 pipe, in the losing steam reach area of the Fordville Aquifer from mile post 45.6 to mile post 47.9, which is approximately 2.3 miles. Mileposts locating streams in the Fordville Aquifer area are included in Exhibit T-22. The 0.72 pipe would cross 2 intermittent streams located north of the North Branch of the Forest River, would cross the North Branch of the Forest River, and cross 6 intermittent streams located south of the North Branch. The Commission finds this proposal is acceptable.

63. At the public hearings in Valley City and Park River, some members of the public suggested that the pipeline route should be moved either to the east of the Fordville Aquifer or further to the west.

64. Keystone considered route concepts to the east and west of the Fordville Aquifer.

65. The east route concept involved a route length of 160 miles, was 15 miles longer than the proposed Keystone Pipeline route, involved more road crossings, more stream crossings and approximately 2 more miles (29 more acres) of wetland crossings.

66. The west route concept involved a route 8 or 9 miles west of the current proposed Keystone location. The western route concept is three miles longer than the currently proposed Keystone Pipeline route and involves 2.7 more miles and (43 more acres) of wetland crossings.

67. Both the east and west route concepts in the Fordville area would affect a greater number of landowners.

68. The Commission finds the proposed Keystone Pipeline route in the Fordville area represents the minimal environmental impact and minimal impact to the landowners compared to either the east route or west route concepts.

Public Water Systems

69. Keystone's application indicates there are no reservoirs, no municipal water supplies, nor any water sources for organized rural water districts on the proposed Keystone Pipeline route or within the 1-mile wide corridor/study area of the proposed pipeline route.

70. Surface water and groundwater sources for public water systems fall under the North Dakota Source Water Protection Program. The Program delineates a wellhead protection area for ground water-dependent public water systems and delineates a source water protection area for surface water-dependent public water systems. The goal is to prevent contamination of public water supplies.

71. Horner testified that the Division of Water Quality and Groundwater Protection does not have a permit process for a project like the Keystone Pipeline but does monitor the project for groundwater issues. Horner stated that some of the wellhead protection areas that had been mapped by Keystone during its corridor assessment are not considered wellhead protection areas because the public water supply wells are no longer used. Horner identified the wells at the Pembina River aquifer, east of mileposts 6 and 7 on Map 1 of 10, that may still be in place but are no longer used by the City of Walhalla for public water.

72. Horner identified several wells east of milepost 30.7 on Map 2 of 10, approximately 2112 to 2957 feet east, in the Gardar aquifer, that may still be in place but are no longer used for public water. Horner indicated that the well near Sharon located east of milepost 100 on Map 5 of 10, is no longer a public water system.

73. Keystone's Exhibit T9, a map of the Fordville Aquifer area indicates a wellhead protection area near milepost 40 that is also classified as a high consequence area by the Office of Pipeline Safety of the Department of Transportation. Tillquist testified that this area is associated with surface water intakes for the City of Park River. Tillquist confirmed with the North Dakota Department of Health that the City of Park River no longer gets its water from this source and this source is therefore no longer a wellhead protection area.

74. The proposed Keystone Pipeline route is approximately 5227 feet from a public water supply well near mile post marker 20.24 in Pembina County.

75. Horner testified that he was satisfied and comfortable with the location of the Keystone Pipeline Project from a groundwater perspective.

76. The Commission finds that the evidence in the record shows the proposed Keystone Pipeline route will not impact public water systems.

Private Water Systems

77. Tillquist testified that Keystone did not assess whether private wells or localized groundwater will be impacted by a pipeline leak. Tillquist was not aware of any mandates or regulations that dictate the distance a pipeline needs to be from a private well.

78. A number of private landowners raised concern about contamination of groundwater and private wells. Landowners testified concerning the existence of shallow private water wells and such wells in the vicinity of the pipeline but no one indicated the existence of a well within 500 feet of the pipeline.

79. Horner testified to the existence of a database listing private water wells that is available at the North Dakota State Water Commission. Not all private water wells are listed in the database since, prior to 1972, there were no requirements for private water well registration with the Board of Water Well Commissioners. Horner recommended that the pipeline be located 500 feet from private water wells.

80. Thomas, represented that in the event a leak were to affect a private individual's well, Keystone would find an alternate source of water for that individual and also develop a mitigation plan to mitigate the well contamination while maintaining an alternate supply of water for the landowner.

Lake Ashtabula/Sheyenne River Area

81. Tillquist testified that, in the event of a large pipeline leak that would exit the pipeline trench, crude oil would not reach the Sheyenne River or Lake Ashtabula by overland transport, subsurface transport, or overland transport in a dry stream channel. Tillquist testified that the pipeline is over two and one-half linear miles away from the water bodies so sub-surface transport is not a viable route for crude oil to reach the Sheyenne River or Lake Ashtabula. The terrain in the Sheyenne River and Lake Ashtabula area is relatively flat, so overland transport is not a viable route for the crude oil. All of the intermittent streams, except for one stream that is right at the Sheyenne River, are at least 1.6 miles away from the river and, when dry, would not be a viable route for crude oil to reach the Sheyenne River.

82. Tillquist identified viable stream channels where, if a leak occurred, crude oil could potentially get into the stream channel and be transported by flowing water to Lake Ashtabula or the Sheyenne River. Tillquist identified a 1.4 mile pipeline segment where the pipeline crosses intermittent stream channels that could flow into Lake Ashtabula. The closest stream distance to Lake Ashtabula from the point the Keystone pipeline intersects a viable intermittent stream is 1.6 miles.

83. Tillquist testified about another 1.4 mile pipeline segment downstream of Lake Ashtabula where the pipeline crosses intermittent stream channels that could flow into the Sheyenne River. The closest stream distance to the Sheyenne River from the point the Keystone pipeline intersects a viable intermittent stream is 2.1 miles.

84. Horner testified that he was not concerned with the proximity of the proposed pipeline route to Lake Ashtabula and Sheyenne River.

85. Lake Ashtabula and the Sheyenne River are not defined as a high consequence area under the Code of Federal Regulations.

86. At the public hearing in Valley City a suggestion was made to move the pipeline to the east further away from the Sheyenne River and Lake Ashtabula.

87. Koski testified that shifting the pipeline one and one half to two miles to the east puts the pipeline in the drainage system of the Maple River which drains into the

Sheyenne. It would also move the Pipeline closer to other shallow aquifers and involves crossing one and a half more miles of wetlands.

88. The Commission finds the proposed Keystone Pipeline route in the Lake Ashtabula/Sheyenne River area represents minimal environmental impact and minimal impact to the landowners compared to the east route concept. The Commission finds that neither the Sheyenne River nor Lake Ashtabula will likely be exposed to crude oil contamination or BTEX contamination by means of surface transport, stream transport, or subsurface transport or any combination of those transport mechanisms.

89. By its January 22, 2008 letter, Keystone informed the Commission that it will install a continuous length of 0.72 pipe, instead of 0.80 pipe, where the pipeline crosses intermittent streams in the area of Lake Ashtabula from mile post 126.7 to mile post 128.1, which is approximately 1.4 miles. Mileposts locating streams in the area of Lake Ashtabula are specified in Exhibit T-24. The 0.72 pipe would cross 3 intermittent streams. The Commission finds this proposal is acceptable.

Stream and River Crossings

90. The proposed Keystone Pipeline route will cross several rivers and streams including the Pembina River, Tongue River, North Branch Park River, Middle Branch Park River, South Branch Park River, North Branch Forest River, Middle Branch Forest River, South Branch Forest River, North Branch Turtle River, Goose River, and the Sheyenne River.

91. Under Section 404 of the Clean Water Act, Keystone must obtain from the U.S. Army Corps of Engineers a Section 404 Permit if the construction or operation of the Keystone Pipeline may result in any discharge into waters of the United States including navigable waters, tributaries to navigable waters, and wetlands. In addition, under Section 401 of Clean Water Act, Keystone must provide the U.S. Army Corps of Engineers a water quality certification from the State in which the discharge originates or will originate. The state agency with jurisdiction over water quality matters is the North Dakota Department of Health.

92. Intervenor witness Michael Sauer, Senior Environmental Scientist, Division of Water Quality, North Dakota Department of Health, testified that a detailed Section 401 Water Quality Certification review is initiated after receiving a completed Section 404 application from the U.S. Army Corps of Engineers. The Section 404 Permit will contain any requirements established by Department of Health in the Section 401 certificate.

93. In its May 4, 2006 letter the North Dakota Game and Fish Department stated that the Pembina River; Tongue River; a tributary to the Tongue River running through section 18, Township 161 North, Range 56 West, Pembina County; North Branch Park River; Middle Branch Park River; South Branch Park River; North Branch Forest River; Middle Branch Forest River; Goose River; and Sheyenne River are classified as valuable fisheries. For the crossings of these valuable fisheries, the North Dakota Game and Fish Department requested directional drilling of the streams if possible. If this method is not feasible, then the North Dakota Game and Fish Department requests no construction activities within the waterway between April 15 and June 1 with appropriate controls to minimize erosion and sedimentation. With this caveat, the North Dakota Game and Fish Department believes the Keystone Pipeline Project will have no significant effects on wildlife or wildlife habitat, including rare or protected species provided best management practices are implemented.

94 The Commission finds that Keystone should notify the Commission whether it intends to HDD under these valuable fisheries. This notification should include maps similar to those filed concerning HDD at the Pembina River and Sheyenne River crossings. If Keystone does not intend to HDD under all of the valuable fisheries, Keystone should study the feasibility of HDD under these valuable fisheries. Stream crossing plans must be filed with the Commission and approved prior to the start of construction.

Sheyenne River Crossing

95. Keystone initially proposed an open cut of the crossing at the Sheyenne River.

96. Sauer indicated in a September 25, 2007 letter to the Commission that, after conducting a cursory field review, it would be extremely difficult if not impossible to restore the proposed Sheyenne crossing area if trenching methods were implemented. He also indicated that the riverine and riparian zone for 300 feet upstream and downstream look similar to the proposed crossing site and that the crossing method appears to be much more important than the selected site.

97. Keystone's January 17, 2008 filing indicates that HDD will be used to drill under the Sheyenne River as well as the trees and shrubs on either side of the Sheyenne River. The filing provides a drawing of the HDD proposal. The drawing shows the start point and end point of the directional drill. The drawing indicates the pipeline depth will be approximately 40 feet under the river and the trees and shrubs on the south embankment of the Sheyenne River valley. The drawing confirms the HDD proposal extends approximately 400 feet north of the Sheyenne River but does not extend under the trees and shrubs on the north embankment of the Sheyenne River valley.

98. The proposed Keystone Pipeline route is acceptable to the Commission only if the HDD goes under the Sheyenne River and the trees and shrubs on both the north and south embankments of the Sheyenne River valley, e.g. the valley view shed. We find an order concerning the proposed route must be conditioned upon a HDD proposal that goes under the Sheyenne River and the trees and shrubs on both the north and south embankments of the Sheyenne River valley and such proposal must be filed for Commission approval before the Route Permit between mileposts 168 and 170 is effective. The construction, operation and maintenance of the Keystone Pipeline must not impact the Sheyenne River or the forested area of the Sheyenne River or the Sheyenne River valley.

Tree and Shrub

99. Dean Cowling, project director for the Keystone Pipeline project, testified that it is possible to construct a 30-inch pipeline with only a 50 foot clear cut through a shelterbelt but to construct such a pipeline in other wooded areas would require a wider clear cut to construct the pipeline in a safe and practical manner. Keystone needs 25-35 feet to weld and place the pipe on skids and to have equipment to travel along and pick up the pipe and place it in the ditch. All the dirt that comes out of the trench needs to be placed in the easement area. Due to these construction and safety concerns, Keystone cannot safely limit the tree cuts to 50 feet width in wood lot areas.

100. Cowling testified that Keystone would, through lengths of wooded areas in excess of 50 feet, agree to keep clear cuts to 85 feet wide where practical. The Commission finds that, due to the size of pipe used for the Keystone Pipeline, the width of clear cuts through windbreaks and shelterbelts should be limited to 50 feet or less, and clear cuts through lengths of other wooded areas in excess of 50 feet shall be limited to 85 feet or less.

101. Keystone specified several areas where more than 110 feet of tree clearing might be needed for extra work space. The areas are the Tongue River crossing, North Branch Park River crossing, North Branch Forest River crossing, Middle Branch Forest River crossing, North Branch Turtle River crossing, and Sheyenne River crossing. Extra work space is required at these areas for deep ditch excavation for the stream crossing and stream bank grading. This tree clearing would be limited to 25 feet beyond the standard 110-foot construction right-of-way. After reviewing Keystone's proposal to HDD, the Commission finds Keystone's request for more than 110 feet of tree clearing at the Sheyenne River crossing is no longer necessary. As shown by the map of the HDD, no trees will be cleared in the Sheyenne River crossing area.

102. The Commission finds that pipeline construction at the other locations should avoid trees to the extent practicable. The Commission has already determined that clear cuts through lengths of wooded areas in excess of 50 feet of route length shall be limited to 85 feet or less. If Keystone needs additional construction work space at stream or river crossings and would like to clear more than an 85 feet width of trees, Keystone must submit a clearing plan to be approved by the Commission prior to start of construction. The plan must indicate the width of the cut (up to 135 feet) and the distance from the crossing (number of feet on each side of the crossing) that is needed.

103. L.A. Gray, Senior Vice President of Universal Ensco Inc., Engineering and Construction Manager for the United States portion of the Keystone Pipeline project, testified that Keystone has a permanent 50-foot easement along the pipeline and would allow all but 20 to 30 feet of the permanent easement to revegetate. The Commission agrees with this recommendation which improves on the previously approved specification that allowed a clearing of 50 feet over the pipeline.

104. Exhibit T5 is a Tree and Shrub Mitigation Specifications document approved by the Commission in previous siting cases. Keystone proposed an amended version of the Commission's specifications as Exhibit T4. Keystone proposes changes to the Commission approved Tree and Shrub Mitigation Specifications as follows:

- Keystone proposes to inventory trees in wind break and shelter belt areas that are 1-inch diameter at breast height and in non-wind break and non-shelter belt areas to inventory trees that have a 3-inch diameter at breast height.
- Keystone proposes to inventory trees and shrubs anticipated to be removed during construction in wood lots and riparian areas by using a sample method. Trees and shrubs in shelter belts and wind breaks would be actually counted.
- Keystone proposes to inventory for replacement in non-windbreak and non-shelterbelt areas only those shrubs in the maintained corridor portion of the permanent right-of-way where shrubs will not be allowed to regrow.
- Keystone proposes that all areas, rather than just non-windbreak and non-shelterbelt areas, outside of the maintained corridor portion of the permanent right-of-way shrubs shall be allowed to regenerate naturally, and in the event topsoil is disturbed and not preserved and replaced, shrubs in those areas shall be inventoried for replacement.
- Keystone proposes that the width of the construction right-of-way for clear cuts through woody areas be limited to 85 feet or less where practical.
- Keystone proposes that the number of trees or shrubs cleared from areas outside of the inventory areas be noted in the inventory rather than noting

differences in the number of trees or shrubs in general that are actually cleared versus the number of trees and shrubs inventoried.

- Keystone proposes that tree and shrub replacement shall not be conducted within 20 to 30 feet of the permanent maintained corridor rather than within 25 feet of the pipeline.
- Keystone proposes to advise each landowner in writing of their right to have replacement trees/shrubs planted on the landowner's property, and landowners will have 60 days to elect to exercise that right by advising Keystone in writing. Failure of the landowner to exercise that right within the 60 day time period would constitute a waiver of the right.
- Keystone proposes that only tree/shrub replacements planted by shall be inspected, and that the annual report shall document the condition of a replacement planting but not any woodlands work completed. Keystone further proposes that if the 3 year survival rate is less than 75%, the Commission may order a one-time additional planting.

105. The Commission finds merit in some of Keystone's proposals for tree and shrub mitigation. Therefore, the Commission amends its previously approved Exhibit T5 Tree and Shrub Mitigation Specifications. The amended Tree and Shrub Mitigation Specifications for the Keystone Pipeline project is attached to this order. Amendments are shown by underlines and strikethroughs. Also attached is a final version of the amended Specifications.

106. Keystone agrees to inventory for replacement all shrubs in areas where the topsoil is disturbed and not preserved.

Noxious Weeds

107. Roger Johnson, North Dakota Agriculture Commissioner, notified Keystone by June 11, 2007 letter that the primary jurisdiction regarding noxious weed law resides with the counties and the jurisdiction of each county weed board extends to all land within the county, but the jurisdiction does not include any land within the corporate limits of a city if that city has its own noxious weed control program. Johnson encouraged Keystone to contact each county weed control officer and schedule a time for inspection of the land impacted by pipeline construction. Cooperation with the county weed boards will ensure that the disturbed land does not create a future noxious weed control concern.

108. Keystone has prepared a Construction Mitigation and Reclamation Plan (CMR Plan) that is a compilation of procedures for environmental mitigation, restoration and post monitoring compliance when constructing a pipeline across agricultural land,

pastureland, cultivated lands wetlands, streams, water bodies, grasslands. It also covers noise and dust control during construction; management of weeds including noxious weeds; fire prevention and spill prevention and containment; topsoil removal, storage and replacement; erosion and sediment control; and reclamation.

109. Keystone's CMR Plan at subsections 2.13, 4.11.4 and 4.11.5.3 sets forth procedures for control of noxious weeds.

Noise

110. There will be five pump stations in North Dakota located approximately 40 to 50 miles apart in relatively rural locations. Keystone provided late filed Exhibit T-29 which included maps depicting pump station locations and showing that, based on estimated noise projections, no residences or businesses will experience a sound pressure level greater than 55 decibels audible (dBa). The residence closest to a pump station, that is pump station 19 at milepost 217.7 in Sargent County, is not occupied. A sound pressure level of 55 dBa is approximately equivalent to noise from a car that is approximately 100 yards away and traveling at about 40 miles per hour. Keystone will manage the sound levels of the five pump stations in North Dakota to 55 dBa at the nearest noise sensitive area.

111. We find there is no significant impact relative to noise levels at generated by the pumps at the proposed station locations.

3rd Party Inspector

112. Koski testified that he is responsible for the discussion of environmental training and environmental inspection and post-construction monitoring and maintenance programs committed to by Keystone. Keystone will implement a post-monitoring construction program, some of which is outlined in the CMR Plan, to ensure that reclamation obligations and specifications and landowner commitments are met following construction. Keystone will also implement a detailed environmental inspection program during construction, which will involve environmental inspectors dedicated to environmental inspection activities in each construction spread conducted by the project. Environmental inspection is conducted to ensure compliance with commitments, permit conditions, regulations and specifications. Keystone will conduct a post-construction monitoring program to ensure compliance with commitments made to landowners and in various permitting processes.

113. In response to cross-examination by Commissioner Cramer concerning third-party oversight on location during construction of the pipeline, Gray testified that there is

precedence of jurisdiction oversight of pipeline construction. The Commission finds that it is appropriate for jurisdiction oversight of the construction of Keystone Pipeline.

114. The Commission will procure a qualified inspector for oversight during construction. Oversight inspection shall be conducted for the purpose of monitoring the construction activities to help ensure compliance with the Commission's order. Oversight inspection shall be accomplished through frequent spot inspections of construction activities conducted throughout the state including reclamation of disturbed surface areas. The cost of the inspector will be paid from the siting process expense recovery fund that was established under N.D.C.C. § 49-22-22 (3).

Other Considerations

115. Gray testified that Keystone would commit to compensating the landowners for any damages caused by Keystone related to the mixing of topsoil.

116. Kothari testified that normal farming practices would not impact the pipeline and that the pipeline is designed inherently to manage any sort of stresses with equipment crossing over the pipeline. If oil were to leak from the pipeline because of farm equipment or other equipment contact with it, Keystone would be responsible for the damage.

117. The total proposed Keystone route alignment through the State of North Dakota crosses approximately 14.7 miles (197 acres) of wetlands. This amounts to approximately 6% of the total construction disturbance. Keystone's CMR Plan at section 6.0 sets forth procedures for crossing wetlands.

118. Keystone stated that, to the extent practical, all effects of pipeline construction will be mitigated. All lands disturbed will be returned to their current land uses. Keystone's CMR Plan at section 4.0 sets forth construction practices when crossing agricultural, forest, pasture, range and grass lands.

119. Construction of the Keystone Project will involve approximately 500 construction workers working on two spreads. One crew will start at the Canadian Border and work southerly approximately 130 miles and the second crew will start northeast of Valley City and work southerly to the South Dakota border.

120. The Keystone Project will require 20-30 acre pipe yards for the storing of pipe, to be located approximately every 30 miles along the pipeline. The Keystone Project will have two or three 20-acre contractor yards in North Dakota.

121. The construction right-of-way for the Keystone Pipeline will be 110 feet wide made up of a 50-foot permanent easement – 25 feet either side of center of the pipeline – and a 60-foot wide temporary work space. The Keystone Project will require additional work space in areas where there are large excavations, river and stream crossings, highways and railroads. At the Pembina River crossing, the HDD operation will require a construction right-of-way of 150 feet wide and 250 feet long at the south side entry point and 150 feet wide and 150 feet long at the north side exit point. The HDD entry and exit points at the Sheyenne River crossing will require a construction right-of-way of 150 feet wide and 250 feet long.

122. Keystone will use construction tools to relieve compaction along the right-of-way, to return the agricultural land to the same compaction as adjacent land, and to return agricultural fields to their previous productivity.

123. Surface water will be used short term for hydrostatic testing but no extended consumptive use of water resources. All areas of natural vegetation within the right-of-way will be reclaimed, and no agricultural lands will be taken permanently out of production except for land used to install above ground facilities, (i.e. pump stations and valves).

124. Keystone is using the State One Call System to locate existing utilities, waterlines and septic systems, fiber optic cables, sewer lines and other utilities. Keystone works with these utilities and will enter into agreements concerning inspection and methods of crossing these utilities.

125. Landowners expressed concerns regarding landowner liabilities once the pipeline is operating. Cowling testified that he believes liability protection is provided for landowners in the easement document. Cowling stated that under the easement document Keystone will pay commercially reasonable costs and indemnify and hold the landowner harmless for any loss, damages, claims or actions resulting from Keystone's use of the easement, except to the extent such loss, damage claims or actions result from negligence or willful misconduct of the landowner or its agents.

From the foregoing Findings of Fact, the Commission now makes its:

Conclusions of Law

1. The Commission has jurisdiction over the applicant TransCanada Keystone Pipeline, LP and over the subject matter of this application under North Dakota Century Code Chapter 49-22.

2. Keystone is a utility as defined in North Dakota Century Code Section 49-22-03(13).
3. The pipeline proposed by Keystone is a transmission facility as defined in North Dakota Century Code Section 49-22-03(12).
4. Keystone is required to obtain written waiver under North Dakota Century Code Section 49-22-05.1 to locate the pipeline within 500 feet of an inhabited rural residence.
5. The location, construction, and operation of the proposed pipeline, as conditioned in this Order, will produce minimal adverse effects on the environment and upon the welfare of the citizens of North Dakota.
6. The proposed pipeline corridor and route, as conditioned in this Order, are compatible with the environmental preservation and the efficient use of resources.
7. The proposed pipeline corridor and route, as conditioned in this Order, will minimize adverse human and environmental impact while ensuring continuing system reliability and integrity and ensuring that energy needs are met and fulfilled in an orderly and timely fashion.
8. The proposed project, as conditioned in this Order, is of such design and location that it will produce minimal adverse effects, as defined under North Dakota Century Code Section 49-22-07.2.

From the foregoing Findings of Fact and Conclusions of Law, the Commission now makes its:

Order

The Commission orders:

1. TransCanada Keystone Pipeline, LP's application for waiver of procedures and time schedules is granted.
2. Keystone is issued Certificate of Corridor Compatibility No. 101 and Route Permit No. 111 to construct the 218 mile, 30-inch crude oil pipeline. The route that is approved for this purpose is the route identified in the Application, as supplemented by Exhibit Nos. T16 and T17 that were submitted at the hearing for the reroutes at the Bures and Zacharias properties. The Route Permit between mileposts 168 and 170 is conditioned upon Commission approval of an acceptable HDD proposal that goes under the

Sheyenne River and the trees and shrubs on both the north and south embankments of the Sheyenne River valley. There shall be no construction activity related to the pipeline between mileposts 168 and 170 until Keystone's HDD proposal has been approved by the Commission. Keystone shall file a HDD proposal by May 21, 2008.

3. Keystone shall obtain approval from the Commission prior to any changes or deviations to the pipeline route.

4. Certificate of Corridor Compatibility No. 101 and Route Permit No. 111 are effective for the life of the pipeline, but are subject to modification by order of the Commission if deemed necessary to further protect the public or the environment.

5. Keystone shall comply with all the rules and regulations of all other agencies having jurisdiction over any phase of the proposed project, and shall obtain all other necessary licenses and permits, and shall provide copies to the Commission prior to any construction.

6. Keystone shall obtain written waivers from affected landowners for location of the pipeline within 500 feet of a residence, school, or place of business prior to any construction in those areas.

7. Keystone shall conduct a preconstruction conference to be held prior to the commencement of any construction. The conference must include a Keystone representative, Keystone's construction supervisor, and Commission staff, to ensure that Keystone fully understands the conditions set forth in this order.

8. Keystone shall inform the Commission of the date construction will start just prior to the commencement of construction; report to the Commission on the date construction is started; and, once construction has started, shall keep the Commission updated on construction activities on a weekly basis.

9. Keystone shall construct and operate the pipeline in the manner described in the application and at the hearing and in late filed exhibits and supplemental materials, and in accordance with all applicable safety requirements.

10. The pipeline must be buried to a minimum depth from the ground surface to the top of the pipe of 48 inches in rangeland, 48 inches for cultivated land, 48 inches at the bottom of the ditch for road crossings, and 72 inches across undeveloped section lines.

11. All crossings of graded roads must be bored unless the responsible governing agency specifically permits Keystone to open cut the road.

12. Keystone shall study the feasibility of HDD at the crossings of the Tongue River; a tributary to the Tongue River running through section 18, Township 161 North, Range 56 West, Pembina County; the North Branch Park River; Middle Branch Park River; South Branch Park River; North Branch Forest River; Middle Branch Forest River; and Goose River, which are classified as valuable fisheries.

13. Pipeline construction at the Tongue River, North Branch Park River, North Branch Forest River, Middle Branch Forest River, and North Branch Turtle River crossings shall avoid trees to the extent practicable. If Keystone needs additional construction work space at stream or river crossings and would like to clear more than an 85 feet width of trees, Keystone shall submit a clearing plan with the Commission to be approved prior to start of construction. The plan shall indicate the width of the cut (up to 135 feet) and the distance from the crossing (number of feet on each side of the crossing) that is needed.

14. The width of the clear cuts through any windbreaks and shelterbelts shall be limited to 50 feet or less. The width of clear cuts through extended lengths of wooded areas shall be limited to 85 feet or less.

15. Keystone shall promptly report to the Commission the presence in the permit area of any critical habitat of threatened or endangered species, or of bald or golden eagles that Keystone becomes aware of and that were not previously reported to the Commission.

16. Construction must be suspended when weather conditions are such that construction activities will cause irreparable damage, unless adequate protection measures approved by the Commission are taken.

17. All cultural resource mitigation plans must be submitted to the State Historic Preservation Office (SHPO) and approved by the SHPO prior to the start of any fieldwork or construction activity. Any route changes necessitated by requirements of the SHPO must be filed with the Commission and approved prior to the start of construction.

18. If any cultural resource, paleontological resource, archeological resource, historical resource, or gravesite is discovered during construction of the facility, earth disturbing activities in the immediate vicinity of the discovery must be halted. The resource must be marked, preserved and protected from any further disturbance until a professional examination can be made in consultation with the SHPO. A report of such

examination must be filed with the SHPO and the Commission. Clearance to proceed must be given by the SHPO and the Commission.

19. During construction, at least 12 inches of topsoil, where available (or topsoil to the depth of cultivation, whichever is greater), over and along trench areas where cuts will be made, must be stripped and segregated from subsoil. Any area on which excavated subsoil will be placed must also be stripped of topsoil. After backfilling is completed, any excess subsoil must be placed over the excavation area, blending the grade into existing topography. Topsoil must then be replaced over areas from which it was stripped only after the subsoil is replaced.

20. Reclamation and clean-up along the right-of-way must be continuous and coordinated with ongoing construction.

21. All pre-existing roads and lanes used during construction must be restored to a condition that will accommodate their previous use, and areas used as temporary roads during construction must be restored to their original condition.

22. Keystone shall, prior to any construction, file with the Commission a list identifying private and new access roads that will be used or required during construction and file a description of methods used by Keystone to reclaim those access roads.

23. Reclamation, fertilization and reseeding must be done by Keystone according to the Natural Resource Conservation Service unless otherwise specified by the landowner and approved by the Commission.

24. Keystone shall comply with the Commission's Tree and Shrub Mitigation Specifications attached to this order.

25. Keystone shall repair or replace all property removed or damaged during all phases of construction and operation of the proposed transmission facility including all fences and gates removed or damaged.

26. Keystone shall repair, replace, or compensate landowners where irrigation or drainage systems are damaged by construction.

27. In the event that a person's well is contaminated as a result of the pipeline operation, Keystone shall pay all costs associated with finding and providing a permanent water supply that is at least of similar quality and quantity; and any other

related damages including but not limited to any consequences, medical or otherwise, related to water contamination.

28. Any damage that occurs as a result of soil disturbance on a persons' property shall be paid for by Keystone.

29. No person will be held responsible for a pipeline leak that occurs as a result of normal farming practices over the top of or near the pipeline.

30. Keystone shall pay commercially reasonable costs and indemnify and hold the landowner harmless for any loss, damages, claims or actions resulting from Keystone's use of the easement, except to the extent such loss, damage claims or actions result from negligence or willful misconduct of the landowner or its agents.

31. Keystone shall prepare and implement an Emergency Response Plan. Prior to putting the Keystone Pipeline into operation, the manual of written procedures for conducting normal operations and maintenance activities and handling abnormal operations and emergencies required under 49 CFR 195.402 shall be filed with the Commission, reviewed and approved by the Commission, and shall be in place.

32. Keystone shall prepare and implement a written integrity management program. Prior to putting the Keystone Pipeline into operation, the written integrity management program required under 49 CFR 195.452 shall be filed with the Commission, reviewed and approved by the Commission, and shall be in place.

33. Keystone shall provide the Commission with a hard copy and electronic copy of the pipeline alignment drawings with alignment data showing the pipeline as built, and an electronic version of the as-built pipeline alignment that can be imported into ESRI GIS mapping software, and shall provide this information within 6 months of the completion of the construction.

34. Keystone's obligation for reclamation and maintenance of the right-of-way shall continue throughout the life of the pipeline.

PUBLIC SERVICE COMMISSION


Tony Clark
Commissioner


Susan E. Wefald
President


Kevin Cramer
Commissioner