

STATE OF NORTH DAKOTA
PUBLIC SERVICE COMMISSION

TransCanada Keystone Pipeline, LP
30-Inch Crude Oil Pipeline/Cavalier to
Sargent Ctys

Case No. PU-06-421

TESTIMONY OF SCOTT ELLIS

IN SUPPORT OF WAIVER OF SIX-MILE CORRIDOR REQUIREMENT

SCOTT ELLIS, BEING FIRST DULY SWORN, ON OATH, DEPOSES AND STATES, AS FOLLOWS:

- I have attached a copy of my resume with my educational background and qualifications.
- I am filing this testimony in support of Keystone's application for waiver of Section 69-06-04-02(1)(b) of the North Dakota Administrative Code. Section 69-06-04-02(1)(b) requires an applicant for a Certificate of Corridor Compatibility to request approval of a corridor, the width of which is at least ten percent of the length of the proposed pipeline, but not less than one mile, nor more than six miles. Once a corridor is approved, the applicant proposes a specific pipeline route within the approved corridor.
- Over the past 20 years I have served as a project manager and technical specialist on a variety of interstate pipeline projects throughout the United States. The larger projects range from 200 to 1,000 miles in length, and typically cross federal, state, and private ownerships. In these roles, I have been involved in pipeline route selection and evaluation studies for a variety of situations where land use and natural resource issues have dictated consideration of project changes. I have been a participant in the Keystone Pipeline Project since 2005 when the initial project proposal was developed. I participated in both initial and subsequent routing studies across all the states crossed by the project. Tools for these studies included land use maps that included existing utility corridors, aerial photography, and aerial flyovers to examine routing options. I contributed to the Alternatives chapter in the Environmental Report filed with the Department of State in April 2006. In summary, in my career I have frequently participated in the development of pipeline routes based on environmental, land use, and construction feasibility factors.
- In its Application for Waiver or Reduction of Procedures or Time Schedules, Keystone has requested the Public Service Commission to approve a width of one mile for the pipeline corridor. Keystone has also requested a waiver to permit the simultaneous filing and processing of its Corridor and Route permit applications.

- In its Corridor and Route Permit application, Keystone has proposed a one-mile corridor and a specific pipeline route. The following sections outline the data collection and the public and agency coordination completed to develop the preliminary (and then more refined) project pipeline route, followed by the rationale to study a one-mile corridor rather than a six-mile corridor.

A. Route Development.

- In selecting a proposed route for the Keystone Pipeline Project, Keystone began by identifying certain key project routing control points. The major control points that affect the project route in North Dakota are: 1) the Canadian/U.S. border crossing, which is dictated by the location of an existing natural gas pipeline that will be converted to crude oil transportation service; and 2) the Missouri River crossing location on the South Dakota/Nebraska border. After consideration of several possible crossings, a crossing location at Yankton, South Dakota was determined to represent the most feasible location from construction and long-term stability standpoints. After these points were established, the initial pipeline corridor was based on local environmental and land use considerations, while establishing a relatively direct route between the Canadian border and Yankton.
- Keystone gathered regional data with respect to environmental and cultural features (topography, aquifers, surface waters, soils, wetlands, cultural resources, residential areas, and agricultural uses). A portion of this information is provided in the Application filed with the Commission.
- After gathering background data, Keystone identified an initial proposed route for its pipeline. This proposed route was presented to North Dakota agencies in meetings held in Bismarck in early 2006. Keystone also held meetings with federal agencies (Corps of Engineers, and the U.S. Fish and Wildlife Service) to identify issues that needed to be addressed in permit applications and consultations.
- Keystone has initiated studies of wetlands, cultural resources, USFWS threatened and endangered species and their habitats along the proposed pipeline. Studies conducted in 2006 have been filed with the Commission, and additional information will be filed with the Commission after it is collected in 2007. This information will be used to make minor adjustments (expected to be no more than hundreds of feet) in the route to avoid sensitive features.
- Keystone also engaged in extensive public consultation with respect to its proposed route. The following is summary of project-related coordination efforts that have been completed since late 2005:

1. In November 2005, Keystone hosted public open houses in the communities of Grafton, Finley and Lisbon. A total of 182 people participated in these open houses. Keystone also hosted open houses in Michigan and Lisbon in March 2006. A total of 214 people attended these meetings. Keystone staff discussed routing issues with landowners, and identified potential route changes.
 2. Keystone maintains a website that provides project updates to the public, and provides an opportunity for direct public communication with the project.
 3. Keystone has conducted visits with state and local units of government to provide feedback to the project planners. This coordination has been ongoing since late 2005. Keystone has made periodic mailings to landowners to provide project updates.
 4. Keystone land agents have met with individual landowners to discuss the project, and to establish a working relationship for future pipeline easement acquisition discussions.
 5. The U.S. Department of State, the lead federal agency for preparing an Environmental Impact Statement for the project, held public scoping meetings in Michigan on October 24, and Lisbon on October 25, 2006.
- As the result of this detailed review of the initial proposed route, as well as consideration of agency and public consultation, Keystone made a number of adjustments to its initial proposed route. These adjustments included:
 1. A 5.5-mile reroute along the Pembina/Cavalier County lines to minimize disturbance to woodlots, shelterbelts, and wetlands (Documented in the November 2006 Environmental Report, filed with the Department of State, Page 2-72 and 2-73).
 2. A 3.5-mile reroute in Pembina County to reduce the number of Tongue River tributaries crossed from 2 to 1, and to avoid a pond and shelterbelt. (Documented in the November 2006 Environmental Report, filed with the Department of State, Page 2-73).
 3. A 52-mile reroute in Nelson and Steele Counties to reduce the length of wetland crossings within Fish and Wildlife easements. (Documented in the November 2006 Environmental Report, filed with the Department of State, Page 2-73).
 4. A 35-mile reroute in Sargent County to avoid the Hecla Sandhills. The Hecla Sandhills represents a sensitive ecological area, an area underlain by near surface aquifers, and sandy substrates that may be difficult to stabilize and revegetate over the long-term. An initial discussion of this reroute proposal was provided in the November 2006

Environmental Report on Page 2-73. Based on additional studies, this pipeline reroute was moved to a location east of the Hecla Sandhills in an area with fewer miles of shallow aquifer crossings than the route originally proposed. The rationale for this alternative, including environmental and land use comparisons between the previously proposed and alternative route are documented in the January 2007 Supplemental Filing to the Department of State, Supplemental Materials, Route Alternatives.

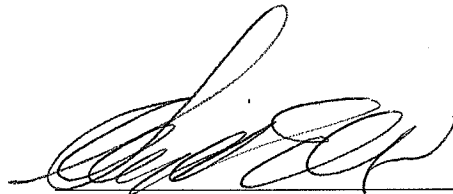
B. Rationale for Evaluation of a One-mile rather than Six-mile wide corridor in the Keystone Application filed with the North Dakota Public Service Commission.

- Keystone has conducted extensive coordination with the public since 2005, and has conducted field studies along the proposed route at a level sufficient to demonstrate that the project can be constructed within a one-mile corridor that complies with the PSC Exclusion and Avoidance Criteria (with implementation of certain mitigation measures) as discussed below.
- In its review of environmental and cultural features within a one-mile study corridor, Keystone identified only one potential Exclusion Area (Fort Ransom State Park), which will not be crossed by the proposed route.
- In its review of potential Avoidance Areas, Keystone identified that the project will cross land occupied by North Dakota State Forests, and North Dakota State Forest Lands. Keystone will coordinate with the North Dakota State Forest Service to implement mitigation measures to maintain forest values.
- In its review of potential Avoidance Areas, Keystone identified that it will cross within 500 feet of 23 inhabited residences. Keystone has contacted the owners of these residences, and has obtained waivers for locating the pipeline less than 500 feet from the residence for 18 out of 23 residences. As of April 30, Keystone proposes to adjust its routes more than 500 feet away from three of the five remaining residences. Of the two remaining residences, Keystone is negotiating a possible waiver from one owner, and has not been able to contact the last owner. Keystone will continue its efforts to obtain waivers from these two remaining owners.
- In its review of potential Avoidance Areas, Keystone identified one pivot irrigated parcel that will be crossed by the project in Sargent County. Keystone will coordinate with the landowner to minimize the disruption of seasonal uses for this irrigation system, and to restore irrigated cropland to its former productivity.
- In summary, the Keystone Project will not directly intercept any Exclusion Areas identified in the PSC criteria. The relatively small number of Avoidance Areas that the Project will

intercept can be mitigated by good construction practice and by agreements with landowners resulting from the easement negotiation process.

- According to Section 49-22-07.2 NDCC, the proposed Keystone pipeline facility is of such length, design, location, or purpose that a one-mile corridor will produce minimal adverse affects. Adherence to the six-mile corridor is not justified because of the small number of project conflicts identified with the Commission Exclusion and Avoidance criteria ; and more importantly, an expanded study would unnecessarily delay the review and hearing process on the corridor and route permit application for the Keystone pipeline.
- In light of Keystone's consultation and coordination of the corridor and route with the public, United States Fish and Wildlife Service, state agencies and local governments, individual land owners and the US Department of State, I am confident that a one-mile corridor will be sufficient to locate the route and that the route will lie outside of all exclusion areas and almost all avoidance areas. Adjustments that may need to be made to the route will be able to be made within the proposed one-mile corridor.
- If a review of Keystone's proposed one-mile corridor identified issues that required the pipeline route to be adjusted outside of the one-mile corridor, Keystone recognizes that it will be required to conduct detailed studies with respect to any areas that were not included in the previously studied corridor.

Dated this 1st day of May, 2007.




SCOTT ELLIS

STATE OF Colorado)
) ss.
 COUNTY OF Larimer)

On the 1 day of May, 2007, before me personally appeared SCOTT ELLIS, known to me to be the same person described in and who executed the within and foregoing instrument and acknowledged to me that he executed the same.

(SEAL)


 Notary Public, State of Colorado
 My Commission Expires
4/12/2010

Scott L. Ellis**Years Experience:** 31**Technical Specialties**

- Management of Environmental Studies Required for State and Federal Permits
- Design and Execution of Baseline and Impact Assessment Studies
- Biological Assessment for Threatened and Endangered Species

Professional History

- ENSR

Education

- BA (Biology and English) Cornell University

Representative Project ExperienceA. Pipelines

Trow Engineering/TransCanada Keystone Pipeline. Current regulatory project manager for the acquisition of environmental permits for a crude oil pipeline from Alberta, Canada to refinery and pipeline interconnections destinations near Saint Louis, Illinois, and Cushing, Oklahoma. The proposed pipeline would cross the states of North and South Dakota, Nebraska, Kansas, Oklahoma, Missouri, and Illinois. Responsible for supervising environmental data collection programs (i.e. cultural resources, wetlands, and biological resources); coordination with state and federal permitting agencies concerning permit requirements; and oversight of environmental permit application preparation. Participation on a team to identify the initial project pipeline routes and land use constraints. Routing studies included reviews of state data bases, aerial photography, and aerial flyovers. Internal team responsibilities include representation of the environmental programs in team progress meetings, supervision of field office coordination teams, and overall financial responsibility for work performed by ENSR staff and 7 subcontractor companies.

BLM, Shell New Mexico Products Pipeline. Project manager for the preparation of a third party impact statement in 2003 for the conversion of an existing 16-inch crude oil pipeline to petroleum products service. This pipeline extends from Odessa, Texas to Bloomfield, New Mexico. The BLM was the lead federal agency, and the Bureau of Indian Affairs was a cooperating agency. The Office of Pipeline Safety provided technical review of safety aspects of the conversion process. Major issues included the

operational safety of a 1950's era pipeline, and potential spill effects on aquifers and surface water supply sources.

BLM, U.S. Forest Service, and Federal Energy Regulatory Commission, Questar, Williams, and Kern River (QWK) Pipeline Projects Environmental Impact Statement.

Project manager for an environmental impact statement project for three pipeline projects (75- and an 82-mile natural gas pipelines; 460-mile petroleum products pipeline) in the states of New Mexico, Colorado, and Utah. Major issues include the risk of petroleum product spills and natural gas releases, geologic hazards, Forest Service roadless areas, and cumulative impacts. Mr. Ellis was responsible for supervising internal staff and four specialty subcontractors.

BLM Farmington District/Mid-America Pipeline Company, Four Corners Natural Gas Liquids Loop Project Environmental Assessment and Environmental Permits.

Project manager for the preparation of a BLM Environmental Assessment for a 400-mile, 12-inch natural gas liquids pipeline extending from northwest to southeast New Mexico. Primary issues for the project included a large number of sensitive species potentially affected by the project (approximately 100), extensive cultural resources, and construction methods for stream and river crossings. Responsibilities included scoping meeting organization and participation, directing staff preparing the Environmental Assessment and Biological Assessment, and coordinating with the BLM, and the Bureau of Indian Affairs, which represented the Navajo Nation and Santa Ana and Zia Pueblos. The Environmental Assessment was completed on an expedited schedule of 7 months.

Mr. Ellis also supervised construction monitoring and inspection for sensitive plant and animal species, and sensitive stream crossings and wetland areas. The inspection and monitoring team included up to 5 staff stationed at various locations.

BLM Utah State Office/Williams Pipeline Company, Rocky Mountain System Natural Gas Liquids Loop Project Environmental Assessment and Environmental Permits.

Project manager for the preparation of an Environmental Assessment for a 412-mile natural gas liquids 11-to 16-inch natural gas liquids loop pipeline between Bloomfield, New Mexico, and Browns Park, Utah. Responsibilities included supervision of the preparation of the environmental assessment, the biological assessment, sections of the project Plan of Development, 404 Permit Applications, and Storm Water and Hydrostatic Test Discharge Permit Applications. ENSR also provided biological resource and water quality protection measure compliance surveys and inspection during construction. Mr. Ellis supervised internal staff and two specialty biological subcontractor firms.

FERC, BLM, Entrega Natural Gas Pipeline EIS. Project manager for the preparation of a third party impact statement in 2005 for a 328-mile 36 to 42-inch diameter pipeline from the Piceance Basin of Colorado to the vicinity of Cheyenne, Wyoming. FERC was

the lead federal agency, and the BLM a cooperating agency. Major issues included river crossings, and cumulative impacts with other existing and proposed pipeline projects sharing the same pipeline corridor.

FERC, BLM, WIC Piceance Basin Expansion Natural Gas Pipeline EIS. Project manager for the preparation of a third party impact statement in 2005 for a 142-mile 24-inch diameter pipeline from the Piceance Basin of Colorado to the vicinity of Wamsutter, Wyoming. FERC was the lead federal agency, and the BLM a cooperating agency. Major issues included river crossings, and cumulative impacts with other existing and proposed pipeline projects sharing the same pipeline corridor.

BLM, U.S. Forest Service, Federal Energy Regulatory Commission/ KN Energy, Questar, TransColorado Pipeline Environmental Impact Statement and Environmental Permits. Project manager for the preparation of a third-party environmental impact statement in 1992 for a 300-mile natural gas pipeline from northwestern Colorado to northwestern New Mexico. Lead agencies were the Federal Energy Regulatory Commission, BLM, and the U.S. Forest Service. Major issues included pipeline routing alternatives in relation to land use and natural resources, expansion of existing utility corridors, threatened and endangered species, air quality in Class I areas, and visual effects. Technical field studies included effects on municipal water supply areas, effects of saline soils, and potential effects on threatened and endangered species, including the Mexican spotted owl, black-footed ferret, and bald eagle. Mr. Ellis was responsible for all aspects of environmental impact statement preparation including facilitation of scoping meetings, hearings, and interagency review meetings. In 1998, Mr. Ellis supervised the preparation of a Supplement to the final environmental impact statement that addressed new issues that emerged since 1992.

Mr. Ellis directed field studies required for U.S. Fish and Wildlife Service Section 7 consultation, COE 404 permit applications, and was responsible for oversight of a major cultural resource program that included mitigation of numerous large archaeological sites in southwestern Colorado and northwestern New Mexico.

Mr. Ellis also directed biological compliance inspections and surveys during pipeline construction, and participated in the processing of construction variance requests. Mr. Ellis was the primary contact with TransColorado and the agencies during the permitting period and construction. The permitting portion of the project was completed in 9 months under an expedited schedule so that construction could begin during the summer of 1998; construction was completed in 6 months.

BLM/Burlington Resources/Enron Capital and Trading, Lost Creek Gathering System Environmental Assessment, Wyoming. Project manager for a 150-mile natural gas gathering pipeline system. Supervised the preparation of a BLM environmental assessment, Biological Assessment for threatened and endangered species, 404

application, water quality applications and plans, and air quality permit applications. Other studies included cultural resource surveys, aerial and ground surveys for endangered species, and wetland delineations. Special considerations included pipeline route selection that involved evaluation of the risk of encountering contaminated groundwater at trench depth near at a uranium mill site being closed under Nuclear Regulatory Commission oversight, and mitigation for multiple crossings of the Oregon Trail and other historic trails near Jeffrey City.

Mr. Ellis supervised pre-construction and construction monitoring surveys for raptors, sage grouse, and other sensitive species during the construction and reclamation period.

BLM/Amoco Production Company, Cave Creek Sour Gas System Environmental Assessment. Manager for the Cave Creek Sour Gas Project, a 40-mile sour gas gathering system. Key issues on this environmental assessment were risks from sour gas (hydrogen sulfide) releases and pipeline routing options that would minimize the risk of sour gas exposure to humans, wildlife, and fish.

Federal Energy Regulatory Commission and California State Lands, Questar Southern Trails Environmental Impact Statement/Environmental Impact Report. Project manager for a 675-mile crude-oil to natural gas pipeline conversion project from northwestern New Mexico, across Arizona to Long Beach, California. ENSR was the environmental impact statement/environmental impact report contractor under the direction of Federal Energy Regulatory Commission and California State Lands. Major issues included urban construction effects, construction across Navajo Nation and Hopi lands, seismic hazards, and threatened and endangered species. Mr. Ellis was responsible for supervision of internal staff, and four specialty subcontractor firms.

Federal Energy Regulatory Commission and California State Lands, Tuscarora Natural Gas Pipeline Environmental Impact Statement/Environmental Impact Report. As a subcontractor to Resource Management, Inc, assistant project manager responsible for physical resource discipline sections for a joint federal and state Environmental Impact Statement/Environmental Impact Report for an approximately 300-mile, 20-inch natural gas pipeline from southeastern Oregon to Reno, Nevada. ENSR staff conducted field reviews, prepared Environmental Impact Statement/Environmental Impact Report sections, and participated in agency review meetings during the document preparation process.

Federal Energy Regulatory Commission and BLM/Tuscarora Pipeline Company, Hungry Valley Natural Gas Lateral Federal Energy Regulatory Commission Resource Reports and Environmental Assessment. Project manager for preparation of land use and soils sections of Federal Energy Regulatory Commission resource reports for a 15-mile natural gas pipeline lateral located on the north side of Reno, Nevada.

Major issues included pipeline construction effects within residential areas, and cumulative effects among various development projects.

Washington Energy Facility Siting Council, TransMountain Pipeline Preliminary Study. Participant in a scoping study to determine environmental impact statement issues for a controversial crude oil pipeline project that would cross Puget Sound along both underwater and overland segments. The major project issue was the relative oil spill risks of pipeline operation versus the existing tanker traffic across the Sound. Responsible for participating in public meetings and providing a framework for evaluating oil spill risk issues in the environmental impact statement.

El Paso Natural Gas Co., All-American Pipeline Conversion Project. Principal-in-charge for conversion of an existing crude oil pipeline to natural gas service for the California segment of the pipeline. Oversight of Federal Energy Regulatory Commission resource report preparation, field surveys, and coordination with state and federal agencies.

Fluor Engineering, Champlain Pipeline Project. Environmental studies manager for a Federal Energy Regulatory Commission open-season application for a 300-mile natural gas pipeline project that crosses Vermont, New Hampshire, and Massachusetts. Managed technical staff, report production, and state and federal agency interactions.

K N Energy, Pony Express Pipeline Project Federal Energy Regulatory Commission Resource Reports, Applicant-Prepared Environmental Assessment, and Environmental Permits. Project manager for the preparation of Federal Energy Regulatory Commission resource reports and applicant-prepared Environmental Assessment for an 800-mile crude oil to natural gas conversion project in Wyoming, Nebraska, Colorado, Kansas, and Missouri. Major issues included cultural resources and threatened and endangered species. ENSR prepared all required storm water, COE 404 permit applications, coordinated with the State Historic Preservation Officers in the respective states, and obtained concurrence letters from the U.S. Fish and Wildlife Service. ENSR provided biological compliance survey support during construction. Mr. Ellis was responsible for managing five cultural resources contractors for various work locations along the pipeline, and for supervising the preparation of project construction compliance documents and environmental inspector training. Mr. Ellis provided primary coordination with Federal Energy Regulatory Commission staff during resource report and Environmental Assessment preparation, and supported K N Energy during negotiations with the Federal Energy Regulatory Commission concerning Certificate environmental conditions.

Northern Tier Pipeline Co., Northern Tier Crude Oil Pipeline Project. Vegetation task manager for a multi-state crude oil pipeline originating in Washington. Responsible for

vegetation mapping, evaluating impacts, preparing revegetation guides, and conducting threatened and endangered plant surveys.

Williams Brothers Engineering, ARCO Ferndale Pipeline. Assistant project manager for a 34-mile, 16-inch natural gas pipeline from Sumas to Cherry Point, Washington. Prepared Federal Energy Regulatory Commission environmental report in 2 months. Issues included shoreline permits, wetlands, fisheries, endangered species, and cultural resources

B. Oil and Gas Field Development

BLM, Forest Service/Exxon et al., Riley Ridge Natural Gas Environmental Impact Statement. Vegetation task manager for a third-party Environmental Impact Statement for a gas field development in western Wyoming. Coordinated soil/vegetation correlation and impact assessment activities.

ICATEC S.A./PEMEX, Chicotepec Paleocanal Development Project. Land use task manager for a comprehensive oil field/infrastructure impact analysis for a large oil field in the state of Veracruz, Mexico. Responsible for defining land use patterns and identifying land use constraints in locating drilling sites and pipelines.

BLM/Wildrose Resources, Wildrose Pariette Unit Waterflood Project Environmental Assessment. Project manager for evaluating the effects of using surface water for an oil field waterflooding project in the Uinta Basin of Utah. Issues included effects on wildlife habitats in an adjacent Area of Critical Environmental Concern, and additional surface disturbance associated with construction of injection wells.

BLM/Chevron, Brennan Bottom Waterflood Project Environmental Assessment. Project manager for evaluating the effects of using surface water obtained from the Green River for an oil field waterflooding project in the Uinta Basin of Utah. Environmental Assessment issues included potential water withdrawal effects on threatened and endangered species inhabiting the Green River, and surface disturbance from construction of 14 new producing wells and 11 injection wells within the 1,200-acre Brennan Bottom Unit.

BLM/Coastal Oil and Gas Corporation, Natural Buttes Unit Environmental Assessment. Project manager for an infill expansion of an existing natural gas field in the Uinta Basin of Utah. This expansion consisted of the addition of up to 875 wells within the 78,000-acre Natural Buttes Unit. Environmental Assessment issues included visual resource effects seen from the White River, which is frequented by recreational boaters, and potential effects on nesting raptors and on threatened and endangered species.

BLM/Enron Oil and Gas Company, Chapita Wells Unit Environmental Assessment. Principal-in-charge and senior reviewer for an infill expansion of an existing natural gas well field in the Uinta Basin of Utah. The expansion consisted of drilling 99 additional wells within the 12,000 Chapita Wells Unit. Environmental Assessment issues included visual resource effects of drill sites seen from the White River, which is frequented by recreational boaters; drill sites potentially seen from Fantasy Canyon, a unique geologic area; and potential effects on nesting raptors and on threatened and endangered species.

BLM/Resource Development Group, Resource Development Group Natural Gas Field Development Environmental Assessment. Principal-in-charge and senior reviewer for a new and existing natural gas field development project in the southern Uinta Basin of Utah. The proposed project consisted of drilling 970 wells on an 80-acre spacing within an area of approximately 80,000 acres. Environmental Assessment issues included loss of mule deer winter range and winter range use and mitigation of these losses; effects on sage grouse, effects on threatened and endangered species; development effects on areas that may be proposed for wilderness in the future; and cumulative effects of oil and gas development across the Uinta Basin.

BLM/Wexpro Company, Island Unit Environmental Assessment. Principal-in-charge and senior reviewer for an expansion of an existing natural gas field development in the Uinta Basin of Utah. The proposed project consisted of drilling 97 wells on 40-acre spacing within a 6,900 unit. Environmental Assessment issues included concerns about threatened and endangered species, construction in floodplains, and cumulative effects on air and water resources.

BLM/BIA/Costilla Energy, Hill Creek Unit Environmental Assessment. Principal-in-charge and senior reviewer for an expansion of an existing natural gas field development in the Uinta Basin of Utah. The proposed project consisted of drilling 47 wells on 40-acre spacing within a 5,350 unit located on BLM and the Uintah/Ouray Indian Reservation. Environmental Assessment issues included and amendment to the BLM Book Cliffs Resource Management Plan; concerns about threatened and endangered species, construction in floodplains, and cumulative effects on air and water resources.

H. Water Resource Development and Management

Basin Electric Power Cooperative, Grayrocks Dam. Participated in public hearings on downstream effects of water withdrawals on the Platte River resulting from construction of the Grayrocks Dam on the Laramie River. Presented testimony on the environmental variables that affect vegetation encroachment into the Platte River channel.

Denver Water Department, Two Forks Dam Threatened and Endangered Species Studies. Technical specialist responsible for the preparation of biological assessments for federally listed and candidate species that would be potentially affected by the

construction and operation of the Two Forks Dam west of Denver, Colorado. Responsible for the design and execution of population field studies for the Pawnee Montane Skipper butterfly, and for providing witness testimony on Platte River use by threatened and endangered species during agency hearings on the project.

Wyoming Attorney General, Technical and Litigation Support for Threatened and Endangered Species Issues, Platte River. Project manager responsible for providing technical support and expert testimony on endangered species potentially affected by water management changes in the North Platte and Platte River systems. Provided expert witness testimony on Platte River use by threatened and endangered species during instream flow hearings conducted by Nebraska water agencies.

Platte River Whooping Crane Habitat Maintenance Trust, Monitoring Plan. Project manager for developing a habitat monitoring plan for the Big Bend region of Nebraska. The plan included procedures for developing an automated land cover mapping system and employing habitat suitability models to measure the importance of habitat changes.

Bureau of Reclamation, Niobrara River Whooping Crane Habitat Study. Project manager for evaluating the effects of constructing the Norden Dam on the Niobrara River in Nebraska on whooping crane nesting and feeding habitat. The purpose of the project was to define operational criteria that could be used to maintain crane habitat after dam construction between the Bureau of Reclamation and U.S. Fish and Wildlife Service.