

ES.0 EXECUTIVE SUMMARY

ES.1 INTRODUCTION

TransCanada Keystone Pipeline, LP (Keystone) has applied to the U.S. Department of State (DOS) for a Presidential Permit for the proposed construction, connection, operation, and maintenance of a pipeline and associated facilities at the United States border for importation of crude oil from Canada. DOS receives and considers applications for Presidential Permits for such oil pipeline border crossings and associated facilities pursuant to the President's constitutional authority over foreign relations, and as Commander-in-Chief, which authority the President delegated to DOS in Executive Order (EO) 13337, as amended (69 Federal Register [FR] 25299). DOS's jurisdiction to issue a Presidential Permit for the border crossing and the associated facilities at the border.

DOS, as the lead agency for the environmental impact statement (EIS), discussed the appropriate level of participation required with other federal agencies that will be required to issue permits associated with the proposed Keystone XL Pipeline Project (Project). The following federal agencies and one state agency have elected to participate as cooperating agencies in the process:

- U.S. Environmental Protection Agency (EPA)
- U.S. Department of the Interior, Bureau of Land Management (BLM)
- U.S. Department of the Interior, National Park Service (NPS)
- U.S. Department of the Interior, U.S. Fish and Wildlife Service (USFWS)
- U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS)
- U.S. Department of Agriculture, Farm Service Agency (FSA)
- U.S. Department of Agriculture, Rural Utilities Service (RUS)
- U.S. Army Corps of Engineers (USACE)
- U.S. Department of Energy, Western Area Power Administration (Western)
- U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Pipeline Safety (OPS)
- Montana Department of Environmental Quality (MDEQ)

The U.S. Department of Interior, Bureau of Reclamation (Reclamation) has agreed to provide technical assistance to DOS in the environmental review process. Reclamation has responsibilities for federal water supplies in the West. The proposed pipeline would cross beneath one of Reclamation's canals in South Dakota.

Certain county governments in Nebraska have agreed to be assisting agencies, and as such would work with DOS to ensure that the EIS incorporates local planning processes and/or laws. These counties are: Fillmore, Greely, Holt, Merrick, Nance, Saline, and Wheeler. In Nebraska, the Lower Big Blue Natural Resources district and the Upper Elkhorn Natural Resources district have also agreed to be assisting agencies. Various other state and local resource agencies from each of the states crossed by the proposed Project have responsibilities for state and local permit issuance (see Table 1.8-1).

ES.2 PROPOSED ACTION

The Project would consist of approximately 1,380 miles of new 36-inch-diameter pipeline in the U.S. The proposed pipeline would cross the international border between Saskatchewan, Canada and the United States near Morgan, Montana. The Project initially would have the nominal transport capacity of 700,000 barrels per day (bpd) of crude oil, with up to 200,000 bpd delivered to an existing terminal in Cushing, Oklahoma and the remaining amount shipped to existing delivery points in Nederland (near Port Arthur), Texas, and Moore Junction (in Harris County), Texas. By increasing the pumping capacity in the future, the Project could ultimately transport up to 900,000 bpd of crude oil through the proposed pipeline. At that throughput, up to 200,000 bpd would be delivered to the Cushing Oil Terminal and the remainder would be delivered to the existing terminals in Texas.

ES.2.1 Pipeline System

The Project includes three new pipeline segments plus additional pumping capacity on the previously permitted Cushing Extension Segment of the Keystone Pipeline Project (Keystone Cushing Extension):

- Steele City Segment (from Morgan, Montana to Steele City, Nebraska) that connects to the northern end of the previously approved, and currently under construction, Keystone Cushing Extension;
- Gulf Coast Segment (from Cushing, Oklahoma to Nederland, Texas) that connects to the southern end of the Keystone Cushing Extension; and
- Houston Lateral (from the Gulf Coast Segment, in Liberty County, Texas to Moore Junction, in Harris County, Texas).

Table ES.2.1-1 lists the miles of new pipeline by state for the proposed Keystone XL Project.

TABLE ES.2.1-1						
Miles of Pipeline by State for the Proposed Project						
	MT	SD	NE	OK	TX	Total
Steele City Segment	282.5	314.1	254.1	0.0	0.0	850.7
Gulf Coast Segment	0.0	0.0	0.0	155.4	324.8	480.2
Houston Lateral	0.0	0.0	0.0	0.0	48.6	48.6
Project total	282.5	314.1	254.1	155.4	373.4	1,379.5

The Project components would include 30 new pump stations, 74 mainline valves (MLVs), approximately 50 permanent access roads, one tank farm, and two crude oil delivery sites. Additional access roads, stockpile sites, railroad sidings and construction camps would be required during Project construction.

The pipeline would require a 110-foot wide construction right-of-way (ROW), consisting of a 60-foot temporary easement and a 50-foot permanent easement. In certain sensitive areas, which may include wetlands, cultural sites, shelterbelts, residential areas, or commercial/industrial areas, the construction ROW would be reduced to 85 feet.

ES.2.2 Connected Actions

Pump stations, remotely operated valves and densitometers¹ for the Project would be electrically powered. The necessary electric power lines and associated facility upgrades would be constructed by local electrical service companies to provide power for these facilities. Those companies would be responsible for obtaining the necessary approvals or authorizations from federal, state, and local agencies for such facilities. Although the permitting process for the electrical facilities is an independent process, construction and operation of these facilities are considered connected actions under NEPA and were evaluated as part of the NEPA review process reported in this EIS. Additionally, Western has determined that due to load forecasts associated with proposed pump stations in South Dakota, a new 230-kV transmission line would need to be added to the existing electrical grid system; as a result Western has proposed construction and operation of the 80-mile-long Lower Brule to Witten transmission line. Two potential corridors and several route options within each of those corridors were identified for the transmission line; the potential impacts of construction and operation of the transmission line are generally addressed in this EIS. An additional and separate NEPA environmental assessment of the alternatives for the proposed transmission line will be conducted in the future.

ES.3 PURPOSE AND NEED FOR THE PROPOSED ACTION

The primary purpose of the proposed Project is to transport Western Canadian Sedimentary Basin (WCSB) crude oil from the border with Canada to existing delivery points in Petroleum Administration for Defense District (PADD) III² that provide connections to existing refineries in PADD III. An additional purpose of the Project is to supplement WCSB deliveries to the Cushing Oil Terminal in Cushing, Oklahoma, which is in PADD II³. Keystone's goal is to initially transport up to 700,000 bpd of crude oil by pipeline from the WCSB to the United States. Up to 500,000 bpd of this volume of crude oil would be transported to delivery points in PADD III and up to 200,000 bpd would be transported to the existing Cushing Oil Terminal. At maximum capacity (achieved with the addition of supplementary pumping power) the Project would have the potential to transport a total of 900,000 bpd of WCSB crude oil to the U.S., with the additional 200,000 bpd transported to delivery points in PADD III. Due to market projections of future fuel demand in PADD III, the applicant does not currently anticipate the need to expand capacity to 900,000 bpd in the near future.

The need for the Project is dictated by:

- Supply of heavy crude oil from the WCSB;
- Demand for heavy crude oil in PADD III;
- Transport of crude oil from the WCSB to PADD III; and
- Future crude oil supply and demand scenarios with and without the proposed Project.

ES.4 PUBLIC INVOLVEMENT PROCESS

On January 28, 2009, DOS issued a Notice of Intent (NOI) to prepare an EIS. The NOI informed the public about the proposed action, announced plans for scoping meetings, invited public participation in the scoping process, and solicited public comments for consideration in establishing the scope and content of the EIS. The NOI was published in the Federal Register and distributed to affected landowners, federal

¹ Densitometers measure the batch density of the crude oil to allow operators to track individual crude oil shipments.

² PADD III (Gulf Coast) consists of the states of Alabama, Mississippi, Louisiana, Arkansas, Texas, and New Mexico.

³ PADD II (MidWest) consists of 15 states from Oklahoma north to Wisconsin and east to Ohio.

agencies, Indian tribes, state agencies, municipalities and counties, elected officials, non-governmental organizations, the media, and other interested individuals. DOS held 20 separate scoping meetings in the vicinity of the proposed Project to provide opportunity for public comment on the scope of the EIS. Meetings were held in Beaumont, Liberty, Livingston, and Tyler, Texas; Durant and Ponca City, Oklahoma; El Dorado and Clay Center, Kansas; York and Atkinson, Nebraska; Murdo, Faith, and Buffalo, South Dakota; Baker, Terry, Circle, Plentywood, Glendive Glasgow, and Malta, Montana. The scoping period was originally planned to extend from January 28 to March 16, 2009. Weather conditions in South Dakota precluded holding the scoping meetings on this schedule, and an amended NOI published on March 23, 2009 extended the scoping period until April 15, 2009 to provide time to reschedule two South Dakota scoping meetings.

DOS received verbal, written, and electronic comments during the scoping comment period. All verbal scoping comments formally presented at the meetings were recorded and transcribed. Additional written scoping comments were received on comment forms provided to the public at the meetings and in letters.

ES.5 ALTERNATIVES CONSIDERED

The following alternatives were assessed by DOS:

- No Action Alternative – the proposed Project would not be built;
- System Alternatives – use of other pipeline systems or other methods of providing crude oil supplies to the U.S. Gulf Coast market;
- Major Route Alternatives – other pipeline routes for transporting crude oil from the U.S./Canada border near Morgan, Montana to the Port Arthur and the east Houston areas of Texas; and
- Alternative Routes for the Electrical Transmission Line – preliminary alternative routings for the proposed 230-kV transmission line in South Dakota that is needed to ensure power system stability given the loads required for providing electrical power to the pump stations in South Dakota.

In addition, MDEQ evaluated alternatives and variations in Montana as part of its analysis of Keystone's application for a Certificate of Compliance under the state's Major Facility Siting Act (MFSA). MDEQ also evaluated the alternatives and variations in accordance with the requirements of the Montana Environmental Policy Act (MEPA) as reported in Appendix I of the EIS.

ES.5.1 No Action Alternative

Under the No Action Alternative, the Project would not be constructed and would not require issuance of a DOS Presidential Permit. The increasing demand for crude oil in the U.S. cannot be entirely met by efforts to conserve use of refined petroleum products or the increased use of renewable energy. As crude oil demand increases, the overall domestic supplies of crude oil are declining. At the same time, only a small volume of WCSB crude oil can be shipped to PADD III through a single pipeline, and a substantial portion of the oil imported from outside of North America originates in countries with decreasing or un dependable oil supplies. Under the No Action Alternative, it is likely that other projects would be proposed to meet the increased demand. Although it is not possible to identify the specific impacts of such projects, it is likely that they would be similar in nature to those of the proposed Project and either smaller, greater than, or equal to the magnitude of impacts of the proposed Project.

Under the No Action Alternative, the U.S. would not receive a reliable and cost efficient source of crude oil from the WCSB region and would remain dependent upon unstable foreign oil supplies from the Mideast, Africa, Mexico, and South America. Further, the WCSB crude oil would likely be shipped to

countries outside of North America, which would require new infrastructure that would result in environmental impacts at least as great as those of the proposed Project. In addition, the transport of crude oil by tanker and other means such as truck and rail would likely result in greater GHG emissions than those that would occur as a result of the proposed Project. Finally, the No Action Alternative would not meet the purpose and need of the proposed Project.

ES.5.2 System Alternatives

System alternatives to the proposed Project would make use of other existing, modified, or proposed pipeline systems as well as non-pipeline systems - to meet the purpose and need of the proposed Project.

ES.5.2.1 Existing Pipeline Systems

There is currently only one existing pipeline system that extends from the Midwest to the Gulf region. The ExxonMobil Pegasus pipeline is a system that transports crude oil from Patoka, Illinois to Nederland, Texas. Since the committed pipeline capacity is 50,000 bpd and the total capacity is 66,000 bpd, Pegasus is considering an expansion of up to 30,000 bpd to PADD III as early as 2009. Even with the proposed expansion, the Exxon Pegasus proposal would not meet the service capacity needs of the PADD III market.

ES.5.2.2 New Pipeline System Alternatives

Four alternative new proposed pipeline system alternatives were analyzed: The Altex Pipeline System; The Chinook-Maple Leaf Pipeline System; Trailbreaker Transportation System; and the Enbridge – BP Delivery System all of which at this time are speculative. None of the proposed system alternatives would provide the delivery capacity of the proposed Project and none could provide WCSB crude oil to PADD III in the same timeframe as the proposed Project. Therefore, none of the system alternatives considered can meet the Project purpose and need and none of them offer a significant environmental advantage.

ES.5.2.3 Alternative Modes of Transportation

Surface crude oil delivery transportation modes from the U.S./Canada border near Morgan, Montana to the Port Arthur and the east Houston areas of Texas were considered as an alternative to the proposed Project. Modes considered include delivery by truck, railroad cars, and barges. Truck transportation would not be a practical way to meet the Project's purpose and need since crude oil transport equivalent to that of the proposed Project would require 4,000 trucks per day. There is not an existing direct rail line from Morgan, Montana, to Port Arthur, Texas and the east Houston areas of Texas. Barging the oil would not be feasible due to the lack of a large waterway system between Morgan, Montana, and the PADD III area capable of supporting barge traffic.

The alternative modes considered would be less safe, would require construction of substantially more infrastructure, have greater atmospheric emissions (including GHG), and/or pose greater safety hazards than the proposed Project. Therefore, none of the alternative modes of transportation have been evaluated further.

ES.5.3 Pipeline Route Alternatives

DOS identified alternatives to the proposed Project for the Steele City Segment (SCS), the Gulf Coast Segment (GCS), and the Houston Lateral (HL). In addition DOS considered an alternative that would avoid using the Cushing Extension.

ES.5.3.1 Steele City Segment Alternatives

For the Steele City Segment, five alternatives were considered: Express-Platte Alternative; SCS Alternative A; SCS Alternative A1A; SCS Alternative B (the proposed Project); and Baker Alternative. The initial assessment of the Steele City Segment Alternatives indicates that the alternatives considered do not offer an environmental advantage over the Applicant's proposed route (Alternative SCS-B), and are eliminated from further consideration.

ES.5.3.2 Alternative to Using the Cushing Extension

One alternative was identified that would avoid using the Cushing Extension, the Western Alternative. The Western Alternative does not offer an environmental advantage over the proposed Project and was eliminated from further analysis.

ES.5.3.3 Gulf Coast Segment Alternatives

Two geographical alternatives were assessed for the Gulf Coast Segment: Gulf Coast Segment (GCS)-A (proposed Project) and GCS-B. While GCS-A would cross more wetlands as compared to GCS-B, it would affect less overall agricultural land, developed land, and crosses less streams/rivers. GCS-A was therefore determined to be the environmentally preferred alternative and GCS-B was eliminated from further analysis.

ES.5.3.4 Houston Lateral Alternatives

Alternatives identified for the Houston Lateral include Alternative HL-A (the proposed Project) and Alternative HL-B. Alternative HL-A, the environmentally preferred alternative is the shorter route and would require fewer miles of new pipeline and would have a lesser area of impact. Alternative HL-B does not offer an environmental advantage over the Alternative HL-A, and was eliminated from further analysis.

ES.5.3.5 Summary of Pipeline Route Alternatives Analysis

Based on the assessment of alternatives conducted, DOS determined that none of the identified alternatives offered an environmental advantage over the Applicant's preferred route. Therefore, the DOS preferred route consists of the following alternatives by segment:

- Steele City Segment Alternative B (SCS-B);
- Gulf Coast Segment Alternative A (GCS-A); and
- Houston Lateral Alternative A (HL-A).

ES.5.4 Alternative 230-kV Electrical Transmission Line Routes

The 230-kV Lower Brule to Witten transmission line would be needed to ensure transmission system reliability with the expected load demands at full pipeline operational capacity in southern South Dakota. Western and Basin Electric Power Cooperative (BEPC) have identified two alternative transmission corridors (Alternative Corridors A and B) for the Project and have identified five alternative routes in Corridor A and four alternative routes in Corridor B. The corridors extend from the Big Bend Dam and include the site of a proposed new substation at Lower Brule and the existing Witten Substation.

The transmission line would transfer electricity from the proposed Lower Brule Substation near Big Bend Dam in Lyman County, to an existing substation near Witten in Tripp County. The existing Big Bend-Fort Thompson No. 2, 230-kV transmission line turning structure would be converted to a double-circuit structure. Western would construct 2.1 miles of new double-circuit transmission line south of the dam and construct the new Lower Brule Substation. The new transmission line from the dam would connect to the Lower Brule Substation. Western would own and operate the 2.1 mile transmission line but would transfer ownership and operation of the Lower Brule Substation to BEPC. BEPC would construct and operate the new, 70-mile-long, 230-kV transmission line between the Lower Brule Substation and the existing Witten Substation, which is owned by Rosebud Electric Cooperative. The five alternative routes for the transmission line that were identified within Corridor A and the four alternative routes identified within Corridor B are all between the two substations.

Both of the alternative corridors cross the Lower Brule Reservation, but the Corridor A has a shorter path through the Lower Brule Reservation. The key impacts of the transmission line alternatives are listed in the listed in EIS for comparison purposes. In addition, the impacts of construction and operation of the transmission line alternatives are generally addressed in Section 3.0 the EIS. However, DOS, Western, and the other cooperating agencies do not have sufficient design and construction information to establish an agency preferred alternative for the proposed transmission line project. An additional and separate NEPA environmental review of the alternatives to the proposed transmission line will be conducted after the alternative routes are further defined. The design and environmental review of the proposed 230-kV transmission line are on a different schedule than the pipeline system itself. Regional transmission system reliability concerns are not associated with the initial operation of the proposed pipeline pump stations, but rather with later stages of proposed pipeline operation at higher levels of crude oil throughput.

ES.5.5 Montana Major Facility Siting Act and Montana Environmental Policy Act Environmental Review

Keystone applied to MDEQ for a Certificate of Compliance under MFSA for the portions of the proposed Project in Montana. Prior to issuing a certificate, MDEQ must find and determine the basis of the need for the facility and determine whether or not the facility would serve the public interest, convenience, and necessity. Under the law, it must also identify the route that minimizes adverse environmental impacts and uses public land whenever the use of public lands is as economically practicable as the use of private land to include use of federal lands. As a cooperating agency in the preparation of the EIS, MDEQ considered and eliminated the Project alternatives described above under the federal NEPA process. MDEQ also required Keystone to identify and provide assessments of two additional alternative routes in Montana that increased the use of public lands in comparison to Alternative SCS-B (proposed route). Although both of the new alternatives were eliminated in the initial screening process, portions of one of the alternatives cross more public land as compared to the proposed route segments in those areas. MDEQ identified those portions of the alternative as variations to Alternative SCS-B and evaluated them along with other variations it developed to avoid or minimize impacts to specific resources, to minimize conflicts with existing or proposed residential and agricultural land uses, and in response to requests submitted by concerned landowners.

MDEQ identified and evaluated a total of 19 variations in Montana. Descriptions of the variations and the evaluations are presented in Appendix I along with environmental assessments of Alternative SCS-B in Montana that are specific to the needs of MEPA. MDEQ preliminarily selected 9 variations as preferable to the segments of Alternative SCS-B they would replace. DOS has determined that Alternative SCS-B in Montana (the proposed route) and the variations to Alternative SCS-B selected by MDEQ have been evaluated sufficiently to meet the requirements of NEPA.

ES.6 ENVIRONMENTAL ANALYSIS

As summarized below, DOS evaluated the potential impacts of the Project on geology, soils and sediments, water resources, wetlands, terrestrial vegetation, wildlife, fisheries, threatened and endangered species, land use, socioeconomics, cultural resources, and air quality and noise. In addition, DOS evaluated the potential risks and effects of oil spills and cumulative impacts.

ES.6.1 Geology

ES.6.1.1 Physiography and Surface and Bedrock Geology

The proposed Project would not involve substantial long- or short-term, large scale alteration of topography. Most of the proposed route would be within areas where bedrock is buried by unconsolidated sediments consisting of glacial till, alluvium, colluvium, loess and/or aeolian deposits. In these areas, impacts to bedrock would be expected to be minimal, and limited to areas where bedrock is within 8 feet of the surface. Routine pipeline operation and maintenance activities would not be expected to affect physiography or surface or bedrock geology. During construction, blasting or ripping could be required at locations where shallow bedrock is present within 8 feet of the ground surface. Over the entire proposed Project route, approximately 9 miles would cross areas identified as potential blasting locations and approximately 166 miles would cross areas identified as potential ripping locations.

ES.6.1.2 Paleontological Resources

Fossil potential along the ROW is designated as being very low to very high in Montana, low to high in South Dakota, and not scaled but possible for Nebraska, Oklahoma, and Texas. Rocks underlying the location of two new pump stations in Kansas may be fossiliferous. Potential impacts to paleontological resources during construction includes damage to or destruction of fossils in shallow bedrock areas due to ripping and/or blasting, erosion of fossil beds due to grading, and unauthorized collection of fossils by construction personnel or the public. Keystone is preparing a Paleontological Mitigation Plan prior to beginning construction on federal and state lands. Fossils or other paleontological resources found on private or other non-federal land would only be recovered with approval of the landowner. There is currently an effort among federal land management agencies in Montana such as BLM, USACE, and MDEQ and other agencies to develop a Memorandum of Understanding (MOU) for the identification, evaluation and protection of paleontological resources in the state of Montana; however, the Geology Section of the EIS also describes protocols for these resources for the whole proposed Project route. Routine pipeline operations and maintenance activities are not expected to affect paleontological resources.

ES.6.1.3 Mineral and Fossil Fuel Resources

In the Project area, oil, natural gas, and coal comprise the major energy resources. The proposed route would not cross the well-pads of any active oil and gas wells. Accordingly, extraction of oil and gas resources would not be affected by operation of the proposed pipeline. The proposed pipeline route would not cross any known coal mines therefore coal extraction would not be affected by the Project. Sand, gravel and bentonite are also mined in Montana, South Dakota and Nebraska. Crushed stone, coal (lignite), clay, iron, peat, and sand are other mineral resources present in the Project area. The proposed route would not cross any active surface mines or quarries, construction; however, operation of the Project would limit access to sand, gravel, clay, and stone resources that are within the width of the permanent pipeline ROW. Although not currently planned, if surface mining was proposed for this area in the future, the pipeline could limit access to these resources.

ES.6.1.4 Geologic Hazards

At certain locations along the proposed route, seismic hazards, landsliding, subsidence, or flooding would be possible. Since the proposed pipeline ROW would be located in the relatively flat and stable continental interior, the potential for impacts from geologic hazards is lower than for facilities located in active mountain belts or coastal areas. Based on the evaluation of potential seismic hazards along the proposed ROW, the risk of pipeline rupture from earthquake ground motion would be considered minimal. The proposed route would not cross any known active faults and is located outside of known zones of high seismic hazard. During construction activities, vegetation clearing and alteration of surface-drainage patterns could increase landslide risk. Implementation of temporary erosion control structures would reduce the likelihood of construction-triggered landslides. In addition, Keystone plans to revegetate areas disturbed by construction along the pipeline ROW. There is a risk of subsidence where the proposed route crosses karst formations in Nebraska, Oklahoma, and Texas. Keystone would conduct site-specific studies as necessary to characterize the karst features, and would evaluate and modify construction techniques as necessary in these areas. The overall risk to the pipeline from karst-related subsidence is expected to be minimal.

ES.6.2 Soils and Sediments

Pipeline construction activities, including clearing, grading, trench excavation, backfilling, heavy equipment traffic, and restoration along the construction ROW, could adversely affect soil resources. In addition, the construction of pump stations, access roads, construction camps and the tank farm could also affect soil resources. Potential impacts could include temporary and short-term soil erosion, loss of topsoil, short-term to long-term soil compaction, permanent increases in the proportion of large rocks in the topsoil, and short-term to permanent soil contamination. Pipeline construction also could result in damage to existing tile drainage systems. Keystone has proposed construction procedures that are designed to reduce the likelihood and severity of Project impacts to soils and sediments, and to mitigate where impacts are unavoidable. These include, but are not limited to: segregating and salvaging all topsoil up to a maximum of 12 inches of topsoil from the area disturbed by trenching where practicable and restoring topsoil to its approximate original stratum after backfilling is complete; reducing soil erosion by installing sediment barriers, trench plugs, temporary slope breakers, drainage channels or ditches, and mulching; ripping to relieve soil compaction in particular areas from which topsoil has been removed; and halting construction during wet weather periods, or implementing methods to mitigate impacts when construction activities are conducted in wet conditions.

During the operational phase of the Project, small scale, isolated surface disturbance impacts could occur from pipeline maintenance traffic and incidental repairs. These impacts would be addressed with the affected landowner or land management agency and a mutually agreeable resolution reached.

ES.6.3 Water Resources

ES.6.3.1 Groundwater

Potential impacts to groundwater during construction activities could include: groundwater quality degradation during or after construction resulting from disposal of materials and equipment, or vehicle spills and leaks; temporary increases in total suspended solids (TSS) concentrations where the water table is disturbed during trenching and excavation activities; increased surface water runoff and erosion from clearing vegetation in the ROW; degradation of groundwater quality due to potential blasting; and groundwater withdrawal for hydrostatic testing.

Many of the aquifers present in the subsurface beneath the proposed route are isolated by the presence of glacial till or other confining units, which characteristically inhibits downward migration of water and

contaminants into these aquifers. However, shallow or near-surface aquifers are also present beneath the proposed route and may be impacted by construction activities. Additionally, the risk of dewatering shallow groundwater aquifers or reducing groundwater quality through an increase in total suspended solids during construction likely would be temporary, and these aquifers are expected to recover quickly following construction activities. Keystone's blasting plan would include provisions to avoid impacts to groundwater and to incorporate post-blasting testing for surface water and water wells within 150 feet of the centerline to ensure that water resources are not negatively affected by blasting activities. Hydrostatic testing discharge waters would meet all water quality requirements prior to discharge and would therefore not impact groundwater quality. All applicable water withdrawal and discharge permits would be acquired prior to hydrostatic testing. Construction and normal operations therefore are not expected to result in a long-term significant impact on groundwater.

ES.6.3.2 Surface Water

Potential impacts on surface water resources during construction activities would include: temporary increases in TSS concentrations and increased sedimentation during stream crossings; temporary to long term decrease in bank stability and resultant increase in TSS concentrations from bank erosion as vegetation removed from banks during construction is re-establishing; temporary reduced flow in streams and potential other adverse effects during hydrostatic testing activities; and temporary degradation of surface water quality and alteration of aquatic habitat from blasting activities within or adjacent to stream channels.

Keystone would select one of the following construction methods for surface waterbody crossings: dry-cut methods, open cut wet crossings, and horizontal directional drilling (HDD). Thirty-eight crossings have been identified for HDD crossings. The HDD method would avoid any impacts on water bodies. The open cut wet method, involving trenching while water continues to flow, would entail a high risk of temporary siltation to streams and other water bodies. The risks of open-cut wet trenching could be temporary (for the duration of construction) or longer term (where compromised stream bank stability or bank erosion occurs). Dry-cut methods would greatly reduce risks to surface waterbodies but are not feasible for wider streams and would only be used selectively during construction. At all water crossings, Keystone would use buffer strips, drainage diversion structures, sediment barrier installations, and clearing limits to reduce siltation and erosion. Hydrostatic test water would be discharged to the source water at an approved location along the waterway or to an upland area within the same drainage as the source water where it may evaporate or infiltrate. Discharged water would be tested to ensure it meets applicable water quality standards, and discharge rate would be regulated.

ES.6.3.3 Floodplains

Floodplain terraces and low floodplains are found along the Project route. Two pump stations and 10 MLVs would be in the 100-year floodplain as currently proposed, but the effect of those facilities on floodplain function is expected to be minor.

Actions by federal agencies, under EO 11988, must avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplain development including reducing the risk of flood loss, minimizing the impact of floods on human safety, health and welfare, and restoring and preserving the natural and beneficial values served by floodplains. The pipeline would be constructed under river channels with potential for lateral scour. In floodplain areas adjacent to waterbodies, the contours would be restored to as close to previously existing contours as practical and the construction ROW would be revegetated so that after construction, the pipeline would not obstruct flows over designated floodplains.

ES.6.4 Wetlands

Wetland types within the Project area include emergent wetlands, scrub/shrub wetlands, and forested wetlands. The Project would disturb a total of 554 acres of wetlands (not including pipe storage yards, rail sidings, contractor's yards, access roads, or construction camps), primarily forested wetlands (271 acres) and emergent wetlands (262 acres), with minimal shrub/scrub wetlands (21 acres). Additional impacts to wetlands from construction camps and access roads outside of the 110-foot construction right-of-way cannot be assessed until the actual locations for these sites are determined.

Construction of the pipeline would affect wetlands and their functions primarily during and immediately following construction activities, but permanent changes also are possible.

Planned conservation measures (such as installing trench breakers and/or sealing the trench to maintain the original wetland hydrology, where the pipeline trench may drain a wetland; using timber riprap, timber mats, and prefabricated equipment mats; and restoring wetland areas within conservation lands or easements to a level consistent with any additional criteria established by the relevant managing agency) would avoid or minimize most impacts on wetlands associated with construction and operation activities, and would ensure that potential effects would be primarily minor and short term. Impacts to forested wetlands are long-term and would be considered permanent. Keystone would work with each USACE district to determine what kind of compensation would be required for the permanent conversion of forested wetland to herbaceous wetland, and Keystone would continue to work with the USACE to develop a Wetland Mitigation Plan.

ES.6.5 Terrestrial Vegetation

Construction of the pipeline would temporarily impact 11,533 acres of grassland/rangeland and 2,523 acres of upland forest. The permanent ROW would impact 749.1 acres of grassland/rangeland and 175.6 acres of upland forest. Grassland impacts due to pipeline construction are expected to be minimal, and affected vegetative communities generally are expected to reestablish within 2 years. Impacts on upland forest and shrubland would be longer term than those anticipated for grassland, because of the time required for these plant communities to reestablish and reach mature, pre-construction conditions. Keystone would implement measures to reduce impacts to forested uplands and grasslands such as restoring original contours and drainage patterns to the extent practicable after construction; providing and maintaining temporary and permanent erosion control measures on steep slopes or wherever erosion potential is high; and reseeding the reclaimed construction ROW following cleanup and topsoil replacement as closely as possible using seed mixes based on input from the local NRCS and specific seeding requirements as requested by the landowner or the land management agency.

After removal of vegetation cover and disturbance to the soil, reestablishment of vegetation communities could be delayed or prevented by infestations of noxious weeds and invasive plants. Vegetation removal and soil disturbance during construction could create optimal conditions for the establishment of many weeds. Keystone has committed to control the introduction and spread of noxious weeds by implementing construction and restoration procedures in coordination with appropriate local, state, and federal agencies to prevent the spread of noxious weeds, insects and soil borne pests.

There would be temporary and permanent impacts on about 51 miles of Conservation Reserve Program (CRP) land and less than 2 miles of Wetland Reserve Program lands along the proposed pipeline corridor. Successful restoration of native vegetation and CRP fields (defined as 90 percent cover of desirable perennial plants, stable soils, and comparable vegetation community composition) would be expected within 4 to 8 years.

ES.6.6 Wildlife

The Project crosses six states with a diversity of wildlife, including big game animals, small game animals and furbearers, waterfowl and game birds, and many other nongame animals. Wildlife habitats along the Project ROW include croplands, grasslands/rangelands (short-grass prairie, mixed-grass prairie, tall-grass prairie, and shrublands), upland forests and wetlands. These vegetation communities provide foraging, cover, and breeding habitats for wildlife. Construction of the proposed Project would result in loss and alteration of about 22,493 acres of wildlife habitat, including 11,533 acres of grasslands and rangelands, 2,523 acres of forested habitat, and 554 acres of wetland habitats (including 271 acres of forested wetlands).

Pipeline construction can produce short term barriers to wildlife movements. Blasting can cause both short-term disturbance, in the form of increased noise, dust, and vibration, and permanent habitat modification. The severity of the effects of blasting on wildlife would primarily depend on timing and wildlife use of the area surrounding the area to be blasted. Total habitat loss due to pipeline construction would be small in the context of available habitat both because of the linear nature of the Project and because restoration would follow pipeline construction.

Additional potential impacts to wildlife during construction include direct mortality, and stress or avoidance of feeding and/or reduced breeding success due to exposure to noise and from increased human activity.

Normal operation of the pipeline would result in negligible effects on wildlife. Pipeline corridors may be used as travel corridors by coyotes, deer, raccoons, and many other animals. Pipeline produced habitat fragmentation may result in altered wildlife communities. Animals adapted to exploiting edge habitats increase, and animals requiring large contiguous habitats are displaced. Prey species may experience reduced survival or reproduction due to decreased abundance of forage species or reduced cover.

Potential impacts to wildlife from connected actions are direct mortality due to collision with or electrocution by electrical distribution and transmission lines, and reduced survival and reproduction for ground nesting birds due to the creation of perches for raptors in grassland and shrubland habitats. To reduce these impacts, power providers may incorporate standard, safe designs, as outlined in Suggested Practice for Avian Protection on Power Lines (issued by the Avian Power Line Interaction Committee [APLIC] in 2006) into the design of electrical distribution lines in areas of identified avian concern; incorporate standard raptor-proof designs, as outlined in Avian Protection Plan Guidelines (jointly prepared by the APLIC and the USFWS in 2005) into the design of the electrical distribution lines to prevent collision by foraging and migrating raptors; and route electrical distribution lines and the 230-kV electrical transmission line such that they avoid areas with grouse leks, brood-rearing habitat, and wintering habitats that also support wintering raptors.

ES.6.7 Fisheries

The Project would cross a total of 91 perennial streams that support recreational or commercial fisheries (18 in Montana, 10 in South Dakota, 15 in Nebraska, 16 in Oklahoma, and 32 in Texas). Thirty-one of these perennial waterbodies that support recreational or commercial fisheries, would be crossed using HDD technology. All other stream crossings for recreational or commercial fisheries perennial streams would use either the open-cut wet crossing or an open-cut dry crossing methodology. Possible impacts to fisheries could occur through siltation and disturbance of streams crossed by the proposed pipeline and also through water removal for hydrostatic testing and HDD operations.

Stream crossings could potentially increase sedimentation during construction and result in bank erosion until erosion control measures are implemented and the bank stabilizes. Construction of a dry open-cut

crossing is the most rapid and least impacting of the open-cut methods, primarily because water is not flowing in the streambed and sediments are not transported downstream. No impacts are expected to fisheries resources from a dry open-cut crossing method. Construction of open-cut wet crossings may result in short-term impacts including direct mortality to fishery and aquatic resources. Sediment released during trenching of the pipeline crossings would be transported by the water flowing through the trench and has the potential to affect downstream aquatic life and habitat through either direct exposure or sediment deposition. Wet open-cut dam and pump crossings have a moderate potential to temporarily affect fishery resources. Dam and pump crossings may block or delay normal fish movements. Short-term delays in movements of spawning migrations could have adverse impacts on fisheries, however, most crossings of streams less than 50 feet would be completed in less than 2 days and potential impacts would be minor.

Successful HDD crossings would avoid direct disturbance to aquatic habitat and stream banks. This method of stream crossing likely would avoid affects to those recreational or commercial fisheries that occur at the river or stream crossings. Drilling fluids and additives used during implementation of a directional drill would be non-toxic to the aquatic environment. A contingency plan to address a frac-out during HDD including preventative and response measures to control the inadvertent release of drilling lubricant would be maintained.

Keystone would be responsible for acquiring all permits required by federal, state and local agencies for procurement of water and for the discharge of water used in hydrostatic testing and HDD drilling. Any water obtained or discharged would be in compliance with permit requirements, including screening and withdrawal rates. Fisheries impacts from water withdrawals would be short term and minor.

ES.6.8 Threatened and Endangered Species

Federally-protected threatened or endangered species and federal candidate species with the potential to occur in the Project area include three mammals, eight birds, one amphibian, six reptiles, four fish, two invertebrates, and five plants. Of these, the Project is expected to have no effect to 14 species, and the Project may affect, but is not likely to adversely affect eight species. There are six additional species to which a findings summary was not applicable. The Project may affect, and is likely to adversely affect one species, the American burying beetle. This determination is based on the location of the Project within the known range and habitat of the American burying beetle and the results from surveys along the Steele City Segment of the Project. Direct impacts to American burying beetles as a result of construction would result in habitat loss, alteration of suitable habitat to unsuitable habitat, increased habitat fragmentation, and the potential mortality to eggs, larvae and adults. Even with trap and relocation efforts along the proposed construction ROW, the proposed Project could result in the potential accidental loss of individuals from construction-related activities. Conservation measures have been proposed to protect this species including setting up a compensatory mitigation plan for potential impacts to the American burying beetle by contributing to habitat conservation.

State-protected species potentially occurring along the Project ROW include three mammals, nine birds, six reptiles, 13 fish and one plant. Many sensitive and protected species are tied to woodland, wetland, or prairie habitats; habitats that historically were converted to agricultural use throughout the Project area. These animals have been identified and designated by federal and state wildlife management agencies as being of conservation concern after review of abundance, population trends, distribution, number of protected sites, degree of threat to survival, suitable habitat trends, degree of knowledge about the species, and its life history. These designations are intended to assist with conservation planning and maintenance of the state's natural heritage.

Keystone has begun formal Section 7 consultation for the American Burying Beetle. Additional species-specific conservation measures have been identified and include: additional surveys for many species to discover the presence of the species themselves, or their nests/dens/habitat; construction timing to occur outside of the breeding/denning/spawning season; and reduce the width of the construction ROW in areas where listed plant populations have been identified, to the extent possible. To reduce impacts from connected actions, Keystone would inform electrical power providers of the requirements for Endangered Species Act consultations with the USFWS for the electrical infrastructure components constructed for electrical distribution lines serving the Project as well as the 230-kV transmission line to prevent impacts to threatened and endangered species. Keystone would also develop a Migratory Bird Conservation Plan in consultation with USFWS to avoid or mitigate potential Project-related impacts to migratory birds.

ES.6.9 Land Use

The majority of land that would be affected by the Project is privately owned (21,333 acres) with nearly equal amounts of federal (579 acres) and state (582 acres) lands. Construction, operation, and maintenance would cause temporary and permanent impacts to land uses such as agriculture, rangeland, forestland, residential and planned development, commercial and industrial land, recreation and special interest areas, and visual resources. Rangeland is the most common land type, accounting for 11,533 acres or 54.3 percent of the total land that would be affected during construction; during operation 698 acres of the 8,613 acres, or 54.5 percent would be permanently impacted by the ROW. Agricultural land accounts for 5,484 acres impacted during construction with 2,011 acres needed for the permanent ROW. Forestland, development, and water and wetlands make up the remaining 2,523; 945; and 747 acres, respectively, which would be affected by construction. During operation of the pipeline 1,071, 465, and 368 acres, of forestland, developed land, and water and wetlands, respectively, would be included in the permanent ROW.

Within the Steele City Segment of the pipeline corridor are 102 tracts of land and which are enrolled in or affected by the CRP. There are no affected parcels in either the Gulf Coast Segment or Houston lateral. Pipeline construction and operation should have no effect on landowners' participation in CRP. FSA would require that landowners, prior to pipeline construction, notify the FSA of the planned construction activities; and commit to restoring their land to its pre-construction condition. In doing so, land owners should not lose their eligibility for participation in the CRP.

Keystone has agreed to compensate landowners for crop and other losses on a case-by-case basis. Keystone also has developed mitigation plans for limiting impacts on soil drainage mechanisms, compaction, irrigation systems, farm access areas, windbreaks and living fences, and CRP lands. After construction, nearly all agricultural land and rangeland along the ROW would be allowed to return to production, and productivity is not expected to be reduced significantly over the long term. Keystone has further sought to minimize impacts on rangelands by developing range-specific mitigation measures.

Keystone would implement procedures to reduce land impacts including: implementing soil protection measures; preventing stoppage or obstruction of irrigation systems except during pipeline installation periods through irrigated areas; minimizing time of installation in irrigated areas; repairing or restoring drain tiles; restoring farm terraces to their pre-construction functions; restoring disturbed areas with custom seed mixes (approved by landowners and land managers) to match the native foliage; providing access to rangeland during construction to the extent practicable; installing temporary fences with gates around construction areas to prevent injury to livestock or workers; and leaving in place hard plugs and installing soft plugs to allow livestock and wildlife to cross the trench safely.

In some cases, construction of the pipeline may cause disrupted or delayed recreational usage of private lands. Keystone would cooperate with local agencies to reduce the conflict between recreational users and pipeline construction. Impacts are expected to be only short term. Noise impacts from pump stations

are expected to be minor. Recreational use access would not be affected by pipeline operations within special management areas.

ES.6.10 Socioeconomics

Several types of socioeconomic effects could occur within the region of influence. Temporary effects during construction of the proposed Project could include changes in population levels or local demographics, changes in the demand for housing and public services, disruption of local transportation corridors, increased employment opportunities and related labor income benefits, and increased government revenues associated with sales and payroll taxes. Isolated impacts on individual property owners and economic land use also could occur along the pipeline route. The primary socioeconomic impacts associated with long-term operation of the proposed Project likely would include employment and income benefits resulting from long-term staffing requirements and local operating expenditures, as well as an increased property tax base and associated tax revenues. Long-term impacts could include impacts to property owners if there is any decrease in land value or usefulness as a result of the pipeline. However, tilled agricultural land in most cases would still be useable after construction.

The proposed pipeline has the potential to generate substantial direct and indirect economic benefits for local and regional economies along the pipeline route. During construction, these benefits would be derived from the construction labor requirements of the Project and spending on construction goods and services that would not otherwise have occurred if the line were not built. At the local level, these benefits would be in the form of employment of local labor as part of the construction workforce and related income benefits from wage earnings, construction expenditures made at local businesses, and construction worker spending in the local economy.

A peak workforce of approximately 5,000 to 6,000 personnel would be required to construct the entire Project and it is estimated that 4,500 to 5,100 non-local residents would temporarily move into the region of influence, resulting in short-term population increases during the construction period. Keystone is expected to utilize temporary local construction labor where possible and it is estimated that approximately 10 to 15 percent (50 to 100 people per spread) could be hired from the local work force for each spread, although this may not be possible in rural areas. Non-local construction workers moving into the region of influence would require short-term accommodations such as hotels/motels, recreational vehicle sites, campgrounds and temporary work camps (four camps are anticipated, two in Montana and two in South Dakota).

Portions of the new pipeline and new and upgraded pumping stations are located in areas with minority populations and with families living below the poverty level; however, none over 50 percent. The Project also is located in areas of majority populations and with relatively few families living below the poverty level. The Project is not expected to result in adverse impacts that would fall disproportionately on minority or low-income populations located along the pipeline route. Public participation in assessing the Project is especially important in areas where low-income populations and/or minority populations have the potential to be affected. Public outreach would continue throughout the life of the Project.

ES.6.11 Cultural Resources

The Project area contains cultural resources resulting from human settlement and other activities over the last 10,000 years. These include archaeological sites, special activity areas such as food processing sites, cemeteries, and sites of spiritual and traditional use. Later historic activities expressed on the landscape include mining-related resources, railroads, commercial buildings, domestic residences, and agricultural buildings. Many of these cultural resources are associated with mineral exploration, transportation, settlement, logging, and agricultural production. Lands and resources are very important to Indian tribes

for subsistence gathering, for the collection of plants for medicines, for spiritual and ceremonial purposes, and for everyday life.

For the Project, the principal types of impacts on cultural resources that could occur include physical destruction or damage to historic properties caused by pipeline trenching or related excavations or boring; introduction of visual, atmospheric, or audible elements that diminish the integrity of significant historic features by short-term pipeline construction or construction of above ground appurtenant facilities, roads and connected actions; and change of the character of historic properties or of physical features that contribute to significance.

The evaluation of historic properties for the Project will not be completed until full access to all parcels along the proposed corridor is feasible. Additionally, the Project design, including a determination of the final alignment after all route variations are assessed, continues to evolve as a result of the NEPA and Section 106 processes, continuing engineering analysis, and ongoing landowner and land manager negotiations. As a result, DOS and the consulting parties are developing a Programmatic Agreement (PA) to facilitate the Section 106 process. The use of a PA for this Project is consistent with 36 CFR 800.4(b)(2), which provides that when “alternatives under consideration consist of corridors or large land areas, or where access to properties is restricted, the agency official may use a phased process to conduct identification and evaluation efforts.” The PA would allow DOS and the consulting parties to continue the identification and evaluation of historic properties pursuant to the provisions in the PA should the Project receive all necessary certifications and permits. The PA would ensure that appropriate consultation procedures are followed and that cultural resources surveys would be completed prior to construction.

Unanticipated Discovery Plans will be prepared for Montana, South Dakota, Nebraska, Kansas, Oklahoma, Texas and the Lower Brule Sioux Reservation. They will be prepared in consultation with the consulting parties for this Project, including the SHPOs of the six states, Indian tribes, as well as state and federal agencies. Keystone would implement these plans, with DOS oversight, in the event that unanticipated cultural materials or human remains are encountered during the construction phase of the Project.

Under Section 106 of the NHPA, the lead federal agency is required to share Project information and consult with consulting parties. This includes Indian tribes, SHPOs, local governments, and applicants for federal permits. For this Project, DOS is consulting with six SHPOs, over 95 Indian tribes, numerous federal and state agencies and local governments, and to seek the views of the public. Government-to-government Section 106 consultation meetings, direct mailings, teleconferencing, direct telephone communications, and email will be used to keep consulting party members informed and to solicit comments on the Project.

Informal discussions with SHPOs and Indian tribes were initiated by Keystone and their consultants in 2008 and 2009 when a number of tribal engagement meetings were conducted in an effort to inform interested Indian tribes of the Project and seek initial comments. DOS recognized its lead federal agency status under Section 106 and its responsibilities to consult directly with the Indian tribes, SHPOs, and agencies in its NOI issued on January 28, 2009 in the FR.

ES.6.12 Air Quality and Noise

Air quality impacts associated with construction of the proposed Project would include fugitive dust and emissions from fossil-fueled construction equipment, open burning, temporary fuel transfer systems, and associated fuel storage tanks, and the tank farm. Air emissions typically would be localized, intermittent,

and short term since pipeline construction moves through an area relatively quickly. Emissions would be controlled to the extent required by state and local agencies.

Air quality impacts associated with operation of the proposed Project would include minimal fugitive emissions from crude oil pipeline connections and pumping equipment at the pump stations, minimal emissions from mobile sources, and volatile organic compound (VOC) and (hazardous air pollutant (HAP) emissions from the crude oil storage tank at the Steele City tank farm. All pipeline pumps would be electrically powered. The Project would not cause or contribute to a violation of any federal, state, or local air quality standards. In addition, Project operations would not trigger the requirement for a Clean Air Act Title V operating permit.

The Project would cross five counties that are designated as nonattainment for the federal ozone standard. Liberty, Chambers, and Harris counties are located in the Houston-Galveston-Brazoria 8-hour ozone nonattainment area. Hardin and Jefferson counties are located in the Beaumont-Port Arthur 8-hour ozone nonattainment area. Emissions of ozone precursor compounds (oxides of nitrogen [NO_x] and VOCs) would be evaluated against the General Conformity applicability threshold levels and nonattainment area emissions budget. All Project emissions of NO_x and VOCs emitted during construction and operation would be evaluated because no emissions would be covered under air permit programs. As pipeline emissions are limited to fugitive emissions from valves and flanges at pump stations and as there are no crude terminals located along the portion of the project within the Beaumont-Port Arthur nonattainment area, the General Conformity Rule does not apply to these operational activities. NO_x emissions for both 2011 and 2012 construction in the Houston-Galveston-Brazoria 8-hour ozone nonattainment area would exceed the general conformity threshold of 25 tons per year. Best Management Practices and other mitigation measures would be required to mitigate emissions. However, NO_x and VOC emissions for operation in the Houston-Galveston-Brazoria 8-hour ozone nonattainment area would be below the General Conformity significance thresholds of 25 tons per year. Since the operational emissions of NO_x and VOC are well below the 25-ton per year threshold, the General Conformity Rule does not apply to these operational activities.

Noise impacts for a pipeline project generally fall into two categories: temporary impacts resulting from operation of construction equipment, and long-term or permanent impacts resulting from operation of the facility. The Project would be constructed in primarily rural agricultural areas. It is estimated that the existing ambient noise level in the Project area is in the range of 40 dBA (rural residential) to 45 dBA (agricultural cropland). There are approximately 142 structures within 25 feet and 1,819 structures within 500 feet of the proposed pipeline centerline for Project. There are approximately 55 residences/homes/mobile homes/cabins within 25 feet and 1,014 residences/home/mobile homes/cabins within 500 feet of the proposed pipeline centerline. There are approximately 91 structures within 0.5 mile of all pump stations for Project. Residential, agricultural, and commercial areas within 500 feet of the ROW would experience short-term inconvenience from the construction equipment noise.

Noise impacts from construction of the Project typically would be localized, intermittent, and short term because construction moves through an area relatively quickly (several hundred feet to 1.5 miles or more per day). Pipeline construction activities in any one area could last from 30 days to 7 weeks. Construction of all pump stations would take approximately 18 to 24 months complete, and construction of the Steele City tank farm would take approximately 15 to 18 months.

Measures to reduce noise impacts would include but are not limited to: limiting the hours during which construction activities with high-decibel noise levels are conducted in residential areas; providing noise mitigation plans to the construction contractors for implementation and enforcement by construction inspectors using portable sound meters; and developing site-specific noise mitigation plans to comply

with any specific regulations and obtain any applicable authorizations or variances, if local noise regulations exist.

Noise impacts from operation of the pipeline would be from the pump stations. Material traveling through the buried pipeline would not emit audible noise above the surface or a perceptible level of vibration. Sound levels would attenuate nearly to existing ambient noise levels (40 to 45 dBA) within 2,300 feet of the facility and would be considered minor. There are approximately 91 structures within 0.5 mile (2,640 feet) of all pump stations for the Project. Although noise impacts from the electrically-powered pump stations are projected to be minor, Keystone would perform a noise assessment survey during operations in locations where nearby residents express concerns about pump station noise. Mitigation measures can include construction of berms around the facilities or planting vegetation screens.

ES.6.13 Reliability and Safety

ES.6.13.1 Oil Spill Risk

Transportation of crude oil by pipeline involves risk to the public and the environment in the event of an accident or an unauthorized action, and subsequent release of oil. Releases of crude oil from the Project and appurtenant facilities could occur. Spill frequency can be estimated using historic spill frequencies on other pipelines as determined from existing data bases and as supplemented by considerations of new pipeline system age and technological improvements compared with much older systems. Releases of oil or petroleum products would affect the environment to varying degrees, and would be of concern to all stakeholders. Risk of an oil spill was assessed using failure frequencies derived from the general hazardous liquid pipeline operating history. In addition to onsite fuel facilities, construction of the proposed pipeline would involve tanker trucks that deliver fuel and other fluids to operating equipment along the construction ROW. Tanker and fuel or maintenance truck accidents or fuel storage tank failures would be the most likely sources of larger construction spills.

Spills from the proposed pipeline, associated pump stations, valves, or pigging facilities could occur during Project operation and have the potential to result in larger-volume spills. Spill locations could include the pipeline ROW, pump stations, and construction and contractor staging areas. Although leak detection systems would be in place, some leaks might not be detected by the system. A pinhole leak, for example, could potentially be undetectable for days or weeks. If the proposed pipeline is subsurface within a wetland, the crude oil would float and could be detected during a regular patrol of the Project ROW. Soil impacts from floating oil would likely be minor, although active cleanup of the floating oil would likely produce high impacts to the wetland system.

ES.6.13.2 Impacts of Oil Spills

Crude or refined oil released into the environment (oil spills) may affect natural resources, protected areas, human uses and services, and aesthetics to varying degrees, depending on the cause, size, type, volume, location, season, environmental conditions, and associated response actions. Small oil spills (e.g., intermittent leaks and drips from construction machinery and operating equipment) would be almost certain to occur during construction and operation of the Project. There would be a very limited potential for an operational pipeline spill of sufficient magnitude to significantly affect natural resources and human uses of the environment.

Almost all spills from the proposed pipeline would be crude oil. Based on experience, spills would be more likely to occur in developing areas where excavation activities are common, and at locations where based on soil and other physical conditions the corrosion potential is greatest. The locations of greatest concern for potential oil spills would be in sensitive environmental areas, especially wetlands, flowing

streams and rivers, and water intakes for drinking water or commercial/industrial users. Potential impacts to the natural environment from oil spills would include but are not limited to: coating wildlife feathers or fur reducing insulating efficiency, which could result in hypothermia; coating sediments and soils reducing water and gas (e.g., oxygen and carbon dioxide) exchange and affecting subterranean organisms; coating beaches, water surfaces, wetlands, and other resources used by people resulting in offensive odors, visual impacts and soiling of humans, animals, habitats and equipment; toxicological impacts including direct and acute mortality, sub-acute interference with feeding or reproductive capacity, disorientation, narcosis, reduced resistance to disease, tumors, reduction or loss of various sensory perceptions, interference with metabolic, biochemical, and genetic processes, and a host of other acute or chronic effects; contamination of soil and water resources through oil spill containment or clean up actions; minor short to long-term surface water and/or groundwater quality degradation from sporadic equipment and vehicle spills or leaks; and damage to recreational and historic values.

The impact of an oil spill would be heavily influenced by the types of receptors (i.e., habitats, natural resources, and human uses) that might be exposed to the oil. For spills ranging in magnitude from very small to significant, response time and actions by Keystone and its response contractors would likely prevent the oil from reaching sensitive receptors or would contain and clean up the spills before significant environmental impacts occurred. Most spills in this category are likely to occur on construction sites or at operations and maintenance facilities, and would not reach the natural environment. For large spills and very large spills, especially those that reach aquatic habitats, the response time between initiation of the spill event and arrival of the response contractors would influence the magnitude of impacts to the natural environment and human uses. Once the response contractors are at the spill scene, the efficiency, effectiveness, and environmental sensitivity of the response actions (e.g., containment and clean up of oil, and protection of resources and human uses from further oiling) would substantially influence the type and magnitude of additional environmental impacts.

ES.6.13.3 Mitigation Measures

The Project's pipeline system would be designed, constructed, and maintained in a manner that meets or exceeds industry standards and regulatory requirements. The Project would be built within an approved ROW. Signage would be installed at all road, railway, and water crossings, indicating that a pipeline is located in the area, to help prevent third-party damage or impact to the proposed pipeline. Keystone would manage a crossing and encroachment approval system for all other operators. Keystone would ensure safety near its facilities through a combination of programs encompassing engineering design, construction, and operations; public awareness and incident prevention programs; and emergency response programs.

To prevent or mitigate potential oil spills during construction of the proposed pipeline, measures would be implemented at each construction or staging area where fuel, oil, or other liquid hazardous materials are stored, dispensed, or used.

Historically, the most significant risk associated with operating a crude oil pipeline is the potential for third-party excavation damage. Keystone would mitigate this risk by implementing a comprehensive Integrated Public Awareness Program focused on education and awareness. The program would provide awareness and education that encourages use of the state one-call system before people begin excavating. Keystone's operating staff also would complete regular visual inspections of the ROW and monitor activity in the area. Keystone's preventative maintenance, inspection, and repair program would monitor the integrity of the proposed pipeline and make repairs if necessary. Keystone's pipeline maintenance program would include routine visual inspections of the ROW, regular inline (pigging) inspections, and collection of predictive data. Data collected in each year of the program would be fed back into the decision-making process for development of the following year's inspection, maintenance, and repair program. The pipeline system would be monitored 24 hours a day, 365 days per year.

Keystone has developed and implemented Project safeguards after conducting a pipeline threat analysis using the pipeline industry-published list of threats issued by the American Society of Mechanical Engineers (ASME B31.8S) and also using threats identified by PHMSA to determine the applicable threats to the proposed pipeline. Keystone would be required to provide an Emergency Response Plan (ERP) and a Spill Prevention Control and Countermeasure (SPCC) plan prior to receiving authorization from PHMSA OPS to operate the pipeline system. Keystone would utilize a comprehensive Supervisory Control and Data Acquisition (SCADA) system to monitor and control the proposed pipeline. Data provided by the SCADA system would alert the Operations Control Center (OCC) operator to an abnormal operating condition, indicating a possible spill or leak. A back-up communication system also would be available should SCADA communications fail between field locations and the OCC. Additionally, Keystone would perform any other procedures mandated by PHMSA in the event that PHMSA approves a special permit related to maximum operating pressures for the pipeline system.

In summary, the reliability and safety of the Project is expected to be well within industry standards. Further, the low probability of large, catastrophic spill events and the routing of the proposed pipeline to avoid most sensitive areas suggest a low probability of impacts to human and natural resources. Nevertheless, the potential for construction and operation-related spills does exist.

ES.6.14 Cumulative Impacts

As defined in 40 CFR 1508.7, cumulative impacts are the incremental impacts on the environment resulting from adding the proposed action to other past, present, and reasonably foreseeable future actions. Cumulative impacts were assessed by combining the potential environmental impacts of the proposed action with the impacts of projects that have occurred in the past, are currently occurring, or are proposed in the future within the pipeline corridor or in the vicinity of the pipeline ROW.

ES.6.14.1 Past, Present and Reasonably Foreseeable Projects

The Project area includes numerous existing, under construction, and planned linear energy transportation systems, including natural gas pipelines, carbon dioxide (CO₂) pipelines, crude oil pipelines, and electric transmission lines. Additionally, the general Project area supports a major water delivery project and a number of energy development projects, including producing oil and natural gas well fields (with associated collection piping systems), coal mines, and wind power facilities. The potential impacts associated with these projects that are most likely to be cumulatively significant are related to wetlands and waterbodies, vegetation and wildlife, land use, air quality, noise, and socioeconomics.

The operation of existing oil, natural gas, and CO₂ pipeline systems have resulted primarily in alteration of land uses, terrestrial vegetation, and wildlife habitat. Cumulative impacts associated with existing pipelines within the Project area would be primarily related to noise emanating from pump stations (oil pipelines) and compressor stations (natural gas pipelines) and the cumulative increases in the width of ROWs in areas where the proposed Project would be adjacent to existing ROWs. In those areas where the proposed Project is not directly adjacent to existing ROWs, but are located within the Project area, there would be a cumulative change in vegetative resources, wildlife habitat, and land uses associated with ROWs operation. The impacts of existing ROWs in the context of the proposed Project have largely been included in Section 3.0.

No other proposed oil pipelines have been identified within the Project area. However, should additional oil pipelines be constructed within the Project area, they would likely contribute to potential cumulative impacts associated with habitat fragmentation, land use issues and viewshed degradation. Several natural gas and CO₂ pipelines have been proposed in the vicinity of the Project area. Potential cumulative impacts associated with the proposed Bison Pipeline Project and Green Pipeline would be habitat

fragmentation, land use issues and viewshed degradation. Further, a potential pipeline that would connect the Bakken Formation and the proposed Project area could potentially result in similar additional cumulative impacts to these resources. Should these or other unidentified pipelines be under construction at the same time as the Project, there may also be impacts to noise and air quality.

Due to advances in engineering, construction methods, and environmental regulation, construction and operation of existing electrical power lines typically encumber additional lands compared to more recent projects; therefore, the impacts from these lines may be greater than a line of similar length and energy capacity constructed in the recent past or future. Planned electrical power distribution and transmission lines that may be constructed in the general Project area includes three proposed power projects. However, of these proposed transmission lines, only the Nebraska Public Power District would be located within the Project corridor. Cumulative impacts which may arise include impacts to avian wildlife and viewshed degradation. In addition, if the construction of future power distribution or transmission lines in the Project corridor overlaps with the proposed Project construction schedule, short-term cumulative impacts associated with noise, dust, and general construction activity could occur those areas where they would be constructed within the proposed project corridor.

Wind resources in the contiguous U.S., specifically in the central plains states, could accommodate as much as 16 times total current demand for electricity in the U.S. There is a high concentration of wind resources in the central plains region extending northward from Texas to the Dakotas, westward to Montana and Wyoming, and eastward to Minnesota and Iowa. Exploitation of these wind resources would require significant extension of the existing power transmission grid. Expansion and upgrading of the grid will be required in any case to meet anticipated future growth in U.S. electricity demand. It is therefore reasonable to assume that there will be upgrades and extensions to the existing electrical power transmission grid to support wind power development within the Project area in the future. The magnitude of impacts from these transmission line extensions would be dependant somewhat upon the extent of new lines required to meet the needs of new and existing wind farms. Likely cumulative impacts from future construction and operation of transmission lines originating from wind farms may include viewshed degradation and disruption to land uses, vegetation, and avian wildlife. Should the construction of future transmission lines occur concurrent with the proposed Project construction schedule within the Project corridor, short-term cumulative impacts associated with noise, dust, and general construction activity could occur.

ES.6.14.2 Greenhouse Gases and Climate Change

Crude oil delivered to PADD II and PADD III refineries by the Project are likely to be replacing heavy crude oil from other less reliable and diminishing sources. Assuming constant demand for refined oil products, the incremental impact of the Project on GHG emissions would be minor. Indirect GHG-related emissions during operation would be associated with electrical generation for the pump stations (approximately 2.6 to 4.4 million tons of CO₂ per year for a proposed initial capacity of 700,000 bpd and a potential capacity of 900,000 bpd, respectively). In addition, refining the quantity of crude oil that would be delivered by the Project would produce an estimated 1.3 to 1.7 million tons of CO₂ per year. This assumes that the entire volume of oil transported by the project would be heavy crude oil. However, since the crude oil delivered by the Project would be replacing similar crude oils from other sources, the incremental impact of these emissions would be minor. Future refinery upgrades and expansions could potentially increase the annual production of GHG in the PADD II and PADD III area. Should such upgrades and expansions occur, generation of GHG could potentially increase. The cumulative impact of increased GHG emissions in this area would depend upon the potential for reductions in GHG emissions elsewhere, consistent with developing regulatory frameworks in the U.S., Canada and worldwide.

The proposed mitigation measures would serve to offset some of the GHG emissions associated with the Project. These measures would include revegetation of the construction work areas, restoration of wetland functions, and compensatory wetland mitigation for wetland impacts. Minimal direct GHG emissions would be associated with operation (e.g., vehicle operation and fugitive emissions), and indirect emissions would be associated with electrical generation for the pump stations and refineries.

The potential impacts of climate change would not be expected to affect the proposed Project. An increase in temperatures may increase wildfires in the Project area. An increased intensity of storm events, should this occur, may result in additional flooding in some areas near the Project, particularly in the Gulf Coast Segment and Houston Lateral should hurricane activity increase as a result of oceanic temperature conditions. The Project would be designed and constructed to be consistent with applicable federal, state, and local standards, and therefore should be resistant to forces associated with reasonably likely climate conditions during the lifetime of the pipeline system. Other effects of climate change, such as air quality degradation, health effects, reduced snow pack, and agricultural issues, would not likely impact the proposed Project.

ES.6.14.3 Extraterritorial Concerns

While the Project analyzed in this draft EIS begins at the international boundary where the pipeline would exit Saskatchewan, Canada and enter the United States through Montana, the origination point of the pipeline system would be in Alberta, Canada. Neither DOS regulations (22 CFR 161.12) nor Executive Order 12114, Environmental Effects Abroad of Major Federal Actions, require this draft EIS to analyze impacts to the environment or activities that occur outside of the United States. As a matter of policy, however, DOS has included information in this draft EIS regarding the environmental analysis conducted in Canada.

The analysis of environmental effects from the proposed Project is occurring on both sides of the international border under the appropriate regulatory authorities, as discussed in Section 1 of this DEIS. In Canada, the Canadian National Energy Board (NEB) conducted that analysis, held public hearings in September 2009, and issued its findings in March 2010.

The NEB completed its analyses in March 2010 and determined that the proposed Project is required in Canada to meet the present and future public convenience and necessity, provided that the NEB terms and conditions outlined in the Project certificate are met, including all commitments made by Keystone during the hearing process.

Cumulative impacts to Canadian resources are limited by available data at this time. However, as both the NEPA and NEB processes proceed, additional information on potential cross international boundary cumulative impacts would likely become available and would be assessed to the degree possible for inclusion in the FEIS. Pertinent NEB documents are provided in Appendix R.

ES.6.15 Conclusions

The information assessed in this draft EIS indicates that the proposed Keystone XL Project would result in limited adverse environmental impacts during both construction and operation, assuming that the Project would be constructed and operated in compliance with:

- All applicable laws and regulations;
- The provisions in Keystone's proposed Construction, Mitigation and Reclamation Plan (Appendix B);

- The environmental specifications and water quality protection requirements mandated by MDEQ for Montana, as part of the Montana Major Facility Siting Act certification process and presented in Attachments 1 and 2 to Appendix I; and
- Other mitigation measures presented in this draft EIS.

This page intentionally left blank.