United States Department of State

Bureau of Oceans and International Environmental and Scientific Affairs

Washington, D.C. 20520

March 1, 2013

Subject: Keystone XL Project – Draft Supplemental Environmental Impact Statement

To: All interested parties

On March 1st, the U.S. Department of State (the Department) released a Draft Supplemental Environmental Impact Statement (Draft SEIS) for the proposed Keystone XL Project based on the application submitted by TransCanada Keystone Pipeline, LP (Keystone) on May 4, 2012.

The Draft SEIS is available for download from the Department's Keystone XL project website (http://www.keystonepipeline-xl.state.gov). Further updates and other related information will also be available on this website. A paper copy and CD of the Draft SEIS are available for viewing at public libraries along the proposed route.

Once the Draft SEIS is noticed in the Federal Register, a 45-day comment period will begin. As part of the Department's process, members of the public, public agencies, and other interested parties are encouraged to submit comments, questions, and concerns about the project via e-mail to **keystonecomments@state.gov**, at http://www.keystonepipeline-xl.state.gov, or mailed to:

U.S. Department of State
Attn: Genevieve Walker, NEPA Coordinator
2201 C Street NW, Room 2726
Washington, D.C. 20520

After the end of the public comment period, the Department will prepare a Final SEIS.

Ultimately, a determination will be made on whether this project serves the national interest. The national interest determination will involve consideration of many factors, including: energy security; environmental, cultural, and economic impacts; foreign policy; and compliance with relevant federal regulations. As directed by Executive Order 13337, before making such a decision, the Department will also request the views of several agencies and officials, including: the Departments of Defense,

Justice, Interior, Commerce, Transportation, Energy, Homeland Security, and the Environmental Protection Agency.

Sincerely,

Genevieve Walker
NEPA Coordinator
U.S. Department of State
Telephone: 202-647-9798

Errata Sheet

Keystone XL Project—Draft Supplemental Environmental Impact Statement

As of March 1, 2013, the following errata and clarifications to the draft Supplemental Environmental Impact Statement (Draft Supplemental EIS) for the Keystone XL Project are presented in the table below.

Table 1 Errata and Clarifications

Page	Differences in the original text and the amendment
Volume I: Pages 2.1-75 through 2.1-77	Amendment Discussion: During publication, new information was provided to the Department by the Applicant concerning the Bakken Marketlink Project. The Bakken Marketlink Project no longer includes the previously proposed facilities at the Cushing, Oklahoma, tank farm, which included two 250,000 barrel tanks. The new information is included in an updated Bakken Marketlink Project description provided in Section 2.1.12.1, Bakken Marketlink Project, of the Draft Supplemental EIS.
Volumes I and II: Throughout various resource-specific sections of the Draft Supplemental EIS	Original Text Discussion: Throughout the draft Supplemental EIS, various resource-specific sections discuss the affected environment and environmental consequences that were based on the previous Bakken Marketlink Project description, which included the proposed facilities at the Cushing, Oklahoma, tank farm. Since the new information was received during the publication of the Draft Supplemental EIS, the numerous resource-specific discussions throughout the Draft Supplemental EIS do not reflect the new information. The Department requests that all interested parties reviewing resource-specific discussions of the Bakken Marketlink Project disregard the information related to the proposed facilities at the Cushing, Oklahoma, tank farm.

United States Department of State
Bureau of Oceans and International
Environmental and Scientific Affairs

Draft Supplemental Environmental Impact Statement

for the

Keystone XL Project

Executive Summary

March 2013

Applicant for Presidential Permit: TransCanada Keystone Pipeline, LP

United States Department of State
Draft Supplemental Environmental Impact Statement

For the

KEYSTONE XL PROJECT

Applicant for Presidential Permit:
TransCanada Keystone Pipeline, LP

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Cooperating Agencies
U.S. Army Corps of Engineers (USACE)
U.S. Department of Agriculture—Farm Service Agency (FSA)
U.S. Department of Agriculture—Natural Resource Conservation Service (NRCS)
U.S. Department of Agriculture—Rural Utilities Service (RUS)
U.S. Department of Energy (DOE)
U.S. Department of Interior—Bureau of Land Management (BLM)
U.S. Department of Interior—National Park Service (NPS)
U.S. Department of Interior—U.S. Fish and Wildlife Service (USFWS)
U.S. Department of Transportation—Pipeline and Hazardous Materials Safety Administration, Office of Pipeline Safety (PHMSA)
U.S. Environmental Protection Agency (USEPA)

Assisting Agencies
U.S. Department of the Interior, Bureau of Reclamation (BOR)
Nebraska Department of Environmental Quality (NDEQ)
Various State and Local Agencies in Montana, South Dakota, Nebraska, and Kansas

March 1, 2013

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ES.1 INTRODUCTION

ES.1.1 Overview

The proposed Keystone XL Pipeline is a new 875-mile pipeline infrastructure project that would allow delivery of up to 830,000 barrels per day (bpd) of crude oil from Alberta, Canada, and the Bakken Shale Formation in the United States to Steele City, Nebraska for onward delivery to Cushing, Oklahoma, and refineries in the Gulf Coast area[1]. TransCanada Keystone Pipeline, LP (Keystone) has applied for a Presidential Permit which, if granted, would authorize the proposed pipeline to cross the United States-Canadian border.

For proposed petroleum pipelines that cross international borders of the United States, the President, through Executive Order 13337, directs the Secretary of State to decide whether a project is in the "national interest" before granting a Presidential Permit. The national interest determination by the U.S. Department of State (the Department) involves consideration of many factors, including energy security; environmental, cultural, and economic impacts; foreign policy; and compliance with relevant federal regulations. Before making such a decision, the Department also asks for the views of the Departments of Energy, Defense, Transportation, Homeland Security, Justice, Interior, and Commerce, and the U.S. Environmental Protection Agency.

Background

Previously, Keystone submitted an application for the same border crossing, but with a pipeline route in the United States that differed from the route that is currently proposed. The biggest difference in the previous route compared to the current one is that it went through the Sand Hills Region of Nebraska as identified by the Nebraska Department of Environmental Quality (NDEQ). A separate Environmental Impact Statement was issued in August 2011 for that route. In November 2011, the Department determined that additional information was needed to fully evaluate the application, in particular, additional information about alternative routes within Nebraska that would avoid the Sand Hills Region. In late December 2011, Congress adopted a provision of the Temporary Payroll Tax Cut Continuation Act that sought to require the President to make a decision on the Presidential Permit for that route within 60 days. That deadline did not allow sufficient time to prepare a thorough, rigorous, and transparent review of an alternative route through Nebraska. As such, the Presidential Permit was denied.

In February 2012, Keystone informed the Department that it considered the Gulf Coast portion of the previous pipeline project (from Cushing, Oklahoma, to the Gulf Coast area) to have independent economic utility and indicated it intended to proceed with construction of that pipeline as a separate project, the Gulf Coast Project. The Gulf Coast Project does not require a Presidential Permit because it does not cross an international border. Construction on the Gulf Coast Project is underway.

On May 4, 2012, Keystone filed a Presidential Permit application for a new Keystone XL Project. The proposed Project has a new route and a new stated purpose. The route in Montana and South Dakota would be largely unchanged from the route analyzed in August 2011. However, the newly proposed route not only avoids the NDEQ-identified Sand Hills Region but also terminates at Steele City, Nebraska, and thus is approximately half the length of the previously proposed project analyzed in 2011. In other words, the newly proposed Project is 509 miles shorter than the previously proposed project analyzed in 2011.

About the Draft Supplemental Environmental Impact Statement

The Department has issued this draft Supplemental Environmental Impact Statement (draft Supplemental EIS) that builds on the analysis completed in August 2011 (the Final Environmental Impact Statement or Final EIS). The analysis has been revised, expanded, and updated to include a comprehensive review of the new route in Nebraska as well as any significant new circumstances or information that is now available on the largely unchanged route through Montana and South Dakota.

In completing the draft Supplemental EIS, the Department took into consideration the comments contained in more than 400,000 e-mails, letters, and other communications submitted throughout the scoping process by public citizens, government agencies, Tribal governments, and interested non-governmental organizations as well as over one million e-mails, letters, and other communications submitted to the Department during its consideration of the previous Keystone XL application.

[1] The Gulf Coast area refers to the region from Houston, Texas, to Lake Charles, Louisiana.

Expanded and new analyses include, among others: economic effects of the proposed project, impacts from potential releases or spills, impacts related to climate change, and cumulative effects from the proposed project in combination with other projects. The Department re-examined and expanded the evaluation of project alternatives, including a reasonable route alternative and other scenarios of crude oil transport, such as rail. The Department also updated the analysis of the relationship of the proposed project to crude oil markets in light of developments since August 2011, which includes an update to the assessment of whether the proposed Project is likely to impact the extraction rate from the oil sands in Canada, and thus impact greenhouse gas (GHG) emissions associated with that extraction.

The Executive Summary on the following pages briefly presents the contents of the draft Supplemental EIS, including the purpose and need of the proposed Project, key potential impacts, measures to reduce or mitigate those impacts if a permit was granted, and alternatives to the proposed Project.

ES.1.2 Project Description

The proposed Keystone XL Pipeline Project consists of a 36-inch pipeline and related facilities that would allow for transport of up to 830,000 bpd of crude oil from the Western Canadian Sedimentary Basin (WCSB) in Alberta, Canada, and from the Williston Basin (Bakken) region in Montana and North Dakota, primarily to refineries in the Gulf Coast area. There is existing demand for crude oil, particularly heavy crude oil at refiners in the Gulf Coast area, but the ultimate disposition of crude oil transported by the proposed Project, and any refined products produced from that crude oil, would be determined by future market forces.

This draft Supplemental EIS evaluates the 875-mile pipeline that would stretch from the U.S.-Canadian border near Morgan, Montana, to the existing Keystone pipeline in Steele City, Nebraska. As noted above, the draft Supplemental EIS builds on and supplements the analysis completed in August in 2011 by specifically addressing the new route in Nebraska as well as any significant new information that has since become available.

Figure ES-1: Proposed Keystone XL Project

ES.1.3 Alternatives

In addition to minor route variations and pipeline design options, the draft Supplemental EIS considers the following alternatives to the proposed Project.

- **The No Action Alternative** evaluates scenarios that are likely to occur if the proposed Project is not built, including rail and vessel-based options for transporting WCSB and Bakken crude oil to the Gulf Coast.
- **Major Route Alternatives** evaluate the impacts of changing the route of the pipeline. Specific alternatives include the route previously proposed as well as a route that parallels Interstate 90 in South Dakota before joining the right-of-way (ROW) of the existing Keystone pipeline.

ES.1.4 Findings

Chapter 4 of the draft Supplemental EIS gives detailed findings about the proposed Project's impacts. Among these are resources where impacts could potentially be substantial, or that have been the focus of significant public attention and comment. These key resource areas include:

- Soils (including sandy and erodible soils);
- Groundwater, including aquifers such as the Ogallala Aquifer;
- Surface water resources;
- Socioeconomics, including the potential job and revenue benefits of the proposed Project, as well as concerns about environmental justice;

- Lifecycle GHG emissions associated with oil sands development, refining, and consumption; and
- Potential releases or spills.

ES.2 CONTEXT

ES.2.1 Purpose and Need

The Department must determine if the proposed Project is in the national interest pursuant to Executive Order 13337. The Department evaluates the proposed Project's purpose and need consistent with the National Environmental Policy Act (NEPA).

According to the application submitted by Keystone, the primary purpose of the proposed Project is to provide the infrastructure to transport heavy crude oil from the border with Canada to delivery points in the United States by connecting to existing pipeline facilities near Steele City, Nebraska. The proposed Project is meant to respond to the market demand of refineries for heavy crude oil. The proposed Project would also provide transportation for light crude oil from the Bakken in North Dakota and Montana (as well as from Canada).

The proposed Project would have the capacity to deliver up to 830,000 bpd. Keystone has represented that it has firm commitments to transport approximately 555,000 bpd of heavy crude oil from producers in the WCSB. In addition, Keystone has represented that it has firm commitments to transport 65,000 bpd of crude oil from the Bakken of the 100,000 bpd of capacity set aside on the proposed Project for that purpose. The ultimate mixture and quantity of crude oils transported by the proposed Project over its lifetime would be determined by future market forces.

ES.2.2 Crude Oil Overview

Oil producers send a variety of crude oils to refiners to produce consumer products such as gasoline, diesel fuel for trucks, heating oil, and raw materials for plastics and medicines. Each U.S. refinery has different "hardware"— equipment and capacity, metallurgy, and treating processes—and different resulting mixes of finished products.

The proposed Project would primarily transport crude oil from the WCSB and Bakken regions. The majority of the oil from WCSB sources is considered a heavy crude oil, while Bakken crude is considered a light crude oil. In general, refineries in the Gulf Coast area are designed to process a mixture of heavy and light crudes. The refineries in that region possess one of the highest concentrations of heavy-crude refining capacity of any area in the world. Gulf Coast refiners use both domestic crude oil produced in the United States, and crude oil imported from foreign countries to create various petroleum products.

The crude oil from the WCSB is produced as a viscous material, known as raw bitumen, that has the consistency of soft asphalt. Due to its viscosity, bitumen cannot be transported by pipeline on its own. It first must be mixed with a petroleum-based product (called a diluent), such as naphtha or natural gas condensate, to make a less viscous liquid called dilbit; or it must be upgraded (partially refined) to a medium weight crude oil called "synthetic crude oil." If diluents are not available, producers use synthetic crude oil as the diluent to create a product called synbit. The proposed Project is expected to carry predominantly either dilbit, synbit, or both, as well as synthetic crude oil and light crude oil produced from the Bakken.

ES.2.3 Market Overview

Refiners determine the optimal crudes to process similar to other manufacturing companies that select the right raw materials to manufacture products. Refining companies pay market prices for crude oil, and measure their profitability based on selling their product into the wholesale market. They then use that margin (the difference between the price of crude and the price of the refined products) to cover their expenses and generate profits. Refiners may select a more expensive crude oil if that crude oil's yield provides a greater margin than a cheaper crude oil.

The proposed Project seeks to capitalize on the demands of refiners for a stable supply of both heavy and light crude oil. Refineries in the Gulf Coast rely mostly on foreign imports, particularly from Venezuela and Mexico, as well as from other countries. However, the volume of crude exports from Mexico is declining. The long-term contracts supporting the proposed Project indicate that refiners see economic advantages to processing heavy WCSB crude oil as well as the domestically produced Bakken light crude oil, which are both growing in supply and may be less expensive to transport to the refinery than imported crude oils that are shipped by tanker. A detailed analysis of the market is presented in the Supplemental EIS and discussed further in the Market Analysis section of this Executive Summary.

ES.3 EIS DEVELOPMENT PROCESS

ES.3.1 Presidential Permitting Process

For proposed petroleum pipelines that cross international borders of the United States, the President, through Executive Order 13337, directs the Secretary of State to decide whether a project is in the national interest. If the proposed Project is determined to be in the national interest, it is granted a Presidential Permit that authorizes the construction, operation, and maintenance of the facilities at the border between the United States and Canada. The Department's jurisdiction does not extend to cover selection of pipeline routes within the United States. The draft Supplemental EIS was produced consistent with NEPA and will help inform that determination.

The National Interest Determination (or NID) involves consideration of many factors, including energy security; environmental, cultural, and economic impacts; foreign policy; and compliance with relevant federal regulations. Before making such a decision, the Department seeks the views of the eight federal agencies identified in Executive Order 13337: the Departments of Energy, Defense, Transportation, Homeland Security, Justice, Interior, and Commerce, and the U.S. Environmental Protection Agency. The Department is also soliciting public input on the draft Supplemental EIS.

ES.3.2 Supplemental EIS Process

In September 2012, Keystone submitted an Environmental Report in support of its Presidential Permit application providing an update of the impacts of the proposed Project and describing several modifications to the originally proposed pipeline route to reduce environmental impacts, improve constructability, and in response to agency and public comments.

To assist in preparing the draft Supplemental EIS, the Department retained an environmental consulting firm, Environmental Resources Management, Inc. (ERM). ERM was selected pursuant to the Department's interim guidance on the selection of independent third-party contractors. ERM works at the sole and exclusive instruction of the Department and is not permitted to communicate with Keystone unless specifically directed to do so by Department officials. Preparation of the draft Supplemental EIS occurred over a 5-month period and included consultation with ERM, cooperating agencies, scientists, and engineers with expertise in key areas of concern related to the proposed Project.

This draft Supplemental EIS describes potential impacts of the proposed Project and alternatives, including direct, indirect, and cumulative impacts. It builds on the work done in the 2011 Final EIS, including references to that document throughout the text where appropriate. The Supplemental EIS includes an analysis of the modified route in Nebraska, as well as analysis of any significant new circumstances or information that has become available since the August 2011 publication of the Final EIS for the previously proposed project. This draft Supplemental EIS also relies, where appropriate, on the data presented and the analyses done in the Final EIS for the previously proposed project, because much of the proposed pipeline route remains unchanged from its August 2011 publication. Finally, the draft Supplemental EIS also includes the latest available information on the proposed Project resulting from ongoing discussions with federal, state, and local agencies.

ES.4 PROJECT DESCRIPTION

ES.4.1 Keystone XL Project

The proposed Project consists of a crude oil pipeline and related facilities to transport WCSB crude oil from an oil supply hub near Hardisty, Alberta, Canada, to existing pipeline facilities near Steele City, Nebraska, for onward delivery to Cushing, Oklahoma, and the Gulf Coast area. The proposed Project would also transport domestically produced Bakken crude oil from a terminal near Baker, Montana, to the existing Keystone Pipeline system at Steele City, Nebraska.

The Steele City delivery point provides access to the existing Keystone Cushing Extension pipeline, which delivers crude oil to Cushing, Oklahoma, where there is access to other pipeline systems and terminals, including those serving the Gulf Coast area. The proposed Project would consist of approximately 875 miles of new, 36-inch-diameter pipeline across portions of Montana, South Dakota, and Nebraska (an additional 329 miles of pipeline in Canada were evaluated by the Canadian government). Figure ES-2 depicts the proposed Project in the United States.

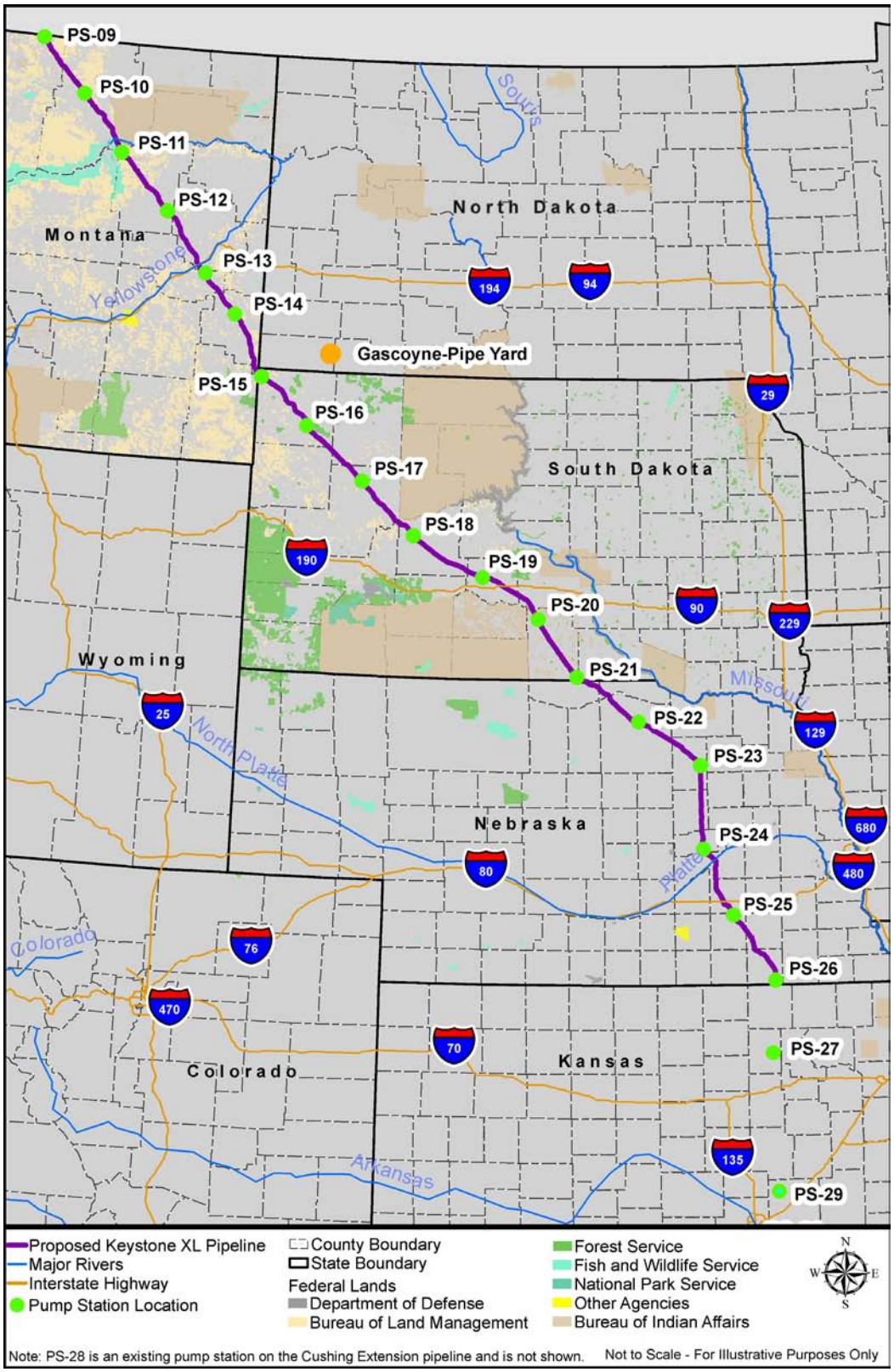


Figure ES-2: Proposed Project Overview

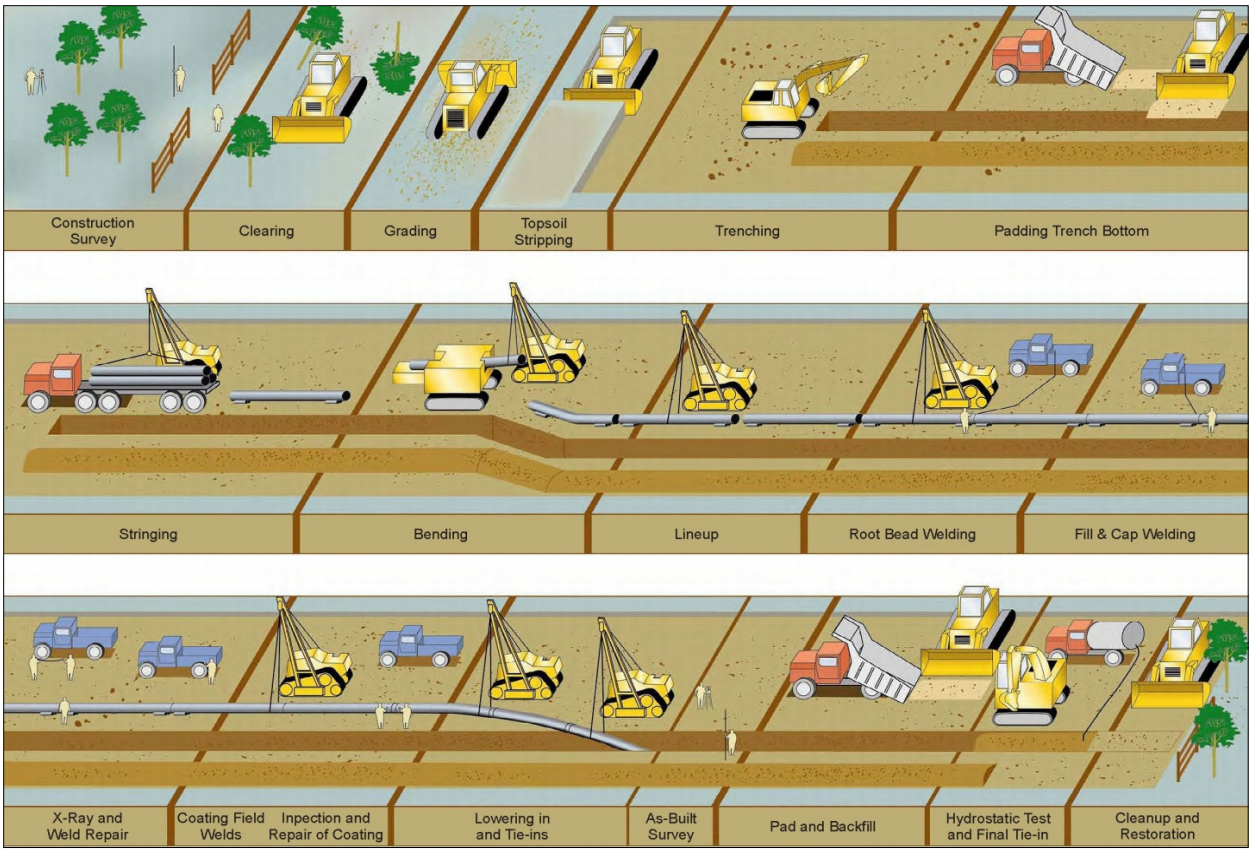


Figure ES-3: Keystone XL, Typical Pipeline Construction Sequence

Construction of the proposed Project would generally require a 110-foot-wide, temporary ROW, and a variety of aboveground ancillary facilities. Figure ES-3 illustrates the construction sequence that would be followed for the proposed Project.

If permitted, when in operation, the proposed Project would maintain a 50-foot, permanent easement over the pipeline. Keystone would have access to property within the easement, but property owners would retain the ability to farm and conduct other activities. The remaining aboveground ancillary facilities would include 20 electrically operated pump stations (two of which would be built along existing sections of the Keystone Cushing Extension pipeline in Kansas), 44 mainline valves, and 38 permanent access roads.[2]

The overall proposed Project is estimated to cost approximately $3.3 billion in the United States. If permitted, it would begin operation in 2015, with the actual date dependent on the necessary permits, approvals, and authorizations.

[2] Locations for access roads in Nebraska have not yet been determined and are not included in this total.

ES.4.2 Changes Since the Final EIS

The proposed pipeline route in the United States that is the subject of this draft Supplemental EIS is similar to part of the previous project evaluated in the August 2011 Final EIS. The newly proposed route in Montana and South Dakota would be largely unchanged, except for minor modifications Keystone made to improve constructability and in response to comments, such as landowner requests to adjust the route across their property. The new proposed route is 509 miles shorter than the previously proposed route; however, it would be approximately 21 miles longer in Nebraska to avoid sensitive areas including the NDEQ-identified Sand Hills Region. Thus, the newly proposed route is substantially different from the previous route analyzed in August 2011 in two significant ways: it avoids the NDEQ-identified Sand Hills Region and it terminates at Steele City, Nebraska.

Figure ES-4: Sand Hills Grassland

As shown in Figure ES-5, the proposed Project route in Nebraska is substantially different from the previously proposed route analyzed in the 2011 Final EIS.

Figure ES-5: Comparison of Proposed Project Route to Previously Proposed Project Segment

In addition to the NDEQ-identified Sand Hills Region, the proposed Project route would avoid areas in Keya Paha County identified by the NDEQ that have soil and topographic characteristics similar to the Sand Hills Region, and it avoids or moves further away from wellhead protection areas for the Villages of Clarks and Western.

ES.4.3 Connected Actions

Connected actions are projects that would not be constructed or operated in the absence of the proposed Project. The three connected actions associated with the proposed Project are described below. While these projects would be reviewed and acted on by other agencies as needed, the draft Supplemental EIS also evaluates the impacts of these connected actions.

ES.4.3.1 The Bakken Marketlink Project

Keystone Marketlink, LLC, a wholly owned subsidiary of TransCanada Pipelines Limited, would construct and operate the Bakken Marketlink Project. This project would include a 5-mile pipeline, pumps, meters, and storage tanks to supply Bakken crude oil to the proposed pipeline from the proposed Bakken Marketlink pipeline system in North Dakota and Montana. Three crude oil storage tanks would be built near Baker, Montana, as part of this project. This proposed project can deliver up to 100,000 bpd of crude oil, and has commitments for approximately 65,000 bpd.

ES.4.3.2 Big Bend to Witten 230-kV Electrical Transmission Line

The Western Area Power Administration (Western) has determined that providing reliable electricity for operation of the proposed Project requires the construction of a new 230-kilovolt (kV) transmission line, originating at the Fort Thompson/Big Bend Dam area in South Dakota and extending south to the existing Witten Substation. To meet these demands, Western would repurpose existing transmission infrastructure and construct new infrastructure between the Dam and a proposed Big Bend Substation. The Basin Electric Power Cooperative would construct a new 76-mile, 230-kV transmission line from the Big Bend Substation to the existing Witten Substation, and would operate both the transmission line and the Big Bend Substation.

ES.4.3.3 Electrical Distribution Lines and Substations

Electrical power for the proposed Project would be obtained from local power providers. These power providers would construct the necessary substations and transformers and would either use existing service lines or construct new service lines to deliver electrical power to the specified point of use (e.g., pump stations and mainline valves), which would be located at intervals along the proposed Project route.

ES.5 ENVIRONMENTAL ANALYSIS

Construction of the proposed Project would disturb approximately 15,493 acres of land. After construction, approximately 5,584 acres would be retained for operation of the proposed Project; this includes the pipeline ROW and aboveground facilities. Construction and operation of the proposed Project would result in numerous impacts to the environment. The Department evaluated the impacts of the proposed Project and alternatives associated with the following types of resources and consequences:

- Geology
- Wetlands
- Fisheries
- Recreation
- Cultural resources
- Climate change
- Water resources
- Land use
- Pipeline releases
- Soils
- Terrestrial vegetation
- Threatened and endangered species
- Visual resources
- Air quality
- Noise
- Wildlife
- Socioeconomics

The proposed Project Construction, Mitigation, and Reclamation Plan (CMRP) (see Appendix G) includes procedures that Keystone would follow to reduce the likelihood and severity of, or avoid impacts from the proposed Project.

The discussion below summarizes the findings of the analysis related to selected resources and consequences. These resources would either be substantially impacted by the proposed Project, or have been the focus of particular public attention and comment.

ES.5.1 Soils

Construction of the proposed Project and its connected actions could affect soil resources. Potential impacts could include, to varying degrees:

- Soil erosion;
- Loss of topsoil;
- Soil compaction;
- Changes in soil composition (increased proportion of large rocks in the topsoil);
- Soil mixing; and
- Soil contamination.

Nearly half of the proposed Project route would cross soils characterized as highly erodible to either wind or water, and comments on the 2011 Final EIS expressed concern about the proposed Project's effects on erodible soils. Many of the stages of construction—notably clearing, trenching, and spoil storage—could potentially increase soil erosion. Such erosion, in turn, could result in loss of valuable topsoil from its original location. The proposed Project avoids the NDEQ-identified Sand Hills region, as well as areas in Keya Paha County, Nebraska, defined by NDEQ as having Sand Hills-like soils.

These potential impacts would be mitigated through a variety of measures. Keystone's proposed construction methods (Appendix G, CMRP) incorporate measures to reduce soil erosion, including the use of sediment barriers, trench plugs, temporary slope breakers, drainage channels or ditches, mulching, and inspection of these control methods. Specific additional methods and measures, such as the following would apply in areas of fragile soils (i.e., where the soil exhibits conditions typical of the NDEQ-identified Sand Hills Region and is very susceptible to wind erosion):

- Use of photodegradable matting, sediment logs, or straw wattles rather than terraces (slope breakers) in steep slope or erosion-prone areas;
- Use of native seed mixes (developed with local Natural Resource Conservation Service offices and used in coordination with landowners);
- Use of trench-line or blade-width stripping procedures where practicable to reduce the width of disturbance; and
- Minor route realignments.

Approximately 4,715 acres of prime farmland soil would be directly impacted by construction of the proposed pipeline. To avoid permanent impacts to these soils, topsoil in non-forested agricultural areas would be removed and stockpiled at the edge of the ROW during excavation activities and returned

following completion of construction and subsurface soil preparation. Salvage depths would vary from 4 inches in shallow soils to 12 inches in highly productive soils. Operation of the proposed Project would have minor, localized impacts on soils.

ES.5.2 Water Resources

In response to public scoping comments for the proposed Project, the draft Supplemental EIS includes a detailed assessment of impacts on groundwater and surface water, including shallow groundwater associated with the Ogallala Aquifer and the NDEQ-identified Sand Hills Region.

ES.5.2.1 Surface Water

The proposed Project would impact waterbodies across the states of Montana, South Dakota, and Nebraska. The proposed Project route would avoid surface water whenever possible; however, the proposed Project route would still cross approximately 1,073 waterbodies, including 56 perennial rivers and streams, as well as approximately 25 miles of mapped floodplains.

Construction Phase

Construction of the proposed Project could result in temporary and permanent impacts such as:

- Stream sedimentation;
- Changes in stream channel morphology (shape) and stability;
- Temporarily reduced flow in streams; and
- Potential impacts associated with spills.

Open-cut methods would be used at most waterbody crossings. However, impacts to surface waterbodies would be mitigated through various means. Horizontal directional drilling (HDD) would be used at 14 major and sensitive waterbody crossings (see Figure ES-6). Waterbody banks would be restored to preconstruction contours or to a stable slope. Seeding, erosion control fabric, and other erosion control measures would be installed, as specified in the CMRP (Appendix G), and permit documents.

Operations Phase

Surface water impacts associated with potential releases of crude oil and other hazardous liquid spills are addressed later in this Executive Summary. Other potential impacts during the operations phase would include:

- Channel migration or streambed degradation that exposes the pipeline;
- Channel incision that increases bank heights to the point where slopes are destabilized, ultimately widening the stream; and
- Sedimentation within a channel that triggers lateral bank erosion, such as the expansion of a channel meander (curve) opposite a point bar.

Mitigation measures to address these impacts would include those specified in the CMRP (Appendix G). Crossings would be at least 5 feet below the bottom of all waterbodies, and would have a horizontal buffer of at least 15 feet from either waterbody edge.

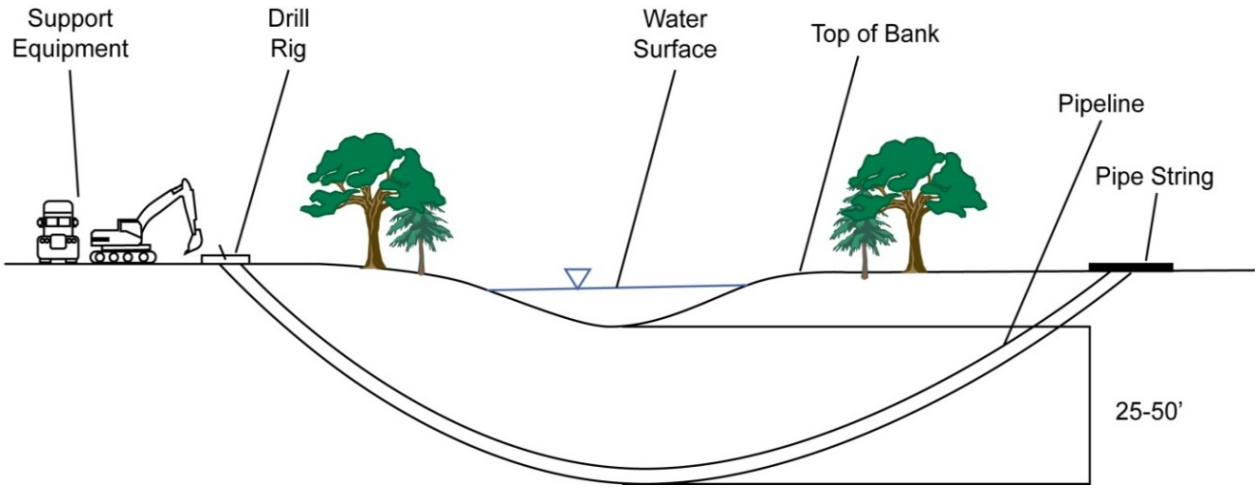


Figure ES-6: Cross Section of Horizontal Directional Drilling Method

Where an HDD method is used, the crossing depth would be up to 50 feet below the stream bed. Potential bank protection measures could include installing rock, wood, or other materials keyed into the bank to provide protection from further erosion, or regrading the banks to reduce the bank slope.

ES.5.2.2 Groundwater

The primary source of groundwater impacts from the proposed Project would be potential releases of petroleum during pipeline operation and, to a lesser extent, from fuel spills from equipment. The risks and impacts of these effects are discussed later in this Executive Summary. Any petroleum releases from construction or operation could potentially impact groundwater where the overlying soils are permeable and the depth to groundwater is shallow. Table ES-1 summarizes the anticipated effects of potential releases from the proposed Project on the aquifers and aquifer groups along the proposed Project route.

Figure ES-7 provides a schematic view of these groundwater resources.

Hydrostatic Testing

Water hydrostatic testing is performed to expose defective materials or welds that have missed prior detection, expose possible leaks, and serve as a final validation of the integrity of the constructed system. Water is pumped into the sealed pipe section, typically to a pressure greater that the specified pipe strength, and the pressurized segment is monitored for failure.

Following the test, the water is removed from the pipe and returned to the natural environment or disposed of in a regulated fashion. Water used for hydrostatic testing would be obtained from nearby surface water resources, groundwater, or municipal sources. Approximately 50 potential surface water sources have been identified along the proposed Project route. Discharged water would be tested for water quality prior to release to ensure that it meets applicable water quality standards.

Table ES-1: Effects of Potential Releases on Aquifers

Aquifer	Effects
Alluvial Aquifers and Northern High Plains Aquifer (NHPAQ), including the Ogallala Aquifer	Aquifer conditions in the NHPAQ in the proposed Project area indicate that shallow groundwater generally discharges to local surface waterbodies, and typically does not flow downward in significant amounts or flow horizontally over long distances. Analysis of historic spills and groundwater modeling indicate that contaminant plumes from a large-scale release that reaches groundwater in the NHPAQ and alluvial aquifers could be expected to affect groundwater quality up to approximately 1,000 feet downgradient of the release source. This localized effect indicates that petroleum releases from the proposed Project would not extensively affect water quality in this aquifer group.
Great Plains Aquifer (GPA)	Across most of the proposed pipeline area where the GPA is present, it is very unlikely that any releases from the proposed pipeline would affect groundwater quality in the aquifer, because the aquifer is typically deeply buried beneath younger, water-bearing sediments and/or aquitard units. The exception is in southern Nebraska, where the aquifer is closer to the surface. Water quality in the GPA could be affected by releases in this area, but groundwater flow patterns in the vicinity of the proposed Project route make such effects unlikely. Overall, it is very unlikely that the proposed pipeline area would affect water quality in the GPA due to weak downward gradients (downward groundwater flows) in the aquifers overlying the GPA.
Western Interior Plains Aquifer	The depth to this aquifer is several hundred feet in the proposed Project area; therefore, there is an extremely low probability that a petroleum release from the proposed Project would affect water quality in this aquifer.
Northern Great Plains Aquifer System (NGPAS)	As with the GPA, petroleum releases from the proposed Project would only affect water quality in portions of the NGPAS near the ground surface. In the case of a large-scale release, these impacts would typically be limited to within several hundred feet of the release source, and would not affect groundwater within areas that provide groundwater recharge to large portions of the NGPAS.
Shallow Groundwater and Water Wells	There are 2,537 wells within 1 mile of the proposed Project, including 39 public water supply wells and 20 private wells within 100 feet of the pipeline ROW. The vast majority of these wells are in Nebraska. Those wells that were in the vicinity may be affected by a petroleum release from the proposed Project.

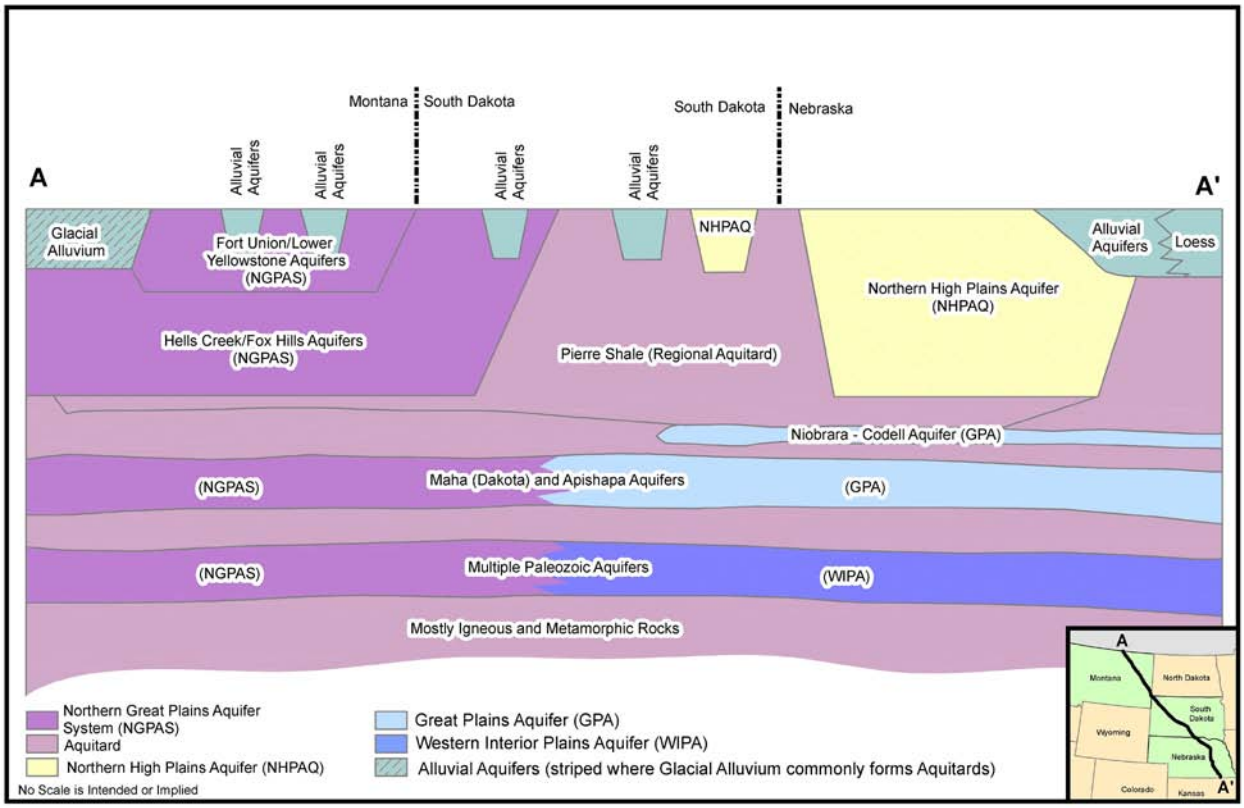


Figure ES-7: Schematic Hydrogeologic Cross-Section along Proposed Pipeline Route

ES.5.2.3 Floodplains

The proposed pipeline would cross mapped and unmapped floodplains in Montana, South Dakota, and Nebraska. In floodplain areas adjacent to waterbody crossings, contours would be restored to as close to previously existing contours as practical and the disturbed area would be revegetated during construction of the ROW in accordance with the CMRP (Appendix G). After construction, the proposed pipeline would not obstruct flows over designated floodplains, and any changes to topography would be minimal and thus would not affect local flood dynamics or flood elevations.

ES.5.3 Threatened and Endangered Species

Consultation with the U.S. Fish and Wildlife Service (USFWS) identified 13 federally protected or candidate species that could be impacted by the proposed Project: eleven federally-listed threatened or endangered species, as defined under the Endangered Species Act (ESA), and two candidate species for listing as threatened or endangered. In addition, this draft Supplemental EIS also evaluated the potential Project impacts on one species under consideration for federal protection under ESA. In consultation with the USFWS, the Department prepared a Biological Assessment (BA) to evaluate the proposed Project's potential impacts to federally protected and candidate species and their federally designated critical habitat (Appendix H). In addition, 13 state-listed species that are not also federally listed species and one species under consideration for federal protection under the ESA could be impacted by the proposed Project.

Types of potential impacts to threatened and endangered species include:

- Habitat loss, alteration, and fragmentation;
- Direct mortality during construction and operation, including collision with power lines;
- Indirect mortality due to stress or avoidance of feeding, and/or reduced breeding success due to exposure to noise and/or increased human activity; and
- Reduced survival or reproduction due to decreased abundance of food or reduced cover.

The subsections below provide additional detail on species that could potentially be affected by the proposed Project, or species that are frequent topics of concern for projects similar to or in the same geographic region as the Project. Monitoring and mitigation measures that address these impacts are discussed thoroughly in the draft Supplemental EIS.

ES.5.3.1 American Burying Beetle

Of the 13 federally protected or candidate species, the American burying beetle (*Nicrophorus americanus*) was the only species determined to be potentially adversely affected by the proposed Project.

Figure ES-8: American Burying Beetle

Approximately 50 miles of the proposed Project Route in Nebraska would affect American burying beetle habitat; approximately 43 miles in South Dakota would affect suitable habitat for the species. Consultation between the Department and USFWS resulted in development of conservation measures and compensatory mitigation, such as trapping and relocating beetles, special lighting restrictions (the beetles are attracted to light), and establishment of a habitat conservation trust.

Even with these measures, the proposed Project could affect, and would be likely to adversely affect the American burying beetle, resulting in incidental takes (unintended death of individual beetles) during construction or operations. Keystone continues to work with USFWS to refine conservation measures for minimizing incidental take and to quantify estimated incidental take and development of compensatory mitigation through the formal Section 7 ESA consultation process for the American burying beetle.

ES.5.3.2 Whooping Crane

The whooping crane (*Grus Americana*) is federally protected and is also protected under the Migratory Bird Treaty Act. Whooping cranes could be impacted by collisions with power lines associated with the proposed Project. The majority of the proposed Project route crosses the central flyway whooping crane migration corridor in South Dakota and Nebraska, and the Rainwater Basin in south central Nebraska provides whooping crane migration habitat. With avoidance, minimization, and conservation measures, such as following the Whooping Crane Survey Protocol previously developed by the USFWS and Nebraska Game and Parks Commission, the proposed Project is unlikely to adversely affect whooping cranes, based on the low likelihood of the species occurring near the proposed Project route during construction and operations activities and implementation of USFWS recommended mitigation measures.

ES.5.3.3 Greater Sage-Grouse

The greater sage-grouse (*Centrocerus urophasianus*) is a federal candidate species under the ESA, a Bureau of Land Management sensitive species, and a species of conservation concern in Montana and South Dakota. Approximately 190 miles of the proposed Project route would cross areas with greater sage-grouse habitat in Montana, of which 94 miles are classified as moderate to high-quality habitat for greater sage-grouse.

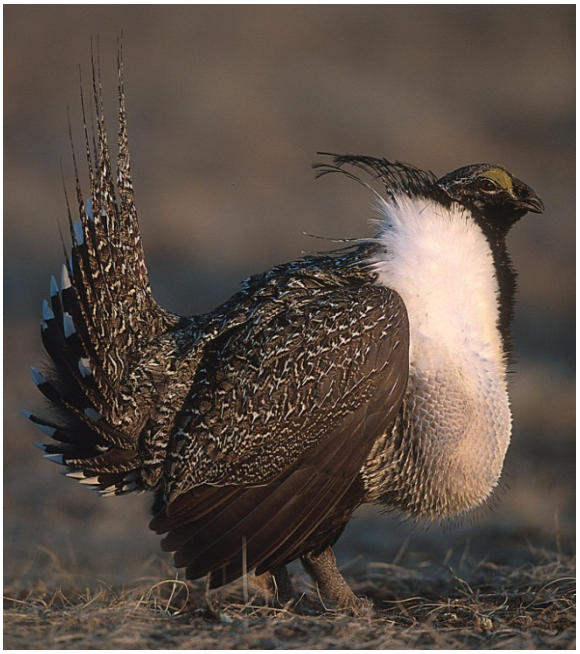


Figure ES-9: Greater Sage-Grouse

The most substantial potential effects of the proposed Project on the greater sage grouse would be disturbance of habitat, including sagebrush, which can take up to 20 years to regenerate to pre-construction cover levels, and disturbance of mating and breeding behavior.

The BA (Appendix H) and greater sage-grouse mitigation plans for Montana and South Dakota describe conservation measures that Keystone would implement to address potential impacts. After implementation of these measures, the proposed Project would not likely affect greater sage-grouse mating behavior, and would likely result in a low impact on nesting greater sage-grouse. Construction would likely result in an incremental loss of sagebrush habitat.

ES.5.3.4 Western Prairie Fringed Orchid

The western prairie fringed orchid (*Platanthera leucophaea*) is federally listed as threatened, state-listed as threatened in Nebraska, and is a species of conservation concern in South Dakota. The proposed Project would pass near known populations of western prairie fringed orchid in Nebraska, and through land where the orchid may potentially occur in South Dakota. Clearing and grading of land associated with construction of the proposed Project (including pipeline and ancillary facilities) may potentially disturb western prairie fringed orchids, and may introduce or expand invasive species that already contribute to the orchid's decline.

Figure ES-10: Western Prairie Fringed Orchid

Keystone would implement conservation measures included in the BA (Appendix H) and would avoid known western prairie fringed orchid populations; therefore, the proposed Project would not be likely to adversely affect the western prairie fringed orchid.

ES.5.3.5 Small White Lady's Slipper

The small white lady's slipper *(Cypripedium candidum)*, a type of perennial orchid, is a threatened species under Nebraska state law. This species may potentially occur within suitable habitat along the proposed Project route in Nebraska. If this plant were to be observed within the proposed Project route in Nebraska, appropriate mitigation measures would be developed and implemented in consultation with state agencies.

ES.5.4 Socioeconomics and Environmental Justice

The draft Supplemental EIS updates the economic data contained in the Final EIS and re-evaluates the economic impacts of the proposed Project. In particular, and in response to public comments, the draft Supplemental EIS addresses local economic impacts and Environmental Justice.

ES.5.4.1 Tribal Consultation

Government-to-government consultation is underway for the current Supplemental EIS process for the proposed Project, and tribal meetings were held in October 2012 in Montana, South Dakota, and Nebraska. As the lead federal agency for the proposed Project, the Department is continuing throughout the Supplemental EIS process to engage in consultation on the Supplemental EIS, the proposed Project generally, and on cultural resources consistent with Section 106 of the National Historic Preservation Act of 1986 with identified consulting parties, including federal agencies, state agencies, State Historic Preservation Offices, the Advisory Council on Historic Preservation, and interested federally recognized Native American tribes in the vicinity of the proposed Project.

ES.5.4.2 Socioeconomics

Construction

Construction of the proposed Project would generate temporary, positive socioeconomic impacts as a result of local employment, taxes, spending by construction workers, and spending on construction goods and services. Including direct, indirect, and induced effects, the proposed Project would potentially support approximately 42,100 average

annual jobs across the United States over a 1- to 2-year construction period (of which, approximately 3,900 would be directly employed in construction activities). This employment would potentially translate to approximately $2.05 billion in earnings. Direct expenditures such as construction and materials costs (including construction camps) would total approximately $3.3 billion. Short-term revenues from sources such as sales and use taxes would total approximately $65 million in states that levy such a tax. Yields from fuel and other taxes could not be calculated, but would provide some additional economic benefit to host counties and states.

The proposed Project area does not have sufficient temporary housing for the anticipated construction workforce. Keystone proposes to meet the housing need through a combination of local housing and eight construction camps. Property taxes on these camps would potentially generate the equivalent of one full year of property tax revenue for seven host counties, totaling approximately $2 million.

Other construction-phase socioeconomic impacts would include minor increases in demand for utilities and public services (such as police, fire, and emergency medical services), and temporary traffic delays at public road crossings. The construction camps would provide utilities and other services for workers, reducing demands on existing communities.

Operations Phase

Generally, the largest economic impacts of pipelines occur during construction rather than operations. Once in place, the labor requirements for pipeline operations are relatively minor. Operation of the proposed Project would generate 35 permanent and 15 temporary jobs, primarily for routine inspections, maintenance, and repairs. Based on this estimate, routine operation of the proposed Pipeline would have negligible socioeconomic impacts.

ES.5.4.3 Environmental Justice

As defined by the U.S. Environmental Protection Agency, “Environmental Justice” refers to the “fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.” Executive Order 12898 further directs federal agencies to identify and address, as appropriate, disproportionately high and adverse health or environmental effects of their programs, policies, and activities on minority populations and low-income populations, specifically as part of a NEPA process. Within the socioeconomic analysis area, 16 block groups contain minority populations that were meaningfully greater than the surrounding state or county (reference areas), and five census tracts had larger low-income populations than their respective reference areas. Four of these areas contained both types of “meaningfully greater” populations.

Impacts to minority and low-income populations during construction may include exposure to construction dust and noise, disruption to traffic patterns, and increased competition for medical or health services in underserved populations. Such impacts would generally be small and short-term.

Typical operation of the proposed Project is unlikely to disproportionately adversely impact the Environmental Justice populations discussed in this section. Because the risk of a potential release is roughly equal at all points along the pipeline, the risks associated with such releases would not be disproportionately borne by minority or low-income populations.

ES.5.5 Greenhouse Gas Emissions and Climate Change

The draft Supplemental EIS evaluates the GHG emissions associated with the proposed Project from several distinct perspectives. The construction and operation of the proposed Project and its connected actions (the pipeline, pump stations, electrical transmission lines, etc.) would generate GHG emissions. In addition, concerns have been raised that extracting the crude oil that would be transported by the proposed Project produces more GHG emissions compared to other types of crude oil. Finally, climate change considerations—which are influenced by GHG emissions—could affect the construction and operation of the proposed Project. GHG and climate change issues were the subject of many comments received during the public scoping process for the proposed Project.

ES.5.5.1 Greenhouse Gas Emissions

Construction and operation of the proposed Project would generate GHG emissions from several sources or activities, as described below.

Construction-Phase Sources

- Clearing of land in the proposed ROW via open burning;
- Electricity usage and emergency generators at construction camps; and
- Construction vehicles, worker transports, and other mobile sources.

Operations-Phase Sources

- Fugitive methane emissions at connections;
- Maintenance vehicles (two or more times per year);
- Aircraft used for aerial inspection (biweekly); and
- Electrical generation for pump station power.

During the construction period, GHG emissions from these sources and activities would be approximately 240,423 metric tons of carbon dioxide equivalents (CO_2e). Emissions during operation of the proposed Project would be approximately 3.19 million metric tons of CO_2e per year, almost entirely due to electrical generation needed to power the proposed Project's pump stations.

The annual CO_2e emissions from the proposed Project is equivalent to CO_2e emissions from approximately 626,000 passenger vehicles operating for one year or 398,000 homes using electricity for one year.

ES.5.5.2 Life Cycle Analysis

Combustion of fossil fuels, including petroleum-based products such as crude oil, is a major source of global GHG emissions, which contribute to human-induced climate change. WCSB crudes are more GHG-intensive than the other heavy crudes they would replace or displace in U.S. refineries, and emit an estimated 17 percent more GHGs on a life-cycle basis than the average barrel of crude oil refined in the United States in 2005. If the proposed Project were to induce growth in the rate of extraction in the oil sands, then it could cause GHG emissions greater than just its direct emissions.

Based on information and analysis about the North American crude transport infrastructure (particularly the proven ability of rail to transport substantial quantities of crude oil profitably under current market conditions, and to add capacity relatively rapidly) and the global crude oil market, the draft Supplemental EIS concludes that approval or denial of the proposed Project is unlikely to have a substantial impact on the rate of development in the oil sands, or on the amount of heavy crude oil refined in the Gulf Coast area.

As discussed in the market analysis, if the proposed Project were denied but other proposed new and expanded pipelines go forward, production could decrease by approximately 0.4 to 0.6 percent of total WCSB production by 2030. If all pipeline capacity were restricted, oil sands production could decrease by approximately 2 to 4 percent by 2030.

The incremental indirect life-cycle emissions associated with those decreases in oil sands production are estimated to be in the range of 0.07 to 0.83 million metric tons CO_2 equivalent ($MMTCO_2e$) annually if the proposed Project were not built, and in the range of 0.35 to 5.3 $MMTCO_2e$ annually if all pipeline projects were denied.

As WCSB and Bakken crudes replace crudes from other sources—independent of whether the proposed Project exists—the life-cycle GHG emissions associated with transportation fuels produced in U.S. refineries would likely increase. The GHG intensity of reference crudes may also increase in the future as more of the world crude supply requires extraction by increasingly energy-intensive techniques, such as those used to extract oil-sands crude, although regulatory pressures and technological advances could counter this trend.

ES.5.5.3 Climate Change Effects on the Project

Changes in climate have been observed both globally and within the proposed Project study area over the past century. These changes include direct effects, such as increases and decreases in temperature and precipitation, and indirect effects, such as increases in freeze-thaw cycles, increased occurrences of flooding and drought, and wind erosion of soil, and resultant changes to the natural environment, such as vegetation changes.

As part of the preparation of this draft Supplemental EIS, an analysis was performed to evaluate the potential impacts of climate change on the proposed Project construction and operations. Using future climate scenarios developed by the Intergovernmental Panel on Climate Change and peer-reviewed downscaled models, the draft Supplemental EIS evaluates the range of impacts that climate change could have on the proposed Project.

Assuming construction of the proposed Project begins as planned in 2015, climate conditions during the 1- to 2-year construction period would not differ substantially from current conditions. During the operations period, climate change projections suggest the following changes:

- Warmer winter temperatures;
- A shorter cool season;
- A longer duration of frost-free periods;
- More freeze-thaw cycles per year (which could lead to an increased number of episodes of soil contraction and expansion);
- Warmer summer temperatures;
- Increased number of hot days and consecutive hot days; and
- Longer summers (which could lead to impacts associated with heat stress and wildfire risks).

The pipeline would be buried deep enough to avoid surface impacts of climate changes (freeze-thaw cycles, fires, and temperature extremes).

ES.5.6 Potential Releases

The terms "release," "leak," and "spill" are used throughout this section. These are distinct terms. A release is a loss of integrity of a pipeline (including the mainline and other components); a leak is a release over time; and a spill is the liquid volume of a leak that escapes any containment system and enters the environment. This section describes the release and spill analyses included in the draft Supplemental EIS, including potential impacts on waterbodies and mitigation measures, as identified in public scoping comments.

ES.5.6.1 Spill Scenarios

The Potential Releases section of the draft Supplemental EIS addresses the risks and potential impacts of crude oil releases and spills during construction and operation of the proposed Project. This risk assessment addresses both the potential frequency of operational pipeline releases and the potential crude oil spill volumes associated with the releases, using three hypothetical spill volumes to represent the range of reported spills in the Pipeline and Hazardous Materials Safety Administration (PHMSA) database. These spill volumes and the probabilities of such volumes are shown in Table ES-2. Screening-level (i.e., general) models were used to estimate the distance oil could move over land or migrate in groundwater.

Table ES-3 summarizes hazardous liquid pipeline incidents reported to PHMSA from January 2002 through July 2012 and shows the breakdown of incidents by pipeline component. Figure ES-11 summarizes the spill scenarios reported to PHMSA, by pipeline elements.

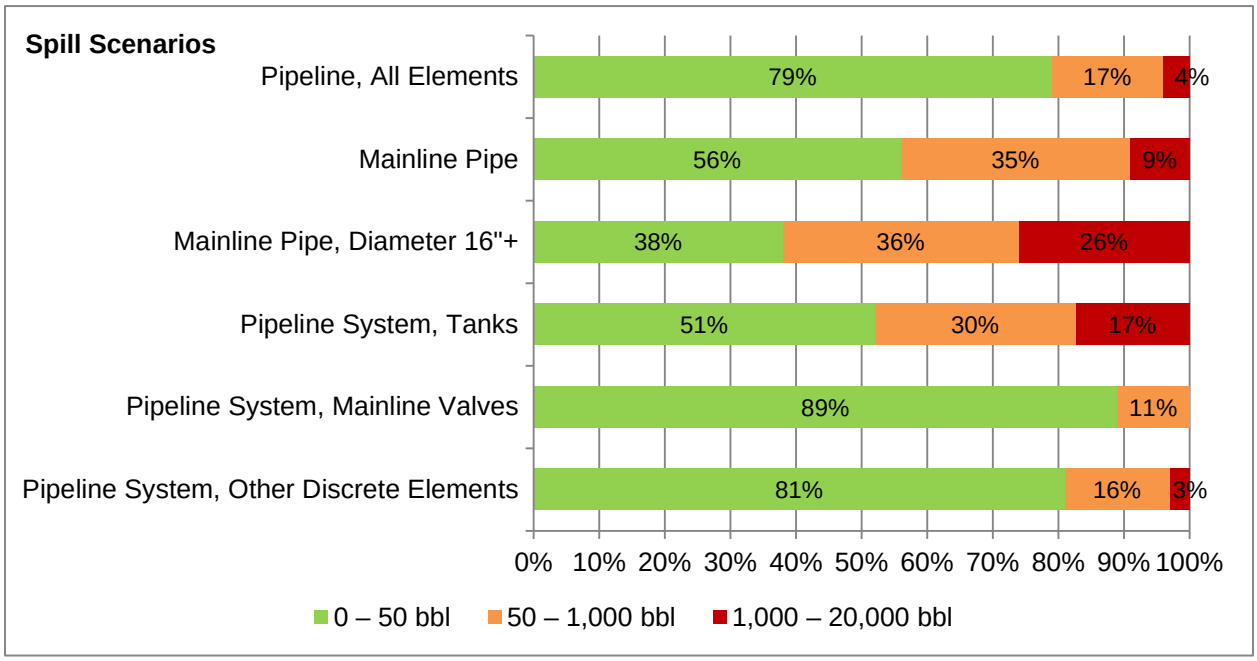
Table ES-2: Spill Scenarios Evaluated in Draft Supplemental EIS

Spill Volume Scenario	Frequency[a]
Small: Less than 50 barrels (bbl) (2,100 gallons)	79%
Medium: 50–1,000 bbl (2,100–42,000 gallons)	17%
Large: 1,000–20,000 bbl (42,000–840,000 gallons)	4%

[a] Indicates the share of all releases reported in the PHMSA database that fit each spill volume scenario.

Table ES-3: Summary of PHMSA Database Incidents (January 2002 to July 2012)

Incident Category	Incidents	Incident Sub-Category	Incidents
Crude oil pipeline	1,692	Crude oil mainline pipe incidents	321
		Crude oil pipeline, equipment incidents (not mainline pipe)	1,027
		Crude oil pipeline system, unspecified elements	344
Crude oil mainline pipe	321	16-inch or greater diameter	71
		8-inch or 15-inch diameter	154
		Less than 8-inch diameter	52
		Diameter not provided	44
Crude oil pipeline, equipment (not mainline pipe)	1,027	Tanks	93
		Valves	25
		Other discrete elements (pumps, fittings, etc.)	909



Source: PHMSA Hazardous Liquid Pipeline Incident Data 2002–2012, and PHMSA Liquid Annual Pipeline Data. 2004–2011

Figure ES-11: Spill Volume Distribution by Pipeline Component

ES.5.6.2 Oil Movement

Small and Medium Spills

The potential impacts from small leaks of oil would typically be confined to soil immediately surrounding the leak, and would have little effect on nearby natural resources. These types of spills would generally be detected by maintenance or operations personnel and addressed through repair of the leak and removal and remediation of impacted soil. A slow subsurface leak, characterized as a slow drip (e.g., gallons per year as opposed to gallons per minute), would infiltrate into soil and could potentially reach a groundwater resource. If the spill rate is faster than the soil can absorb, the oil may surface and potentially flow away from the release site, affecting nearby vegetation or other resources.

With medium spills, a release can occur as a subsurface or surface event depending upon the cause. Similar to a small spill, a slow subsurface release could potentially reach a groundwater resource, and if the rate of the spill is faster than the soil can absorb, the oil may surface. Once the migrating oil leaves the release site, impacts to soil, vegetation, and surface water along the flow path might occur. Depending on how quickly it is remediated, some of this volume of material might tend to pool in low areas and potentially infiltrate back into the soil and to groundwater depending on the depth to groundwater. Potential behavior in shallow groundwater is the same as small spills that reach groundwater; the spill could migrate away from the release site. Because of the increased volume of oil released from the pipeline when compared to a small release, it is also possible that oil could pool on groundwater.

Large Spills

With a large spill, the majority of the spill volume would migrate away from the release site. The potential impacts from a large spill would be similar to the impacts from the medium-sized spill, but on a much larger scale. Once the spill reaches the surface, the oil would flow following topographic gradient or lows (e.g., gullies, roadside drainage ditches, culverts, and storm sewers) and eventually to surface water features. If the release enters flowing water or other surface water feature, the extent of the release could become very large, potentially affecting soil and vegetation along miles of river and shoreline. Sinking oil can be deposited in river or stream bottoms and become a continual source of oil as changing water flows release the deposited oil.

ES.5.6.3 Mitigation

Keystone has agreed to incorporate 57 Special Conditions developed by PHMSA into the proposed Project and in its manual for operations, maintenance, and emergencies. The majority of the Special Conditions relate to reduction in the likelihood of a release occurring. Some provide mitigation that reduces the consequences and impact of a spill, should such an event occur. Examples of the types of Special Conditions that PHMSA developed to reduce the risk of a release include, among others, measures that would better prevent corrosion, stress cracking, equipment malfunctions, third-party damage, and operator error.

ES.5.7 Cumulative Effects

The cumulative effects analysis evaluates the way that the proposed Project's impacts interact with the impact of other past, present, and reasonably foreseeable future actions or projects. The goal of the cumulative impacts analysis is to identify situations where sets of comparatively small individual impacts, taken together, constitute a larger collective impact.

For the proposed Project, the draft Supplemental EIS identifies actions or projects with the potential for cumulative impacts. The cumulative effects analysis provides detailed evaluation of the effects of these projects when combined with the proposed Project, including impacts on resources within the United States, lifecycle GHG emissions of WCSB activities, and impacts on resources in Canada.

ES.5.8 Environmental Impacts in Canada

In addition to the environmental analysis of the proposed Project in the United States, the Department monitored and obtained information from the environmental analysis of the Canadian portion of the Project. The Canadian government conducted an environmental review of the portion of the proposed Project in Canada. The Department did not conduct an assessment of the potential impacts of the Canadian portion of the proposed Project. However, the Department has included information from the Canadian government's assessment in this draft Supplemental EIS.

The Canadian environmental analysis process began in July 2008 and involved an environmental assessment process pursuant to the Canadian Environmental Assessment Act. On March 11, 2010, the Canadian National Energy Board (NEB) issued its Reasons for Decision granting Keystone's application. The NEB's Reasons for Decision included an Environmental Screening Report that was prepared to meet the requirements of Canadian Environmental Assessment Act for the Canadian portion of the proposed Project.

The Environmental Screening Report concluded that, with incorporation of Keystone's proposed measures to avoid or minimize impacts and with Keystone's acceptance of the NEB's regulatory requirements and recommended conditions, implementation of the proposed Project in Canada would not likely result in significant adverse environmental effects. For the Canadian portion of the pipeline, construction began on the Hardisty B Terminal in September 2010, and HDD crossings of the Red Deer and South Saskatchewan rivers were completed in early 2012.

Analysis and mitigation of environmental impacts in Canada are ongoing by Canadian officials. For example, on September 1, 2012, the Government of Alberta's development plan for the Lower Athabascan oil sands region became effective. The plan would require cancellation of about ten oil sands leases, set aside nearly 20,000 square kilometers (7,700 square miles) for conservation, and set new environmental standards for the region in an effort to protect sensitive habitat, wildlife, and forest land.

ES.6 ALTERNATIVES

The draft Supplemental EIS considers three broad categories of alternatives to the proposed Project, consistent with NEPA requirements:

- No Action Alternative—which addresses potential market responses that could result if the Presidential Permit is denied or the proposed Project is not otherwise implemented;
- Major Route Alternatives—which includes other potential pipeline routes for transporting WCSB and Bakken crude oil to Steele City, Nebraska; and
- Other Alternatives—which include minor route variations, alternative pipeline designs, and alternative sites for aboveground facilities.

ES.6.1 Scenario Screening

Several alternatives exist for the transport of WCSB and Bakken crude oil to Gulf Coast refineries, including many that were not carried forward for detailed analysis. The draft Supplemental EIS provides a more detailed description of the categories of alternatives, the alternative screening process, and the detailed alternatives identified for evaluation in the draft Supplemental EIS.

Potential No Action Alternative scenarios were screened based on technical and economic feasibility, such as implementation timeframe and crude oil transport capacity, as well as the potential to provide a cost advantage (compared to other No Action Alternative scenarios). As explained in detail in the draft Supplemental EIS, No Action Alternative scenarios excluded from further analysis are:

- Rail or Pipeline to Vancouver, British Columbia, and Tanker to Gulf Coast;
- Rail Directly to Gulf Coast;
- Rail to Wood River, Illinois; Barge to Gulf Coast via Mississippi River;
- Bitumen by Rail; and
- Canadian Pipeline Scenario (Existing Pipelines).

The primary purpose of major route alternatives is to identify a route that avoids the NDEQ-identified Sand Hills Region without an unacceptable increase in other environmental impacts. Although the Keystone XL 2011 Steele City Segment Alternative traverses the NDEQ-identified Sand Hills Region, the draft Supplemental EIS evaluates the impacts of constructing that route as a comparison against which other route alternatives, including the proposed Project, can be made. The initial (Phase I) screening of other major route alternatives considered the following criteria:

- Project Purpose—to be considered reasonable, an alternative must provide reliable transport of up to 730,000 bpd of WCSB crude oil and up to 100,000 bpd of Bakken crude oil to Cushing, Oklahoma (the intermediate destination of crude oil in the proposed Project) or Gulf Coast refineries (the ultimate destination of that crude oil); and
- Pipeline Length—pipeline length was considered a relative measure of reliability, environmental impact, and construction/operational costs.

The Phase II screening used a desktop data review of key environmental and other features (e.g., wetlands and waterbodies crossed, total acreage affected). Major route alternatives excluded from further analysis are:

- Western Alternative (to Cushing);
- Express-Platte Alternative;
- Steele City Segment-A1A Alternative;
- Keystone Corridor Option 1; and
- Keystone Corridor Option 2.

ES.6.2 Market Analysis

This section in the Supplemental EIS examines the changes in petroleum markets since the publication of the Final EIS on August 26, 2011. It assesses whether these changes alter the conclusion of the 2011 Final EIS market analysis, namely, that the proposed Project is unlikely to significantly affect the rate of extraction in the oil sands or in U.S. refining activities. Specifically, the section presents changes observed in the petroleum market since August 2011 and how such changes may impact the assessment made in the Final EIS. The analysis is based, in part, on the following considerations.

Several changes in the outlook for the crude oil market since August 2011 have occurred and are accounted for in the Supplemental EIS analysis. First, the outlook for U.S. demand for transportation fuel is now lower than it was in 2010 and 2011. Second, domestic production of crude oil has increased and is expected to continue increasing over the next 10 to 15 years. Third, the infrastructure for crude oil transportation in North America, including pipeline, rail, and other non-pipeline modes, is undergoing significant adaptations and increases in capacity.

While the increase in U.S. production of crude oil and the reduced U.S. demand for transportation fuels will likely reduce the demand for total U.S. crude oil imports, it is unlikely to reduce demand for heavy sour crude at Gulf Coast refineries. Additionally, as was projected in the 2011 Final EIS, the midstream industry is showing it is capable of developing alternative capacity to move WCSB (and Bakken and Midcontinent) crudes to markets in the event the proposed Project is not built. Specifically, it is moving to develop alternative pipeline capacity that would support Western Canadian, Bakken, and Midcontinent crude oil movements to the Gulf Coast and is increasingly using rail to transport large volumes of crude oil to East, West, and Gulf Coast markets as a viable alternative to pipelines. In addition, projected crude oil prices are sufficient to support production of essentially all Western Canadian crude oil projects (and U.S. tight oil projects, such as those in the Bakken shale), even with potentially somewhat more expensive transport options to market in the form of alternative pipelines and rail. Rail and supporting non-pipeline modes should be capable, as was projected in 2011, of providing the capacity needed to transport all

incremental Western Canadian and Bakken crude oil production to markets if there were no additional pipeline projects approved.

Approval or denial of any one crude oil transport project, including the proposed Project, remains unlikely to significantly impact the rate of extraction in the oil sands, or the continued demand for heavy crude oil at refineries in the U.S. Limitations on pipeline transport would force more crude oil to be transported via other modes of transportation, such as rail, which would probably (but not certainly) be more expensive. Longer term limitations also depend upon whether pipeline projects that are located exclusively in Canada proceed (such as the proposed Northern Gateway, the Trans Mountain expansion, and the TransCanada proposal to ship crude oil east to Ontario on a converted natural gas pipeline).

If all such pipeline capacity were restricted in the medium-to-long-term, the incremental increase in cost of the non-pipeline transport options could result in a decrease in production from the oil sands, perhaps 90,000 to 210,000 bpd (approximately 2 to 4 percent) by 2030. If the proposed Project were denied but other proposed new and expanded pipelines go forward, the incremental decrease in production could be approximately 20,000 to 30,000 bpd (from 0.4 to 0.6 percent of total WCSB production) by 2030.

Fundamental changes to the world crude oil market, and/or more far reaching actions than are evaluated in this Supplemental EIS would be required to significantly impact the rate of production in the oil sands. In light of the additional analysis performed, as explained in the Supplemental EIS, these changes are not anticipated to alter the outlook for the crude oil market in a manner that would lead to a change in the key conclusions reached in the 2011 Final EIS.

ES.6.3 No Action Alternative

The No Action Alternative includes an evaluation of multiple scenarios that describe potential outcomes if the Department was to deny the Presidential Permit for the proposed Project, or if it was otherwise not constructed. Based on available information and independent analysis discussed at greater length in the draft Supplemental EIS, under a No Action "Status Quo" Alternative, production and transportation of WCSB and Bakken crude oil would remain unchanged. This scenario serves as a benchmark against which other alternatives are evaluated, although market forces would preclude this scenario from occurring.

Given that production of WCSB and Bakken crude oil will proceed with or without the proposed Project, the denial of a Presidential Permit would likely result in actions by other firms in the United States (and global) petroleum market, such as use of alternative modes to transport WCSB and Bakken crude oil. Table ES-4 compares some of the key characteristics of the non-Status Quo scenarios under this Alternative to the proposed Project. The individual scenarios are described below.

Table ES-4: Summary of No Action Alternative Scenarios

Characteristics	Proposed Project	Rail and Pipeline	Rail and Vessel[a]
New Acreage Required (permanent easement)	5,303	7,727	9,427
Average Annual U.S. Employment During Construction	3,900	2,400	0
Construction Period	1-2	about 2	about 2
Permanent (Operations) U.S. Employment	35	65	0

[a] In the Rail and Vessel scenario, characteristics of the marine terminal in Kitimat are based on the capital costs and employment estimates for the Enbridge Northern Gateway marine terminal. Information is available at http://gatewaypanel.review-examen.gc.ca/clf-nsi/dcmnt/pplctn-eng.html

ES.6.3.1 Rail and Pipeline Scenario

Under this scenario, WCSB and Bakken crude oil (in the form of dilbit or synbit) would be shipped via railroad to Stroud, Oklahoma, where it would be loaded into existing and expanded pipelines approximately 17 miles to Cushing, Oklahoma, where the crude oil would enter the existing Keystone pipeline system.

This scenario would require the construction of seven new rail loading terminals in Lloydminster, Saskatchewan (the possible loading point for WCSB crude oil), one in Epping, North Dakota (the possible loading point for Bakken crude oil), and seven in Stroud (see Figure ES-12). Each new terminal would require approximately 500 acres of land, as well as new track, pipelines, and storage tanks.

Assuming shipment via Class I (major) railroads such as the Canadian Pacific Railway System (CPRS), Canadian National, BNSF Railway (BNSF),and Union Pacific (UP), the distance from Lloydminster to Stroud is approximately 1,900 to 2,000 miles. The route from Epping to Stroud is approximately 1,350 miles. This scenario would require a total of approximately 15 unit trains (one train with 100 rail cars) per day.

Figure ES-12: Typical Rail Loading Facility in North Dakota

ES.6.3.2 Rail and Tanker Scenario

A second transportation method would include shipping crude oil from Alberta to a western Canada port, and then via oil tanker to Gulf Coast markets. Under this scenario, WCSB dilbit or synbit would be shipped via rail (CPRS or Canadian National) from Lloydminster to Prince Rupert, British Columbia, where it would be loaded onto Suezmax vessels (capable of carrying approximately 986,000 bbl of WCSB crude oil) to the Gulf Coast (Houston and/or Port Arthur) via the Panama Canal. Bakken crude would be shipped to Stroud via BNSF or UP rail lines. Bakken crude oil would be transported by rail, as described under the Rail and Pipeline Scenario. This scenario would require 13 unit trains (trains consisting of approximately 100 cars carrying the same material and destined for the same location) per day between Lloydminster and Prince Rupert, and 1 to 2 unit trains per day between Epping and Stroud. This scenario would require the construction of seven rail loading facilities in Lloydminster. Required facilities in Prince Rupert would include seven unloading facilities and a new marine terminal and storage terminal encompassing approximately 4,700 acres and capable of accommodating two Suezmax vessels. For the Bakken crude portion of this Scenario, one rail terminal would be required in Epping and Stroud.

ES.6.4 Major Pipeline Route Alternatives

The Department considered potential alternative pipeline routes to assess whether or not route alternatives could avoid or reduce impacts to environmentally sensitive resources while also meeting the proposed Project's purpose. The two route alternatives evaluated in the draft Supplemental EIS are described below. Table ES-5 summarizes key aspects of the major pipeline route alternatives.

Table ES-5: Summary of Major Pipeline Route Alternatives

	Proposed Project	2011 Steele City Segment Alternative	I-90 Corridor Alternative
New Pipeline Length (miles)	875	854	927
Number of Aboveground Facilities	59	56	90
Length Co-Located with Existing Keystone Pipeline (miles)	0	0	254
NDEQ-Identified Sand Hills Region Crossed (miles)	0	90	0
Highly Erodible Soil (Wind) Crossed (miles)	66	116	36
Perennial Waterbody Crossings	56	48	61
Wetland Affected during Construction (acres)	262	544	223
Average Annual Employment During Construction	3,900	3,900	4,100
Property Tax Revenues (millions)	$34.5	$34.1	$38.4
Construction Land Area Affected (acres)	11,667	11,387	12,360
Operations (Permanent) Land Area Required (acres)	5,303	5,176	4,818

ES.6.4.1 2011 Steele City Segment Alternative

The Keystone XL 2011 Steele City Segment Alternative evaluates the impacts of constructing the route proposed in the August 2011 Final EIS as a comparison against which other route alternatives, including the proposed Project, can be made. This alternative would follow Keystone's proposed Project route from the Canadian border milepost (MP 0) south to approximately MP 204 where it would connect with the proposed Bakken Marketlink Project onramp at the same location as the proposed Project, and continue to approximately MP 615 in northern Nebraska near the South Dakota border.

At that location, the Keystone XL 2011 Steele City Segment Alternative would divert from the current proposed Project and would continue southeasterly for another 240 miles to the southern terminus at Steele City, Nebraska. For approximately 90 miles, the Keystone XL 2011 Steele City Segment Alternative would cross the NDEQ-identified Sand Hills Region.

ES.6.4.2 I-90 Corridor Alternative

Keystone's proposed Project route starts at the Canadian Border (MP 0) and stretches south through the state of Montana into South Dakota to approximately MP 516, where the proposed pipeline route intersects Interstate 90 (I-90). From this point, this alternative pipeline route would follow the ROW of I-90 and State Highway 262 for 157 miles, where it would then intersect and follow the ROW of the existing Keystone pipeline to Steele City.

The I-90 Corridor would avoid crossing the NDEQ-identified Sand Hills Region and would reduce the length of pipeline crossing the Northern High Plains Aquifer system, which includes the Ogallala formation.

ES.6.5 Other Alternatives Considered

ES.6.5.1 Route Variations

In addition to the route alternatives, the Department reviewed proposed variations—relatively short deviations—to the proposed route that avoid or minimize construction impacts to specific resources (cultural resource sites, wetlands, recreational lands, residences, etc.) or that minimize constructability issues (shallow bedrock, difficult waterbody crossings, steep terrain, etc.).

ES.6.5.2 Alternative Pipeline Design

In response to public comments, the Department considered two alternative pipeline designs: an aboveground pipeline and an alternative using smaller-diameter pipe. The Department determined that both alternative designs were not reasonable alternatives for the proposed Project; they were not considered further in the draft Supplemental EIS.

ES.7 NEXT STEPS

A Notice of Availability—indicating that the draft Supplemental EIS is available for public review—has been published in the Federal Register and distributed to participating federal and state agencies, elected officials, media organizations, Native American tribes, private landowners, and other interested parties. Printed copies have also been distributed to public libraries.

As part of the EIS process, members of the public, public agencies, and other interested parties are encouraged to submit comments, questions, and concerns about the project via e-mail to **keystonecomments@state.gov**, at http://www.keystonepipeline-xl.state.gov/, or by mail to:

U.S. Department of State
Attn: Genevieve Walker, NEPA Coordinator
2201 C Street NW
Room 2726
Washington, D.C. 20520

Where appropriate, the draft Supplemental EIS will be revised in response to public comments, and the revised document will be published as the Final Supplemental EIS. The Department's determination of whether the proposed Project is in the national interest would follow publication of the Final Supplemental EIS.

ES.8 DRAFT SUPPLEMENTAL EIS CONTENTS

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