**BEFORE THE PUBLIC UTILITIES COMMISSION**
**OF THE STATE OF SOUTH DAKOTA**

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| IN THE MATTER OF THE PETITION OF TRANSCANADA KEYSTONE PIPELINE, LP FOR ORDER ACCEPTING CERTIFICATION OF PERMIT ISSUED IN DOCKET HP09-001 TO CONSTRUCT THE KEYSTONE XL PIPELINE | **JOINT MOTION IN LIMINE TO EXCLUDE EVIDENCE PERTAINING TO KEYSTONE'S PROPOSED CHANGES TO FINDINGS OF FACT**<br><br>**HP14-001** |

COME NOW Yankton Sioux Tribe, Cheyenne River Sioux Tribe, Bold Nebraska, Rosebud Sioux Tribe, Indigenous Environmental Network, and Dakota Rural Action (collectively, "Movants"), by and through counsel, and hereby move the Public Utilities Commission ("Commission") for an order excluding all evidence offered by Keystone in support of its Tracking Table of Changes attached to its Petition as an appendix. In support of this motion, Movants state as follows:

## I. RELEVANT FACTS

On March 12, 2009, TransCanada Keystone Pipeline, LP ("Keystone") filed an application with the Commission in Docket HP09-001 requesting a permit for a project to construct a pipeline through South Dakota to transport tar sands. Pursuant to South Dakota law, Keystone was required to provide key information including a description of the nature and location and the purpose of the proposed pipeline to the Commission in its permit application in order for the Commission to make an informed, sound decision on the project. SDCL 49-41B-11. The Commission issued its *Amended Final Decision and Order* ("*Final Decision*") on June 29, 2010, based on the information provided by Keystone at that time. The *Final Decision* is attached hereto as **Exhibit A.** As a part of its *Final Decision*, the Commission issued a detailed list of its findings

of fact that led to the decision. *See* **Exhibit A**. Those findings of fact are the basis for the Commission's decision to issue that permit, therefore the permit issued in 2010 is inextricably tied to those findings of fact. Through the *Final Decision*, the Commission issued a permit authorizing construction of the project.

On September 15, 2014, after more than four years had passed since the issuance of the permit, Keystone filed its *Petition* with the Commission in Docket HP14-001 seeking to certify to the Commission that it continues to meet the conditions upon which the permit was granted pursuant to SDCL 49-41B-27. Keystone did not expressly request in the *Petition* that the Commission amend the findings of fact contained in the *Final Decision*. However, as an appendix to the *Petition*, Keystone submitted a "Tracking Table of Changes" that identifies thirty (30) findings of fact contained in the *Final Decision* and, for each finding, sets out a new, different, "update" finding. The "Tracking Table of Changes" is attached hereto as **Exhibit B.**

On May 26, 2015, the Yankton Sioux Tribe ("Yankton") and Indigenous Environmental Network ("IEN") filed a *Motion to Preclude Improper Relief or, in the Alternative, to Amend Findings of Fact*, seeking to preclude the amendment of the Findings of Fact contained in the *Final Decision*. During oral argument, Keystone indicated that it had no intention of seeking an amendment to the Findings of Fact. Staff for the Commission agreed with Yankton and IEN that amendment of the Findings was not available because the Commission does not have authority to amend its previous *Final Decision*. The Commission found that it has no legal authority to amend the *Final Decision*, but because it also found that Keystone does not seek to amend the Findings of Fact, the Commission denied the motion.

On April 2, 2015, Keystone submitted prefiled testimony for five witnesses which is attached hereto as **Exhibit C**. Each of these testimonies contains responses to questions that

explicitly ask about the Tracking Table of Changes and the respective witness' responsibility for portions of the Tracking Table of Changes. Moreover, four of the testimonies themselves directly and expressly address the "updated information" with respect to those Findings for which the witness was responsible. The fifth testimony, that of Heidi Tillquist, states that she was not directly responsible for portions of the Tracking Table of Changes but that she is familiar with certain changes. She further describes updates to Finding No. 50.

## II. ARGUMENT

The burden of proof in this case rests on Keystone to show that the proposed project continues to meet the conditions on which it was granted. SDCL 49-41B-27. The statutory certification process neither requires nor permits the consideration of updates, changes, amendments, additions, or other alterations to findings of fact contained in a permit. Based on its prefiled testimony, Keystone's case appears to consist of little more than evidence about such updates and the say-so of five witnesses that they have no knowledge that Keystone cannot meet the original conditions.

Specifically, the following responses contained in Keystone's prefiled testimony must be excluded as they are offered in support of the proposed changes to the Findings of Fact:

- David Diakow's responses to Question Nos. 4-10.
- Meera Kothari's responses to Question Nos. 4-12.
- Jon Schmidt's responses to Question Nos. 4-11.
- Corey Goulet's responses to Question Nos. 4-14.
- Heidi Tillquist's response to Question No. 4.

Keystone cannot substitute its evidence about its Tracking Table of Changes for evidence that the permit conditions are and can still be met, and the introduction of such evidence serves no

purpose other than to murky the water in this proceeding. Given the sizeable scope of this proceeding (compliance with all 50 permit conditions), the introduction of extraneous evidence during the limited time of the trial would serve to prejudice the other parties. Moreover, such evidence is not relevant to this proceeding. As the Commission has found and Keystone has acknowledged, the Commission has no legal authority to amend the Findings of Fact.

"Motions in limine are heard in advance of trial and seek a court order requiring the parties not to discuss or disclose certain facts that the court deems to be prejudicial." *Leon v. Anderson*, 692 N.W.2d 194, 197 (S.D. 2005). Furthermore, a motion in limine "can be an objection to the admissibility of evidence." *State v. Johnson*, 771 N.W.2d 360, 367 (S.D. 2009). The Supreme Court of South Dakota has long favored such motions. *Leon*, 692 N.W.2d at 197. Because the parties would be prejudiced if Keystone presents the evidence described above, because such evidence is not relevant to the proceeding, and in the interest of judicial economy, the Commission should grant this motion in limine.

## III. CONCLUSION

Movants request only that the Commission exclude Keystone's offered evidence, testimony, and exhibits used to support its Tracking Table of Changes, not that the Commission exclude evidence that allegedly supports Keystone's position regarding certification. This request is in line with the Commission's earlier findings that 1) Keystone does not seek changes to the Findings of Fact, and 2) the Commission lacks authority to amend the Findings of Fact. Because evidence to support the Tracking Table of Changes is not relevant to this proceeding and because the introduction of such evidence would be unduly prejudicial, Yankton requests that the Commission issue an order precluding Keystone from presenting any testimony, evidence, or exhibits to support the Tracking Table of Changes at the Evidentiary Hearing.

Dated this 10th day of July, 2015.

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# BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF SOUTH DAKOTA

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| **IN THE MATTER OF THE APPLICATION BY TRANSCANADA KEYSTONE PIPELINE, LP FOR A PERMIT UNDER THE SOUTH DAKOTA ENERGY CONVERSION AND TRANSMISSION FACILITIES ACT TO CONSTRUCT THE KEYSTONE XL PROJECT** | ) ) ) ) ) ) | **AMENDED FINAL DECISION AND ORDER; NOTICE OF ENTRY**<br><br>**HP09-001** |

## PROCEDURAL HISTORY

On March 12, 2009, TransCanada Keystone Pipeline, LP ("Applicant" or "Keystone") filed an application with the South Dakota Public Utilities Commission ("Commission") for a permit as required by SDCL Chapter 49-41B to construct the South Dakota portion of the Keystone XL Pipeline ("Project")[1]. The originally filed application described the Project as proposed to be an approximately 1,702 mile pipeline for transporting crude oil from Alberta, Canada, to the greater Houston area in Texas, with approximately 1,375 miles to be located in the United States and 313 miles located in South Dakota.

On April 6, 2009, the Commission issued its Notice of Application; Order for and Notice of Public Input Hearings; and Notice of Opportunity to Apply for Party Status. The notice provided that pursuant to SDCL 49-41 B-17 and ARSD 20:10:22:40, each municipality, county, and governmental agency in the area where the facility is proposed to be sited; any nonprofit organization, formed in whole or in part to promote conservation or natural beauty, to protect the environment, personal health or other biological values, to preserve historical sites, to promote consumer interests, to represent commercial and industrial groups, or to promote the orderly development of the area in which the facility is to be sited; or any interested person, may be granted party status in this proceeding by making written application to the Commission on or before May 11, 2009.

Pursuant to SDCL 49-41B-15 and 49-41B-16, and its Notice of Application; Order for and Notice of Public Hearings and Notice of Opportunity to Apply for Party Status, the Commission held public hearings on Keystone's application as follows: Monday, April 27, 2009, 12:00 noon CDT at Winner Community Playhouse, 7th and Leahy Boulevard, Winner, SD, at which 26 persons presented comments or questions; Monday, April 27, 2009, 7:00 p.m. MDT at Fine Arts School, 330 Scottie Avenue, Philip, SD, at which 17 persons presented comments or questions; and Tuesday, April 28, 2009, 6:00 p.m. MDT at Harding County Recreation Center, 204 Hodge Street, Buffalo, SD, at which 16 persons presented comments or questions. The purpose of the public input hearings was to hear public comment regarding Keystone's application. At the public input hearings, Keystone presented a brief description of the project, following which interested persons appeared and presented their views, comments and questions regarding the application.

On April 29, 2009, Mary Jasper (Jasper) filed an Application for Party Status. On May 4, 2009, Paul F. Seamans (Seamans) filed an Application for Party Status. On May 5, 2009, Darrell Iversen (D. Iversen) filed an Application for Party Status. On May 8, 2009, the City of Colome (Colome) and Glen Iversen (G. Iversen) filed Applications for Party Status. On May 11, 2009, Jacqueline Limpert (Limpert), John H. Harter (Harter), Zona Vig (Vig), Tripp County Water User District (TCWUD), Dakota Rural Action (DRA) and David Niemi (David Niemi) filed Applications for

[1]The Commission's Orders in the case and all other filings and documents in the record are available on the Commission's web page for Docket HP09-001 at: http://puc.sd.gov/dockets/hydrocarbonpipeline/2009/hp09-001.aspx

Party Status. On May 11, 2009, the Commission received a Motion for Extension of Time to File Application for Party Status from DRA requesting that the intervention deadline be extended to June 10, 2009. On May 12, 2009, Debra Niemi (Debra Niemi) and Lon Lyman (Lyman) filed Applications for Party Status. On May 15, 2009, the Commission received a Response to Motion to Extend Time from DRA and a Motion to Establish a Procedural Schedule from the Commission's Staff ("Staff").

At its regularly scheduled meeting of May 19, 2009, the Commission voted unanimously to grant party status to Jasper, Seamans, D. Iversen, Colome, G. Iversen, Limpert, Harter, Vig, TCWUD, DRA, David Niemi, Debra Niemi and Lyman. The Commission also voted to deny the Motion for Extension of Time to File Application for Party Status, and in the alternative, the Commission extended the intervention deadline to May 31, 2009. On May 29, 2009, Ruth M. Iversen (R. Iversen) and Martin R. Lueck (Lueck) filed Applications for Party Status. At its regularly scheduled meeting of June 9, 2009, the Commission voted unanimously to grant the Motion to Establish a Procedural Schedule and granted intervention to R. Iversen and Lueck.

On August 26, 2009, the Commission received a revised application from Keystone. On September 3, 2009, the Commission received a Motion for Extension of Time to Submit Testimony from DRA. At its regularly scheduled meeting of September 8, 2009, the Commission voted unanimously to grant the Motion for Extension of Time to Submit Testimony to extend DRA's time for filing and serving testimony until September 22, 2009.

On September 18, 2009, Keystone filed Applicant's Response to Dakota Rural Action's Request for Further Discovery. On September 21, 2009, DRA filed a Motion to Compel Responses and Production of Documents Addressed to TransCanada Keystone Pipeline, LP Propounded by Dakota Rural Action. At an ad hoc meeting on September 23, 2009, the Commission considered DRA's Motion to Compel and on October 2, 2009, issued its Order Granting in Part and Denying in Part Motion to Compel Discovery. By letter filed on September 29, 2009, Chairman Johnson requested reconsideration of the Commission's action with respect to DRA's Request 6 regarding Keystone documents pertaining to development of its Emergency Response Plan for the Project. At its regularly scheduled meeting on October 6, 2009, the Commission voted two to one, with Commissioner Hanson dissenting, to require Keystone to produce to DRA via email the References for the Preparation of Emergency Response Manuals before the close of business on October 6, 2009, that DRA communicate which documents on the list it wished Keystone to produce on or before the close of business on October 8, 2009, and that Keystone produce such documents to DRA on or before October 15, 2009.

On October 2, 2009, Staff filed a letter requesting the Commission to render a decision as to whether the hearing would proceed as scheduled commencing on November 2, 2009. Staff's letter stated that rescheduling the hearing would result in significant scheduling complications for Staff's expert witnesses whose scheduling and travel arrangements had been made months earlier based on the Commission's Order Setting Procedural Schedule issued on June 30, 2009. At its regular meeting on October 6, 2009, the Commission considered Staff's request. At the meeting, all parties agreed that the hearing could proceed on the scheduled dates. DRA requested that its date for submission of pre-filed testimony be extended from October 14, 2009, until October 22, if possible, or at least until October 20, 2009. After discussion, the parties agreed on an extension for DRA's pre-filed testimony until October 20, 2009, with Applicant's rebuttal to be filed by October 27, 2009. The Commission voted unanimously to approve such dates and issued its Order Setting Amended Procedural Schedule on October 8, 2009.

On October 15, 2009, the Commission issued its Order for and Notice of Hearing setting the matter for hearing on November 2-6, 2009, and its Order for and Notice of Public Hearing for an

additional informal public input hearing to be held in Pierre on November 3, 2009, commencing at 7:00 p.m. CST. On October 19, 2009, DRA requested that the time for commencement of the public hearing be changed from 7:00 p.m. CST to 6:00 p.m. CST to better accommodate the schedules of interested persons. On October 21, 2009, the Commission issued an Amended Order for and Notice of Public Hearing amending the start time for the public hearing to 6:00 p.m. CST.

On October 19, 2009, Keystone filed a second revised application ("Application") containing minor additions and amendments reflecting refinements to the route and facility locations and the most recent environmental and other planning evaluations.

In accordance with the scheduling and procedural orders in this case, Applicant, Staff and Intervenors David and Debra Niemi filed pre-filed testimony. The hearing was held as scheduled on November 2-4, 2009, at which Applicant, DRA and Staff appeared and participated. The informal hearing was held as scheduled on the evening of November 3, 2009, at which 23 persons presented comments and/or questions. A combined total of 326 persons attended the public input hearings in Winner, Phillip, Buffalo and Pierre. As of February 26, 2009, the Commission had received 252 written comments regarding this matter from the public.

On December 31, 2009, the Commission issued its Amended Order Establishing Briefing Schedule setting the following briefing schedule: (i) initial briefs and proposed findings of fact and conclusions of law from all parties wishing to submit them due by January 20, 2010; and (ii) reply briefs and objections and revisions to proposed findings of fact and conclusions of law due from all parties wishing to submit them on or before February 2, 2010.

On January 13, 2009, Intervenor David Niemi filed a letter with the Commission requesting and recommending a series of conditions to be included in the order approving the permit, if granted. On January 20, 2010, initial briefs were filed by the Applicant and Staff. On January 20, 2010, Applicant also filed and served proposed findings of fact and conclusions of law. On January 21, 2010, DRA filed an initial brief and Motion to Accept Late-Filed Brief. On January 21 and 26, 2010, respectively, Keystone and Staff filed letters of no objection to acceptance of DRA's late-filed initial brief. On February 2, 2010, reply briefs were filed and served by Applicant, DRA and Staff, and Keystone filed Applicant's Response to David Niemi's Letter filed on January 13, 2010.

At an ad hoc meeting on February, 18, 2010, after separately considering each of a set of draft conditions prepared by Commission Counsel from inputs from the individual Commissioners and a number of Commissioner motions to amend the draft conditions, the Commission voted unanimously to approve conditions to which a permit to construct the Project would be subject, if granted, and to grant a permit to Keystone to construct the Project, subject to the approved conditions.

On April 14, 2010, Keystone filed Applicant's Motion for Limited Reconsideration of Certain Permit Conditions ("Motion"). On April 19, 2010, intervenors David Niemi and Seamans filed responses to the Motion. On April 19, 2010, Peter Larson ("Larson") filed two comments responsive to the Motion. On April 27, 2010, Keystone filed Applicant's Reply Brief In Support of Motion for Limited Reconsideration responding to the responses and comments filed by Niemi, Seamans and Larson. On April 28, 2010, Staff filed a response to the Motion. On April 29, 2010, DRA filed the Answer of Dakota Rural Action in Opposition to Applicant's Motion for Limited Reconsideration of Certain Permit Conditions.

At its regularly scheduled meeting on May 4, 2010, the Commission considered the Motion and the responses and comments filed by the parties and Larson. Applicant, Staff, intervenor John

H. Harter, DRA and Larson appeared and participated in the hearing on the Motion. After an extensive discussion among the Commission and participants, the Commission made rulings on the specific requests in the Motion and voted to grant the Motion in part and deny in part and amend certain of the Conditions as set forth in the Commission's Order Granting in Part Motion to Reconsider and Amending Certain Conditions In Final Decision And Order, which was issued by the Commission on June 29, 2010.

Having considered the evidence of record, applicable law and the arguments of the parties, the Commission makes the following Findings of Fact, Conclusions of Law and Decision:

## FINDINGS OF FACT

### Parties

1. The permit applicant is TransCanada Keystone Pipeline, LP, a limited partnership, organized under the laws of the State of Delaware, and owned by affiliates of TransCanada Corporation ("TransCanada"), a Canadian public company organized under the laws of Canada. Ex TC-1, 1.5, p. 4.

2. On May 19, 2009, the Commission unanimously voted to grant party status to all persons that had requested party status prior to the commencement of the meeting. On June 9, 2009, the Commission unanimously voted to grant party status to all persons that had requested party status after the commencement of the meeting on May 19, 2009, through the intervention deadline of May 31, 2009. Fifteen persons intervened, including: Mary Jasper, Paul F. Seamans, Darrell Iversen, the City of Colome, Glen Iversen, Jacqueline Limpert, John H. Harter, Zona Vig, Tripp County Water User District ("TCWUD"), Dakota Rural Action, David Niemi, Debra Niemi, Ruth M. Iversen, Martin R. Lueck, and Lon Lyman. Minutes of May 19, 2009, and June 9, 2009, Commission Meetings; Applications for Party Status.

3. The Staff also participated in the case as a full party.

### Procedural Findings

4. The application was signed on behalf of the Applicant on February 26, 2009, in Calgary, Alberta, Canada, and was filed with the Commission on March 12, 2009. Ex TC -1, 9.0, p. 116.

5. The Commission issued the following notices and orders in the case as described in greater detail in the Procedural History above, which is hereby incorporated by reference in these Findings of Fact and Conclusions of Law:

- Order of Assessment of Filing Fee
- Notice of Application; Order for and Notice of Public Input Hearings; and Notice of Opportunity to Apply for Party Status
- Order Granting Party Status; Order Denying Motion for Extension of Time to File Application for Party Status; Order Extending Intervention Deadline
- Order Granting Motion to Establish Procedural Schedule and Order Granting Party Status
- Order Setting Procedural Schedule
- Order Granting Motion for Extension of Time to Submit Testimony

- Order Granting in Part and Denying in Part Motion to Compel Discovery
- Order Amending Order Granting in Part and Denying in Part Motion to Compel Discovery
- Order Setting Amended Procedural Schedule
- Order for and Notice of Hearing
- Order for and Notice of Public Hearing
- Amended Order for and Notice of Public Hearing
- Order Establishing Briefing Schedule
- Amended Order Establishing Briefing Schedule
- Order Granting in Part Motion to Reconsider and Amending Certain Conditions In Final Decision And Order

6. Pursuant to SDCL 49-41B-15 and 49-41B-16 and its Notice of Application; Order for and Notice of Public Hearings; and Notice of Opportunity to Apply for Party Status, the Commission held public hearings on Keystone's application at the following times and places (see Public Hearing Transcripts):

- Monday, April 27, 2009, 12:00 noon CDT at Winner Community Playhouse, 7th and Leahy Boulevard, Winner, SD
- Monday, April 27, 2009, 7:00 p.m. MDT at Fine Arts School, 330 Scottie Avenue, Philip, SD
- Tuesday, April 28, 2009, 6:00 p.m. MDT at Harding County Recreation Center, 204 Hodge Street, Buffalo, SD.

7. The purpose of the public hearings was to afford an opportunity for interested persons to present their views and comments to the Commission concerning the Application. At the hearings, Keystone presented a brief description of the project after which interested persons presented their views, comments and questions regarding the application. Public Hearing Transcripts.

8. The following testimony was prefiled in advance of the formal evidentiary hearing held November 2, 3 and 4, 2009, in Room 414, State Capitol, Pierre, South Dakota:

A. Applicant's March 12, 2009, Direct Testimony.
- Robert Jones
- John Phillips
- Richard Gale
- Jon Schmidt
- Meera Kothari
- John Hayes
- Donald Scott
- Heidi Tillquist
- Tom Oster

B. Supplemental Direct Testimony of August 31, 2009.
- John Phillips

C. Intervenors' Direct Testimony of September 11, 2009.
- David Niemi
- Debra Niemi

D. Staff's September 25, 2009, Direct Testimony.

- Kim McIntosh
- Brian Walsh
- Derric Iles
- Tom Kirschenmann
- Paige Hoskinson Olson
- Michael Kenyon
- Ross Hargove
- Patrick Robblee
- James Arndt
- William Walsh
- Jenny Hudson
- David Schramm
- William Mampre
- Michael K. Madden
- Tim Binder

E. Applicant's Updated Direct and Rebuttal Testimony.

- Robert Jones Updated Direct (10/23/09)
- Jon Schmidt Updated Direct and Rebuttal (10/19/09)
- Meera Kothari Updated Direct and Rebuttal (10/19/09)
- Donald M. Scott Updated Direct (10/19/09)
- John W. Hayes Updated Direct (10/19/09)
- Heidi Tillquist Updated Direct (10/20/09)
- Steve Hicks Direct and Rebuttal (10/19/09)

F. Staff's Supplemental Testimony of October 29, 2009.

- William Walsh
- William Mampre
- Ross Hargrove

9. As provided for in the Commission's October 21, 2009, Amended Order for and Notice of Public Hearing, the Commission held a public input hearing in Room 414 of the State Capitol beginning at 6:00 p.m. on November 3, 2009, at which 23 members of the public presented comments and/or questions. Transcript of November 3, 2009 Public Input Hearing.

**Applicable Statutes and Regulations**

10. The following South Dakota statutes are applicable: SDCL 49-41B-1 through 49-41B-2.1, 49-41B-4, 49-41B-11 through 49-41B-19, 49-41B-21, 49-41B-22, 49-41B-24, 49-41B-26 through 49-41B-38 and applicable provisions of SDCL Chs. 1-26 and 15-6.

11. The following South Dakota administrative rules are applicable: ARSD Chapter 20:10:01, ARSD 20:10:22:01 through ARSD 20:10:22:25 and ARSD 20:10:22:36 through ARSD 20:10:22:40.

12. Pursuant to SDCL 49-41B-22, the Applicant for a facility construction permit has the burden of proof to establish that:

(1) The proposed facility will comply with all applicable laws and rules;

(2) The facility will not pose a threat of serious injury to the environment nor to the social and economic condition of inhabitants or expected inhabitants in the siting area;
(3) The facility will not substantially impair the health, safety or welfare of the inhabitants; and
(4) The facility will not unduly interfere with the orderly development of the region with due consideration having been given the views of governing bodies of affected local units of government.

**The Project**

13. The Project will be owned, managed and operated by the Applicant, TransCanada Keystone Pipeline, LP. Ex TC-1, 1.5 and 1.7, p. 4.

14. The purpose of the Project is to transport incremental crude oil production from the Western Canadian Sedimentary Basin ("WCSB") to meet growing demand by refineries and markets in the United States ("U.S."). This supply will serve to replace U.S. reliance on less stable and less reliable sources of offshore crude oil. Ex TC-1, 1.1, p. 1; Ex TC-1, 3.0 p. 23; Ex TC-1, 3.4 p. 24.

15. The Project will consist of three segments: the Steele City Segment, the Gulf Coast Segment, and the Houston Lateral. From north to south, the Steele City Segment extends from Hardisty, Alberta, Canada, southeast to Steele City, Nebraska. The Gulf Coast Segment extends from Cushing, Oklahoma south to Nederland, in Jefferson County, Texas. The Houston Lateral extends from the Gulf Coast Segment in Liberty County, Texas southwest to Moore Junction, Harris County, Texas. It will interconnect with the northern and southern termini of the previously approved 298-mile-long, 36-inch-diameter Keystone Cushing Extension segment of the Keystone Pipeline Project. Ex TC-1, 1.2, p. 1. Initially, the pipeline would have a nominal capacity to transport 700,000 barrels per day ("bpd"). Keystone could add additional pumping capacity to expand the nominal capacity to 900,000 bpd. Ex TC-1, 2.1.2, p. 8.

16. The Project is an approximately 1,707 mile pipeline with about 1,380, miles in the United States. The South Dakota portion of the pipeline will be approximately 314 miles in length and will extend from the Montana border in Harding County to the Nebraska border in Tripp County. The Project is proposed to cross the South Dakota counties of Harding, Butte, Perkins, Meade, Pennington, Haakon, Jones, Lyman and Tripp. Ex TC-1, 1.2 and 2.1.1, pp. 1 and 8. Detailed route maps are presented in Ex TC-1, Exhibits A and C, as updated in Ex TC-14.

17. Construction of the Project is proposed to commence in May of 2011 and be completed in 2012. Construction in South Dakota will be conducted in five spreads, generally proceeding in a north to south direction. The Applicant expects to place the Project in service in 2012. This in-service date is consistent with the requirements of the Applicant's shippers who have made the contractual commitments that underpin the viability and need for the project. Ex TC-1, 1.4, pp. 1 and 4; TR 26.

18. The pipeline in South Dakota will extend from milepost 282.5 to milepost 597, approximately 314 miles. The pipeline will have a 36-inch nominal diameter and be constructed using API 5L X70 or X80 high-strength steel. An external fusion bonded epoxy ("FBE") coating will be applied to the pipeline and all buried facilities to protect against corrosion. Cathodic protection will be provided by impressed current. The pipeline will have batching capabilities and will be able to transport products ranging from light crude oil to heavy crude oil. Ex TC-1, 2.2, 2.2.1, 6.5.2, pp. 8-9, 97-98; Ex TC-8, ¶ 26.

19. The pipeline will operate at a maximum operating pressure of 1,440 psig. For location specific low elevation segments close to the discharge of pump stations, the maximum operating pressure will be 1,600 psig. Pipe associated with these segments of 1,600 psig MOP are excluded from the Special Permit application and will have a design factor of 0.72 and pipe wall thickness of 0.572 inch (X-70) or 0.500 inch (X-80). All other segments in South Dakota will have a MOP of 1,440 psig. Ex TC-1, 2.2.1, p. 9.

20. The Project will have seven pump stations in South Dakota, located in Harding (2), Meade, Haakon, Jones and Tripp (2) Counties. TC-1, 2.2.2, p. 10. The pump stations will be electrically driven. Power lines required for providing power to pump stations will be permitted and constructed by local power providers, not by Keystone. Initially, three pumps will be installed at each station to meet the nominal design flow rate of 700,000 bpd. If future demand warrants, pumps may be added to the proposed pump stations for a total of up to five pumps per station, increasing nominal throughput to 900,000 bpd. No additional pump stations will be required to be constructed for this additional throughput. No tank facilities will be constructed in South Dakota. Ex TC-1, 2.1.2, p.8. Sixteen mainline valves will be located in South Dakota. Seven of these valves will be remotely controlled, in order to have the capability to isolate sections of line rapidly in the event of an emergency to minimize impacts or for operational or maintenance reasons. Ex TC-1, 2.2.3, pp. 10-11.

21. The pipeline will be constructed within a 110-foot wide corridor, consisting of a temporary 60-foot wide construction right-of-way and a 50-foot permanent right-of-way. Additional workspace will be required for stream, road, and railroad crossings, as well as hilly terrain and other features. The Applicant committed to reducing the construction right-of-way to 85 feet in certain wetlands to minimize impacts. Ex TC-1, 2.2.4, pp. 11-12; Ex TC-7, ¶ 20. FERC guidelines provide that the wetland construction right-of-way should be limited to 75 feet except where conditions do not permit, and Staff witness Hargrove's Construction, Mitigation and Reclamation Plan Review states that industry practice is to reduce the typical construction right-of-way width to 75 feet in non-cultivated wetlands, although exceptions are sometimes made for larger-diameter pipelines or where warranted due to site-specific conditions. Ex S-5, p. 2 and Attachment 2, 6.2; TR 335, 353. The Commission finds that the construction right-of-way should be limited to 75 feet, except where site-specific conditions require use of Keystone's proposed 85-foot right-of-way or where special circumstances are present, and the Commission accordingly adopts Condition 22(a), subject to the special circumstance provisions of Condition 30.

22. The Project will be designed, constructed, tested, and operated in accordance with all applicable requirements, including the U.S. Department of Transportation, Pipeline Hazardous Materials and Safety Administration (PHMSA) regulations set forth at 49 CFR Part 195, as modified by the Special Permit requested for the Project from PHMSA (see Finding 71). These federal regulations are intended to ensure adequate protection for the public and the environment and to prevent crude oil pipeline accidents and failures. Ex TC-1, 2.2, p. 8.

23. The current estimated cost of the Keystone Project in South Dakota is $921.4 million. Ex TC-1, 1.3, p. 1.

**Demand for the Facility**

24. The transport of additional crude oil production from the WCSB is necessary to meet growing demand by refineries and markets in the U.S. The need for the project is dictated by a number of factors, including increasing WCSB crude oil supply combined with insufficient export pipeline capacity; increasing crude oil demand in the U.S. and decreasing domestic crude supply;

the opportunity to reduce U.S. dependence on foreign off-shore oil through increased access to stable, secure Canadian crude oil supplies; and binding shipper commitments to utilize the Keystone Pipeline Project. Ex TC-1, 3.0, p. 23.

25. According to the U.S. Energy Information Administration ("EIA"), U.S. demand for petroleum products has increased by over 11 percent or 2,000,000 bpd over the past 10 years and is expected to increase further. The EIA estimates that total U.S. petroleum consumption will increase by approximately 10 million bpd over the next 10 years, representing average demand growth of about 100,000 bpd per year (EIA Annual Energy Outlook 2008). Ex TC-1, 3.2, pp. 23-24.

26. At the same time, domestic U.S. crude oil supplies continue to decline. For example, over the past 10 years, domestic crude production in the United States has declined at an average rate of about 135,000 bpd per year, or 2% per year. Ex TC-1, 3.3, p. 24. Crude and refined petroleum product imports into the U.S. have increased by over 3.3 million bpd over the past 10 years. In 2007, the U.S. imported over 13.4 million bpd of crude oil and petroleum products or over 60 percent of total U.S. petroleum product consumption. Canada is currently the largest supplier of imported crude oil and refined products to the U.S., supplying over 2.4 million bpd in 2007, representing over 11 percent of total U.S. petroleum product consumption (EIA 2007). Ex TC-1, 3.4, p. 24.

27. The Project will provide an opportunity for U.S. refiners in Petroleum Administration for Defense District III, the Gulf Coast region, to further diversify supply away from traditional offshore foreign crude supply and to obtain direct access to secure and growing Canadian crude supplies. Access to additional Canadian crude supply will also provide an opportunity for the U.S. to offset annual declines in domestic crude production and, specifically, to decrease its dependence on other foreign crude oil suppliers, such as Mexico and Venezuela, the top two heavy crude oil exporters into the U.S. Gulf Coast. Ex TC-1, 3.4, p. 24.

28. Reliable and safe transportation of crude oil will help ensure that U.S. energy needs are not subject to unstable political events. Established crude oil reserves in the WCSB are estimated at 179 billion barrels (CAPP 2008). Over 97 percent of WCSB crude oil supply is sourced from Canada's vast oil sands reserves located in northern Alberta. The Alberta Energy and Utilities Board estimates there are 175 billion barrels of established reserves recoverable from Canada's oil sands. Alberta has the second largest crude oil reserves in the world, second only to Saudi Arabia. Ex TC-1, 3.1, p. 23.

29. Shippers have already committed to long-term binding contracts, enabling Keystone to proceed with regulatory applications and construction of the pipeline once all regulatory, environmental, and other approvals are received. These long-term binding shipper commitments demonstrate a material endorsement of support for the Project, its economics, proposed route, and target market, as well as the need for additional pipeline capacity and access to Canadian crude supplies. Ex TC-1, 3.5, p. 24.

**Environmental**

30. In order to construct the Project, Keystone is required to obtain a Presidential Permit from the U.S. Department of State ("DOS") authorizing the construction of facilities across the international border. Ex TC-1, 1.8, pp. 4-5; 5.1, p. 30.

31. Because Keystone is required to obtain a Presidential Permit from the DOS, the National Environmental Policy Act requires the DOS to prepare an Environmental Impact Statement

("EIS"). Ex TC-1, 1.8, pp. 4-5; Ex TC-4; Ex S-3. In support of its Presidential Permit application, Keystone has submitted studies and other environmental information to the DOS. Ex TC-1, 1.8, pp. 4-5; 5.1, p. 30.

32. Table 6 to the Application summarizes the environmental impacts that Keystone's analysis indicates could be expected to remain after its Construction Mitigation and Reclamation Plan is implemented. Ex TC-1, pp. 31-37.

33. The pipeline will cross the Unglaciated Missouri Plateau. This physiographic province is characterized by a dissected plateau where river channels have incised into the landscape. Elevations range from just over 3,000 feet above mean sea level in the northwestern part of the state to around 1,800 feet above mean sea level in the White River valley. The major river valleys traversed include the Little Missouri River, Cheyenne River, and White River. Ex TC-1, 5.3.1, p. 30; Ex TC-4, ¶15. Exhibit A to the Application includes soil type maps and aerial photograph maps of the Keystone pipeline route in South Dakota that indicate topography, land uses, project mileposts and Section, Township, Range location descriptors. Ex TC-1, Exhibit A. Updated versions of these maps were received in evidence as Exhibit TC-14.

34. The surficial geologic deposits along the proposed route are primarily composed of Quaternary alluvium, colluvium, alluvial terraces, and eolian deposits (sand dunes). The alluvium primarily occurs in modern stream channels and floodplains, but also is present in older river terraces. The bedrock geology consists of Upper Cretaceous and Tertiary rocks. The Upper Cretaceous units include the Pierre Shale, Fox Hills Formation, and the Hell Creek Formation. The Ogallala Group, present in the far southern portion of the Project in South Dakota, was deposited as a result of uplift and erosion of the Rocky Mountains. Material that was eroded from the mountains was transported to the east by streams and wind. Ex TC-1, 5.3.2, p. 37.

35. Sand, gravel, crushed stone, oil, natural gas, coal and metallic ore resources are mineral resources existing along the proposed route. The route passes through the Buffalo Field in Harding County. Construction will have very minor and short-term impact on current mineral extraction activities due to the temporary and localized nature of pipeline construction activities. Several oil and gas wells were identified within or close to the Project construction ROW. Prior to construction, Keystone will identify the exact locations of active, shut-in, and abandoned wells and any associated underground pipelines in the construction ROW and take appropriate precautions to protect the integrity of such facilities. Ex TC-1, 5.3.3, pp. 38-39.

36. Soil maps for the route are provided in Exhibit A to Ex TC-1. In the northwestern portions of South Dakota, the soils are shallow to very deep, generally well drained, and loamy or clayey. Soils such as the Assiniboine series formed in fluvial deposits that occur on fans, terraces, and till plains. Soils such as the Cabbart, Delridge, and Blackhall series formed in residuum on hills and plains. Fertile soils and smooth topography dominate Meade County. The soils generally are shallow to very deep, somewhat excessively drained to moderately well drained, and loamy or clayey. Cretaceous Pierre Shale underlies almost all of Haakon, Jones, and portions of Tripp counties. This shale weathers to smectitic clays. These clays shrink as they dry and swell as they get wet, causing significant problems for road and structural foundations. From central Tripp County to the Nebraska state line, soils typically are derived from shale and clays on the flatter to moderately sloping, eroded tablelands. In southern Tripp County, the route also crosses deep, sandy deposits on which the Doger, Dunday, and Valentine soils formed. These are dry, rapidly permeable soils. Topsoil layers are thin and droughty, and wind erosion and blowouts are a common hazard. Ex TC-1, 5.3.4, p. 40.

37. Grading and excavating for the proposed pipeline and ancillary facilities will disturb a variety of agricultural, rangeland, wetland and forestland soils. Prime farmland soils may be altered temporarily following construction due to short-term impact such as soil compaction from equipment traffic, excavation and handling. However, potential impacts to soils will be minimized or mitigated by the soil protection measures identified in the Construction Mitigation and Reclamation Plan (CMR Plan) to the extent such measures are fully implemented. The measures include procedures for segregating and replacing top soil, trench backfilling, relieving areas compacted by heavy equipment, removing surface rock fragments and implementing water and wind erosion control practices. Ex TC-1, 5.3.4, p. 41; TC-1 Ex. B.

38. To accommodate potential discoveries of contaminated soils, Keystone made a commitment in the Application to develop, in consultation with relevant agencies, procedures for the handling and disposal of unanticipated contaminated soil discovered during construction. These procedures will be added to the CMR Plan. If hydrocarbon contaminated soils are encountered during trench excavation, the appropriate federal and state agencies will be contacted immediately. A remediation plan of action will be developed in consultation with that agency. Depending on the level of contamination found, affected soil may be replaced in the trench or removed to an approved landfill for disposal. Ex TC-1, 5.3.4, p. 42.

39. The USGS ground motion hazard mapping indicates that potential ground motion hazard in the Project area is low. South Dakota historically has had little earthquake activity. No ground subsidence or karst hazards are present in the vicinity of the route. Ex TC-1, 5.3.6, p. 43.

40. Cretaceous and Tertiary rocks in the Missouri River Plateau have high clay content and upon weathering can be susceptible to instability in the form of slumps and earth flows. Landslide potential is enhanced on steeper slopes. Formations that are especially susceptible are the Cretaceous Hell Creek and Pierre Shale as well as shales in the Tertiary Fort Union Formation mainly on river banks and steep slopes. These units can contain appreciable amounts of bentonite, a rock made up of montmorillonite clay that has deleterious properties when exposed to moisture. The bentonite layers in the Pierre Shale may present hazards associated with swelling clays. These formations are considered to have "high swelling potential." Bentonite has the property whereby when wet, it expands significantly in volume. When bentonite layers are exposed to successive cycles of wetting and drying, they swell and shrink, and the soil fluctuates in volume and strength. Ex TC-1, 5.3.4, pp. 43.

41. Fifteen perennial streams and rivers, 129 intermittent streams, 206 ephemeral streams and seven man-made ponds will be crossed during construction of the Project in South Dakota. Keystone will utilize horizontal directional drilling ("HDD") to cross the Little Missouri, Cheyenne and White River crossings. Keystone intends to use open-cut trenching at the other perennial streams and intermittent water bodies. The open cut wet method can cause the following impacts: loss of in-stream habitat through direct disturbance, loss of bank cover, disruption of fish movement, direct disturbance to spawning, water quality effects and sedimentation effects. Alternative techniques include open cut dry flume, open cut dam-and-pump and horizontal directional drilling. Exhibit C to the Application contains a listing of all water body crossings and preliminary site-specific crossing plans for the HDD sites. Ex TC-14. Permitting of water body crossings, which is currently underway, will ultimately determine the construction method to be utilized. Keystone committed to mitigate water crossing impacts through implementation of procedures outlined in the CMR Plan. Ex TC-1, 5.4.1, pp. 45-46.

42. The pipeline will be buried at an adequate depth under channels, adjacent flood plains and flood protection levees to avoid pipe exposure caused by channel degradation and lateral scour. Determination of the pipeline burial depth will be based on site-specific channel and hydrologic investigations where deemed necessary. Ex TC-1, 5.4.1, p. 46.

43. Although improvements in pipeline safety have been made, the risk of a leak cannot be eliminated. Keystone's environmental consulting firm for the Project, AECOM, estimated the chances of and the environmental consequences of a leak or spill through a risk assessment. Ex TC-1, 6.5.2, pp. 96-102; Table 6; TC-12, 10, 24.

44. Keystone's expert estimated the chance of a leak from the Project to be not more than one spill in 7,400 years for any given mile of pipe. TR 128-132, 136-137; Ex TC-12, ¶10; TC-1, 5.5.1, p. 54; 6.1.2.1, p. 87. The frequency calculation found the chance to be no more than one release in 24 years in South Dakota. TR 137.

45. Keystone's spill frequency and volume estimates are conservative by design, overestimating the risk since the intent is to use the assessment for planning purposes. The risk assessment overestimates the probable size of a spill to ensure conservatism in emergency response and other planning objectives. If a spill were to occur on the Keystone pipeline, PHMSA data indicate that the spill is likely to be three barrels or less. Ex TC-12, ¶10; TR 128-132, 137; TC-1, 6.1.2.1, p. 87.

46. Except for a few miles in the far southern reach of the Project in southern Tripp County which will be located over the permeable Sand Hills and shallow High Plains Aquifer, the Project route in South Dakota does not cross geologic units that are traditionally considered as aquifers. TR 440. Where aquifers are present, at most locations they are more than 50 feet deep, which significantly reduces the chance of contamination reaching the aquifer. Additionally, the majority of the pipeline is underlain by low permeability confining materials (e.g., clays, shales) that inhibit the infiltration of released crude oil into aquifers. TR 158; Ex TC-12, ¶13, EX TC-1, 5.4.2, pp. 47-48. Keystone consulted with the DENR during the routing process to identify and subsequently avoid sensitive aquifers and recharge areas, e.g., Source Water Protection Areas (SWPAs) in order to minimize risk to important public groundwater resources, and no groundwater SWPAs are crossed by the Project in South Dakota. EX TC-1, 5.4.2, pp. 47-48. Except for the Sand Hills area, no evidence was offered of the existence of a shallow aquifer (i.e. less than 50 feet in depth) crossed by the Project.

47. Because of their high solubility and their very low Maximum Contaminant Levels ("MCLs"), the constituents of primary concern in petroleum, including crude oil, are benzene, toluene, ethyl benzene and xylene. These constituents are commonly referred to as BTEX. TR 142, 146. The crude oil to be shipped through the Project will be similar in composition to other crude oils produced throughout the world and currently shipped in the United States. TR 155-56. The BTEX concentration in the crude oil to be shipped through the Project is close to 1 % to 1.5%. TR 151.

48. The Project will pass through areas in Tripp County where shallow and surficial aquifers exist. Since the pipeline will be buried at a shallow depth, it is unlikely that the construction or operation of the pipeline will alter the yield from any aquifers that are used for drinking water purposes. Keystone will investigate shallow groundwater when it is encountered during construction to determine if there are any nearby livestock or domestic wells that might be affected by construction activities. Appropriate measures will be implemented to prevent groundwater contamination and steps will be taken to manage the flow of any ground water encountered. Ex TC-

1, 5.4.2, pp. 47-48. The Tripp County Water User District is up-gradient of the pipeline and therefore would not be affected by a spill. TR 441, 449-50.

49. The risk of a spill affecting public or private water wells is low because the components of crude oil are unlikely to travel more than 300 feet from the spill site. TR 142-43. There are no private or public wells within 200 or 400 feet, respectively, of the right of way. TC-16, Data Response 3-46.

50. The total length of Project pipe with the potential to affect a High Consequence Area ("HCA") is 34.3 miles. A spill that could affect an HCA would occur no more than once in 250 years. TC-12, ¶ 24.

51. In the event that soils and groundwater are contaminated by a petroleum release, Keystone will work with state agency personnel to determine what type of remediation process would be appropriate. TR 148. Effective emergency response can reduce the likelihood and severity of contamination. TC-12, ¶ 10, 14, 24. Soils and groundwater contaminated by a petroleum release can be remediated. TR 499-500. The experience of DENR is that pipeline facilities have responded immediately to the incident in every case. TR 502.

52. The Commission finds that the risk of a significant release occurring is low and finds that the risk that a release would irremediably impair a water supply is very low and that it is probable that Keystone, in conjunction with state and federal response agencies, will be able to and will be required to mitigate and successfully remediate the effects of a release.

53. The Commission nevertheless finds that the Sand Hills area and High Plains Aquifer in southeastern Tripp County is an area of vulnerability that warrants additional vigilance and attention in Keystone's integrity management and emergency response planning and implementation process. The evidence demonstrates that the shallow Sand Hills groundwater or High Plains Aquifer is used by landowners in the Project area, that many wells are developed into the aquifer, including TCWUD 's, that the very high permeability of both the sandy surficial soils and deeper soils render the formation particularly vulnerable to contamination and that rapid discovery and response can significantly lessen the impact of a release on this vulnerable groundwater resource. The Commission further finds that if additional surficial aquifers are discovered in the course of pipeline construction, such aquifers should have similar treatment. The Commission accordingly finds that Condition 35 shall be adopted.

54. Of the approximately 314-mile route in South Dakota, all but 21.5 miles is privately owned. 21.5 miles is state-owned and managed. The list is found in Table 14. No tribal or federal lands are crossed by the proposed route. Ex TC-1, 5.7.1, p. 75.

55. Table 15 of the Application identifies the land uses affected by the pipeline corridor. Among other things, it shows that the project will not cross or be co-located with any major industrial sites, the pipeline will not cross active farmsteads, but may cross near them and the pipeline will not cross suburban and urban residential areas. The project will not cross municipal water supplies or water sources for organized rural water districts. Ex TC-1, 5.7.1, pp. 76-78.

56. The pipeline will be compatible with the predominant land use, which is rural agriculture, because the pipeline will be buried to a depth of four feet in fields and will interfere only minimally with normal agricultural operations. In most locations, the pipeline will be placed below agricultural drain tiles, and drain tiles that are damaged will be repaired. The only above-ground

facilities will be pump stations and block valves located at intervals along the pipeline. Ex TC-1, 5.7.3, pp.78-79.

57. The Project's high strength X70 steel will have a puncture resistance of 51 tons of digging force. Ex TC-8, ¶ 28. Keystone will have a public awareness program in place and an informational number to call where landowners and others can obtain information concerning activities of concern. TC-1, 6.3.4, pp. 93-94. The Commission finds that the risk of damage by ordinary farming operations is very low and that problems can be avoided through exercise of ordinary common sense.

58. If previously undocumented sites are discovered within the construction corridor during construction activities, all work that might adversely affect the discovery will cease until Keystone, in consultation with the appropriate agencies such as the SHPO, can evaluate the site's eligibility and the probable effects. If a previously unidentified site is recommended as eligible to the National Registry of Historic Places, impacts will be mitigated pursuant to the Unanticipated Discovery Plan submitted to the SHPO. Treatment of any discovered human remains, funerary objects, or items of cultural patrimony found on federal land will be handled in accordance with the Native American Grave Protection and Repatriation Act. Construction will not resume in the area of the discovery until the authorized agency has issued a notice to proceed. If human remains and associated funerary objects are discovered on state or private land during construction activities, construction will cease within the vicinity of the discovery and the county coroner or sheriff will be notified of the find. Treatment of any discovered human remains and associated funerary objects found on state or private land will be handled in accordance with the provisions of applicable state laws. TR 40; Ex TC-1, 6.4, pp. 96; Ex TC-16, 3-54. In accordance with these commitments, the Commission finds that Condition 43 should be adopted.

59. Certain formations to be crossed by the Project, such as the Fox Hills, Ludlow and particularly the Hell Creek Formation are known to contain paleontological resources of high scientific and monetary value. TR 438-439, 442-444. In northwest South Dakota, the Hell Creek Formation has yielded valuable dinosaur bones including from a triceratops, the South Dakota State fossil. Ex TC-1, 5.3.2, p. 38. Protection of paleontological resources was among the most frequently expressed concerns at the public input hearings held by the Commission. There is no way for anyone to know with any degree of certainty whether fossils of significance will be encountered during construction activities. TR 439. Because of the potential significance to landowners of the encounter by construction activities with paleontological resources and the inability to thoroughly lessen the probability of such encounter through pre-construction survey and avoidance, the Commission adopts Condition 44 to require certain special procedures in high probability areas, including the Hell Creek formation, such as the presence of a monitor with training in identification of a paleontological strike of significance.

**Design and Construction**

60. Keystone has applied for a special permit ("Special Permit") from PHMSA authorizing Keystone to design, construct, and operate the Project at up to 80% of the steel pipe specified minimum yield strength at most locations. TC-1, 2.2, p. 8; TR 62. In Condition 2, the Commission requires Keystone to comply with all of the conditions of the Special Permit, if issued.

61. TransCanada operates approximately 11,000 miles of pipelines in Canada with a 0.8 design factor and requested the Special Permit to ensure consistency across its system and to reduce costs. PHMSA has previously granted similar waivers adopting this modified design factor for natural gas pipelines and for the Keystone Pipeline. Ex TC-8, ¶¶ 13, 17.

62. The Special Permit is expected to exclude pipeline segments operating in (i) PHMSA-defined HCAs described as high population areas and commercially navigable waterways in 49 CFR Section 195.450; (ii) pipeline segments operating at highway, railroad, and road crossings; (iii) piping located within pump stations, mainline valve assemblies, pigging facilities, and measurement facilities; and (iv) areas where the MOP is greater than 1,440 psig. Ex TC-8, ¶ 16.

63. Application of the 0.8 design factor and API 5L PSL2 X70 high-strength steel pipe results in use of pipe with a 0.463 inch wall thickness, as compared with the 0.512 inch wall thickness under the otherwise applicable 0.72 design factor, a reduction in thickness of .050 inches. TR 61. PHMSA previously found that the issuance of a waiver is not inconsistent with pipeline safety and that the waiver will provide a level of safety equal to or greater than that which would be provided if the pipeline were operated under the otherwise applicable regulations. Ex TC-8, ¶ 15.

64. In preparation for the Project, Keystone conducted a pipeline threat analysis, using the pipeline industry published list of threats under ASME B31.8S and PHMSA to determine threats to the pipeline. Identified threats were manufacturing defects, construction damage, corrosion, mechanical damage and hydraulic event. Safeguards were then developed to address these threats. Ex TC-8, ¶ 22.

65. Steel suppliers, mills and coating plants were pre-qualified using a formal qualification process consistent with ISO standards. The pipe is engineered with stringent chemistry to ensure weldability during construction. Each batch of pipe is mechanically tested to prove strength, fracture control and fracture propagation properties. The pipe is hydrostatically tested. The pipe seams are visually and manually inspected and also inspected using ultrasonic instruments. Each piece of pipe and joint is traceable to the steel supplier and pipe mill shift during production. The coating is inspected at the plant with stringent tolerances on roundness and nominal wall thickness. A formal quality surveillance program is in place at the steel mill and at the coating plant. Ex TC-8, ¶ 24; TR 59-60.

66. All pipe welds will be examined around 100 percent of their circumferences using ultrasonic or radiographic inspection. The coating is inspected and repaired if required prior to lowering into the trench. After construction the pipeline is hydrostatically tested in the field to 125 percent of its maximum operating pressure, followed by caliper tool testing to check for dents and ovality. Ex TC-8, ¶ 25.

67. A fusion-bonded epoxy ("FBE") coating will be applied to the external surface of the pipe to prevent corrosion. Ex TC- 8, ¶ 26.

68. TransCanada has thousands of miles of this particular grade of pipeline steel installed and in operation. TransCanada pioneered the use of FBE, which has been in use on its system for over 29 years. There have been no leaks on this type of pipe installed by TransCanada with the FBE coating and cathodic protection system during that time. When TransCanada has excavated pipe to validate FBE coating performance, there has been no evidence of external corrosion. Ex TC-8, ¶ 27.

69. A cathodic protection system will be installed comprised of engineered metal anodes, which are connected to the pipeline. A low voltage direct current is applied to the pipeline, resulting in corrosion of the anodes rather than the pipeline. Ex TC-8, ¶ 27. FBE coating and cathodic protection mitigate external corrosion. Ex TC-8, ¶ 26.

70. A tariff specification of 0.5 percent solids and water by volume will be utilized to minimize the potential for internal corrosion. This specification is half the industry standard of one percent. In Condition 32, the Commission requires Keystone to implement and enforce its crude oil specifications in order to minimize the potential for internal corrosion. Further, the pipeline is designed to operate in turbulent flow to minimize water drop out, another potential cause of internal corrosion. During operations, the pipeline will be cleaned using in-line inspection tools, which measure internal and external corrosion. Keystone will repair areas of pipeline corrosion as required by federal regulation. Ex TC-8, ¶ 26. Staff expert Schramm concluded that the cathodic protection and corrosion control measures that Keystone committed to utilize would meet or exceed applicable federal standards. TR 407-427; Ex S-12.

71. To minimize the risk of mechanical damage to the pipeline, it will be buried with a minimum of four feet of cover, one foot deeper than the industry standard, reducing the likelihood of mechanical damage. The steel specified for the pipeline is high-strength steel with engineered puncture resistance of approximately 51 tons of force. Ex TC-8, ¶ 28.

72. Hydraulic damage is caused by over-pressurization of the pipeline. The risk of hydraulic damage will be minimized through the SCADA system's continuous, real-time pressure monitoring systems and through operator training. Ex TC-8, ¶ 29.

73. The Applicant has prepared a detailed CMR Plan that describes procedures for crossing cultivated lands, grasslands, including native grasslands, wetlands, streams and the procedures for restoring or reclaiming and monitoring those features crossed by the Project. The CMR Plan is a summary of the commitments that Keystone has made for environmental mitigation, restoration and post-construction monitoring and compliance related to the construction phase of the Project. Among these, Keystone will utilize construction techniques that will retain the original characteristics of the lands crossed as detailed in the CMR Plan. Keystone's thorough implementation of these procedures will minimize the impacts associated with the Project. A copy of the CMR Plan was filed as Exhibit B to Keystone's permit application and introduced into evidence as TC-1, Exhibit B.

74. The CMR Plan establishes procedures to address a multitude of construction-related issues, including but not limited to the following:

- Training
- Advance Notice of Access
- Depth of Cover
- Noise Control
- Weed Control
- Dust Control
- Fire Prevention and Control
- Spill Prevention and Containment
- Irrigation Systems
- Clearing
- Grading
- Topsoil Removal and Storage
- Temporary Erosion and Sediment Control
- Clean-Up
- Reclamation and Revegetation
- Compaction Relief

- Rock Removal
- Soil Additives
- Seeding
- Construction in Residential and Commercial/Industrial Areas
- Drain Tile Damage Mitigation and Repair

Ex TC-1, Exhibit B.

75. The fire prevention and containment measures outlined in the CMR Plan will provide significant protection against uncontrolled fire in the arid region to be crossed by the Project. The Commission finds, however, that these provisions are largely centered on active construction areas and that certain additional fire prevention and containment precautions are appropriate as well for vehicles performing functions not in proximity to locations where fire suppression equipment will be based, such as route survey vehicles and vehicles involved in surveillance and inspection activities whether before, during and after construction. The Commission accordingly adopts Conditions 16(p) and the last sentence of Condition 30 to address these situations.

76. Keystone's CMR Plan includes many mitigation steps designed to return the land to its original production. These include topsoil removal and replacement, compaction of the trench line, decompaction of the working area, and tilling the topsoil after replacement. Ex TC-1, Exhibit B; Ex TC-6, ¶ 27; Ex TC-1, 6.1.2.2, pp. 87-88.

77. In areas where geologic conditions such as ground swelling, or slope instability, could pose a potential threat, Keystone will conduct appropriate pre-construction site assessments and subsequently will design facilities to account for various ground motion hazards as required by federal regulations. The main hazard of concern during construction of the pipeline will be from unintentional undercutting of slopes or construction on steep slopes resulting in instability that could lead to landslides. Other hazards may result from construction on Cretaceous shales that contain bentonite beds. The high swelling hazard may cause slope instability during periods of precipitation. Ex TC-1, 5.3.6, p. 44.

78. When selecting the proposed pipeline route, Keystone has attempted to minimize the amount of steep slopes crossed by the pipeline. Special pipeline construction practices described in the CMR Plan will minimize slope stability concerns during construction. Landslide hazards can be mitigated by:

- Returning disturbed areas to pre-existing conditions or, where necessary, reducing steep grades during construction;
- Preserving or improving surface drainage;
- Preserving or improving subsurface drainage during construction;
- Removing overburden where necessary to reduce weight of overlying soil mass; and
- Adding fill at toe of slope to resist movement.

Ex TC-1, 5.3.6, pp. 43-44.

79. Slope instability poses a threat of ground movement responsible for approximately 1 percent of liquid pipeline incidents (PHMSA 2008). Keystone will monitor slope stability during routine surveillance. Areas where slope stability poses a potential threat to the pipeline will be incorporated into Keystone's Integrity Management Plan. If ground movement is suspected of having caused abnormal movement of the pipeline, federal regulations (49 CFR Part 195) require

Keystone to conduct an internal inspection. Consequently, damage to the pipeline would be detected quickly and spills would be averted or minimized. Ex TC-1, 5.3.6, p. 44

80. Keystone is in the process of preparing, in consultation with the area National Resource Conservation Service, construction/reclamation unit ("Con/Rec Unit") mapping to address differing construction and reclamation techniques for different soils conditions, slopes, vegetation, and land use along the pipeline route. This analysis and mapping results in the identification of segments called Con/Rec Units. Ex. TC-5; TC-16, DR 3-25.

81. The Applicant will use special construction methods and measures to minimize and mitigate impacts where warranted by site specific conditions. These special techniques will be used when constructing across paved roads, primary gravel roads, highways, railroads, water bodies, wetlands, sand hills areas, and steep terrain. These special techniques are described in the Application. Ex TC-1, 2.2.6, p. 17; TC-6, ¶ 11.

82. Of the perennial streams that are crossed by the proposed route, the Cheyenne River is the largest water body and is classified as a warm water permanent fishery. Of the other streams that have been classified, habitat is considered more limited as indicated by a warm water semi-permanent or warm water marginal classification. Ex TC-1, 5.6.2, pp. 71-72, Table 13.

83. Keystone will utilize HDD for the Little Missouri, Cheyenne and White River crossings, which will aid in minimizing impacts to important game and commercial fish species and special status species. Open-cut trenching, which can affect fisheries, will be used at other perennial streams. Keystone will use best practices to reduce or eliminate the impact of crossings at the perennial streams other than the Cheyenne and White Rivers. Ex TC-1, 5.4.1, p. 46; 5.6.2, p. 72; TC-16, DR 3-39.

84. Water used for hydrostatic testing during construction and subsequently released will not result in contamination of aquatic ecosystems since the pipe is cleaned prior to testing and the discharge water is monitored and tested. Ex TC-1, 5.4.3.1, pp. 48-50. In Conditions 1 and 2, the Commission has required that Keystone comply with DENR's regulations governing temporary use and discharge of water and obtain and comply with the DENR General Permits for these activities.

85. During construction, Keystone will have a number of inspectors on a construction spread, including environmental inspectors, who will monitor erosion control, small spills, full tanks, and any environmental issues that arise. TR. 37-38. In Condition 14, the Commission requires that Keystone incorporate such inspectors into the CMR Plan.

86. The Pipeline corridor will pass through areas where shallow and surficial aquifers exist. Appropriate measures will be implemented to prevent groundwater contamination and steps will be taken to manage the flow of any ground water encountered. Ex TC-1, 5.4.2, p. 47-48.

87. In addition to those recommendations of Staff and its expert witnesses referenced specifically in these Findings, Staff expert witnesses made a number of recommendations which the Commission has determined will provide additional protections for affected landowners, the environment and the public, and has included Conditions in this Order requiring certain of these measures. These recommendations encompassed matters such as sediment control at water body crossings, soil profile analysis, topsoil, subsoil and rock segregation and replacement, special procedures in areas of bentenitic, sodic, or saline soils, noise, etc. Staff's final recommendations are set forth in its Brief. See also Staff Exhibits and testimony in Transcript Vols. II and III.

88. Keystone will be required to acquire permits authorizing the crossing of county roads and township roads. These permits will typically require Keystone to restore roads to their pre-construction condition. If its construction equipment causes damage to county or township roads, Keystone will be responsible for the repair of those roads to pre-construction condition. Pursuant to SDCL 49-41B-38, Keystone will be required to post a bond to ensure that any damage beyond normal wear to public roads, highways, bridges or other related facilities will be adequately compensated. Staff witness Binder recommended that the bond amount under SDCL 49-41B-38 for damage to highways, roads, bridges and other related facilities be set at $15,600,000 for 2011 and $15,600,000 for 2012. TR 224. Keystone did not object to this requirement.

89. The Commission finds that the procedures in the CMR Plan and the other construction plans and procedures that Keystone has committed to implement, together with the Conditions regarding construction practices adopted by the Commission herein, will minimize impacts from construction of the Project to the environment and social and economic condition of inhabitants and expected inhabitants in the Project area.

**Operation and Maintenance**

90. The Keystone pipeline will be designed constructed, tested and operated in accordance with all applicable requirements, including the PHMSA regulations set forth at 49 CFR Parts 194 and 195, as modified by the Special Permit. These federal regulations are intended to ensure adequate protection for the public and the environment and to prevent crude oil pipeline accidents and failures. Ex TC-8, ¶ 2.

91. The safety features of Keystone's operations are governed by 49 CFR Part 195 and include aerial inspection 26 times per year, with any interval not to exceed three weeks, right-of-way maintenance for accessibility, and continual monitoring of the pipeline to identify potential integrity concerns. A Supervisory Control and Data Acquisition ("SCADA") system will be used to monitor the pipeline at all times. Ex TC-8, ¶ 9.

92. The Project will have a SCADA system to remotely monitor and control the pipeline. The SCADA system will include: (i) a redundant, fully functional back-up Operational Control Center available for service at all times; (ii) automatic features within the system to ensure operation within prescribed limits; and (iii) additional automatic features at the pump stations to provide pipeline pressure protection in the event that communications with the SCADA host are interrupted. Ex TC-10, ¶ 8.

93. The pipeline will have a control center manned 24 hours per day. A backup control center will also be constructed and maintained. A backup communications system is included within the system design and installation. Keystone's SCADA system should have a very high degree of reliability. TR 82-83.

94. Keystone will use a series of complimentary and overlapping SCADA-based leak detection systems and methods at the Operational Control Center, including: (i) remote monitoring; (ii) software-based volume balance systems that monitor injection and delivery volumes; (iii) Computational Pipeline Monitoring or model-based leak detection systems that break the pipeline into smaller segments and monitor each segment on a mass balance basis; and (iv) computer-based, non-real-time, accumulated gain/(loss) volume trending to assist in identifying low rate or seepage releases below the 1.5 percent by volume detection threshold. The SCADA and other monitoring and control systems to be implemented by Keystone for the Project are state of the art

and consistent with the best commercially available technology. Ex TC-10, ¶ 8. Staff witness, William Mampre, testified that Keystone's SCADA system was one he probably would have selected himself. TR 431.

95. Additionally, Keystone will implement and utilize direct observation methodologies, which include aerial patrols, ground patrols and public and landowner awareness programs designed to encourage and facilitate the reporting of suspected leaks and events that may suggest a threat to the integrity of the pipeline. Ex TC10, ¶ 8. Remote sensing technologies that could be employed in pipeline surveillance such as aerial surveillance are in their infancy and practical systems are not currently available. Keystone would consider using such technology if it becomes commercially available. TR 89-90.

96. Keystone will implement abnormal operating procedures when necessary and as required by 49 CFR 195.402(d). Abnormal operating procedures will be part of the written manual for normal operations, maintenance activities, and handling abnormal operating and emergencies. Ex TC-1, 2.3.2, p. 20.

97. As required by US DOT regulations, Keystone will prepare an emergency response plan ("ERP") for the system. Ex TC-11, ¶ 13. The ERP will be submitted to PHMSA for review prior to commencement of pipeline operations. Ex TC-11, ¶ 13. The Commission finds that the ERP and manual of written procedures for conducting normal operations and maintenance activities and handling abnormal operations and emergencies as required under 49 CFR195.402 should also be submitted to the Commission at the time it is submitted to PHMSA to apprise the Commission of its details. Keystone has agreed to do this. The Commission has so specified in Condition 36.

98. Keystone will utilize the ERP approved by PHMSA for the Keystone Pipeline as the basis for its ERP for the Project. Under the ERP, Keystone will strategically locate emergency response equipment along the pipeline route. The equipment will include trailers, oil spill containment and recovery equipment, boats, and a communication office. Keystone will also have a number of local contractors available to provide emergency response assistance. Ex TC-11, ¶ 15. Keystone's goal is to respond to any spill within six hours. TR 102-103. Additional details concerning the ERP and the ERP process are set forth in the Application at Section 6.5.2 and in the pre-filed and hearing testimony of John Hayes. Ex TC-11; EX TC-1, 6.5.2, pp. 96-101. Keystone has consulted with DENR in developing its ERP. TR 111-12.

99. If the Keystone pipeline should experience a release, Keystone would implement its ERP. TC-11, ¶ 10; S-18, p. 4. DENR would be involved in the assessment and abatement of the release, and require the leak to be cleaned up and remediated. S-18, p. 5. DENR has been successful in enforcing remediation laws to ensure the effects of any pipeline releases are mitigated. TR 488-89, 497, 502-03.

100. Local emergency responders may be required to initially secure the scene and ensure the safety of the public, and Keystone will provide training in that regard. Ex TC-11, ¶ 17; TR 105-107.

101. If ground movement is suspected of having caused abnormal movement of the pipeline, federal regulations (49 CFR Part 195) require Keystone to conduct an internal inspection. Consequently, damage to the pipeline would be detected quickly and spills would be averted or minimized. Ex TC-1, 5.3.6, p. 44.

102. In addition to the ERP, hazardous materials pipeline segments through High Consequence Areas ("HCAs") are subject to the Integrity Management Rule. 49 CFR 195.452. Pipeline operators are required to develop a written Integrity Management Plan ("IMP") that must include methods to measure the program's effectiveness in assessing and evaluating integrity and protecting HCAs. Keystone will develop and implement an IMP for the entire pipeline including the HCAs. The overall objective of the IMP is to establish and maintain acceptable levels of integrity and having regard to the environment, public and employee safety, regulatory requirements, delivery reliability, and life cycle cost. The IMP uses advanced in-line inspection and mitigation technologies applied with a comprehensive risk-based methodology. 49 CFR Part 195 also requires pipeline operators to develop and implement public awareness programs consistent with the API's Recommended Practice 1162, Public Awareness Programs for Pipeline Operators. Staff witness Jenny Hudson testified that Keystone's planning and preparation of the IMP were fully compliant with the PHMSA regulations and had no recommendations for conditions. Ex S-9, p.5.

103. The Commission finds that the threat of serious injury to the environment or inhabitants of the State of South Dakota from a crude oil release is substantially mitigated by the integrity management, leak detection and emergency response processes and procedures that Keystone is continuing to plan and will implement.

**Rural Water Crossings**

104. The route crosses through two rural water system districts, the West River/Lyman-Jones Rural Water District and the Tripp County Water User District. Keystone met with these rural water districts to discuss the Project and will continue to coordinate with these districts. During construction and maintenance, Keystone will coordinate with the One Call system to avoid impacts to underground utilities, including water lines. Ex TC-4.

**Alternative Routes**

105. The proposed Project route was developed through an, iterative process. TC-1, 4.1, p. 25. During the course of the route evaluation process, Keystone held public meetings, open houses, and one-on-one meetings with stakeholders to discuss and review the proposed routing through South Dakota. TC-1, 4.1.5, p. 27. The route was refined in Mellette County to avoid environmentally sensitive areas and reduce wetland crossings, and near Colome to avoid groundwater protection areas. Ex TC-3; TC-1, 4.2.1-4.2.2, p. 28.

106. SDCL 49-41B-36 explicitly states that Chapter 49-41B "shall not be construed as a delegation to the Public Utilities Commission of the authority to route a facility." The Commission accordingly finds and concludes that it lacks authority to compel the Applicant to select an alternative route or to base its decision on whether to grant or deny a permit for a proposed facility on whether the selected route is the route the Commission itself might select.

**Socio-Economic Factors**

107. Socio-economic evidence offered by both Keystone and Staff demonstrates that the welfare of the citizens of South Dakota will not be impaired by the Project. Staff expert Dr. Michael Madden conducted a socio-economic analysis of the Keystone Pipeline, and concluded that the positive economic benefits of the project were unambiguous, while most if not all of the social impacts were positive or neutral. S-2, Madden Assessment at 21. The Project, subject to compliance with the Special Permit and the Conditions herein, would not, from a socioeconomic standpoint: (i) pose a threat of serious injury to the socioeconomic conditions in the project area; (ii)

substantially impair the health, safety, or welfare of the inhabitants in the project area; or (iii) unduly interfere with the orderly development of the region.

108. The Project will pay property taxes to local governments on an annual basis estimated to be in the millions of dollars. Ex TC-2, ¶ 24, TC-13, S-13; TR 584. An increase in assessed, taxable valuation for school districts is a positive development. TR 175.

109. The Project will bring jobs, both temporary and permanent, to the state of South Dakota and specifically to the areas of construction and operation. Ex TC-1 at 6.1.1, pp. 85-86.

110. The Project will have minimal effect in the areas of agriculture, commercial and industrial sectors, land values, housing, sewer and water, solid waste management, transportation, cultural and historical resources, health services, schools, recreation, public safety, noise, and visual impacts. Ex TC-1. It follows that the project will not substantially impair the health, safety, or welfare of the inhabitants.

**General**

111. Applicant has provided all information required by ARSD Chapter 20:10:22 and SDCL Chapter 49-41B. S-1.

112. The Commission finds that the Conditions attached hereto as Exhibit A and incorporated herein by reference are supported by the record, are reasonable and will help ensure that the Project will meet the standards established for approval of a construction permit for the Project set forth in SDCL 49-41B-22 and should be adopted.

113. The Commission finds that subject to the conditions of the Special Permit and the Conditions set forth as Exhibit A hereto, the Project will (i) comply with all applicable laws and rules; (ii) not pose an unacceptable threat of serious injury to the environment nor to the social and economic condition of inhabitants or expected inhabitants in the siting area; (iii) not substantially impair the health, safety or welfare of the inhabitants; and (iv) not unduly interfere with the orderly development of the region with due consideration having been given the views of governing bodies of affected local units of government.

114. The Commission finds that a permit to construct the Project should be granted subject to the Conditions set forth in Exhibit A.

115. To the extent that any Conclusion of Law set forth below is more appropriately a finding of fact, that Conclusion of Law is incorporated by reference as a Finding of Fact.

Based on the foregoing Findings of Fact, the Commission hereby makes the following:

## CONCLUSIONS OF LAW

1. The Commission has jurisdiction over the subject matter and parties to this proceeding pursuant to SDCL Chapter 49-41B and ARSD Chapter 20:10:22. Subject to the findings made on the four elements of proof under SDCL 49-41B-22, the Commission has authority to grant,

deny or grant upon reasonable terms, conditions or modifications, a permit for the construction, operation and maintenance of the TransCanada Keystone Pipeline.

2. The TransCanada Keystone Pipeline Project is a transmission facility as defined in SDCL 49-41B-2.1(3).

3. Applicant's permit application, as amended and supplemented through the proceedings in this matter, complies with the applicable requirements of SDCL Chapter 49-41B and ARSD Chapter 20:10:22.

4. The Project, if constructed and operated in accordance with the terms and conditions of this decision, will comply with all applicable laws and rules, including all requirements of SDCL Chapter 49-41B and ARSD 20:10:22.

5. The Project, if constructed and operated in accordance with the terms and conditions of this decision, will not pose an unacceptable threat of serious injury to the environment nor to the social and economic conditions of inhabitants or expected inhabitants in the siting area.

6. The Project, if constructed and operated in accordance with the terms and conditions of this decision, will not substantially impair the health, safety or welfare of the inhabitants in the siting area.

7. The Project, if constructed and operated in accordance with the terms and conditions of this decision, will not unduly interfere with the orderly development of the region with due consideration having been given the views of governing bodies of affected local units of government.

8. The standard of proof is by the preponderance of evidence. The Applicant has met its burden of proof pursuant to SDCL 49-41B-22 and is entitled to a permit as provided in SDCL 49-41B-25.

9. The Commission has authority to revoke or suspend any permit granted under the South Dakota Energy Facility Permit Act for failure to comply with the terms and conditions of the permit pursuant to SDCL 49-41B-33 and must approve any transfer of the permit granted by this Order pursuant to SDCL 49-41B-29.

10. To the extent that any of the Findings of Fact in this decision are determined to be conclusions of law or mixed findings of fact and conclusions of law, the same are incorporated herein by this reference as a Conclusion of Law as if set forth in full herein.

11. Because a federal EIS will be required and completed for the Project and because the federal EIS complies with the requirements of SDCL Chapter 34A-9, the Commission appropriately exercised its discretion under SDCL 49-41B-21 in determining not to prepare or require the preparation of a second EIS.

12. PHMSA is delegated exclusive authority over the establishment and enforcement of safety-orientated design and operational standards for hazardous materials pipelines. 49 U.S.C. 60101, et seq.

13. SDCL 49-41B-36 explicitly states that SDCL Chapter 49-41B "shall not be construed as a delegation to the Public Utilities Commission of the authority to route a facility." The

Commission accordingly concludes that it lacks authority (i) to compel the Applicant to select an alternative route or (ii) to base its decision on whether to grant or deny a permit for a proposed facility on whether the selected route is the route the Commission might itself select.

14. The Commission concludes that it needs no other information to assess the impact of the proposed facility or to determine if Applicant or any Intervenor has met its burden of proof.

15. The Commission concludes that the Application and all required filings have been filed with the Commission in conformity with South Dakota law and that all procedural requirements under South Dakota law, including public hearing requirements, have been met or exceeded.

16. The Commission concludes that it possesses the authority under SDCL 49-41B-25 to impose conditions on the construction, operation and maintenance of the Project, that the Conditions set forth in Exhibit A are supported by the record, are reasonable and will help ensure that the Project will meet the standards established for approval of a construction permit for the Project set forth in SDCL 49-41B-22 and that the Conditions are hereby adopted.

It is therefore

ORDERED, that a permit to construct the Keystone Pipeline Project is granted to TransCanada Keystone Pipeline, LP, subject to the Conditions set forth in Exhibit A.

**NOTICE OF ENTRY AND OF RIGHT TO APPEAL**

PLEASE TAKE NOTICE that this Amended Final Decision and Order was duly issued and entered on the ____ day of June, 2010. Pursuant to SDCL 1-26-32, this Final Decision and Order will take effect 10 days after the date of receipt or failure to accept delivery of the decision by the parties. Pursuant to ARSD 20:10:01:30.01, an application for a rehearing or reconsideration may be made by filing a written petition with the Commission within 30 days from the date of issuance of this Final Decision and Order; Notice of Entry. Pursuant to SDCL 1-26-31, the parties have the right to appeal this Final Decision and Order to the appropriate Circuit Court by serving notice of appeal of this decision to the circuit court within thirty (30) days after the date of service of this Notice of Decision.

Dated at Pierre, South Dakota, this 29th of June, 2010.

**CERTIFICATE OF SERVICE**

The undersigned hereby certifies that this document has been served today upon all parties of record in this docket, as listed on the docket service list, electronically.

By: _____

Date: 06/29/10

(OFFICIAL SEAL)

BY ORDER OF THE COMMISSION:

DUSTIN M. JOHNSON, Chairman

STEVE KOLBECK, Commissioner

GARY HANSON, Commissioner

## Exhibit A

## AMENDED PERMIT CONDITIONS

### I. Compliance with Laws, Regulations, Permits, Standards and Commitments

1. Keystone shall comply with all applicable laws and regulations in its construction and operation of the Project. These laws and regulations include, but are not necessarily limited to: the federal Hazardous Liquid Pipeline Safety Act of 1979 and Pipeline Safety Improvement Act of 2002, as amended by the Pipeline Inspection, Protection, Enforcement, and Safety Act of 2006, and the various other pipeline safety statutes currently codified at 49 U.S.C. § 60101 et seq. (collectively, the "PSA"); the regulations of the United States Department of Transportation implementing the PSA, particularly 49 C.F.R Parts 194 and 195; temporary permits for use of public water for construction, testing or drilling purposes, SDCL 46-5-40.1 and ARSD 74:02:01:32 through 74:02:01:34.02 and temporary discharges to waters of the state, SDCL 34A-2-36 and ARSD Chapters 74:52:01 through 74:52:11, specifically, ARSD § 74:52:02:46 and the General Permit issued thereunder covering temporary discharges of water from construction dewatering and hydrostatic testing.

2. Keystone shall obtain and shall thereafter comply with all applicable federal, state and local permits, including but not limited to: Presidential Permit from the United States Department of State, Executive Order 11423 of August 16, 1968 (33 Fed. Reg. 11741) and Executive Order 13337 of April 30, 2004 (69 Fed. Reg. 25229), for the construction, connection, operation, or maintenance, at the border of the United States, of facilities for the exportation or importation of petroleum, petroleum products, coal, or other fuels to or from a foreign country; Clean Water Act § 404 and Rivers and Harbors Act Section 10 Permits; Special Permit if issued by the Pipeline and Hazardous Materials Safety Administration; Temporary Water Use Permit, General Permit for Temporary Discharges and federal, state and local highway and road encroachment permits. Any of such permits not previously filed with the Commission shall be filed with the Commission upon their issuance. To the extent that any condition, requirement or standard of the Presidential Permit, including the Final EIS Recommendations, or any other law, regulation or permit applicable to the portion of the pipeline in this state differs from the requirements of these Conditions, the more stringent shall apply.

3. Keystone shall comply with and implement the Recommendations set forth in the Final Environmental Impact Statement when issued by the United States Department of State pursuant to its Amended Department of State Notice of Intent To Prepare an Environmental Impact Statement and To Conduct Scoping Meetings and Notice of Floodplain and Wetland Involvement and To Initiate Consultation Under Section 106 of the National Historic Preservation Act for the Proposed Transcanada Keystone XL Pipeline; Notice of Intent--Rescheduled Public Scoping Meetings in South Dakota and extension of comment period (FR vol. 74, no. 54, Mar. 23, 2009). The Amended Notice and other Department of State and Project Documents are available on-line at: http://www.keystonepipeline-xl.state.gov/clientsite/keystonexl.nsf?Open.

4. The permit granted by this Order shall not be transferable without the approval of the Commission pursuant to SDCL 49-41B-29.

5. Keystone shall undertake and complete all of the actions that it and its affiliated entities committed to undertake and complete in its Application as amended, in its testimony and

exhibits received in evidence at the hearing, and in its responses to data requests received in evidence at the hearing.

**II. Reporting and Relationships**

6. The most recent and accurate depiction of the Project route and facility locations is found on the maps in Exhibit TC-14. The Application indicates in Section 4.2.3 that Keystone will continue to develop route adjustments throughout the pre-construction design phase. These route adjustments will accommodate environmental features identified during surveys, property-specific issues, and civil survey information. The Application states that Keystone will file new aerial route maps that incorporate any such route adjustments prior to construction. Ex TC-1.4.2.3, p. 27. Keystone shall notify the Commission and all affected landowners, utilities and local governmental units as soon as practicable if material deviations are proposed to the route. Keystone shall notify affected landowners of any change in the route on their land. At such time as Keystone has finalized the pre-construction route, Keystone shall file maps with the Commission depicting the final pre-construction route. If material deviations are proposed from the route depicted on Exhibit TC-14 and accordingly approved by this Order, Keystone shall advise the Commission and all affected landowners, utilities and local governmental units prior to implementing such changes and afford the Commission the opportunity to review and approve such modifications. At the conclusion of construction, Keystone shall file detail maps with the Commission depicting the final as-built location of the Project facilities.

7. Keystone shall provide a public liaison officer, approved by the Commission, to facilitate the exchange of information between Keystone, including its contractors, and landowners, local communities and residents and to promptly resolve complaints and problems that may develop for landowners, local communities and residents as a result of the Project. Keystone shall file with the Commission its proposed public liaison officer's credentials for approval by the Commission prior to the commencement of construction. After the public liaison officer has been approved by the Commission, the public liaison officer may not be removed by Keystone without the approval of the Commission. The public liaison officer shall be afforded immediate access to Keystone's on-site project manager, its executive project manager and to contractors' on-site managers and shall be available at all times to the Staff via mobile phone to respond to complaints and concerns communicated to the Staff by concerned landowners and others. Keystone shall also implement and keep an up-dated web site covering the planning and implementation of construction and commencement of operations in this state as an informational medium for the public. As soon as the Keystone's public liaison officer has been appointed and approved, Keystone shall provide contact information for him/her to all landowners crossed by the Project and to law enforcement agencies and local governments in the vicinity of the Project. The public liaison officer's contact information shall be provided to landowners in each subsequent written communication with them. If the Commission determines that the public liaison officer has not been adequately performing the duties set forth for the position in this Order, the Commission may, upon notice to Keystone and the public liaison officer, take action to remove the public liaison officer.

8. Until construction of the Project, including reclamation, is completed, Keystone shall submit quarterly progress reports to the Commission that summarize the status of land acquisition and route finalization, the status of construction, the status of environmental control activities, including permitting status and Emergency Response Plan and Integrity Management Plan development, the implementation of the other measures required by these conditions, and the overall percent of physical completion of the project and design changes of a substantive nature. Each report shall include a summary of consultations with the South Dakota Department of Environment and Natural Resources and other agencies concerning the issuance of permits. The

reports shall list dates, names, and the results of each contact and the company's progress in implementing prescribed construction, land restoration, environmental protection, emergency response and integrity management regulations, plans and standards. The first report shall be due for the period ending June 30, 2010. The reports shall be filed within 31 days after the end of each quarterly period and shall continue until the project is fully operational.

9. Until one year following completion of construction of the Project, including reclamation, Keystone's public liaison officer shall report quarterly to the Commission on the status of the Project from his/her independent vantage point. The report shall detail problems encountered and complaints received. For the period of three years following completion of construction, Keystone's public liaison officer shall report to the Commission annually regarding post-construction landowner and other complaints, the status of road repair and reconstruction and land and crop restoration and any problems or issues occurring during the course of the year.

10. Not later than six months prior to commencement of construction, Keystone shall commence a program of contacts with state, county and municipal emergency response, law enforcement and highway, road and other infrastructure management agencies serving the Project area in order to educate such agencies concerning the planned construction schedule and the measures that such agencies should begin taking to prepare for construction impacts and the commencement of project operations.

11. Keystone shall conduct a preconstruction conference prior to the commencement of construction to ensure that Keystone fully understands the conditions set forth in this order. At a minimum, the conference shall include a Keystone representative, Keystone's construction supervisor and Staff.

12. Once known, Keystone shall inform the Commission of the date construction will commence, report to the Commission on the date construction is started and keep the Commission updated on construction activities as provided in Condition 8.

**III. Construction**

13. Except as otherwise provided in the conditions of this Order and Permit, Keystone shall comply with all mitigation measures set forth in the Construction Mitigation and Reclamation Plan (CMR Plan) as set forth in Exhibit TC-1, Exhibit B. If modifications to the CMR Plan are made by Keystone as it refines its construction plans or are required by the Department of State in its Final EIS Record of Decision or the Presidential Permit, the CMR Plan as so modified shall be filed with the Commission and shall be complied with by Keystone.

14. Keystone shall incorporate environmental inspectors into its CMR Plan and obtain follow-up information reports from such inspections upon the completion of each construction spread to help ensure compliance with this Order and Permit and all other applicable permits, laws, and rules.

15. Prior to construction, Keystone shall, in consultation with area NRCS staff, develop specific construction/reclamation units (Con/Rec Units) that are applicable to particular soil and subsoil classifications, land uses and environmental settings. The Con/Rec Units shall contain information of the sort described in response to Staff Data Request 3-25 found in Exhibit TC-16.

a) In the development of the Con/Rec Units in areas where NRCS recommends, Keystone shall conduct analytical soil probing and/or soil boring and analysis in areas of

particularly sensitive soils where reclamation potential is low. Records regarding this process shall be available to the Commission and to the specific land owner affected by such soils upon request.

b) Through development of the Con/Rec Units and consultation with NRCS, Keystone shall identify soils for which alternative handling methods are recommended. Alternative soil handling methods shall include but are not limited to the "triple-lift" method where conditions justify such treatment. Keystone shall thoroughly inform the landowner regarding the options applicable to their property, including their respective benefits and negatives, and implement whatever reasonable option for soil handling is selected by the landowner. Records regarding this process shall be available to the Commission upon request.

c) Keystone shall, in consultation with NCRS, ensure that its construction planning and execution process, including Con/Rec Units, CMR Plan and its other construction documents and planning shall adequately identify and plan for areas susceptible to erosion, areas where sand dunes are present, areas with high concentrations of sodium bentonite, areas with sodic, saline and sodic-saline soils and any other areas with low reclamation potential.

d) The Con/Rec Units shall be available upon request to the Commission and affected landowners. Con/Rec Units may be evaluated by the Commission upon complaint or otherwise, regarding whether proper soil handling, damage mitigation or reclamation procedures are being followed.

e) Areas of specific concern or of low reclamation potential shall be recorded in a separate database. Action taken at such locations and the results thereof shall also be recorded and made available to the Commission and the affected property owner upon request.

16. Keystone shall provide each landowner with an explanation regarding trenching and topsoil and subsoil/rock removal, segregation and restoration method options for his/her property consistent with the applicable Con/Rec Unit and shall follow the landowner's selected preference as documented on its written construction agreement with the landowner, as modified by any subsequent amendments, or by other written agreement(s).

a) Keystone shall separate and segregate topsoil from subsoil in agricultural areas, including grasslands and shelter belts, as provided in the CMR Plan and the applicable Con/Rec Unit.

b) Keystone shall repair any damage to property that results from construction activities.

c) Keystone shall restore all areas disturbed by construction to their preconstruction condition, including their original preconstruction topsoil, vegetation, elevation, and contour, or as close thereto as is feasible, except as is otherwise agreed to by the landowner.

d) Except where practicably infeasible, final grading and topsoil replacement and installation of permanent erosion control structures shall be completed in non-residential areas within 20 days after backfilling the trench. In the event that seasonal or other weather conditions, extenuating circumstances, or unforeseen developments beyond Keystone's control prevent compliance with this time frame, temporary erosion controls shall be maintained until conditions allow completion of cleanup and reclamation. In the event

Keystone can not comply with the 20-day time frame as provided in this Condition, it shall give notice of such fact to all affected landowners, and such notice shall include an estimate of when such restoration is expected to be completed.

e) Keystone shall draft specific crop monitoring protocols for agricultural lands. If requested by the landowner, Keystone shall provide an independent crop monitor to conduct yield testing and/or such other measurements of productivity as he shall deem appropriate. The independent monitor shall be a qualified agronomist, rangeland specialist or otherwise qualified with respect to the species to be restored. The protocols shall be available to the Commission upon request and may be evaluated for adequacy in response to a complaint or otherwise.

f) Keystone shall work closely with landowners or land management agencies to determine a plan to control noxious weeds. Landowner permission shall be obtained before the application of herbicides.

g) Keystone's adverse weather plan shall apply to improved hay land and pasture lands in addition to crop lands.

h) The size, density and distribution of rock within the construction right-of-way following reclamation shall be similar to adjacent undisturbed areas. Keystone shall treat rock that cannot be backfilled within or below the level of the natural rock profile as construction debris and remove it for disposal offsite except when the landowner agrees to the placement of the rock on his property. In such case, the rock shall be placed in accordance with the landowner's directions.

i) Keystone shall utilize the proposed trench line for its pipe stringing trucks where conditions allow and shall employ adequate measures to decompact subsoil as provided in its CMR Plan. Topsoil shall be decompacted if requested by the landowner.

j) Keystone shall monitor and take appropriate mitigative actions as necessary to address salinity issues when dewatering the trench, and field conductivity and/or other appropriate constituent analyses shall be performed prior to disposal of trench water in areas where salinity may be expected. Keystone shall notify landowners prior to any discharge of saline water on their lands or of any spills of hazardous materials on their lands of one pint or more or of any lesser volume which is required by any federal, state, or local law or regulation or product license or label to be reported to a state or federal agency, manufacturer, or manufacturer's representative.

k) Keystone shall install trench and slope breakers where necessary in accordance with the CMR Plan as augmented by Staff's recommendations in Post Hearing Commission Staff Brief, pp. 26-27.

l) Keystone shall apply mulch when reasonably requested by landowners and also wherever necessary following seeding to stabilize the soil surface and to reduce wind and water erosion. Keystone shall follow the other recommendations regarding mulch application in Post Hearing Commission Staff Brief, p. 27.

m) Keystone shall reseed all lands with comparable crops to be approved by landowner in landowner's reasonable discretion, or in pasture, hay or native species areas with comparable grass or forage crop seed or native species mix to be approved by landowner in

landowner's reasonable discretion. Keystone shall actively monitor revegetation on all disturbed areas for at least two years.

n) Keystone shall coordinate with landowners regarding his/her desires to properly protect cattle, shall implement such protective measures as are reasonably requested by the landowner and shall adequately compensate the landowner for any loss.

o) Prior to commencing construction, Keystone shall file with the Commission a confidential list of property owners crossed by the pipeline and update this list if route changes during construction result in property owner changes.

p) Except in areas where fire suppression resources as provided in CMR Plan 2.16 are in close proximity, to minimize fire risk, Keystone shall, and shall cause its contractor to, equip each of its vehicles used in pre-construction or construction activities, including off-road vehicles, with a hand held fire extinguisher, portable compact shovel and communication device such as a cell phone, in areas with coverage, or a radio capable of achieving prompt communication with Keystone's fire suppression resources and emergency services.

17. Keystone shall cover open-bodied dump trucks carrying sand or soil while on paved roads and cover open-bodied dump trucks carrying gravel or other materials having the potential to be expelled onto other vehicles or persons while on all public roads.

18. Keystone shall use its best efforts to not locate fuel storage facilities within 200 feet of private wells and 400 feet of municipal wells and shall minimize and exercise vigilance in refueling activities in areas within 200 feet of private wells and 400 feet of municipal wells.

19. If trees are to be removed that have commercial or other value to affected landowners, Keystone shall compensate the landowner for the fair market value of the trees to be cleared and/or allow the landowner the right to retain ownership of the felled trees. Except as the landowner shall otherwise agree in writing, the width of the clear cuts through any windbreaks and shelterbelts shall be limited to 50 feet or less, and he width of clear cuts through extended lengths of wooded areas shall be limited to 85 feet or less. The environmental inspection in Condition 14 shall include forested lands.

20. Keystone shall implement the following sediment control practices:

a) Keystone shall use floating sediment curtains to maintain sediments within the construction right of way in open water bodies with no or low flow when the depth of non-flowing water exceeds the height of straw bales or silt fence installation. In such situations the floating sediment curtains shall be installed as a substitute for straw bales or silt fence along the edge or edges of each side of the construction right-of-way that is under water at a depth greater than the top of a straw bale or silt fence as portrayed in Keystone's construction Detail #11 included in the CMR Plan.

b) Keystone shall install sediment barriers in the vicinity of delineated wetlands and water bodies as outlined in the CMR Plan regardless of the presence of flowing or standing water at the time of construction.

c) The Applicant should consult with South Dakota Game, Fish and Parks (SDGFP) to avoid construction near water bodies during fish spawning periods in which in-stream

construction activities should be avoided to limit impacts on specific fisheries, if any, with commercial or recreational importance.

21. Keystone shall develop frac-out plans specific to areas in South Dakota where horizontal directional drilling will occur. The plan shall be followed in the event of a frac-out. If a frac-out event occurs, Keystone shall promptly file a report of the incident with the Commission. Keystone shall also, after execution of the plan, provide a follow-up report to the Commission regarding the results of the occurrence and any lingering concerns.

22. Keystone shall comply with the following conditions regarding construction across or near wetlands, water bodies and riparian areas:

a) Unless a wetland is actively cultivated or rotated cropland or unless site specific conditions require utilization of Keystone's proposed 85 foot width and the landowner has agreed to such greater width, the width of the construction right-of-way shall be limited to 75 feet in non-cultivated wetlands unless a different width is approved or required by the United States Army Corps of Engineers.

b) Unless a wetland is actively cultivated or rotated cropland, extra work areas shall be located at least 50 feet away from wetland boundaries except where site-specific conditions render a 50-foot setback infeasible. Extra work areas near water bodies shall be located at least 50 feet from the water's edge, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land or where site-specific conditions render a 50-foot setback infeasible. Clearing of vegetation between extra work space areas and the water's edge shall be limited to the construction right-of-way.

c) Water body crossing spoil, including upland spoil from crossings of streams up to 30 feet in width, shall be stored in the construction right of way at least 10 feet from the water's edge or in additional extra work areas and only on a temporary basis.

d) Temporary in-stream spoil storage in streams greater than 30 feet in width shall only be conducted in conformity with any required federal permit(s) and any applicable federal or state statutes, rules and standards.

e) Wetland and water body boundaries and buffers shall be marked and maintained until ground disturbing activities are complete. Keystone shall maintain 15-foot buffers where practicable, which for stream crossings shall be maintained except during the period of trenching, pipe laying and backfilling the crossing point. Buffers shall not be required in the case of non-flowing streams.

f) Best management practices shall be implemented to prevent heavily silt-laden trench water from reaching any wetland or water body directly or indirectly.

g) Erosion control fabric shall be used on water body banks immediately following final stream bank restoration unless riprap or other bank stabilization methods are utilized in accordance with federal or state permits.

h) The use of timber and slash to support equipment crossings of wetlands shall be avoided.

i) Subject to Conditions 37 and 38, vegetation restoration and maintenance adjacent to water bodies shall be conducted in such manner to allow a riparian strip at least 25 feet wide as measured from the water body's mean high water mark to permanently re-vegetate with native plant species across the entire construction right-of way.

23. Keystone shall comply with the following conditions regarding road protection and bonding:

a) Keystone shall coordinate road closures with state and local governments and emergency responders and shall acquire all necessary permits authorizing crossing and construction use of county and township roads.

b) Keystone shall implement a regular program of road maintenance and repair through the active construction period to keep paved and gravel roads in an acceptable condition for residents and the general public.

c) Prior to their use for construction, Keystone shall videotape those portions of all roads which will be utilized by construction equipment or transport vehicles in order to document the pre-construction condition of such roads.

d) After construction, Keystone shall repair and restore, or compensate governmental entities for the repair and restoration of, any deterioration caused by construction traffic, such that the roads are returned to at least their preconstruction condition.

e) Keystone shall use appropriate preventative measures as needed to prevent damage to paved roads and to remove excess soil or mud from such roadways.

f) Pursuant to SDCL 49-41B-38, Keystone shall obtain and file for approval by the Commission prior to construction in such year a bond in the amount of $15.6 million for the year in which construction is to commence and a second bond in the amount of $15.6 million for the ensuing year, including any additional period until construction and repair has been completed, to ensure that any damage beyond normal wear to public roads, highways, bridges or other related facilities will be adequately restored or compensated. Such bonds shall be issued in favor of, and for the benefit of, all such townships, counties, and other governmental entities whose property is crossed by the Project. Each bond shall remain in effect until released by the Commission, which release shall not be unreasonably denied following completion of the construction and repair period. Either at the contact meetings required by Condition 10 or by mail, Keystone shall give notice of the existence and amount of these bonds to all counties, townships and other governmental entities whose property is crossed by the Project.

24. Although no residential property is expected to be encountered in connection with the Project, in the event that such properties are affected and due to the nature of residential property, Keystone shall implement the following protections in addition to those set forth in its CMR Plan in areas where the Project passes within 500 feet of a residence:

a) To the extent feasible, Keystone shall coordinate construction work schedules with affected residential landowners prior to the start of construction in the area of the residences.

b) Keystone shall maintain access to all residences at all times, except for periods when it is infeasible to do so or except as otherwise agreed between Keystone and the occupant. Such periods shall be restricted to the minimum duration possible and shall be coordinated with affected residential landowners and occupants, to the extent possible.

c) Keystone shall install temporary safety fencing, when reasonably requested by the landowner or occupant, to control access and minimize hazards associated with an open trench and heavy equipment in a residential area.

d) Keystone shall notify affected residents in advance of any scheduled disruption of utilities and limit the duration of such disruption.

e) Keystone shall repair any damage to property that results from construction activities.

f) Keystone shall separate topsoil from subsoil and restore all areas disturbed by construction to at least their preconstruction condition.

g) Except where practicably infeasible, final grading and topsoil replacement, installation of permanent erosion control structures and repair of fencing and other structures shall be completed in residential areas within 10 days after backfilling the trench. In the event that seasonal or other weather conditions, extenuating circumstances, or unforeseen developments beyond Keystone's control prevent compliance with this time frame, temporary erosion controls and appropriate mitigative measures shall be maintained until conditions allow completion of cleanup and reclamation.

25. Construction must be suspended when weather conditions are such that construction activities will cause irreparable damage, unless adequate protection measures approved by the Commission are taken. At least two months prior to the start of construction in South Dakota, Keystone shall file with the Commission an adverse weather land protection plan containing appropriate adverse weather land protection measures, the conditions in which such measures may be appropriately used, and conditions in which no construction is appropriate, for approval of or modification by the Commission prior to the start of construction. The Commission shall make such plan available to impacted landowners who may provide comment on such plan to the Commission.

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

27. All pre-existing roads and lanes used during construction must be restored to at least their pre-construction condition that will accommodate their previous use, and areas used as temporary roads during construction must be restored to their original condition, except as otherwise requested or agreed to by the landowner or any governmental authority having jurisdiction over such roadway.

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

29. Prior to construction, Keystone shall have in place a winterization plan and shall implement the plan if winter conditions prevent reclamation completion until spring. The plan shall be provided to affected landowners and, upon request, to the Commission.

30. Numerous Conditions of this Order, including but not limited to 16, 19, 24, 25, 26, 27 and 51 relate to construction and its effects upon affected landowners and their property. The Applicant may encounter physical conditions along the route during construction which make compliance with certain of these Conditions infeasible. If, after providing a copy of this order, including the Conditions, to the landowner, the Applicant and landowner agree in writing to modifications of one or more requirements specified in these conditions, such as maximum clearances or right-of-way widths, Keystone may follow the alternative procedures and specifications agreed to between it and the landowner.

**IV. Pipeline Operations, Detection and Emergency Response**

31. Keystone shall construct and operate the pipeline in the manner described in the application and at the hearing, including in Keystone's exhibits, and in accordance with the conditions of this permit, the PHMSA Special Permit, if issued, and the conditions of this Order and the construction permit granted herein.

32. Keystone shall require compliance by its shippers with its crude oil specifications in order to minimize the potential for internal corrosion.

33. Keystone's obligation for reclamation and maintenance of the right-of-way shall continue throughout the life of the pipeline. In its surveillance and maintenance activities, Keystone shall, and shall cause its contractor to, equip each of its vehicles, including off-road vehicles, with a hand held fire extinguisher, portable compact shovel and communication device such as a cell phone, in areas with coverage, or a radio capable of achieving prompt communication with emergency services.

34. In accordance with 49 C.F.R. 195, Keystone shall continue to evaluate and perform assessment activities regarding high consequence areas. Prior to Keystone commencing operation, all unusually sensitive areas as defined by 49 CFR 195.6 that may exist, whether currently marked on DOT's HCA maps or not, should be identified and added to the Emergency Response Plan and Integrity Management Plan. In its continuing assessment and evaluation of environmentally sensitive and high consequence areas, Keystone shall seek out and consider local knowledge, including the knowledge of the South Dakota Geological Survey, the Department of Game Fish and Parks and local landowners and governmental officials.

35. The evidence in the record demonstrates that in some reaches of the Project in southern Tripp County, the High Plains Aquifer is present at or very near ground surface and is overlain by highly permeable sands permitting the uninhibited infiltration of contaminants. This aquifer serves as the water source for several domestic farm wells near the pipeline as well as public water supply system wells located at some distance and upgradient from the pipeline route. Keystone shall identify the High Plains Aquifer area in southern Tripp County as a hydrologically sensitive area in its Integrity Management and Emergency Response Plans. Keystone shall similarly treat any other similarly vulnerable and beneficially useful surficial aquifers of which it becomes aware during construction and continuing route evaluation.

36. Prior to putting the Keystone Pipeline into operation, Keystone shall prepare, file with PHMSA and implement an emergency response plan as required under 49 CFR 194 and a manual of written procedures for conducting normal operations and maintenance activities and handling abnormal operations and emergencies as required under 49 CFR 195.402. Keystone shall also prepare and implement a written integrity management program in the manner and at such time as required under 49 CFR 195.452. At such time as Keystone files its Emergency Response Plan and

Integrity Management Plan with PHMSA or any other state or federal agency, it shall also file such documents with the Commission. The Commission's confidential filing rules found at ARSD 20:10:01:41 may be invoked by Keystone with respect to such filings to the same extent as with all other filings at the Commission. If information is filed as "confidential," any person desiring access to such materials or the Staff or the Commission may invoke the procedures of ARSD 20:10:01:41 through 20:10:01:43 to determine whether such information is entitled to confidential treatment and what protective provisions are appropriate for limited release of information found to be entitled to confidential treatment.

37. To facilitate periodic pipeline leak surveys during operation of the facilities in wetland areas, a corridor centered on the pipeline and up to 15 feet wide shall be maintained in an herbaceous state. Trees within 15 feet of the pipeline greater than 15 feet in height may be selectively cut and removed from the permanent right-of-way.

38. To facilitate periodic pipeline leak surveys in riparian areas, a corridor centered on the pipeline and up to 10 feet wide shall be maintained in an herbaceous state.

**V. Environmental**

39. Except to the extent waived by the owner or lessee in writing or to the extent the noise levels already exceed such standard, the noise levels associated with Keystone's pump stations and other noise-producing facilities will not exceed the L10=55dbA standard at the nearest occupied, existing residence, office, hotel/motel or non-industrial business not owned by Keystone. The point of measurement will be within 100 feet of the residence or business in the direction of the pump station or facility. Post-construction operational noise assessments will be completed by an independent third-party noise consultant, approved by the Commission, to show compliance with the noise level at each pump station or other noise-producing facility. The noise assessments will be performed in accordance with applicable American National Standards Institute standards. The results of the assessments will be filed with the Commission. In the event that the noise level exceeds the limit set forth in this condition at any pump station or other noise producing facility, Keystone shall promptly implement noise mitigation measures to bring the facility into compliance with the limits set forth in this condition and shall report to the Commission concerning the measures taken and the results of post-mitigation assessments demonstrating that the noise limits have been met.

40. At the request of any landowner or public water supply system that offers to provide the necessary access to Keystone over his/her property or easement(s) to perform the necessary work, Keystone shall replace at no cost to such landowner or public water supply system, any polyethylene water piping located within 500 feet of the Project with piping that is resistant to permeation by BTEX. Keystone shall not be required to replace that portion of any piping that passes through or under a basement wall or other wall of a home or other structure. At least forty-five (45) days prior to commencing construction, Keystone shall publish a notice in each newspaper of general circulation in each county through which the Project will be constructed advising landowners and public water supply systems of this condition.

41. Keystone shall follow all protection and mitigation efforts as identified by the US Fish and Wildlife Service ("USFWS") and SDGFP. Keystone shall identify all greater prairie chicken and greater sage and sharp-tailed grouse leks within the buffer distances from the construction right of way set forth for the species in the FEIS and Biological Assessment (BA) prepared by DOS and USFWS. In accordance with commitments in the FEIS and BA, Keystone shall avoid or restrict

construction activities as specified by USFWS within such buffer zones between March 1 and June 15 and for other species as specified by USFWS and SDGFP.

42. Keystone shall keep a record of drain tile system information throughout planning and construction, including pre-construction location of drain tiles. Location information shall be collected using a sub-meter accuracy global positioning system where available or, where not available by accurately documenting the pipeline station numbers of each exposed drain tile. Keystone shall maintain the drain tile location information and tile specifications and incorporate it into its Emergency Response and Integrity Management Plans where drains might be expected to serve as contaminant conduits in the event of a release. If drain tile relocation is necessary, the applicant shall work directly with landowner to determine proper location. The location of permanent drain tiles shall be noted on as-built maps. Qualified drain tile contractors shall be employed to repair drain tiles.

**VI. Cultural and Paleontological Resources**

43. In accordance with Application, Section 6.4, Keystone shall follow the "Unanticipated Discoveries Plan," as reviewed by the State Historical Preservation Office ("SHPO") and approved by the DOS and provide it to the Commission upon request. Ex TC-1.6.4, pp. 94-96; Ex S-3. If during construction, Keystone or its agents discover what may be an archaeological resource, cultural resource, historical resource or gravesite, Keystone or its contractors or agents shall immediately cease work at that portion of the site and notify the DOS, the affected landowner(s) and the SHPO. If the DOS and SHPO determine that a significant resource is present, Keystone shall develop a plan that is approved by the DOS and commenting/signatory parties to the Programmatic Agreement to salvage avoid or protect the archaeological resource. If such a plan will require a materially different route than that approved by the Commission, Keystone shall obtain Commission and landowner approval for the new route before proceeding with any further construction. Keystone shall be responsible for any costs that the landowner is legally obligated to incur as a consequence of the disturbance of a protected cultural resource as a result of Keystone's construction or maintenance activities.

44. Keystone shall implement and comply with the following procedures regarding paleontological resources:

a) Prior to commencing construction, Keystone shall conduct a literature review and records search, and consult with the BLM and Museum of Geology at the S.D. School of Mines and Technology ("SDSMT") to identify known fossil sites along the pipeline route and identify locations of surface exposures of paleontologically sensitive rock formations using the BLM's Potential Fossil Yield Classification system. Any area where trenching will occur into the Hell Creek Formation shall be considered a high probability area.

b) Keystone shall at its expense conduct a pre-construction field survey of each area identified by such review and consultation as a known site or high probability area within the construction ROW. Following BLM guidelines as modified by the provisions of Condition 44, including the use of BLM permitted paleontologists, areas with exposures of high sensitivity (PFYC Class 4) and very high sensitivity (PFYC Class 5) rock formations shall be subject to a 100% pedestrial field survey, while areas with exposures of moderately sensitive rock formations (PFYC Class 3) shall be spot-checked for occurrences of scientifically or economically significant surface fossils and evidence of subsurface fossils. Scientifically or economically significant surface fossils shall be avoided by the Project or mitigated by collecting them if avoidance is not feasible. Following BLM guidelines for the assessment

and mitigation of paleontological resources, scientifically significant paleontological resources are defined as rare vertebrate fossils that are identifiable to taxon and element, and common vertebrate fossils that are identifiable to taxon and element and that have scientific research value; and scientifically noteworthy occurrences of invertebrate, plant and trace fossils. Fossil localities are defined as the geographic and stratigraphic locations at which fossils are found.

c) Following the completion of field surveys, Keystone shall prepare and file with the Commission a paleontological resource mitigation plan. The mitigation plan shall specify monitoring locations, and include BLM permitted monitors and proper employee and contractor training to identify any paleontological resources discovered during construction and the procedures to be followed following such discovery. Paleontological monitoring will take place in areas within the construction ROW that are underlain by rock formations with high sensitivity (PFYC Class 4) and very high sensitivity (PFYC Class 5), and in areas underlain by rock formations with moderate sensitivity (PFYC Class 3) where significant fossils were identified during field surveys.

d) If during construction, Keystone or its agents discover what may be a paleontological resource of economic significance, or of scientific significance, as defined in subparagraph (b) above, Keystone or its contractors or agents shall immediately cease work at that portion of the site and, if on private land, notify the affected landowner(s). Upon such a discovery, Keystone's paleontological monitor will evaluate whether the discovery is of economic significance, or of scientific significance as defined in subparagraph (b) above. If an economically or scientifically significant paleontological resource is discovered on state land, Keystone will notify SDSMT and if on federal land, Keystone will notify the BLM or other federal agency. In no case shall Keystone return any excavated fossils to the trench. If a qualified and BLM-permitted paleontologist, in consultation with the landowner, BLM, or SDSMT determines that an economically or scientifically significant paleontological resource is present, Keystone shall develop a plan that is reasonably acceptable to the landowner(s), BLM, or SDSMT, as applicable, to accommodate the salvage or avoidance of the paleontological resource to protect or mitigate damage to the resource. The responsibility for conducting such measures and paying the costs associated with such measures, whether on private, state or federal land, shall be borne by Keystone to the same extent that such responsibility and costs would be required to borne by Keystone on BLM managed lands pursuant to BLM regulations and guidelines, including the BLM Guidelines for Assessment and Mitigation of Potential Impacts to Paleontological Resources, except to the extent factually inappropriate to the situation in the case of private land (e.g. museum curation costs would not be paid by Keystone in situations where possession of the recovered fossil(s) was turned over to the landowner as opposed to curation for the public). If such a plan will require a materially different route than that approved by the Commission, Keystone shall obtain Commission approval for the new route before proceeding with any further construction. Keystone shall, upon discovery and salvage of paleontological resources either during pre-construction surveys or construction and monitoring on private land, return any fossils in its possession to the landowner of record of the land on which the fossil is found. If on state land, the fossils and all associated data and documentation will be transferred to the SDSM; if on federal land, to the BLM.

e) To the extent that Keystone or its contractors or agents have control over access to such information, Keystone shall, and shall require its contractors and agents to, treat the locations of sensitive and valuable resources as confidential and limit public access to this information.

## VII. Enforcement and Liability for Damage

45. Keystone shall repair or replace all property removed or damaged during all phases of construction and operation of the proposed transmission facility, including but not limited to, all fences, gates and utility, water supply, irrigation or drainage systems. Keystone shall compensate the owners for damages or losses that cannot be fully remedied by repair or replacement, such as lost productivity and crop and livestock losses or loss of value to a paleontological resource damaged by construction or other activities.

46. In the event that a person's well is contaminated as a result of construction or pipeline operation, Keystone shall pay all costs associated with finding and providing a permanent water supply that is at least of similar quality and quantity; and any other related damages, including but not limited to any consequences, medical or otherwise, related to water contamination.

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

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

49. Keystone shall pay commercially reasonable costs and indemnify and hold the landowner harmless for any loss, damage, claim or action resulting from Keystone's use of the easement, including any resulting from any release of regulated substances or from abandonment of the facility, except to the extent such loss, damage claim or action results from the gross negligence or willful misconduct of the landowner or its agents.

50. The Commission's complaint process as set forth in ARSD 20:10:01 shall be available to landowners, other persons sustaining or threatened with damage or the consequences of Keystone's failure to abide by the conditions of this permit or otherwise having standing to obtain enforcement of the conditions of this Order and Permit.

## Exhibit B

## RULINGS ON PROPOSED FINDINGS OF FACT

### Rulings on Applicants' Proposed Findings of Fact

As Applicant is the prevailing party, most of Applicant's Proposed Findings of Fact have been accepted in their general substance and incorporated in the Findings of Fact, with additions and modifications to reflect the Commission's understanding of the record.

Appendix C
South Dakota PUC Amended Final Decision and Order
Tracking Table of Changes
9/15/14

| Finding Number | Amended Final Decision and Order | Update |
|---|---|---|
| | **The Project** | |
| 14 | The purpose of the Project is to transport incremental crude oil production from the Western Canadian Sedimentary Basin ("WCSB") to meet growing demand by refineries and markets in the United States ("U.S."). This supply will serve to replace U.S. reliance on less stable and less reliable sources of offshore crude oil. Ex TC-1, 1.1, p. 1; Ex TC-1, 3.0 p. 23; Ex TC-1, 3.4 p. 24. | The purpose of the Project is to transport incremental crude oil production from the Western Canadian Sedimentary Basin ("WCSB") and domestic production from the Williston Basin area to meet demand by refineries and markets in the United States ("U.S."). This supply will serve to replace U.S. reliance on less stable and less reliable sources of offshore crude oil and support the growth of crude oil production in the U.S. (See updated Findings 24-29) |
| 15 | The Project will consist of three segments: the Steele City Segment, the Gulf Coast Segment, and the Houston Lateral. From north to south, the Steele City Segment extends from Hardisty, Alberta, Canada, southeast to Steele City, Nebraska. The Gulf Coast Segment extends from Cushing, Oklahoma south to Nederland, in Jefferson County, Texas. The Houston Lateral extends from the Gulf Coast Segment in Liberty County, Texas southwest to Moore Junction, Harris County, Texas. It will interconnect with the northern and southern termini of the previously approved 298-mile-long, 36-inch-diameter Keystone Cushing Extension segment of the Keystone Pipeline Project. Ex TC-1,1.2, p. 1. Initially, the pipeline would have a nominal capacity to transport 700,000 barrels per day ("bpd"). Keystone could add additional pumping capacity to expand the nominal capacity to 900,000 bpd. Ex TC-1, 2.1.2, p. 8. | The Project will consist of the Steele City Segment. From north to south, the Steele City Segment extends from Hardisty, Alberta, Canada, southeast to Steele City, Nebraska. It will interconnect with the previously approved and constructed 298-mile-long, 36-inch-diameter Keystone Cushing Extension segment of the Keystone Pipeline System allowing crude oil to be delivered to Gulf Coast Refineries. The pipeline would have a maximum capacity to transport 830,000 barrels per day. |
| 16 | The Project is an approximately 1,707 mile pipeline with about 1,380, miles in the United States. The South Dakota portion of the pipeline will be approximately 314 miles in length and will extend from the Montana border in Harding County to the Nebraska border in Tripp County. The Project is proposed to cross the South Dakota counties of Harding, Butte, Perkins, Meade, Pennington, Haakon, Jones, Lyman and Tripp. Ex TC-1, 1.2 and 2.1.1, pp. 1 and 8. Detailed route maps are presented in Ex TC-1, Exhibits A and C, as updated in Ex TC-14. | The Project is an approximately 1202 mile pipeline with about 876 miles in the United States. The South Dakota portion of the pipeline will be approximately 315 miles in length and will extend from the Montana border in Harding County to the Nebraska border in Tripp County. The Project is proposed to cross the South Dakota counties of Harding, Butte, Perkins, Meade, Pennington, Haakon, Jones, Lyman and Tripp. |
| 17 | Construction of the Project is proposed to commence in May of 2011 and be completed in 2012. Construction in South Dakota will be conducted in five spreads, generally proceeding in a north to south direction. The Applicant expects to place the Project in service in 2012. This in-service date is consistent with the requirements of the Applicant's shippers who have made the contractual commitments that underpin the viability and need for the project. Ex TC-1, 1.4, pp. 1 and 4; TR 26. | Construction of the Project is proposed to commence when all necessary permits are obtained. Construction in South Dakota will be conducted in three or four spreads, generally proceeding in a north to south direction. The Applicant expects to place the Project in service when construction is completed. |
| 18 | The pipeline in South Dakota will extend from milepost 282.5 to milepost 597, approximately 314 miles. The pipeline will have a 36-inch nominal diameter and be constructed using API 5L X70 or X80 high-strength steel. An external fusion bonded epoxy ("FBE") coating will be applied to the pipeline and all buried facilities to protect against corrosion. Cathodic protection will be provided by impressed current The pipeline will have batching capabilities and will be able to transport products ranging from light crude oil to heavy crude oil. Ex TC-1, 2.2, 2.2.1, 6.5.2, pp. 8-9, 97 -98; Ex TC-8, ¶ 26. | The pipeline in South Dakota will extend from milepost 285.6 to milepost 600.9, approximately 315 miles. The pipeline will have a 36-inch nominal diameter and be constructed using API 5L X70M high-strength steel. An external fusion bonded epoxy ("FBE") coating will be applied to the pipeline and all buried facilities to protect against corrosion. Cathodic protection will be provided by impressed current. The pipeline will have batching capabilities and will be able to transport products ranging from light crude oil to heavy crude oil. |
| 19 | The pipeline will operate at a maximum operating pressure of 1,440 psig. For location specific low elevation segments close to the discharge of pump stations, the maximum operating pressure will be 1,600 psig. Pipe associated with these segments of 1,600 psig MOP are excluded from the Special Permit application and will have a design factor of 0.72 and pipe wall thickness of 0.572 inch (X-70) or 0.500 inch (X-80). All other segments in South Dakota will have a MOP of 1,440 psig. Ex TC-1, 2.2.1, p. 9. | At most locations, the pipeline will operate at a maximum operating pressure of 1,307 psig. For location specific low elevation segments close to the discharge of pump stations, the maximum operating pressure will be 1,600 psig. Pipe associated with these segments of 1,600 psig MOP will have a design factor of 0.72 and a nominal pipe wall thickness of 0.572 inch (X-70M). All other segments in South Dakota will have a MOP of 1,307 psig. |



009526

| Finding Number | Amended Final Decision and Order | Update |
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| 20 | The Project will have seven pump stations in South Dakota, located in Harding (2), Meade, Haakon, Jones and Tripp (2) Counties. TC-1, 2.2.2, p. 10. The pump stations will be electrically driven. Power lines required for providing power to pump stations will be permitted and constructed by local power providers, not by Keystone. Initially, three pumps will be installed at each station to meet the nominal design flow rate of 700,000 bpd. If future demand warrants, pumps may be added to the proposed pump stations for a total of up to five pumps per station, increasing nominal throughput to 900,000 bpd. No additional pump stations will be required to be constructed for this additional throughput. No tank facilities will be constructed in South Dakota. Ex TC-1, 2.1.2, p.8. Sixteen mainline valves will be located in South Dakota. Seven of these valves will be remotely controlled, in order to have the capability to isolate sections of line rapidly in the event of an emergency to minimize impacts or for operational or maintenance reasons. Ex TC-1, 2.2.3, pp. 10- 11. | The Project will have seven pump stations in South Dakota, located in Harding (2), Meade, Haakon, Jones and Tripp (2) Counties. TC-1, 2.2.2, p. 10. The pump stations will be electrically driven. Power lines required for providing power to pump stations will be permitted and constructed by local power providers, not by Keystone. Three to five pumps will be installed at each station to meet the maximum design flow rate of 830,000 bpd. No tank facilities will be constructed in South Dakota. Twenty mainline valves will be located in South Dakota. All of these valves will be remotely controlled, in order to have the capability to isolate sections of line rapidly in the event of an emergency to minimize impacts or for operational or maintenance reasons. |
| 22 | The Project will be designed, constructed, tested, and operated in accordance with all applicable requirements, including the U.S. Department of Transportation, Pipeline Hazardous Materials and Safety Administration (PHMSA) regulations set forth at 49 CFR Part 195, as modified by the Special Permit requested for the Project from PHMSA (see Finding 71). These federal regulations are intended to ensure adequate protection for the public and the environment and to prevent crude oil pipeline accidents and failures. Ex TC-1, 2.2, p. 8. | The Project will be designed, constructed, tested, and operated in accordance with all applicable requirements, including the U.S. Department of Transportation, Pipeline Hazardous Materials and Safety Administration (PHMSA) regulations set forth at 49 CFR Part 195, and the special conditions developed by PHMSA and set forth in Appendix Z to the Department of State ("DOS") January 2014 Final Supplemental Environmental Impact Statement ("Final SEIS"). These federal regulations and additional conditions are intended to ensure adequate protection for the public and the environment and to prevent crude oil pipeline accidents and failures. |
| 23 | The current estimated cost of the Keystone Project in South Dakota is $921.4 million. Ex TC-1, 1.3, p. 1. | The current estimated cost of the Keystone XL Project in South Dakota is $1.974 billion. The estimated cost of the South Dakota portion of the project has primarily increased due to the new technical requirements (for example, the 59 additional conditions set forth in the DOS Final SEIS), and inflation and additional costs (for example, increased project management; regulatory; and material storage and preservation costs) due to the projected six-year delay in starting construction. |
| | **Demand for the Facility** | |
| 24 | The transport of additional crude oil production from the WCSB is necessary to meet growing demand by refineries and markets in the U.S. The need for the project is dictated by a number of factors, including increasing WCSB crude oil supply combined with insufficient export pipeline capacity; increasing crude oil demand in the U.S. and decreasing domestic crude supply; the opportunity to reduce U.S. dependence on foreign off-shore oil through increased access to stable, secure Canadian crude oil supplies; and binding shipper commitments to utilize the Keystone Pipeline Project. Ex TC-1, 3.0, p. 23. | The June 29, 2010 order recites Findings of Fact demonstrating the strong demand for the Project. Given the dynamic nature of the crude oil market, there have been changes in the nature of this demand since 2010. As demonstrated below, however market demand for the Project remains strong today.<br><br>The transport of additional crude oil production from the WCSB continues to be necessary to meet demand by refineries and markets in the U.S. The need for the project is driven by a number of factors, including increasing domestic U.S. and Canadian, crude oil production combined with insufficient pipeline capacity; an energy efficient and safe method to transport this growing production; the opportunity to reduce U.S dependence on foreign offshore crude oil through increased access to North American supplies; and binding shipper commitments to utilize the Keystone Pipeline System. |
| 25 | According to the U.S. Energy Information Administration ("EIA"), U.S. demand for petroleum products has increased by over 11 percent or 2,000,000 bpd over the past 10 years and is expected to increase further. The EIA estimates that total U.S. petroleum consumption will increase by approximately 10 million bpd over the next 10 years, representing average demand growth of about 100,000 bpd per year (EIA Annual Energy Outlook 2008). Ex TC-1, 3.2, pp. 23-24. | United States production of crude oil has increased significantly, from approximately 6.5 million barrels per day (bpd) in 2012, and is expected to peak at 9.6 million bpd by 2019. However, even with the domestic production growth, the U.S. is expected to remain a net importer of crude oil. According to the U.S. Energy Information Administration ("EIA"), U.S. demand for crude oil has held steady at approximately 15 million bpd and is expected to remain relatively stable into the future.[1] |
| 26 | At the same time, domestic U.S. crude oil supplies continue to decline. For example, over the past 10 years, domestic crude production in the United States has declined at an average rate of about 135,000 bpd per year, or 2% per year. Ex TC-1, 3.3, p. 24. Crude and refined petroleum product imports into the U.S. have increased by over 3.3 million bpd over the past 10 years. In 2007, the U.S. imported over 13.4 million bpd of crude oil and petroleum products or over 60 percent of total U.S. petroleum product | The rise in U.S. crude oil production, predominantly light crude, has replaced most foreign imports of light crude. However the demand persists for imported heavy crude oil by U.S. refineries that are optimally configured to process heavy crude slates.[2] The U.S. Gulf Coast continues to import approximately 3.5 million bpd of heavy and medium sour crude oil.[3] |

[1] Energy Information Administration (EIA) Annual Energy Outlook 2014
[2] Id.
[3] Energy Information Administration – Company Level Imports

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| | consumption. Canada is currently the largest supplier of imported crude oil and refined products to the U.S., supplying over 2.4 million bpd in 2007, representing over 11 percent of total U.S. petroleum product consumption (EIA 2007). Ex TC-1, 3.4, p.24. | |
| 27 | The Project will provide an opportunity for U.S. refiners in Petroleum Administration for Defense District III, the Gulf Coast region, to further diversify supply away from traditional offshore foreign crude supply and to obtain direct access to secure and growing Canadian crude supplies. Access to additional Canadian crude supply will also provide an opportunity for the U.S. to offset annual declines in domestic crude production and, specifically, to decrease its dependence on other foreign crude oil suppliers, such as Mexico and Venezuela, the top two heavy crude oil exporters into the U.S. Gulf Coast. Ex TC-1, 3.4, p. 24. | Canadian production of heavy crude oil continues to grow, the vast majority of which is currently exported to the United States to be processed by U.S. refineries. North American crude oil production growth and logistics constraints have contributed to significant discounts on the price of landlocked crude and led to growing volumes of crude shipped by rail in the United States and, more recently Canada. As the DOS Final SEIS makes clear, in the absence of new pipelines, crude oil will continue to be transported via rail at an increasing rate.[4]<br><br>The North Dakota Pipeline Authority estimates that rail export volumes from the U.S. Williston Basin have increased from approximately 40,000 bpd in 2010 to over 700,000 bpd in early 2014. Over 60% of crude oil transported from the Williston Basin is delivered by rail.[5] The industry has also been making significant investments in increasing rail transport capacity for crude oil out of the Western Canadian Sedimentary Basin (WCSB).[6] In recent years, rail transport of crude oil in Canada has grown from approximately 10,000 bpd in 2010 to approximately 270,000 bpd by the end of 2013.[7] The DOS Final SEIS indicates that transportation of crude oil by pipeline is safer and less greenhouse gas intensive than crude oil transportation by rail.[8]<br><br>The Project will provide an opportunity for U.S. refiners in Petroleum Administration for Defense District III, the Gulf Coast region, to further diversify supply away from traditional offshore foreign crude supply and to obtain direct access to secure and growing domestic crude supplies. |
| 28 | Reliable and safe transportation of crude oil will help ensure that U.S. energy needs are not subject to unstable political events. Established crude oil reserves in the WCSB are estimated at 179 billion barrels (CAPP 2008). Over 97 percent of WCSB crude oil supply is sourced from Canada's vast oil sands reserves located in northern Alberta. The Alberta Energy and Utilities Board estimates there are 175 billion barrels of established reserves recoverable from Canada's oil sands. Alberta has the second largest crude oil reserves in the world, second only to Saudi Arabia. Ex TC-1, 3.1, p. 23. | Reliable and safe transportation of crude oil will help ensure that U.S. energy needs are not subject to unstable political events. Of Canada's 173 billion barrels of oil reserves, 97% or 167 billion, barrels are located in the oil sands. In terms of overall oil reserves, Canada's 173 billion barrels is third only to Venezuela and Saudi Arabia.[9] Canada is the largest foreign supplier of crude oil to the U.S. and is likely to remain as such for the foreseeable future.[10] |
| 29 | Shippers have already committed to long-term binding contracts, enabling Keystone to proceed with regulatory applications and construction of the pipeline once all regulatory, environmental, and other approvals are received. These long-term binding shipper commitments demonstrate a material endorsement of support for the Project, its economics, proposed route, and target market, as well as the need for additional pipeline capacity and access to Canadian crude supplies. Ex TC-1, 3.5, p. 24. | Shippers have committed to long-term binding contracts, enabling Keystone to proceed with regulatory applications and construction of the pipeline once all regulatory, environmental, and other approvals are received. These long-term binding shipper commitments demonstrate a material endorsement of support for the Project, its economics, proposed route, and target market, as well as the need for additional pipeline capacity to access domestic and Canadian crude supplies. The DOS Final SEIS independently confirms the continuing strong market demand.[11] |
| | **Environmental** | |
| 32 | Table 6 to the Application summarizes the environmental impacts that Keystone's analysis indicates could be expected to remain after its Construction Mitigation and Reclamation Plan (CMR Plan) are implemented. Ex TC-1, pp. 31-37. | Table 6 is still applicable. The latest version of the CMR Plan is Rev4, April 2012. Attachment A to this Tracking Table is a redline version showing changes to the CMR Plan from Rev1 to the current Rev4. Overall changes to the CMR Plan were made to clarify language, provide additional detail related to construction procedures and incorporate lessons learned from previous pipeline construction, current right-of-way conditions and project requirements |

[4] Final Supplemental Environmental Impact Statement, Keystone XL Pipeline Project, January 2014 at 1.4.3.2 and 1.4.3.3.
[5] North Dakota Pipeline Authority 2014 https://ndpipelines.files.wordpress.com/2012/04/nd-rail-estimate-april-2014.jpg
[6] Final Supplemental Environmental Impact Statement Keystone XL Pipeline Project, January 2014 at 1.4.1.3
[7] Transportation Safety Board of Canada http://www.tsb.gc.ca/eng/recommandations-recommendations/rail/2014/rec-r1401-r1403.asp
[8] Final Supplemental Environmental Impact Statement, Keystone XL Pipeline Project, January 2014, Chapter 5 and Errata Sheet at http://keystonepipeline-xl.state.gov/documents/organization/227464.pdf.
[9] Canadian Association of Petroleum Producers (CAPP) Crude Oil Forecast, Markets & Transportation June 2014
[10] EIA Annual Energy Outlook 2014
[11] Final Supplemental Environmental Impact Statement, Keystone XL Pipeline Project, January 2014 at 1.3.1 and 1.4.2.6

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| 33 | The pipeline will cross the Unglaciated Missouri Plateau. This physiographic province is characterized by a dissected plateau where river channels have incised into the landscape. Elevations range from just over 3,000 feet above mean sea level in the northwestern part of the state to around 1,800 feet above mean sea level in the White River valley. The major river valleys traversed include the Little Missouri River, Cheyenne River, and White River. Ex TC-1, 5.3.1, p. 30; Ex TC-4, ¶ 15. Exhibit A to the Application includes soil type maps and aerial photograph maps of the Keystone pipeline route in South Dakota that indicate topography, land uses, project mileposts and Section, Township, Range location descriptors. Ex TC-1, Exhibit A. Updated versions of these maps were received in evidence as Exhibit TC-14. | The soil type maps and aerial photograph maps of the Keystone pipeline route in South Dakota that indicate topography, land uses, project mileposts and Section, Township, Range location descriptors that were submitted in evidence as Exhibit TC-14 are still generally consistent in the description of the current Project route through South Dakota. Keystone will submit updated maps prior to the initiation of construction as required by Condition No. 6 of the Amended Final Decision and Order. |
| 41 | Fifteen perennial streams and rivers, 129 intermittent streams, 206 ephemeral streams and seven man-made ponds will be crossed during construction of the Project in South Dakota. Keystone will utilize horizontal directional drilling ("HDD") to cross the Little Missouri, Cheyenne and White River crossings. Keystone intends to use open-cut trenching at the other perennial streams and intermittent water bodies. The open cut wet method can cause the following impacts: loss of in-stream habitat through direct disturbance, loss of bank cover, disruption of fish movement, direct disturbance to spawning, water quality effects and sedimentation effects. Alternative techniques include open cut dry flume, open cut dam-and-pump and horizontal directional drilling. Exhibit C to the Application contains a listing of all water body crossings and preliminary site-specific crossing plans for the HDD sites. Ex TC-14. Permitting of water body crossings, which is currently underway, will ultimately determine the construction method to be utilized. Keystone committed to mitigate water crossing impacts through implementation of procedures outlined in the CMR Plan. Ex TC-1, 5.4.1, pp. 45-46. | Fifteen perennial streams and rivers, 129 intermittent streams, and 206 ephemeral streams will be crossed during construction of the Project in South Dakota. No man-made ponds are crossed. Keystone will utilize horizontal directional drilling ("HDD") to cross the Little Missouri, Cheyenne, Bad, and White rivers, as well as Bridger Creek. Keystone intends to use open-cut trenching at other perennial streams and intermittent water bodies. The open cut wet method can cause the following impacts: loss of in-stream habitat through direct disturbance, loss of bank cover, disruption of fish movement, direct disturbance to spawning, water quality effects and sedimentation effects. Alternative techniques include open cut dry flume, open cut dam-and-pump and horizontal directional drilling. To supplement Exhibit C to the Application, Attachment B to this Tracking Table contains the preliminary site-specific crossing plans for the two newly identified HDD crossings; Bad River and Bridger Creek. |
| 50 | The total length of Project pipe with the potential to affect a High Consequence Area ("HCA") is 34.3 miles. A spill that could affect an HCA would occur no more than once in 250 years. TC-12, ¶ 24. | The total length of Project pipe with the potential to affect a High Consequence Area ("HCA") is 19.9 miles. A spill that could affect an HCA would occur no more than once in 250 years. |
| 54 | Of the approximately 314-mile route in South Dakota, all but 21.5 miles is privately owned. 21.5 miles is state-owned and managed. The list is found in Table 14. No tribal or federal lands are crossed by the proposed route. Ex TC-1, 5.7.1, p. 75. | Of the approximately 315-mile route in South Dakota, all but 27.9 miles are privately owned. 1.7 miles are local government owned, and 26.3 miles are state-owned and managed. No tribal or federal lands are crossed by the route. |
| | **Design and Construction** | |
| 60 | Keystone has applied for a special permit ("Special Permit") from PHMSA authorizing Keystone to design, construct, and operate the Project at up to 80% of the steel pipe specified minimum yield strength at most locations. TC-1, 2.2, p. 8; TR 62. In Condition 2, the Commission requires Keystone to comply with all of the conditions of the Special Permit, if issued. | Keystone withdrew its request to PHMSA for a special permit ("Special Permit") on August 5, 2010. Keystone will implement 59 additional safety measures as set forth in the DOS Final SEIS, Appendix Z. These measures provide an enhanced level of safety equivalent to or greater than those that would have applied under the previously requested Special Permit. |
| 61 | TransCanada operates approximately 11,000 miles of pipelines in Canada with a 0.8 design factor and requested the Special Permit to ensure consistency across its system and to reduce costs. PHMSA has previously granted similar waivers adopting this modified design factor for natural gas pipelines and for the Keystone Pipeline. Ex TC-8, ¶¶ 13, 17. | [Finding 61 is no longer relevant as Keystone has withdrawn its request for a Special Permit]. |
| 62 | The Special Permit is expected to exclude pipeline segments operating in (i) PHMSA defined HCAs described as high population areas and commercially navigable waterways in 49 CFR Section 195.450; (ii) pipeline segments operating at highway, railroad, and road crossings; (iii) piping located within pump stations, mainline valve assemblies, pigging facilities, and measurement facilities; and (iv) areas where the MOP is greater than 1,440 psig. Ex TC-8, ¶ 16. | [Finding 62 is no longer relevant as Keystone has withdrawn its request for a Special Permit.] |
| 63 | Application of the 0.8 design factor and API 5L PSL2 X70 high-strength steel pipe results in use of pipe with a 0.463 inch wall thickness, as compared with the 0.512 inch wall thickness under the otherwise applicable 0.72 design factor, a reduction in thickness of .050 inches. TR 61. PHMSA previously found that the issuance of a waiver is not inconsistent with pipeline safety and that the waiver will provide a level of safety equal to or greater than that which would be provided if the pipeline were operated under the otherwise applicable regulations. Ex TC-8, ¶ 15. | The pipeline will operate at a maximum operating pressure of 1,307 psig. Use of API 5L X70 high-strength steel results in a 0.465 inch nominal pipe wall thickness. For location specific low elevation segments close to the discharge of pump stations, the maximum operating pressure will be 1,600 psig. Pipe associated with these segments of 1,600 psig MOP will have a design factor of 0.72 and a nominal pipe wall thickness of 0.572 inch (X-70M). |

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| 68 | TransCanada has thousands of miles of this particular grade of pipeline steel installed and in operation. TransCanada pioneered the use of FBE, which has been in use on its system for over 29 years. There have been no leaks on this type of pipe installed by TransCanada with the FBE coating and cathodic protection system during that time. When TransCanada has excavated pipe to validate FBE coating performance, there has been no evidence of external corrosion. Ex TC-8, ¶ 27. | TransCanada has thousands of miles of this particular grade of pipeline steel installed and in operation. TransCanada pioneered the use of FBE, which has been in use on its system for over 33 years. There have been no leaks on this type of pipe installed by TransCanada with the FBE coating and cathodic protection system during that time. When TransCanada has excavated pipe to validate FBE coating performance, there has been no evidence of external corrosion except for one instance where an adjacent foreign utility interfered with the cathodic protection system. No similar situations exist on the Project in South Dakota. |
| 73 | The Applicant has prepared a detailed CMR Plan that describes procedures for crossing cultivated lands, grasslands, including native grasslands, wetlands, streams and the procedures for restoring or reclaiming and monitoring those features crossed by the Project. The CMR Plan is a summary of the commitments that Keystone has made for environmental mitigation, restoration and post-construction monitoring and compliance related to the construction phase of the Project. Among these, Keystone will utilize construction techniques that will retain the original characteristics of the lands crossed as detailed in the CMR Plan. Keystone's thorough implementation of these procedures will minimize the impacts associated with the Project. A copy of the CMR Plan was filed as Exhibit B to Keystone's permit application and introduced into evidence as TC-1, Exhibit B. | Keystone has updated its CMR Plan since the Amended Final Decision and Order. Overall changes to the CMR Plan were made to clarify language, provide additional detail related to construction procedures and incorporate lessons learned from previous pipeline construction, current right-of-way conditions and project requirements. A redlined version of the CMR Plan showing changes since the version considered in 2010 is attached as Attachment A to this Tracking Table. |
| 80 | Keystone is in the process of preparing, in consultation with the area National Resource Conservation Service, construction/reclamation unit ("Con/Rec Unit') mapping to address differing construction and reclamation techniques for different soils conditions, slopes, vegetation, and land use along the pipeline route. This analysis and mapping results in the identification of segments called Con/Rec Units. Ex. TC-5; TC-16, DR 3-25. | In consultation with the area National Resource Conservation Service, Keystone has completed construction/reclamation unit ("Con/Rec Unit') mapping to address differing construction and reclamation techniques for different soils conditions, slopes, vegetation, and land use along the pipeline route. |
| 83 | Keystone will utilize HDD for the Little Missouri, Cheyenne and White River crossings, which will aid in minimizing impacts to important game and commercial fish species and special status species. Open-cut trenching, which can affect fisheries, will be used at other perennial streams. Keystone will use best practices to reduce or eliminate the impact of crossings at the perennial streams other than the Cheyenne and White Rivers. Ex TC-1 , 5.4.1, p. 46; 5.6.2, p. 72; TC-16, DR 3-39. | Keystone will utilize HDD for the Little Missouri, Cheyenne, Bad and White River crossings, as well as Bridger Creek, which will aid in minimizing impacts to important game and commercial fish species and special status species. Open-cut trenching, which can affect fisheries, will be used at other perennial streams. Keystone will use best practices to reduce or eliminate the impact of crossings at the perennial streams that are open cut. |
| | **Operation and Maintenance** | |
| 90 | The Keystone pipeline will be designed constructed, tested and operated in accordance with all applicable requirements, including the PHMSA regulations set forth at 49 CFR Parts 194 and 195, as modified by the Special Permit. These federal regulations are intended to ensure adequate protection for the public and the environment and to prevent crude oil pipeline accidents and failures. Ex TC-8, ¶ 2. | The Keystone pipeline will be designed constructed, tested and operated in accordance with all applicable requirements, including the PHMSA regulations set forth at 49 CFR Parts 194 and 195, and the 59 PHMSA Special Conditions as set forth in DOS Final SEIS, Appendix Z. These federal regulations and additional conditions are intended to ensure adequate protection for the public and the environment and to prevent crude oil pipeline accidents and failures. |
| | **Socio-Economic Factors** | |
| 107 | Socio-economic evidence offered by both Keystone and Staff demonstrates that the welfare of the citizens of South Dakota will not be impaired by the Project. Staff expert Dr. Michael Madden conducted a socio-economic analysis of the Keystone Pipeline, and concluded that the positive economic benefits of the project were unambiguous, while most if not all of the social impacts were positive or neutral. S-2, Madden Assessment at 21. The Project, subject to compliance with the Special Permit and the Conditions herein, would not, from a socioeconomic standpoint: (i) pose a threat of serious injury to the socioeconomic conditions in the project area; (ii) substantially impair the health, safety, or welfare of the inhabitants in the project area; or (iii) unduly interfere with the orderly development of the region. | [Keystone has withdrawn its Special Permit application but will comply with the 59 additional conditions set forth in the DOS Final SEIS, Appendix Z, which provide an enhanced level of safety equivalent to or greater than those that would have applied under the requested Special Permit.]<br><br>The increased cost of the Project reflected in updated Finding 23 is likely to result in increased tax revenue to the affected counties. |

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

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| IN THE MATTER OF THE APPLICATION BY TRANSCANADA KEYSTONE PIPELINE, LP FOR A PERMIT UNDER THE SOUTH DAKOTA ENERGY CONVERSION AND TRANSMISSION FACILITIES ACT TO CONSTRUCT THE KEYSTONE XL PROJECT, | : | HP 14-001<br><br>DIRECT TESTIMONY OF COREY GOULET |

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Pursuant to the Commission's Order Granting Motion to Define Issues and Setting Procedural Schedule, Petitioner TransCanada Keystone Pipeline, LP, offers the following direct testimony of Corey Goulet.

**1. Please state your name and address for the record.**

Answer: My name is Corey Goulet. My business address is 450 1st Street S.W., Calgary, AB Canada T2P 5H1.

**2. Please state your position with Keystone and provide a description of your areas of responsibility with respect to the Keystone XL Project.**

Answer: I am President, Keystone Projects, with overall accountability for the implementation and development of the Keystone Pipeline system, including the Keystone XL Project (Project). In that capacity, I am responsible for overall leadership and direction of the Project.

**3. Please state your professional qualifications and experience with pipeline operations.**

Answer: My professional background is stated in my resume, a copy of which is attached as Exhibit A. I have a degree in mechanical engineering.

**4. Are you responsible for portions of the Tracking Table of Changes attached as Appendix C to Keystone's certification petition?**

Answer: Yes. I am individually or jointly responsible for the information provided with respect to Finding Numbers 14, 15, 16, 17, 18, 19, 20, 22, 23, and 107 related to the Project. In general, I can testify to the Project purpose; overall description; construction schedule; operating parameters; overall design; cost; and tax revenues.

**5. Please summarize the updated information regarding Finding Number 14.**

Answer: The Bakken Marketlink project was developed after Keystone's permit application in HP 09-001. The update to this finding reflects that the Project's purpose include transporting domestic production from the Williston Basin and supporting the growth of crude oil production in the United States.

**6. Please summarize the updated information regarding Finding No. 15.**

Answer: The Gulf Coast Segment of the original Keystone XL Project and the Houston Lateral were constructed as a stand-alone project. The update to this finding reflects that change, meaning that the Project consists of the Steele City Segment, from Hardisty, Alberta, Canada, to Steele City Nebraska, where it will interconnect with the Keystone Cushing Extension segment of the Keystone Pipeline. The Project's current design is based on a maximum capacity to transport 830,000 barrels per day.

**7. Please summarize the updated information regarding Finding No. 16.**

Answer: Because the Project is limited to the Steele City Segment, the mileage decreased to approximately 1202 miles, with 876 miles through Montana, South Dakota, and Nebraska. The mileage has changed slightly in South Dakota due to minor route variations made at the request of landowners or for engineering reasons. The right of way passes through the same counties as indicated in the Permit Application.

**8. Please summarize the updated information regarding Finding No. 17.**

Answer: Keystone does not currently have a construction schedule for the Project, pending issuance of the Presidential Permit. The Project's inservice date is uncertain for the same reason.

**9. Please summarize the updated information regarding Finding No. 18.**

Answer: Due to minor route variations, the mileage in South Dakota and the mileposts have changed slightly. The pipeline will be constructed using API 5L X70M high-strength steel, which was one of the design options presented in the original Permit Application. Keystone's final design determinations were made after TransCanada withdrew its application to PHMSA for a special permit and adopted 59 special conditions developed by PHMSA as set forth in Appendix Z to the Department of State Final Supplemental Environmental Impact Statement (FSEIS).

**10. Please summarize the updated information regarding Finding No. 19.**

Answer: This update reflects final design determinations based on the decision to withdraw the special permit application and the requirements of 49 CFR 195.106.

**11. Please summarize the updated information regarding Finding No. 20.**

Answer: This update reflects a change in the number of mainline valves in South Dakota from 16 to 20 due to PHMSA requirements. All of the valves will be remotely controlled for purposes of emergency response.

**12. Please summarize the updated information regarding Finding No. 22.**

Answer: The 59 special conditions are set forth in Appendix Z to the FSEIS. Keystone has committed to meet these conditions.

**13. Please summarize the updated information regarding Finding No. 23.**

Answer: The estimated cost of the Project in South Dakota increased to $1.974 billion due to new technical requirements, inflation, and additional costs due to the delay in receipt of federal approval and commencing construction.

**14. Please summarize the updated information regarding Finding No. 107.**

Answer: Although I am not a tax expert, the increased cost of the Project reflected in Finding No. 23 is likely to result in increased tax revenues to the affected counties. To the extent that tax revenues are an issue at the hearing, Keystone may present rebuttal testimony addressing tax issues from Steve Klekar, Manager, Property Taxation for TransCanada – US Pipelines.

**15. Are you aware of any reason that Keystone cannot continue to meet the conditions on which the Permit was granted by the Commission?**

Answer: No. As stated in the Certification that I signed, Keystone is or will be able to satisfy all of the conditions imposed by the Commission as part of its Amended Final Decision and Order dated June 29, 2010.

**16. Does this conclude your prepared direct testimony?**

Answer: Yes.

Dated this 1 day of April, 2015.

Corey Goulet

## CERTIFICATE OF SERVICE

I hereby certify that on the 2nd day of April, 2015, I sent by United States first-class mail, postage prepaid, or e-mail transmission, a true and correct copy of the foregoing Direct Testimony of Corey Goulet, to the following:

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# Corey Goulet

President, Keystone Projects

As President, Keystone Projects, Corey Goulet has overall accountability for the development and implementation of all phases of the Keystone Pipeline including securing land and permits, engineering, procurement, construction, commissioning, start-up and testing.

Prior to his current role, Mr. Goulet was Vice-President of the Facilities and Pipeline Projects department where he was responsible for leading the technical development and implementation of power plant, compression, metering and pipeline projects in Canada and the United States.

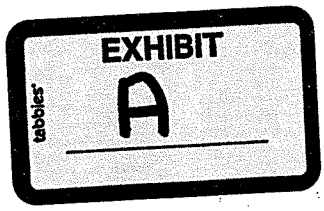
Mr. Goulet has 27 years of energy infrastructure experience. His experience is varied and has focused on the development, construction, operation and maintenance of natural gas, wind, hydro, nuclear and transmission power facilities; gas, oil and refined products pipelines; and oil and gas production facilities. He joined the company in 1998 as a manager in the international business unit where he was responsible for developing projects. Since that role, he has lead various departments including pipeline engineering, energy projects, and nuclear technical development.

Mr. Goulet is a former member of the Operations and System Integrity subcommittee for CSA Z662 Oil and Gas Pipeline Systems. In addition, he represented TransCanada for two years as a Board member, Executive Committee member, and Planning Committee member with the Pipeline Research Council International, Inc. (PRCI). Mr. Goulet has also been a Board member for two joint venture companies.

Born and raised near Edmonton, Alberta, he graduated with a Bachelor of Science in Mechanical Engineering (with Distinction) from the University of Alberta in 1985.

With more than 60 years' experience, TransCanada is a leader in the responsible development and reliable operation of North American energy infrastructure including natural gas and oil pipelines, power generation and gas storage facilities. TransCanada operates a network of natural gas pipelines that extends more than 68,500 kilometres (42,500 miles), tapping into virtually all major gas supply basins in North America. TransCanada is one of the continent's largest providers of gas storage and related services with more than 400 billion cubic feet of storage capacity. A growing independent power producer, TransCanada owns or has interests in over 11,800 megawatts of power generation in Canada and the United States. TransCanada is developing one of North America's largest oil delivery systems. TransCanada's common shares trade on the Toronto and New York stock exchanges under the symbol TRP. For more information visit: www.transcanada.com or check us out on Twitter @transcanada or http://blog.transcanada.com.






TransCanada
*In business to deliver*

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

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| IN THE MATTER OF THE APPLICATION BY TRANSCANADA KEYSTONE PIPELINE, LP FOR A PERMIT UNDER THE SOUTH DAKOTA ENERGY CONVERSION AND TRANSMISSION FACILITIES ACT TO CONSTRUCT THE KEYSTONE XL PROJECT, | : | HP 14-001<br><br>DIRECT TESTIMONY OF DAVID DIAKOW |

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Pursuant to the Commission's Order Granting Motion to Define Issues and Setting Procedural Schedule, Petitioner TransCanada Keystone Pipeline, LP, offers the following direct testimony of David Diakow.

**1. Please state your name and address for the record.**

Answer: My name is David Diakow. My business address is 450 1st Street S.W., Calgary, AB Canada T2P 5H1.

**2. Please state your position with Keystone and provide a description of your areas of responsibility with respect to the Keystone XL Project.**

Answer: I am Vice President, Commercial, Liquids Pipelines, for TransCanada Pipelines. I am responsible for commercial activities for TransCanada's liquids pipeline business, including the Keystone XL Project.

**3. Please state your professional qualifications and experience with pipeline operations.**

Answer: My professional background is stated in my resume, a copy of which is attached as Exhibit A. I have a bachelor's and master's degree in mechanical engineering, and a Master of Business Administration degree.

**4. Are you responsible for portions of the Tracking Table of Changes attached as Appendix C to Keystone's certification petition?**

Answer: Yes. I am individually or jointly responsible for the information provided with respect to Finding Numbers 24, 25, 26, 27, 28, and 29 related to the Project. In general, I can testify to demand for the Project.

**5. Please summarize the updated information regarding Finding Number 24.**

The crude oil market is dynamic. While the crude oil market has changed since 2010, demand for the Project remains strong. Keystone has binding shipper commitments for the Project. The need for the Project is driven by factors that include the need to transport safely and efficiently growing U.S. and Canadian crude oil production, insufficient pipeline capacity, and the opportunity to reduce U.S. dependence on foreign offshore crude oil through increased access to North American supplies. The continued demand for the Project is documented in the Department of State Final Supplemental Environmental Impact Statement (FSEIS), Section 1.4, Market Analysis.

**6. Please summarize the updated information regarding Finding Number 25.**

Answer: Since Keystone's petition for a permit was filed with the Commission in 2009, United States production of crude oil has increased significantly, from approximately 6.5 million barrels per day (bpd) in 2012, and is expected to peak at 9.6 million bpd by 2019. Even with this growth in domestic production, the United States is expected to remain a net importer of crude

oil. Keystone reviews and relies on forecasts from the U.S. Energy Information Administration (EIA). According to the EIA, U.S. demand for crude oil has held steady at approximately 15 million bpd and is expected to remain relatively stable into the future. More information from the EIA forecasts is included in the FSEIS in Section 1.4. Keystone also relies on industry information available from the CAPP Crude Oil Forecast, Markets and Transportation June 2014, which Keystone produced in discovery in this proceeding.

**7. Please summarize the updated information regarding Finding Number 26.**

Answer: While domestic production of light crude oil has increased since 2009 and has replaced most foreign imports of light crude, demand persists for imported heavy crude oil by U.S. refineries that are optimally configured to process heavy crude slates. The U.S. Gulf Coast continues to import approximately 3.5 million bpd of heavy and medium sour crude oil. This demand is supported by Keystone's binding shipper commitments for the Keystone XL Project.

**8. Please summarize the information regarding Finding Number 27.**

Answer: Continued demand for imported heavy crude oil is also demonstrated by the fact that the vast majority of Canadian heavy crude oil production is currently exported to the United States to be processed by U.S. refineries. North American crude oil production growth and logistics constraints have contributed to significant discounts on the price of landlocked crude and led to growing volumes of crude shipped by rail in the United States. As the FSEIS makes clear, in the absence of new pipelines, crude oil will continue to be transported via rail at an increasing rate. The North Dakota Pipeline Authority estimates that rail export volumes from the U.S. Williston Basin have increased from approximately 40,000 bpd in 2010 to over 700,000 bpd in early 2014. Over 60% of crude oil transported from the Williston Basin is delivered by

rail. The industry has also been making significant investments in increasing rail transport capacity for crude oil out of the Western Canadian Sedimentary Basin. In recent years, rail transport of crude oil in Canada has grown from approximately 10,000 bpd in 2010 to approximately 270,000 bpd by the end of 2013. Chapter 5 of the FSEIS (sections 5.0, 5.1, 5.2, and 5.3) indicates that transportation of crude oil by pipeline is safer and less greenhouse gas intensive than crude oil transportation by rail. Thus, the statement in Finding No. 27 remains true--that the project will provide an opportunity for U.S. refiners in Petroleum Administration for Defense District III, the Gulf Coast region, to further diversify supply away from traditional offshore foreign crude supply and to obtain direct access to secure and growing domestic crude supplies.

**9. Please summarize the updated information regarding Finding No. 28.**

Answer: The numbers vary slightly, but the overall fact remains the same. Reliable and safe transportation of crude oil will help ensure that U.S. energy needs are not subject to unstable political events. Canada has 173 billion barrels of oil reserves, 97% of which are located in the oil sands. Canada's reserves are third only to Venezuela and Saudi Arabia. Canada is the largest foreign supplier of crude oil to the United States and is likely to remain as such for the foreseeable future.

**10. Please summarize the updated information regarding Finding No. 29.**

Answer: Keystone's shippers have committed to long-term binding contracts, which demonstrate a material endorsement of support for the Project, its economics, proposed route, and target market, as well as the need for additional pipeline capacity to access domestic and

Canadian crude supplies. The FSEIS independently confirms strong market demand for the Project.

**11. Are you aware of any reason that Keystone cannot continue to meet the conditions on which the Permit was granted by the Commission?**

Answer: No. I have reviewed the conditions contained in the Amended Final Decision and Order dated June 29, 2010. The changes discussed in Finding Nos. 24-29 related to demand do not affect Keystone's ability to meet the conditions on which the Permit was granted.

**12. Does this conclude your prepared direct testimony?**

Answer: Yes.

Dated this 24 day of March, 2015.

David Diakow

## CERTIFICATE OF SERVICE

I hereby certify that on the 2nd day of April, 2015, I sent by United States first-class mail, postage prepaid, or e-mail transmission, a true and correct copy of the foregoing Direct Testimony of David Diakow, to the following:

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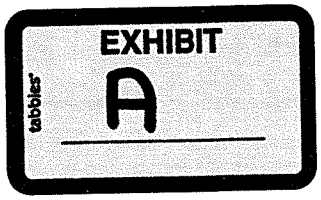
## David Diakow

Vice President, Commercial, Liquids Pipelines
TransCanada Pipelines

David is currently responsible for commercial activities for TransCanada's liquids pipeline business, including strategy development, commercial regulatory management and commercial management of its operating assets, such as the Keystone Pipeline system, and including those in advanced stages of commercial development such as the Keystone XL project.

David has over 27 years of experience in the oil and gas industry, with 24 years at TransCanada. David has held management positions in engineering, major projects and business development with respect to natural gas and crude oil pipelines development in Canada and the U.S.

David graduated from the University of Saskatchewan in 1987 with a Bachelor of Science degree in Mechanical Engineering and also holds both a Master of Science degree in Mechanical Engineering (1994) and a Master of Business Administration degree (2002) from the University of Calgary.



BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

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HP 14-001

IN THE MATTER OF THE APPLICATION BY TRANSCANADA KEYSTONE PIPELINE, LP FOR A PERMIT UNDER THE SOUTH DAKOTA ENERGY CONVERSION AND TRANSMISSION FACILITIES ACT TO CONSTRUCT THE KEYSTONE XL PROJECT,

DIRECT TESTIMONY OF MEERA KOTHARI, P.ENG.

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Pursuant to the Commission's Order Granting Motion to Define Issues and Setting Procedural Schedule, Petitioner TransCanada Keystone Pipeline, LP, offers the following direct testimony of Meera Kothari.

**1. Please state your name and address for the record.**

Answer: My name is Meera Kothari. My business address is 700 Louisiana Street, Houston, Texas 77002.

**2. Please state your position with Keystone and provide a description of your areas of responsibility with respect to the Keystone XL Project.**

Answer: I am currently Manager, U.S. Business Development, Liquids Pipelines, for TransCanada, as well as Manager, Technical Services Pipeline Engineering for Keystone Oil Projects. I have oversight responsibility for design and engineering for the Keystone XL Pipeline Project.

**3. Please state your professional qualifications and experience with pipeline operations.**

Answer: My professional background is stated in my resume, a copy of which is attached as Exhibit A. In general, I am a Professional Engineer, with a degree in mechanical and manufacturing engineering. Beginning in October, 2005, I served as the Lead Project Engineer for the Keystone Pipeline Project. I was the Project Manager for the Cushing Extension Pipeline Project from April 2010 to January 2011. I was the Reclamation Project Manager for the Cushing Extension Pipeline from January 2011 to November 2011. I have testified before the Commission in the permit proceedings concerning the Keystone Pipeline in Docket HP07-001 and concerning the Keystone XL Pipeline in Docket HP 09-001.

**4. Are you responsible for portions of the Tracking Table of Changes attached as Appendix C to Keystone's certification petition?**

Answer: Yes. I am individually or jointly responsible for the information provided with respect to Finding Numbers 60, 61, 62, 63, 68, 83, 90, and 107. In general, I can testify to design and construction of the Keystone XL Pipeline and PHMSA compliance.

**5. Please summarize the updated information regarding Finding No. 60.**

Answer: Since the Amended Final Order dated June 29, 2010, Keystone withdrew its request to PHMSA for a special permit ("Special Permit") on August 5, 2010. The decision was explained in a media advisory issued on August 5, 2010, a copy of which is attached as Exhibit B. As a result of the withdrawal, Keystone will implement 59 additional safety measures as set forth in Appendix Z to the Department of State Final Supplemental Environmental Impact

Statement. These measures provide an enhanced level of safety equivalent to or greater than those that would have applied under the previously requested Special Permit.

**6. Please summarize the updated information regarding Finding No. 61.**

Answer: This finding is no longer relevant as Keystone has withdrawn its request for a Special Permit.

**7. Please summarize the updated information regarding Finding No. 62.**

Answer: This finding is no longer relevant as Keystone has withdrawn its request for a Special Permit.

**8. Please summarize the updated information regarding Finding No. 63.**

Answer: As a result of withdrawing the Special Permit application, Keystone will build the Keystone XL Pipeline using the as-proposed high strength steel, API 5L grade X70M steel with a nominal wall thickness of 0.465 inches, but will operate the pipeline at a lower pressure of 1,307 psig to comply with internal pressure design requirements in accordance with federal code of regulation title 49 CFR 195.106. For location specific low elevation segments close to the discharge of pump stations, the maximum operating pressure will be 1,600 psig. Pipe associated with these segments of 1,600 psig MOP will have a design factor of 0.72 and a nominal pipe wall thickness of 0.572 inches (X-70M).

**9. Please summarize the updated information regarding Finding No. 68.**

Answer: This Finding was updated because TransCanada has four more years of experience in the use of FBE coated pipe. On one occasion when TransCanada excavated pipe to validate FBE coating performance, there was one instance in which an adjacent foreign utility interfered with the cathodic protection system in a shared utility corridor. The situation was

remedied, and no similar situation could exist in South Dakota because there are no shared utility corridors.

**10. Please summarize the updated information regarding Finding No. 83.**

Answer: Keystone will use Horizontal Directional Drilling ("HDD") for the Bridger Creek and Bad River crossings, in addition to the Little Missouri, Cheyenne, and White River crossings. Attachment B to Keystone's Tracking Table of Changes contains the preliminary site-specific crossing plans for the HDD crossings of the Bad River and Bridger Creek.

**11. Please summarize the updated information regarding Finding No. 90.**

Answer: The updated information for this finding is based on the withdrawal of the Special Permit application. Keystone will comply with the 59 additional conditions as set forth in the FSEIS, Appendix Z, which provide an enhanced level of safety equivalent to or greater than those that would have applied under the Special Permit.

**12. Please summarize the updated information regarding Finding No. 107.**

Answer: To the extent that Finding No. 107 included reference to the Special Permit, Keystone has withdrawn its application, but will comply with the 59 additional conditions as set forth in the FSEIS, Appendix Z.

**13. Are you aware of any reason that Keystone cannot continue to meet the conditions on which the Permit was granted by the Commission?**

Answer: No. I have reviewed the conditions contained in the Amended Final Decision and Order dated June 29, 2010. The changes discussed in Finding Nos. 60, 61, 62, 63, 68, 83, 90, and 107 do not affect Keystone's ability to meet the conditions on which the Permit was granted.

**14. Does this conclude your prepared direct testimony.**

Answer: Yes.

Dated this 1 day of April, 2015.

Meera Kothari

Meera Kothari P.Eng.

## CERTIFICATE OF SERVICE

I hereby certify that on the 2nd day of April, 2015, I sent by United States first-class mail, postage prepaid, or e-mail transmission, a true and correct copy of the foregoing Direct Testimony of Meera Kothari, P.Eng., to the following:

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**Meera Kothari P.Eng.**

## Professional Experience

TransCanada Corp. Houston, TX — October, 2014 – Present

*Manager,* U.S. Business Development, Liquids Pipelines

- Manage TransCanada's existing customer relationships, and develop new customers for future business opportunities.
- Market of capacity on TransCanada's existing oil pipeline system, and extending the reach of TransCanada's oil pipeline network through the development of transportation and terminalling opportunities.
- Perform market research and provide analysis supporting strategy development.
- Prepare business strategies and plans.
- Provide analytical and due diligence support.
- Prepare marketing material and proposals.
- Assist with development of key valuation assumptions and related analysis.
- Interact with key internal clients: Engineering, Supply Chain, Construction, Operations, Legal, Finance, Accounting, Tax, and Risk.
- Transition successful development projects to execution.

TransCanada Corp. Houston, TX — October, 2012 – Present

*Manager, Technical Services Pipeline Engineering for Keystone Oil Projects*

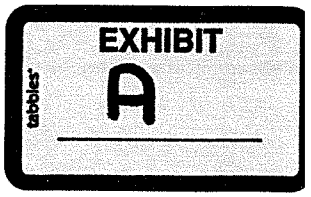
- Guide, review and sign off on pipeline designs and facility interface designs for oil project portfolios worth up to $12B.
- Oversight of 8 engineering firms dealing with all facets of pipeline engineering (inclusive of specialty items such as routing, civil design, E&I, welding, ECA, coating, welding, NDE technology, stress analysis, cathodic protection design, AC mitigation design, risk and spill analysis, thermal modeling, etc.)
- Oversight of construction technical execution for a 860 km 36" pipeline project inclusive of mechanize and flux core welding, automated girth weld coating application, high risk HDDs applications (7500 ft+ in length), AUT/RTR nondestructive examination, automated inspection record capturing
- Performance management for team of 15 direct reports/10 contract staff (engineers, technologists, resident inspectors).
- Technical representative interfacing with construction contractors and major pipe/material suppliers
- Preparation of permit applications, data responses and meetings with Canadian/US Federal and State agencies (NEB, PHMSA, Department of State, Bureau of Reclamation/Land Management ,etc.),

TransCanada Corp. Houston, TX — November 2011 - October 2012

*Technical Advisor, Keystone XL Pipeline Project*

- Technical advisor during pipeline detail design phase, construction contractor bid process, material procurement, and preconstruction planning activities for 36" 2,798 km cross border pipeline project.





TransCanada Corp. Houston, TX — January 2011 - November 2011

*Reclamation Project Manager, Cushing Extension Pipeline*

- Management of ROW reclamation activities for 482 km pipeline.

TransCanada Corp. Houston, TX — April 2010 - January 2011

*Project Manager, Cushing Extension Pipeline Project*

- Construction execution of $110M, 36" 171 km pipeline project in Kansas.
- Delivery of safety performance results and ensured management visibility on the construction site.
- Ensured the project was constructed with the approved design, plans, and standards; and in accordance with environmental regulations and all project permit conditions.
- Delivered within budget and on-time performance meeting project safety, environmental, and quality requirements.
- Ensured positive and professional relationships are enhanced and maintained with contractors, unions, landowners, communities, aboriginal , governmental and regulatory bodies.
- Facilitation of Board of Directors and External Stakeholder visits to the ROW.

TransCanada Corp. Calgary, AB — October 2005 - April 2010

*Lead Project Engineer, Keystone Pipeline Project*

- Development and review of DBM, FEED, detail design, specifications, standards, procedures for new construction, pipeline change of service conversion and above ground facilities in accordance with applicable industry codes and standards (Canada & USA).
- Pipeline route planning, HCA development, integrity management plans, spill analysis.
- Construction technical support for design, coating, NDE (AUT/RTR), ECA, mechanized/manual welding, hydrostatic testing, In-Line Inspection (ILI), and materials.
- Commissioning support.
- Engineering and Integrity assessment for conversion of 864 km circa 1950, 34" gas pipeline to crude oil service in Canada. Converted without hydrotesting through the use of ultrasonic in-line inspection
- Engineering assessment for the design, construction and operation of 30"/36" 2,215 km crude pipeline at 80% SMYS in the USA. First liquid line to be granted a waiver in the US.
- Plan, review and ensure timely completion of regulatory baseline data collection, permit application preparation and submittal in Canada (NEB Section 74, Section 52, Section 58) and the US (NEPA and State).
- Preparation and analysis of project budgets & expansion cases.
- Generation of terms, conditions, scope, analysis and award and completion of project RFP for major materials and services.
- Expert witness testifying at multiple Department of State (DOS) hearings, State hearings, technical spokesperson at public consultation project open houses.
- Preparation of permit applications, data responses and meetings with Canadian/US Federal and State agencies (NEB, PHMSA, Department of State etc),

TransCanada Energy. Trois Rivières, Québec — May 2005 - October 2005

*Project Engineer, Becancour 500 MW Cogeneration Power Plant*

- Development & implementation of inside battery limit/outside battery limit construction quality plan for $550M project.
- Witness point inspections and audit of equipment fabrication & equipment installation.
- Conducted plant hazard assessment recommendation close out.
- Validation of work package estimates for outside battery limit pipeline project bid award.
- Development hazardous material philosophy.

- RFP preparation for gas and chemical supply.
- Development of community investment risk matrix.
- French guided plant tours for various stakeholders.
- Preparation of monthly project status report, management presentations and HS&E statistics
- Analysis and validation of cost and schedule for various work packages
- Development of management operating system compliance tracking report

TransCanada Corp. Calgary, AB July 2001 - April 2005

*Pipeline Integrity Engineer for Asset Reliability, Technical Support and Technology Management*

- Technical specification support for new capital pipeline projects (coating, welding, materials, NDE).
- Engineering critical assessment for pipeline defect assessment, maintenance repair, pipeline pressure de-rating, unsupported pipe lengths, blasting/explosives, coating systems for 40,000 miles of operating pipeline.
- Urban development encroachments, foreign utility, road and vehicle crossing application review focused in the areas of integrity verification, stress analysis, population growth tracking for the purpose of code compliance and conflicts with facilities that may impact the ability to maintain integrity, access for maintenance purposes, emergency response accessibility and compatible land uses for 40,000 miles of operating pipeline.
- Failure analysis of in service pipe body leaks, pipeline ruptures and hydrostatic test failures
- Research & Development of SCC & MFL In-Line Inspection, NDT techniques, pipeline repair techniques, mainline and joint coating systems, welding of new materials.
- Risk analysis for new pipeline construction projects.
- Development of engineering & integrity budget and programs for due diligence and acquisitions.
- Development of commercial agreements & contracts with Provincial Governments, private developers and construction contracts for pipeline upgrade/rehabilitation project.
- Coordination of Facilities Integrity R&D Program reviews and budgeting cycles.
- Liaison with Regulators (National Energy Board, Transportation Safety Board and Alberta Energy and Utilities Board) with respect to integrity management issues and incidents.
- Providing direction during emergency maintenance activities to various groups within the organization.
- Developed annual integrity maintenance program using quantitative risk modeling software.
- Coordination of research & development projects for risk management, corrosion and SCC.
- Coordination of peer review team for evaluation of projects feasibility and cost management.
- Performed value/benefit analysis for integrity projects.
- Directing contractors & field technicians to perform technical tasks.

## Education

Bachelor of Science (BSc) – Mechanical & Manufacturing Engineering, University of Calgary, AB May 2001

- Four (4) Summer Student Program Terms with Petro-Canada Oil & Gas Ltd performing data and technology architecture development for various projects: McKay River Bitumen Recovery Scheme, De-sulferization upgrade facility, transportation developments and Natural Gas Liquids (NGL) facilities June 1998 - May 2001

## Special Skills

- **Team and Individual Leadership** – Can fully utilize the capabilities of direct reports to ensure effectiveness of own department. Empowers and motivates the team to set and achieve goals despite significant obstacles.
- **Project Management** – Utilize time management skills to meet deadlines for numerous major projects and demonstrated ability to engage and collaborate with team members effectively.
- **Communication & Collaboration** – Possess strong oral and written communication skills; able to research and present ideas effectively as shown through publications, speeches, and presentations.
- **Languages** – Write and speak fluent English and French

## Publications & Industry

M. Kothari, S. Tappert, U. Strohmeier, J. Larios and D. Ronsky, "**Validation of EMAT In-Line Inspection Technology for SCC Management**," Proceedings of the International Pipeline Conference, Calgary, 2004.

R. Worthingham, M. Cetiner, M. Kothari, "**Field Trial of Coating Systems for Arctic Pipelines**," Proceedings of the International Pipeline Conference, Calgary, 2004.

Chair Person: **In-Line Inspection Session**, Banff Pipeline Integrity Workshop, Banff, 2005

Professional Member of APEGGA

TransCanada
*In business to deliver*

# Media Advisory

## Special Permit Application Withdrawn for Keystone Gulf Coast Expansion Pipeline

**Calgary, Alberta – August 5, 2010 –** TransCanada has withdrawn its request to the Pipeline and Hazardous Materials Safety Administration (PHMSA) for a special permit. The permit would have allowed TransCanada to operate the proposed Keystone XL pipeline at a slightly higher pressure than current federal regulations for oil pipelines in the United States, subject to building the pipeline using stronger steel and operating under additional safety conditions.

After listening to concerns from the public and various political leaders, TransCanada made the decision to withdraw the permit application. The company will build Keystone XL using the as-proposed stronger steel but will operate it at a lower level of pressure, consistent with current U.S. regulations.

The company recognizes it needs to take more steps to assure the public and stakeholders that the parameters of the special permit would result in a safer pipeline. The company will continue to establish an operating record which will demonstrate the strength and integrity of the Keystone Pipeline System, which has been granted a special permit.

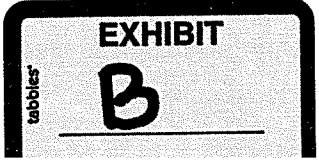
Keystone XL will implement the additional safety measures that would have been required under the special permit. These measures offer an enhanced level of safety and would allow TransCanada to request a special permit in the future. These safety measures also will be consistent with those that have been implemented on the existing Keystone Pipeline. In issuing the special permit for Keystone, PHMSA concluded the permit would provide a level of safety equal to or greater than that provided if the pipeline were operated under the current standard.

Without the special permit, Keystone XL will meet all of its initial commercial commitments to serve Gulf Coast refineries. Keystone also will continue to work with U.S. producers in the Bakken and broader Williston Basin area to provide needed transport for growing production in Montana and the Dakotas.

The Keystone XL project received approval in March 2010 from both the South Dakota Public Utility Commission and the National Energy Board in Canada. Pending receipt of additional permits, construction is planned to begin in 2011.

When completed, the Keystone XL project will increase the commercial capacity of the overall Keystone Pipeline System from 590,000 barrels per day to approximately 1.1 million barrels per day. The $12 billion system is 83 percent subscribed with long-term, binding contracts that include commitments of 910,000 barrels per day for an average term of approximately 18 years.

Commercial operations of the first phase of the Keystone system began June 30. Construction of the extension from Steele City Nebraska to Cushing Oklahoma is one-third complete and the pipeline is expected to be operational in 2011.



Keystone XL is a planned 1,959-mile (3,134-kilometre), 36-inch crude oil pipeline stretching from Hardisty, Alberta and moving southeast through Saskatchewan, Montana, South Dakota and Nebraska. It will connect with a portion of the Keystone Pipeline that will be built through Kansas to Cushing, Oklahoma and facilitate take away capacity from U.S. hubs located on the pipeline. The pipeline will then continue on through Oklahoma to a delivery point near existing terminals in Nederland, Texas to serve the Port Arthur, Texas marketplace.

To view a map of the proposed pipeline route, please visit the project web page at www.transcanada.com/keystone

With more than 50 years' experience, TransCanada is a leader in the responsible development and reliable operation of North American energy infrastructure including natural gas and oil pipelines, power generation and gas storage facilities. TransCanada's network of wholly owned natural gas pipelines extends more than 60,000 kilometres (37,000 miles), tapping into virtually all major gas supply basins in North America. TransCanada is one of the continent's largest providers of gas storage and related services with approximately 380 billion cubic feet of storage capacity. A growing independent power producer, TransCanada owns, or has interests in, over 11,700 megawatts of power generation in Canada and the United States. TransCanada is developing one of North America's largest oil delivery systems. TransCanada's common shares trade on the Toronto and New York stock exchanges under the symbol TRP. For more information visit: www.transcanada.com

**TransCanada Forward-Looking Information**

This news release may contain certain information that is forward looking and is subject to important risks and uncertainties. The words "anticipate", "expect", "believe", "may", "should", "estimate", "project", "outlook", "forecast" or other similar words are used to identify such forward-looking information. Forward-looking statements in this document are intended to provide TransCanada securityholders and potential investors with information regarding TransCanada and its subsidiaries, including management's assessment of TransCanada's and its subsidiaries' future financial and operations plans and outlook. Forward-looking statements in this document may include, among others, statements regarding the anticipated business prospects, projects and financial performance of TransCanada and its subsidiaries, expectations or projections about the future, and strategies and goals for growth and expansion. All forward-looking statements reflect TransCanada's beliefs and assumptions based on information available at the time the statements were made. Actual results or events may differ from those predicted in these forward-looking statements. Factors that could cause actual results or events to differ materially from current expectations include, among others, the ability of TransCanada to successfully implement its strategic initiatives and whether such strategic initiatives will yield the expected benefits, the operating performance of TransCanada's pipeline and energy assets, the availability and price of energy commodities, capacity payments, regulatory processes and decisions, changes in environmental and other laws and regulations, competitive factors in the pipeline and energy sectors, construction and completion of capital projects, labour, equipment and material costs, access to capital markets, interest and currency exchange rates, technological developments and economic conditions in North America. By its nature, forward looking information is subject to various risks and uncertainties, which could cause TransCanada's actual results and experience to differ materially from the anticipated results or expectations expressed. Additional information on these and other factors is available in the reports filed by TransCanada with Canadian securities regulators and with the U.S. Securities and Exchange Commission (SEC). Readers are cautioned to not place undue reliance on this forward looking information, which is given as of the date it is expressed in this news release or otherwise, and to not use future-oriented information or financial outlooks for anything other than their intended purpose. TransCanada undertakes no obligation to update publicly or revise any forward looking information, whether as a result of new information, future events or otherwise, except as required by law.

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BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

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HP 14-001

IN THE MATTER OF THE APPLICATION BY TRANSCANADA KEYSTONE PIPELINE, LP FOR A PERMIT UNDER THE SOUTH DAKOTA ENERGY CONVERSION AND TRANSMISSION FACILITIES ACT TO CONSTRUCT THE KEYSTONE XL PROJECT,

DIRECT TESTIMONY OF JON SCHMIDT, PH.D.

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Pursuant to the Commission's Order Granting Motion to Define Issues and Setting Procedural Schedule, Petitioner TransCanada Keystone Pipeline, LP, offers the following direct testimony of Jon Schmidt.

**1. Please state your name and address for the record.**

Answer: My name is Jon Schmidt. My business address is exp Energy Services, 1300 Metropolitan Boulevard, Suite 200, Tallahassee, FL 32308.

**2. Please state your position and provide a description of your areas of responsibility with respect to the Keystone XL Project.**

Answer: I am Vice President, Environmental & Regulatory Services in the Tallahassee office of exp Energy Services, Inc. I am the regulatory and permitting manager for the Keystone XL Pipeline Project, including the coordination of the Department of State EIS, DEIS, SEIS, FEIS, and FSEIS, the Section 9 Biological Opinion, NHPA Section 106 Programmatic

Agreement, United States Army Corps of Engineers permitting, the Montana Facility Siting Act licensing, South Dakota PUC environmental filing, and other state and federal permitting.

**3. Please state your professional qualifications and experience with pipeline operations.**

Answer: My professional background is stated in my resume, a copy of which is attached as Exhibit A. My education consists of a bachelor's degree in marine biology, a master's degree in biological sciences, and a Ph.D. in biological sciences. In general, I have extensive experience in environmental management with respect to the pipeline industry, and have permitted over 30,000 miles of pipeline projects in most states in the United States over the last 28 years. I managed the regulatory and permitting tasks associated with the Keystone Pipeline, including associated compliance inspection during construction. I have testified before the Commission in the permit proceedings concerning the Keystone XL Pipeline in Docket HP 09-001.

**4. Are you responsible for portions of the Tracking Table of Changes attached as Appendix C to Keystone's certification petition?**

Answer: Yes. I am individually or jointly responsible for the information provided with respect to Finding Numbers 32, 33, 41, 50, 54, 73, and 80. In general, I can testify to environmental issues other than risk and spill response information; the CMR Plan; the Con/Rec Units and the use of horizontal directional drilling.

**5. Please summarize the updated information regarding Finding No. 32.**

Answer: The environmental impacts discussed in Table 6 of Keystone's permit application still apply. The CMR Plan has been updated. The last version is Rev4, which is attached in redlined form as Attachment A to Appendix C to Keystone's certification petition.

Overall changes to the CMR Plan were made to clarify language, provide additional detail related to construction procedures, and incorporate lessons learned from previous construction, current right-of-way conditions, and project requirements.

**6. Please summarize the updated information regarding Finding No. 33.**

Answer: Keystone previously submitted Exhibit TC-14 in connection with the hearing on its permit application. Exhibit TC-14 includes soil type maps and aerial photograph maps of the route in South Dakota, showing topography, land uses, project mileposts and location descriptors. Exhibit TC-14 is still generally consistent in the description of the current Project route through South Dakota. Keystone has disclosed in discovery maps of minor route variations made at the request of landowners or for engineering reasons. These maps will be marked as an exhibit at the hearing on Keystone's certification petition. In addition, Keystone will submit updated maps prior to the initiation of construction as required by Condition No. 6 of the Amended Final Decision and Order.

**7. Please summarize the updated information regarding Finding No. 41.**

Answer: Since the permit application, Keystone has decided to use horizontal directional drilling ("HDD") to cross the Bad River and Bridger Creek, in addition to the Little Missouri, Cheyenne, and White Rivers. Exhibit C to Keystone's permit application contains a listing of all water body crossings and preliminary site-specific crossing plans for the HDD sites. To supplement Exhibit C in Docket HP09-001, Attachment B to Keystone's Tracking Table of Changes in Docket HP14-001 contains the preliminary site-specific crossing plans for the HDD crossings of the Bad River and Bridger Creek.

**8. Please summarize the updated information regarding Finding No. 50.**

Answer: The total length of the Project pipe with the potential to affect a High Consequence Are ("HCA") is 14.9 miles. The reference to 19.9 miles in the Tracking Table was a typographical error. Since the Tracking Table was prepared, the Cheyenne River crossing was adjusted because of HDD access issues and for construction and engineering reasons, resulting in a slight increase in total HCA mileage. The current HCA mileage figure is 15.8 miles. The 15.8 miles are ecologically sensitive areas and do not encompass populated areas or drinking water areas.

**9. Please summarize the updated information regarding Finding No. 54.**

Answer: Because of minor route variations, the mileages in South Dakota have changed slightly. The route is approximately 315 miles in South Dakota. All but 27.9 miles of the route are privately owned. 1.7 miles are owned by local governments, and 26.3 miles are state owned and managed. No tribal or federal lands are crossed by the route in South Dakota.

**10. Please summarize the updated information regarding Finding No. 73.**

Answer: Keystone has updated its CMR Plan since the Amended Final Decision and Order. The changes are shown in a redlined version of the CMR Plan, which is Rev4, filed with the Commission as Attachment A to Appendix C to Keystone's certification petition.

**11. Please summarize the updated information regarding Finding No. 80.**

Answer: Since the Amended Final Decision and Order, Keystone has completed the construction/reclamation unit ("Con/Rec Unit") mapping in consultation with the National Resource Conservation Service. The Con/Rec Unit mapping is included as Appendix R to the FSEIS.

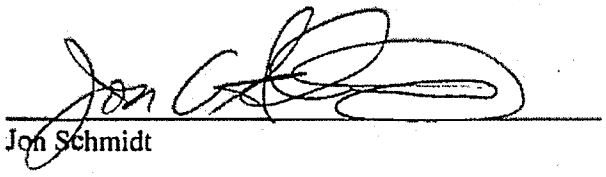
**12. Are you aware of any reason that Keystone cannot continue to meet the conditions on which the Permit was granted by the Commission?**

Answer: No. I have reviewed the conditions contained in the Amended Final Decision and Order dated June 29, 2010. The changes discussed in Finding Nos. 32, 33, 41, 50, 54, 73, and 80 do not affect Keystone's ability to meet the conditions on which the Permit was granted.

**13. Does this conclude your prepared direct testimony?**

Answer: Yes.

Dated this 30th day of March, 2015.



Jon Schmidt

## CERTIFICATE OF SERVICE

I hereby certify that on the 2nd day of April, 2015, I sent by United States first-class mail, postage prepaid, or e-mail transmission, a true and correct copy of the foregoing Direct Testimony of Jon Schmidt, to the following:

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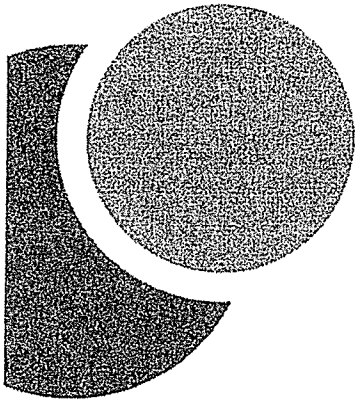


# Jon Schmidt, PhD

## Vice President, Environmental & Regulatory

*+1.850.385.5441 | jon.schmidt@exp.com*

### Education & Training

- PhD, Biological Sciences, Florida State University
- M.S., Biological Sciences, University of Bridgeport
- B.S., Marine Biology, University of Massachusetts - Dartmouth

### Overview

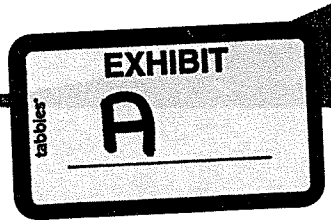
Jon A. Schmidt is currently the Vice President, Environmental & Regulatory Services in the Tallahassee office of **exp** Energy Services Inc. He joined **exp** in May of 2009.

Mr. Schmidt has extensive experience in environmental management, particularly with respect to the pipeline industry including: environmental regulatory strategy development and project planning, project management, environmental surveys, permitting, and environmental inspection. In over 25 years, he has permitted over 30,000 miles of pipeline projects in most states in the US for mid-stream pipeline companies, gas distributors, and producers. He has also permitted LNG facilities, refined products, natural gas, and crude oil pipelines and terminals throughout the US. This included the management of the regulatory and permitting tasks associated with the 7-state, 1,385 mile Keystone pipeline and associated compliance inspection during construction.

Currently, Jon is the regulatory and permitting manager for work for the 6-state, 1,300 mile Keystone XL Pipeline Project, including the coordination of the Department of State EIS, DEIS, SEIS, FEIS and now SFEIS, the Section 9 Biological Opinion, NHPA Section 106 Programmatic Agreement with over 60 parties, USACE permitting across 7 USACE Districts, Montana Facility Siting Act licensing, South Dakota Public Utilities Commission certification and other state and federal permitting. Jon is also working with the Alaska Pipeline Project in developing the FERC filing strategy and overall environmental program for the re-designed pipeline and LNG project.

Prior to joining **exp,** Mr. Schmidt had a wide variety of experience in the midstream energy industry, including work on international pipeline projects.





# Jon Schmidt, PhD– *Continued*

## Vice President, Environmental & Regulatory

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Project Experience

- **TransCanada/ExxonMobil Development Company as Alaska Pipeline Project (APP), 754 mile, Alaska Pipeline Project, Alaska.**
  **Employment: 2010-2012**

  Jon served as a member of the company Environment, Regulatory, and Land (ERL) management team for TransCanada and ExxonMobil to direct consulting firms conducting the environmental field surveys, agency consultations, and development of the FERC application for the proposed APP. His role focused on developing and implementing a regulatory strategy lined up with the commercial realities of the project. Jon directed consultants on the scope and efforts required for field surveys, the Resource Reports, and agency meetings and pre-filing activities. He wrote an overarching permitting roadmap and strategy, individual agency permitting plans, and helped implement through agency meetings and workshops to address and resolve timing and level of detail issues with the Alaskan agencies.

- **Keystone XL Pipeline, Montana, South Dakota, Nebraska, Kansas, Oklahoma, and Texas.**
  **Employment: 2010**

  For the expansion of the Keystone pipeline, Jon served as the overall environmental manager reporting directly to TransCanada. Keystone XL is a 36-inch 1,375 mile crude oil pipeline to the Gulf Coast of the US. Jon's role was similar to that on the Keystone project, but with overall responsibility for environmental compliance. He managed several firms that carried out the field surveys, report writing, and permit application preparation.

- **Keystone Pipeline, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Missouri, and Illinois.**
  **Employment: 2006-2012**

  Was overall account manager and project director for AECOM as they served as environmental management contractor for Trow Engineering Consultants, owner's engineer for the TransCanada Keystone Project. Keystone is an approximate 1,300 mile crude oil pipeline. Jon was responsible for the overall environmental regulatory strategy for the Department of State Presidential Permit application and EIS process. This effort entailed the coordination with the USACE across multiple districts, multiple USFWS field offices, the NRCS, the South Dakota PUC, North Dakota PSC, and multiple state agencies in each state. Jon's role also included senior review on the multiple filings that were made to the agencies, consultation coordination and meetings, and negotiation of permit conditions, and a Conservation Agreement with the USFWS for Migratory Bird Treaty Act mitigation. Jon was also pivotal in negotiating the USACE permitting to be a NWP for all states crossed and mitigation projects to cover compensation in all states crossed.

- **ConocoPhillips Company, Environmental Services for Licensing of Proposed Beacon Port Liquid Natural Gas Facility, Gulf of Mexico.**
  **Employment: 2004**

  - Project Director, ConocoPhillips Company contracted ENSR to assist with the licensing of its proposed Beacon Port liquid natural gas facility in the northern Gulf of Mexico. ENSR's services included: 1) developing the environmental report for the deepwater port (DWP) license application to the Maritime Administration (MARAD) and the U.S. Coast Guard (USCG), and 2) managing the development of the entire DWP license application per the DWP Act of 1974, as amended.

## Jon Schmidt, PhD– *Continued*

**Vice President, Environmental & Regulatory**

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- Related services included: 1) regulatory outreach, 2) biological impact assessment, 3) water discharge modeling, 4) air emissions modeling, 5) Environmental Protection Agency permitting (air and water discharges), U.S. Army Corps of Engineers permitting, 5) wetland surveys, 6) threatened and endangered species surveys, and 7) development and coordination of a biological sampling plan, among other services. ENSR continues to support ConocoPhillips Company in its efforts to develop Beacon Port.

- **AES Ocean Express Pipeline Third Party Environmental Impact Statement.**
  **Employment: 2004**

  Served as Project Director for the Environmental Impact Statement (EIS) prepared for the AES Ocean Express pipeline project from the Economic Exclusion Zone (EEZ) to Broward County, Florida. This project ties into a pipeline and LNG facility to be built in the Bahamas. ENSR's role is to serve as the Federal Energy Regulatory Commission's (FERC's) extended staff in preparing the EIS. To date, a PDEIS has been drafted for regulatory review by the MMS, NMFS, FERC, and the USACE.

- **Ingleside Energy Center and San Patricio Pipeline, Oxy Energy Ventures, Corpus Christi, Texas.**
  **Employment: 2003-2005**

  Jon served as the Project Manager overseeing the preparation of the FERC filing for a new LNG regas facility collocated with Occidental's chemical plant and power plant near Corpus Christi, Texas. Jon coordinated the field surveys required for the facility location, the marine studies to accommodate the dredging of a new berth and pier, as well as studies along the 80+ mile pipeline from the facility to the interstate pipeline grid. Jon worked with Oxy's energy services staff to utilize waste heat from the power plant for regasification, air modeling and coordination with the plant's existing air permits, and coordination of the NHPA 106 and Section 7 ESA consultation required for the FERC application.

- **Bayou Casotte Energy LLC, Casotte Landing Natural Gas Import Terminal, Pascagoula, Mississippi.**
  **Employment: 2003-2005**

  Jon acted as Project Director for the FERC licensing and permitting of a liquefied natural gas import terminal adjacent to Chevron's Pascagoula refinery at Moss Point, Mississippi. The FERC filing covered the regasification facilities, air modeling and permitting, USACE permitting and dredge disposal studies, and the water use permitting for hydrotesting the LNG storage tanks. Because the site location and required dredging impacted the Gulf Sturgeon, a Section 7 ESA consultation was required to complete the EIS.

- **Cypress Pipeline Project, 166 mile Natural Gas Pipeline, Coastal Georgia and Florida**
  **Employment: 2002-2004**

  Project Director for permitting the Cypress Project, which included route analysis, agency consultation, FERC Environmental Report preparation, wetland delineation report to USACE and FERC, Environmental Resource Permit application to the state of Florida, and specialized field surveys for Gopher Tortoises.

# Jon Schmidt, PhD– *Continued*

## Vice President, Environmental & Regulatory

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- **ConocoPhillips Company, Environmental Services for Licensing of Proposed Compass Port Natural Gas Facility, Gulf of Mexico.**
  **Employment: 2002-2004**

  Project Manager, ConocoPhillips Company contracted ENSR to assist with the licensing of its proposed Compass Port liquid natural gas facility in the northern Gulf of Mexico. ENSR's services included: 1) developing the environmental report for the deepwater port (DWP) license application to the Maritime Administration (MARAD) and the U.S. Coast Guard (USCG), 2) developing the environmental report for the Certificate of Public Convenience and Necessity with the Federal Energy Regulatory Commission (FERC), and 3) managing the development of the entire DWP license application in accordance with the DWP Act of 1974, as amended. Related services included: 1) management of the regulatory Team Permitting process, 2) biological impact assessment, 3) water discharge modeling, 4) air emissions modeling, 5) Environmental Protection Agency permitting (air and water discharges), U.S. Army Corps of Engineers permitting, 6) wetland surveys, 7) threatened and endangered species surveys, and 8) development and coordination of a biological sampling plan, among other services. ENSR continues to support ConocoPhillips Company in its efforts to develop Compass Port.

- **Elba Island LNG Import Terminal Reactivation, Southern LNG Inc.—An El Paso Company, Georgia.**
  **Employment: 1999-2001**

  Project Director for the successful 1999–2000 certification for reactivation of the Elba Island Import Terminal.

- **Gulfstream Natural Gas System, Environmental Management of Pipeline Construction Project, Gulf of Mexico, Mississippi, Alabama, Florida.**
  **Employment: 1998-2001**

  Project Director for siting, routing, field surveys, and permitting for 775-mile pipeline construction project. To-date, the project has involved the coordination of over 100 regulatory agencies, and over 15 public meetings with landowners, the general public and over 30 environmental groups. Led the Team Permitting (Florida) and FERC coordination aspects on behalf of the client. Included assessing project impacts to live bottom (reefs) in the Gulf of Mexico and impacts to threaten and endangered marine turtles and mammals.

- **Destin Pipeline Company, LLC (Southern Natural Gas Affiliate), Destin Pipeline Project - Construction of Natural Gas Pipeline, Gulf of Mexico to Clarke County, Mississippi.**
  **Employment: 1996-1998**

  Project Manager for environmental aspects of construction project which included the installation of 206 miles of 36-in outside- diameter (OD) and 30-in OD pipeline, installation of 2.4 miles of 16-in OD pipeline in Mississippi, installation of four meter stations,construction of a platform in the Gulf of Mexico, and construction of two new compressor stations in Mississippi. Tasks included Alternatives Analysis for selection of a preferred route, environmental surveys, permitting, and on-site environmental inspection.

## Jon Schmidt, PhD– *Continued*

Vice President, Environmental & Regulatory

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- **Blue Atlantic Transmission System, Environmental Management of Pipeline Project, Nova Scotia Canada to New York.**
  **Employment: 1996**
  Project Director for the siting, routing, field surveys, regulatory permitting and meetings, and FERC filing for a 850+ mile large diameter pipeline from Nova Scotia into the New York marketplace. The project has involved meeting with all the New England state regulatory bodies, the FERC, NMFS, USACE, MMS, and NOAA to discuss routing and field survey requirements. Most of the offshore field surveys have been completed to date.

- **Etowah LNG Company, LLC, Etowah LNG Peakshaving Facility and Pipeline Construction Project, Polk County, Georgia.**
  **Employment: 1995**
  Project Director for all environmental aspects of project related to construction of a new 2.5-billion cubic ft. liquefied natural gas peakshaving facility and 12.49 miles of 12.75-in OD natural gas pipeline. Directed team responsible for: preparation ofFERC 7(c) filing and Biological Survey Report; conducting biological field surveys of the jurisdiction and non- jurisdictional facilities (including wetlands, species of concern, and surveys for construction constraints); assisting in the siting of the Etowah Pipeline; preparing Land Disturbing Activity; permitting for the construction of the jurisdictional facilities; preparing the application to the USACE for Section 404 permit; coordinating with surveyors to quickly complete field surveys; and performing agency consultations and negotiations.

- **TransCanada/ANR partnership, 800+ mile SunShine Pipeline Project, Florida, and Alabama.**
  **Employment: 1994**
  Technical Project Manager. Managed the technical team to put together the state of Florida Siting Application as well as directed the effort for the FERC ER. Managed the technical efforts and data analysis for the cultural resource and biological surveys using GPS/GIS. Participated in the 36 public meetings and coordinated with 80 regulatory agencies from local, regional, state and federal agencies to coordinate comments and simplify licensing/permitting conditions. Put together a regulatory and technical Mitigation Task Force to constructively deal with the impact to over 1,000 wetland crossings.

- **TransContinental Pipe Line Company, Southeast Mainline Looping Project, Alabama, Georgia, and North Carolina.**
  **Employment: 1994**
  Directed the biological field survey efforts, FERC ER preparation, and provided support to TransContinental for FERC interrogatories.

- **Viking Voyageur Pipeline Company, Viking Voyageur Pipeline Project, Minnesota, Wisconsin, and Illinois.**
  **Employment: 1993**
  Project Director for 800+-mile project which included providing siting, biological and cultural resource field surveys, FERC ER preparation, and permitting support and coordination for the joint TransCanada and NSP Power project.

# Jon Schmidt, PhD– *Continued*

## Vice President, Environmental & Regulatory

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- **ANR, LSP Power Project, Mississippi.**
  **Employment: 1992**
  Project includes the field surveys, permitting and FERC ER preparation for the 12-mile lateral.

- **Southern Natural Gas Company, Southern Natural Zone III Expansion Project, Alabama, and Georgia**
  **Employment: 1991-1994**
  Project director for the Southern Natural Zone III Expansion Project (27 miles looping in 3 states with compression), FERC Section 7(c) Environmental Report (ER), field Surveys, permitting, and environmental inspector's manual preparation.

- **Florida Power Corporation, Environmental Master Services Agreement, Florida.**
  **Employment: 1991-1993**
  Projects included jurisdictional wetland delineations at the Higgins Power Plant, waste water monitoring at the Montincello facility.

- **ANR Pipeline Company, Patterson Looping Project, Gulf of Mexico, and Louisiana.**
  **Employment: 1991**
  Project director for 37-mile project which included FERC ER preparation, federal and state permitting, and agency negotiation.

- **Southern Natural Gas Company, Approximately Fifteen 7(c) Projects Totaling 600 Linear Miles, LA, MI, AL, GA, TN, SC, NC, FL, and Gulf of Mexico.**
  **Employment: 1990-1992**
  Project Manager and Director providing air permitting, contamination assessment, audit and environmental inspection services for regulated facilities.

- **US Navy, Environmental Assessments, Puerto Rico, Florida, and Atlantic Seaboard.**
  **Employment: 1990**
  Project manager for several US Navy EAs which were completed for proposed facilities or Navy actions. Projects included the Camp Pendleton Warfare Training facilities, the Naval Warfare Training Facilities on Isla Pincros, Puerto Rico, and the ecological risk assessment at the Naval Air Training Center in Pensacola, Florida. Managed the efforts to conduct a siting alternatives analysis study along the Atlantic seaboard for the shock testing for the new class of submarine, the Sea Wolf. Project utilized satellite imagery to create databases and a GIS to manage the information. Required to assess impacts of underwater detonation of explosives to marine mammals and endangered species.

# Jon Schmidt, PhD– *Continued*

## Vice President, Environmental & Regulatory

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- **Chandeleur Pipeline Company, Chandeleur Destin Extension Project and Chandeleur Expansion Project, Mississippi, and Gulf of Mexico, and Louisiana.**
  **Employment: 1990**
  Project director for Chandeleur Destin Extension project (4 miles) and Chandeleur Expansion project (30 miles). ENSR provided field survey, FERC ER preparation and permitting support until the project was removed from consideration by Chandeleur.

- **Discovery Pipeline Company LLC, Discovery Pipeline Project, Gulf of Mexico, and Louisiana.**
  **Employment: 1990**
  Project manager for 80-mile project where ENSR was asked to provide a fast track ER for filing with the FERC and support to Discovery through the FERC review and certification process.

- **Southern Natural Gas Company, Southern Natural East Tennessee Expansion Project, Alabama, Georgia, and Tennessee.**
  **Employment: 1989-1991**
  Project Director for the project. On a fast track basis, ENSR conducted biological field surveys, completed the FERC ER and survey reports, agency consultation for filing with the FERC and sate and federal agencies in 45 days. Completed all permitting and construction implementation plans. Provided EIS and managed environmental inspection.

- **Southern Natural Gas Company, North Alabama Pipeline Project, Alabama.**
  **Employment: 1989**
  Project Manager for Southern Natural's 122-mile North Alabama pipeline project in Tuscaloosa, Fayette, Walker, Cullman, Morgan, and Madison counties, Alabama. Project involves route alternatives analysis, FERC 7(c) ER, field surveys using GPS/GIS, and public meeting/FERC support through the EIS process, permitting, and agency negotiation. Currently providing EIS and inspection services.

- **Tenneco, Tenneco West-East Pipeline Project, Louisiana, and Mississippi.**
  **Employment: 1989**
  Project management involved preparation of the ER for a 225-mile project, management of the biological and cultural resource surveys in Tennessee's Vicksburg field office, and coordination with state and federal agencies and FERC.

# Jon Schmidt, PhD– *Continued*

## Vice President, Environmental & Regulatory

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***International***

- **TransCanada Pipelines, Colombia.**
  **Employment: 1997**
  For TransCanada's first pipeline project in Colombia, Jon served as the technical reviewer and in-country consultant coordinator between the local environmental consulting firms and TCPL's project staff. He helped the locals develop the scope of work for the EIA with the regulators, oversaw implementation, and assisted in impact assessment development to ensure permitting conditions could be implemented in the field by TCPL.

- **ENSR (now AECOM) – Senior Vice President**
  **Employment: 1996 – 2009**
  Responsibilities included: Part of senior management team at ENSR/AECOM that oversaw all of the company's consulting services related to pipelines and LNG facilities. This included ensuring that staff resources were available across the country and around the world to support key clients on all pipeline and LNG projects. Jon was also account manager for TransCanada, El Paso, and ConocoPhillips while overseeing the company's mid-stream services line.

- **PDVSA, eastern Venezuela.**
  **Employment: 1996**
  Working with Willbros Engineers, Jon served as the project manager for a routing and feasibility study for the Caripito-Guiria oil pipeline project in the Orinocho River basin. This project involved siting a new oil pipeline from interior E & P locations, across virgin tropical wetland forests, to the coast for PDVSA to build a new oil refinery and shipping facilities to export this new source of crude. Working with local environmental and engineering firms, Jon oversaw the route development, aerial reconnaissance, and report preparation. He participated with Willbros in presenting the study's results to the PDVSA management.

- **Endesa, Chile.**
  **Employment: 1993**
  For two separate projects on the Bio-Bio River, Jon served first as a task leader for an Environmental Impact Assessment (EIA) to the International Finance Corporation (IFC) for a hydro-electric dam, the first in a series of 5 to be built on this Clase VI river. This project was the first Category A EIA to be reviewed and approved by the IFC. On a subsequent project, Jon was the project manager for a downstream impact and flow study related to the EIA. Issues and concerns related to the operations of the dam resulted in this additional study where Jon had to coordinate and manage local University professors specializing in endemic fish species, hydrologists, modelers, and riverine ecologists coupled with E & E's ecological and modeling staff. He managed his work efforts from Santiago Chile and served as the principal negotiator between Endesa and the IFC on flow conditions for dam operations.

- **Ecology and Environment Inc. – Senior Environmental Scientist.**
  **Employment: 1987 – 1996**
  Responsibilities included: Served as project manager and project director on energy related projects throughout the US and overseas. Specialties included marine impact assessments and NEPA document preparation for energy projects.

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

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HP 14-001

IN THE MATTER OF THE APPLICATION BY TRANSCANADA KEYSTONE PIPELINE, LP FOR A PERMIT UNDER THE SOUTH DAKOTA ENERGY CONVERSION AND TRANSMISSION FACILITIES ACT TO CONSTRUCT THE KEYSTONE XL PROJECT,

DIRECT TESTIMONY OF HEIDI TILLQUIST

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Pursuant to the Commission's Order Granting Motion to Define Issues and Setting Procedural Schedule, Petitioner TransCanada Keystone Pipeline, LP, offers the following direct testimony of Heidi Tillquist.

**1. Please state your name and address for the record.**

Answer: My name is Heidi Tillquist. My business address is Stantec Consulting Services Inc., 2950 E. Harmony Road, Suite 290, Fort Collins, CO 80528.

**2. Please state your position and provide a description of your areas of responsibility with respect to the Keystone XL Project.**

Answer: I am a contractor of Keystone. I am employed as an environmental toxicologist and Director of Oil & Gas Risk Management with Stantec Consulting Services Inc. I have provided environmental consulting services to Keystone with respect to the Keystone XL Project. I am responsible for evaluating risk posed by the Project to human and environmental resources.

**3. Please state your professional qualifications and experience with pipeline operations.**

Answer: My professional background is stated in my resume, a copy of which is attached as Exhibit A. My education consists of a bachelor's degree in fishery and wildlife biology, and a master's degree in environmental toxicology. In general, I have over 25 years of experience in environmental consulting, including environmental toxicology and conducting environmental risk assessments and water quality assessment and analysis. I have previously testified before the Commission in the permit proceedings concerning the Keystone Pipeline in Docket HP 07-001 and concerning the Keystone XL Pipeline in Docket HP 09-001.

**4. Are you responsible for portions of the Tracking Table of Changes attached as Appendix C to Keystone's certification petition?**

Answer: Not directly. In general, I can testify to the risk assessments related to the Keystone XL Pipeline, including spill frequency. I am familiar with the design changes addressed in the Tracking Table as a result of Keystone's decision to withdraw its Special Permit application with PHMSA, as well as the minor route variations in South Dakota. The design and route changes have not affected the overall conclusion of the spill frequency analysis to which I testified in connection with the permit application. With respect to Finding No. 50, the minor route changes have caused slight changes resulting in a reduced probability of a spill occurring within High Consequence Areas. As a result, the statement that a spill that could affect an HCA would occur no more than once in 250 years would now be altered to no more than once in 460 years, based on 15.8 miles of HCAs crossed in South Dakota. The 2009 Keystone XL Risk

Assessment, which is Appendix P to the Final Supplemental Environmental Impact Statement, and its conclusions remain valid. .

**5. Are you able to address issues related to worst case spill scenarios, environmental cleanup in the event of a spill, and the potential impacts to groundwater resources?**

Answer. Yes. I participated in answering discovery in this proceeding with respect to all of these issues. While nothing with respect to these issues has changed since the Amended Final Decision and Order, I can answer questions at the hearing related to these issues.

**6. Are you aware of any reason that Keystone cannot continue to meet the conditions on which the Permit was granted by the Commission?**

Answer: No. I have reviewed the conditions contained in the Amended Final Decision and Order. With respect to risk assessment and environmental toxicology, the changes discussed in the Tracking Table do not affect Keystone's ability to meet the conditions on which the Permit was granted.

**7. Does this conclude your prepared direct testimony?**

Answer: Yes.

Dated this 31 day of March, 2015.

Heidi Tillquist

## CERTIFICATE OF SERVICE

I hereby certify that on the 2nd day of April, 2015, I sent by United States first-class mail, postage prepaid, or e-mail transmission, a true and correct copy of the foregoing Direct Testimony of Heidi Tillquist, to the following:

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# Heidi Tillquist

Environmental Toxicologist/Senior Program Manager

Stantec

Ms. Tillquist has over 24 years of experience in environmental consulting, including environmental permitting, environmental toxicology, environmental risk assessment, water quality assessment and analysis, fisheries and wildlife biology. She has evaluated risk and environmental consequences of contaminant releases in 28 states of the U.S. and 6 Canadian provinces. Ms. Tillquist routinely provides technical assistance in support of complicated environmental issues. She has successfully negotiated changes in surface water quality criteria for mining companies and has helped develop water quality criteria for several metals. She has managed numerous projects, such as environmental permitting and compliance for TransCanada's Keystone Pipeline Project and multiple third-party Environmental Impact Statements (EISs). Ms. Tillquist's work requires an in-depth understanding both the engineering and environmental aspects of pipeline projects. Ms. Tillquist breadth of knowledge and ability to effectively communicate between diverse stakeholders (project engineers, environmental staff, regulatory agencies) has resulted in collaborative efforts that focus on potential benefits, constraints and feasibility issues, and short- and long-term costs. Ms. Tillquist believes that development and environmental protection are not mutually exclusive, but are hallmarks of a well-designed and executed project. She has conducted multiple risk assessments for regulatory agencies and mining and the oil and gas industry and provides technical expertise regarding potential environmental impacts. Ms. Tillquist routinely provides expert witness support for issues related to environmental toxicology and risk assessment.

## EDUCATION

MS, Environmental Toxicology, Colorado State University, Fort Collins, Colorado, 1992

BS, Fishery and Wildlife Biology, Colorado State University, Fort Collins, Colorado, 1987

## REGISTRATIONS

Certified Wildlife Biologist #114667, The Wildlife Society

Certified Fisheries Professional #044814, American Fisheries Society

## MEMBERSHIPS

Member, The Wildlife Society

Member, American Fisheries Society

Member, Society for Environmental Toxicology and Chemistry

## PROJECT EXPERIENCE

**Pipeline Projects**

TransCanada, Energy East and Related Pipeline Projects, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, and New Brunswick, Canada

*Senior technical advisor, pipeline risk assessment lead. TransCanada proposes to repurpose an existing natural gas pipeline, construct new build pipeline and terminal facilities to transport various crude oils from Alberta to terminals in Quebec and New Brunswick. Ms. Tillquist and her staff evaluate risk for project components as part of the National Energy Board (NEB) filing. For each project, Stantec will i) identify high consequence areas, ii) assist engineers with valve siting, and iii) conduct a pipeline risk assessment that assesses failure frequency, probable spill volumes, and spill impacts to terrestrial, freshwater, and marine environments. After the final route is approved, Ms. Tillquist and her staff will conduct detailed flow path modeling to identify pipeline segments with the potential to impact High Consequence Areas per 49 CFR 195. Ms. Tillquist role on this project is to advise TransCanada, addressing and resolving substantive issues, helping to maintain consistency of analysis, and providing TransCanada with legacy information to facilitate and improve the overall project.*

# Heidi Tillquist

Environmental Toxicologist/Senior Program Manager

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### Grand Rapids, Heartland, and Northern Courier Pipeline Projects, Alberta, Canada

*Senior technical advisor, pipeline risk assessment lead. TransCanada and its affiliates propose to develop multiple pipeline projects in Alberta. For each project, Stantec will i) identify high consequence areas, ii) assist engineers with valve siting, iii) conduct a pipeline risk assessment that assesses failure frequency, probable spill volumes, range of environmental impacts, and mitigation, and iv) map groundwater vulnerability along the ROW. Ms. Tillquist role on this project is to advise TransCanada, addressing and resolving substantive issues, helping to maintain consistency of analysis, and providing TransCanada with legacy information to facilitate and improve the overall project.*

### TransCanada, Keystone XL Pipeline Project*, Montana, South Dakota, Nebraska, Oklahoma, Texas

*Senior Technical Advisor and Lead Pipeline Risk Assessor for the project, attending numerous public meetings and providing expert witness testimony for public utility commissions in South Dakota as well as a variety of condemnation hearings. TransCanada proposed the construction and operation of a 36- inch crude oil pipeline from the Alberta oil sands into the U.S., terminating in the Gulf Coast region in Texas. The pipeline would have a nominal maximum throughput of 830,000 barrels per day. Within the U.S., the pipeline would cross portions of Montana, South Dakota, Nebraska, Oklahoma, and Texas. Because the project crosses the U.S.-Canada border, the Department of State is the lead federal agency. Ms. Tillquist was involved with TransCanada's Keystone XL crude oil pipeline since its initial design phase. Ms. Tillquist conducted an environmental risk assessment estimated spill frequency and spill volumes and the subsequent environmental consequences, particularly to sensitive areas. The risk analysis was used to support Keystone's Presidential Permit Application, various state permitting processes, and for refinement of the project design. As a result of this early interaction, Ms. Tillquist's risk assessment work helped control construction costs while reducing potential impacts of a spill, thereby reducing potential future environmental damages. Ms. Tillquist prepared the South Dakota Public Utilities Commission Application and participated in public meetings and hearings. She provided expert witness testimony in support of environmental and spill risk issues.*

### Hess Corporation, Hawkeye Pipelines, North Dakota

*Senior technical advisor, PHMSA compliance lead, pipeline risk assessment lead. Hess proposes to construct several co-located pipelines to transport crude oil, natural gas liquids, and natural gas from the Bakken Formation. Stantec is leading the environmental permitting process. Ms. Tillquist role on this project is to advise, address, and resolve substantive issues, such as perceived risk associated with crossing of the Missouri River, tribal concerns, and PHMSA compliance.*

### Bureau of Land Management (BLM), BakkenLink Pipeline, North Dakota

*PHMSA Compliance Lead/ Lead Risk Assessor. BakkenLink proposed to construct and operate a 12-inch crude oil pipeline from Frybery to Beaverlodge, North Dakota, with a 8-inch lateral to Belfield. Ms. Tillquist prepared a risk assessment that evaluated failure frequency and environmental consequences of a release, particularly to High Consequence Areas. The risk assessment was successfully used in the Environmental Assessment for the federal NEPA process. Ms. Tillquist also prepared BakkenLink's Emergency Response Plan which was reviewed and approved by PHMSA. Ms. Tillquist will provide technical support for BakkenLink with their Emergency Response Training exercises.*

### TransCanada, Keystone Pipeline System, US and Canada

*Lead Pipeline Risk Assessor, PHMSA Compliance. Ms. Tillquist prepared hazard assessments for both new build and existing pipeline segments associated with the Keystone Pipeline System in the US and Canada. In Canada, Ms. Tillquist created a procedure to identify highly sensitive receptors, based on economic, public health, and ecological concerns. Using fate and transport analyses, segments of pipeline that were capable of potentially affecting the highly sensitive areas (Canada) or PHMSA-defined High Consequence Areas (US) were identified, risk quantified, and pipeline segments prioritized to facilitate operations and maintenance activities. The analysis incorporated both new build and existing infrastructure. Ms. Tillquist assisted TransCanada with PHMSA audits and provided technical responses to information requests. Ms. Tillquist documented legacy information regarding environmental compliance requirements. Ms. Tillquist coordinated with emergency response team. Provided updated to hazard assessments as required by federal regulations. Ms. Tillquist's work on this project continues with Stantec as the project continues to evolve.*

* denotes projects completed with other firms

# Heidi Tillquist

Environmental Toxicologist/Senior Program Manager

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### TransCanada, Keystone Crude Oil Pipeline Project*, North Dakota, South Dakota, Nebraska, Kansas, Missouri, Illinois, Canada

*Environmental Permitting Project Manager and Pipeline Risk Assessor. As the Environmental Project Manager for the project, Ms. Tillquist was responsible for all environmental permitting and surveying within the U.S., including pre-construction siting and post-construction monitoring and compliance. Ms. Tillquist worked with TransCanada's Keystone crude oil pipeline since its initial design phase. As a result of this early interaction, route selection and intelligent valve placement helped control construction costs while reducing potential impacts of a spill, thereby reducing potential future environmental damages. Further, TransCanada successfully used Ms. Tillquist's environmental risk assessment to justify modification of the pipeline's design factor from 0.72 to 0.8 for the majority of the route. This modification reduced capital costs associated with the pipe by $50 million.*

### Texas Offshore Port System (TOPS)*, Texas

*Lead Pipeline Risk Assessor, Senior Technical Advisor. The Texas Offshore Port System (TOPS) Project consisted of the construction and operation of a proposed deepwater port, receiving up to 1,700,000 barrels of crude oil per day and transporting the oil to a receiving terminal and transmission facility via 50 miles of on- and off-shore pipelines. Ms. Tillquist prepared a risk assessment document to support TOPS in permitting the project through the Maritime Administration and US Coast Guard. The document evaluated risk of a pipeline disruption and its potential environmental consequences. The report presented the results of a pipeline incident frequency and spill volume analysis based on TOPS' design and operations criteria and applies the resulting risk probabilities to an environmental consequence analysis, incorporating project-specific environmental data. Specifically, the report evaluated the risk of crude oil spills during pipeline operations, including contribution of natural hazards to spill risk, and the subsequent potential effects on humans and other sensitive resources, particularly High Consequence Areas, that include highly and other populated areas, municipal drinking water intakes (surface and groundwater), and/or ecologically sensitive areas.*

### Enterprise Products Company, Seaway Pipeline – Segment 7, Texas

*Lead Pipeline Risk Assessor. The Seaway Pipeline - Segment 7 is a crude oil pipeline that will loop an existing- 30-inch pipeline for approximately 60 miles in length from Mont Belvieu to Nederland, Texas. Ms. Tillquist was hired as a subcontractor by Project Consulting Services, Inc. (PCS) to identify valve sites to ensure regulatory compliance and to minimize potential impacts to the environment, particularly to High Consequence Areas.*

### Enterprise Products Company, ATEX Express Pipeline*, Ohio, Indiana, Texas

*Lead Pipeline Risk Assessor, Project Manager. The ATEX Express Pipeline (ATEX) is designed to transport ethane from the Marcellus and Utica shale regions in Pennsylvania, West Virginia and Ohio to the U.S. Gulf Coast. The approximately 1,230-mile, 16-inch diameter pipeline will have an initial capacity of 125,000 barrels per day of ethane and will deliver ethane to Enterprise's natural gas liquids storage complex at Mont Belvieu, Texas. Ms. Tillquist was hired as a subcontractor by Project Consulting Services, Inc. (PCS) to identify valve sites and perform a precursory HCA analysis for the purposes of selecting valve locations along Segment 3, approximately 117 miles in length through southwestern Ohio and southeastern Indiana, and Segment 6, approximately 55 miles in length through southeastern Texas.*

### Enterprise Products Company, Lone Star West Texas Pipeline and Laterals, Texas

*Lead Pipeline Risk Assessor, Senior Technical Review. The Lone Star West Texas Pipeline and Laterals project will deliver natural gas liquids across Texas. As a subconsultant to Project Consulting Services, Inc., Ms. Tillquist was responsible for evaluating the placement of valve sites in relation to 1) federal pipeline regulations and 2) protection of environmental resources. Ms. Tillquist also provided senior technical review of a preliminary risk report.*

* denotes projects completed with other firms

# Heidi Tillquist

Environmental Toxicologist/Senior Program Manager

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### FERC and BLM, Entrega Natural Gas Pipeline Environmental Impact Statement*, Colorado and Wyoming

*Project Manager and Lead Pipeline Risk Assessor. Entrega Gas Pipeline Inc. (an affiliate of Encana Natural Gas) proposed to construct and operate a 328-mile 36- to 42-inch-diameter natural gas transmission pipeline. The pipeline transports up to 1.5 billion cubic feet per day of natural gas from the Piceance Basin in Colorado to interconnections in Wamsutter and near Cheyenne, Wyoming. As the Project Manager, Ms. Tillquist supervised the preparation of the EIS as a third-party contractor to the FERC (lead agency) and the BLM (cooperating agency). Major issues include potential impacts to threatened and endangered species (water depletion issues), noxious weed management, and socioeconomic impacts. Because Western Interstate Company (a subsidiary of El Paso Corporation) also proposed to build a large diameter pipeline from the Piceance Basin to Wamsutter, cumulative impacts were also an issue. The project was approved and construction completed in 2007.*

### BLM and USFS, ONEOK, Overland Pass Natural Gas Liquids Pipeline*, Wyoming, Colorado, and Kansas

*Project Manager, Lead Pipeline Risk Assessor. ONEOK and Williams proposed to construct and operate a 760-mile transmission pipeline for transportation of up to 150,000 barrels per day of natural gas liquids from western Wyoming, through Colorado, to Conway, Kansas. As the Project Manager, Ms. Tillquist supervised the preparation of the EIS as a third-party contractor to the BLM (lead agency) and the U.S. Forest Service (cooperating agency). Major issues included potential impacts to cultural resources, threatened and endangered species, and fisheries impacts. The Final EIS was published in 2007, with the pipeline constructed and is currently in-service.*

### FERC, Piceance Basin Expansion Natural Gas Pipeline Environmental Impact Statement*, Wyoming and Colorado

*Senior Technical Advisor. Wyoming Interstate Company (WIC, a subsidiary of El Paso Corporation) proposed to construct and operate a 141.7-mile 36-inch-diameter natural gas pipeline to transport up to 350 million cubic feet per day of natural gas from the Piceance Basin in Colorado to interconnections near Wamsutter, Wyoming. As The Senior Technical Advisor, Ms. Tillquist supervised staff in the preparation of the EIS (concurrent with the Entrega Pipeline EIS) as a third-party contractor to the Federal Energy Regulatory Commission, with the Bureau of Land Management as a cooperating agency. Major issues include potential impacts to threatened and endangered species (water depletion issues), noxious weed management, and socioeconomic impacts. Because Entrega Pipeline Company Inc. also proposed to build a large diameter pipeline from the Piceance Basin to Wamsutter, cumulative impacts also were an issue.*

### BLM, Inland Resources, Castle Peak and Eightmile Flat Oil Expansion Project*, Utah

*Lead Pipeline Risk Assessor. Ms. Tillquist conducted a pipeline risk assessment, evaluating pipeline failure threats, mitigation, failure frequencies, and probable environmental impacts in the event of a failure. The BLM's Vernal Field Office commissioned the preparation of the EIS that examined potential impacts associated with a proposed expansion of oil field development operations in the Uintah Basin area of northeastern Utah. The study area covered approximately 110 sections or 65,500 acres. Inland proposed to expand its existing waterflood oil recovery operations by drilling up to 900 additional wells in the Castle Peak and Eightmile Flat areas of the greater Monument Butte-Myton Bench oil and gas production region. Important issues associated with this project included cumulative effects to raptor species in the Uintah Basin, air quality, and effects on sensitive species, such as the mountain plover and hookless cactus. A Biological Assessment for the U.S. Fish and Wildlife Service was prepared as part of the project permitting.*

* *denotes projects completed with other firms*

# Heidi Tillquist

Environmental Toxicologist/Senior Program Manager

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BLM, Equilon/Shell Pipeline Company, New Mexico Products Pipeline Environmental Impact Statement*, New Mexico and Texas

*Project manager, pipeline risk assessor. Shell proposed to convert and reverse the flow of an existing 406-mile crude oil pipeline to transport refined petroleum products (i.e., gasoline, diesel, jet fuel). System conversion also entailed the construction of two new pipeline extensions (about 100 miles total), pump stations, pressure reducing stations, miscellaneous facilities, and associated electrical transmission lines. The project would affect portions of New Mexico and Texas, involving many local, state, federal, and tribal jurisdictions. Due to public concern, a probabilistic risk assessment evaluated risk to humans and the environment that could result from an accidental release from the pipeline and its facilities. As a third-party contractor for the BLM, the Draft EIS in May 2003 and the Final EIS was completed in September 2003. Prior to the release of the Final EIS, Shell decided to put the project on hold.*

FERC, Raton Basin 2005 Expansion*, Colorado, Kansas, New Mexico, Oklahoma

*Technical support on pipeline risk issues and field surveys. For this 100-mile, six-loop project built in 2005, Ms. Tillquist supported Colorado Interstate Gas with the Federal Energy Regulatory Commission (FERC) NEPA Pre-filing Process (including agency and public scoping), preparation of the FERC certification application, state and federal environmental permitting, Environmental Assessment (EA) preparation, Biological Assessment/ Biological Evaluation preparation, and construction management. Ms. Tillquist also assisted with U.S. Fish and Wildlife Service Section 7 consultation, a Forest Service EA for crossing the Comanche National Grasslands, environmental compliance training, avian and mammal pre-construction clearing and biological monitoring during construction, and construction environmental inspection support.*

FERC, Application for Line 2000 Converting a Crude Oil Pipeline to Natural Gas Pipeline, Texas, New Mexico, Arizona

*Technical evaluation of pipeline reliability and public safety. Ms. Tillquist assisted with the preparation of El Paso Energy's Line 2000 application to the Federal Energy Regulatory Commission (FERC) for the conversion of an existing 800-mile crude oil pipeline to natural gas service. This conversion project affected lands within Texas, New Mexico, and Arizona. Ms. Tillquist's duties included the preparation of FERC resource reports, an applicant-prepared biological assessment, applicant-prepared environmental assessment, and Clean Water Act 404 permit. Ms. Tillquist's project management activities included project budgeting, coordinating office staff and field survey crews, and creation and maintenance of a database detailing over 300 construction sites and activities.*

FERC and CSLC, Southern Trails Natural Gas Pipeline*, California, Arizona, Utah, and New Mexico

*Project Manager. Responsible for personnel management and project budgeting in addition to technical writing responsibilities. Questar Natural Gas proposed to convert a 600-mile crude oil pipeline to a natural gas pipeline, referred to as the Southern Trails Pipeline. Construction resulting from the proposed extensions, reroutes, realignments, and replacements affected portions of California, Arizona, Utah, and New Mexico and involved many local, state, federal, and tribal jurisdictions. As Project Manager, Ms. Tillquist supervised staff in the preparation of this third-party Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Federal Energy Regulatory Commission. As project coordinator, wrote several technical sections, and provided technical review of the EIS document. For the California Environmental Quality Act, a separate Environmental Impact and Mitigation Measures Summary was developed for the California State Lands Commission.*

* denotes projects completed with other firms

# Heidi Tillquist

Environmental Toxicologist/Senior Program Manager

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El Paso - Western Interstate Company, Kanda Natural Gas Lateral Pipeline Project*, Utah

*Environmental Toxicologist and Lead Pipeline Risk Assessor. One of the most significant services that Ms. Tillquist provides is effective communication between oil and gas companies and federal regulating agencies. Ms. Tillquist has repeatedly demonstrated the ability to successfully work through difficult problems. On the Kanda Project, the U.S. Fish and Wildlife Service (USFWS) insisted that El Paso install emergency shutoff valves at the Green River to protect threatened and endangered fish species. The USFWS concerns revolved around the perceived toxicological threats from natural gas and the potential future conversion to hazardous liquids transportation. Ms. Tillquist prepared a white paper that detailed why the USFWS concerns were unjustified. The argument was successful: the USFWS withdrew its request for a valve at the site, thereby saving El Paso an estimated $250,000.*

BLM, Natural Gas Liquid Pipeline Environmental Assessment*, Wyoming

*Lead Pipeline Risk Assessor. Inland Resources plans to develop an area for natural gas liquids extraction. As part of the development, a new pipeline would be constructed which would cross a tributary to the Green River in Utah, which contains several endangered fish species. At the request of the BLM and potential hazard posed by the pipeline by evaluating the likelihood of a spill, attenuation rates, and dilution potential.*

*Additionally, cumulative risk from other natural gas liquid pipelines within the same drainage was also estimated. Based on the pipelines' location, volume of natural gas liquids, probability of failure, and likelihood of downstream transport, the assessment showed that no impacts to endangered fish species would be anticipated.*

**Spill & Resource Damage Evaluations**

Emergency Spill Response, Confidential O&G Client, North Dakota

*Deputy Incident Command/Lead Environmental Risk Assessor. Ms. Tillquist was on-site to within 6 hours of notification, responding to a well blowout near Watford City, North Dakota. Ms. Tillquist coordinated the environmental sampling and documentation. Crude oil and produced water was dispersed over a 5-square mile area during a winter blizzard. Stantec's emergency response team established and Incident Command Center and coordinated containment and cleanup with the US Environmental Protection Agency and North Dakota Department of Health. The site is stabilized, with closure anticipated after spring runoff. Due to the subzero temperatures, quantitative sampling of snow samples was conducted to determine the area where total petroleum hydrocarbons might exceed North Dakota soils standards after spring runoff. Salinity was also examined as a contaminant of concern since the blowout may have contained produced water. Stantec continues to work with North Dakota Department of Health and US Environmental Protection Agency to monitor the site during spring runoff and obtain site closure.*

American Petroleum Institute (API), Fate and Effects of Oil Spills in Freshwater Environments*

*Environmental Toxicologist, Technical Writing and Review. Ms. Tillquist assisted in the preparation of an API report describing the fate and effects of oil spills in freshwater environments. This report summarizes and documents potential environmental effects from inland oil spills into fresh surface waters. It identifies, describes, and compares the behavior, fate, and ecological implications of crude oil and petroleum products in inland waters. The document provides basic information necessary for the formulation of spill response strategies that are tailored to the specific chemical, physical, and ecological constraints of a given spill situation. The report describes the relevant features of various inland spill habitat types, discusses the chemical characteristics of oils and the fate processes that are dependent thereon, summarizes reported ecological and toxicological effects results both generally and with specific reference to distinct organism groupings, and, finally, in the context of case histories from past spills, highlights some of the considerations, difficulties, and elements of success of presently available spill response techniques.*

* denotes projects completed with other firms

# Heidi Tillquist

Environmental Toxicologist/Senior Program Manager

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Toxicity Profile for Crude Oil*, Nationwide
*Ms. Tillquist authored a report that reviewed the toxicity of crude oil to terrestrial and aquatic ecosystems. The intended audience of this report was BP field personnel that might be involved with accidental releases of crude oil into the environment. The document provided a general characterization of crude oil, its environmental fate, and potential effects to various environments.*

Exxon Valdez Oil Spill*, Prince William Sound, Alaska
*Ms. Tillquist provided technical support for Natural Resource Damage Claims filed against Exxon following the Exxon Valdez spill. Data were compiled from thousands of environmental samples, ranging from water and sediment to oiled wildlife. Ms. Tillquist provided technical support for expert witness testimony in support of Exxon. Specifically, Ms. Tillquist was responsible for assembling, synthesizing, and summarizing relevant literature on oils spills and their impacts to aquatic ecosystems.*

Burlington Northern Santa Fe Railroad, Train Derailment Emergency Response Team, Crow Creek*, Cheyenne, Wyoming
*Ms. Tillquist was a team member in an emergency response program to evaluate potential human health and environmental contamination. She participated in an emergency response call to evaluate potential aquatic effects on a train derailment at Crow Creek, Wyoming. Ms. Tillquist was responsible for coordinating activities with state and federal wildlife agencies regarding potential impacts on federally endangered Preble's meadow jumping mouse as well as to the local plain stream fishery. In the field, she was responsible for the sampling design and field sampling. After the event, she summarized the incident events and presented findings in a report to Burlington Northern Santa Fe Railway.*

Evaluation of the Transredes Petroleum Product Spill*, Bolivia (Technical Advisor)
*Ms. Tillquist provided technical support following a pipeline rupture on the Rio Desaguardero. The spatial extent and environmental effects of hydrocarbon contamination were evaluated by chemical analysis of environmental media and laboratory toxicity tests. These data were then used in a risk assessment to evaluate the potential risk to aquatic biota, terrestrial herbivores (cattle, sheep, and endangered vicunas), and human receptors.*

Exxon Valdez Oil Spill*, Prince William Sound, Alaska
*Technical Support. Ms. Tillquist provided technical support for Natural Resource Damage Claims filed against Exxon following the Exxon Valdez spill. Thousands of environmental samples were collected, analyzed, and catalogued, ranging from water and sediment to oiled wildlife. Ms. Tillquist was responsible for assembling synthesizing, and summarizing relevant literature on oils spills and their impacts to aquatic ecosystems in support of expert witness testimony in support of Exxon.*

**Oil and Gas Projects**

Washington Ranch Natural Gas Field Storage Project*, New Mexico
*Technical support evaluating public safety issues, including preparation of Resource Reports for the Federal Energy Regulatory Commission (FREC) application. El Paso proposed to construct a small natural gas storage field in southeastern New Mexico. The project consisted of several horizontal wells, tie-in pipelines, and access roads. Ms. Tillquist prepared several environmental Resource Reports in support of El Paso's successful Federal Energy Regulatory Commission (FERC) application.*

Boehm Natural Gas Storage Field Project*, Colorado
*Ms. Tillquist provided technical support evaluating public safety issues, including preparation of Resource Reports for the Federal Energy Regulatory Commission (FERC) application. El Paso proposed to construct a small natural gas storage field in southeastern Colorado. The project consisted of horizontal wells, tie-in pipelines, and access roads. The project was successfully permitted.*

Raton Basin Expansion Project and Washington Ranch Natural Gas Field Storage Project*, Colorado, Kansas, Oklahoma, and New Mexico
*Technical Review of Public Safety. Ms. Tillquist evaluated public safety issues associated with several El Paso projects, including Raton Basin and Washington Ranch. El Paso proposed to loop its existing Raton Basin natural gas pipeline system in Colorado, Kansas, and Oklahoma. The project would consist of several pipeline loops, laterals, metering stations, and access roads. In New Mexico, El Paso proposed to construct a small natural gas storage field in southeastern New Mexico. The project consisted of several horizontal wells, tie-in pipelines, and access roads. Ms. Tillquist prepared environmental Resource Reports in support of El Paso's successful FERC application.*

* denotes projects completed with other firms

# Heidi Tillquist

Environmental Toxicologist/Senior Program Manager

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Pipeline and Facility Decommissioning Evaluation*, New Jersey, Pennsylvania

*Project Manager. Ms. Tillquist was responsible for evaluating the condition of the pipeline and facilities and providing cost estimates for decommissioning the facilities, including regulatory compliance. Reliant owns a 10-mile pipeline that has been used to transport fuel oil #6 (historically) and fuel oil #2 (currently). The company also owns a related facility with breakout tanks and aboveground piping. Reliant was considering temporarily (1 to 3 years) suspending the transport of oil through the pipeline and facility and, perhaps, totally abandoning these assets. Alternatively, Reliant wanted the evaluation to include the potential for reactivating the pipeline after a temporary suspension. Ms. Tillquist and other staff evaluated the federal, state, and local regulatory that govern the temporary suspension, reactivation, and abandonment processes. Additionally, Ms. Tillquist and staff identified technical issues that would be associated with each process. Finally, Ms. Tillquist and staff provided Reliant with a range of anticipated costs associated with each of these activities.*

**Ecological Risk Assessment**

Ecological Risk Assessment of Depleted Uranium*, Sonoran Desert and Chesapeake Bay, Arizona, Maryland

*Co-investigator, assessing the environmental fate and distribution of depleted uranium in the Sonoran Desert, Yuma, Arizona, and the Chesapeake Bay, Aberdeen, Maryland. Ms. Tillquist collected biota, vegetation, water, soils, and sediments in the field from contaminated and uncontaminated sites. She also conducted toxicity tests to evaluate the toxicity of depleted uranium on kangaroo rats and freshwater and marine aquatic organisms. Ms. Tillquist compared concentrations of depleted uranium collected in the field to concentrations that caused toxicity in laboratory organisms.*

Effects of Two-Stroke Outboard Motor Exhaust on Aquatic Biota*, California, Nevada

*Ms. Tillquist conducted a systematic survey of the published literature and prepared a monograph summarizing and documenting the ecological effects from two-stroke outboard engine exhaust into the aquatic environment was produced. The document identified the major constituents of outboard exhaust, described the environmental fate of these constituents, and the detailed the toxicological implications. The ecological significance of two-stroke outboard engines was found to be primarily dependent on the water quality characteristics of the waterbody, the intensity of boat use, and the amount of pollution from other anthropogenic sources.*

U.S. Army Corps of Engineers, Alaska District, Fort Richardson Post-wide Human Health and Ecological Risk Assessment*, Alaska

*Ms. Tillquist provided technical support for the ecological risk assessment and toxicological evaluations for the project. Four ecological risk assessments have been conducted for various areas within the Fort Richardson post. This particular post-wide ecological risk assessment reviewed all previous assessments, identified data and assessment gaps, and re-assessed risk on a post-wide scale. During this process, Ms. Tillquist developed chemical profiles for more than 80 compounds that had been detected at Fort Richardson. Ms. Tillquist calculated exposure of various ecological receptors and compared with toxicity reference values established in the chemical profiles to evaluate the likelihood of risk. The evaluation suggested that potential risk exists to wildlife receptors from bioaccumulating contaminants in aquatic ecosystems. Subsequent field surveys were conducted to confirm or refute this possibility. Data from these surveys indicated that the level of contamination was not significantly impacting aquatic ecosystems. To further reduce potential ecological risk at the site, cooling water was rerouted around sensitive areas, providing a simple and inexpensive mitigation to eliminate further exposure.*

Ecological Risk Assessment of US Navy Facilities, South Weymouth, Department of Defense*, Boston, Massachusetts

*Ms. Tillquist conducted ecological risk assessments for the Navy's South Weymouth facility. Ms. Tillquist and other staff evaluated the potential risk to aquatic, wetland, and terrestrial receptors using a weight-of-evidence approach that included screening against benchmarks values, critical body residues, toxicity tests, quantitative field surveys, and food web exposure models.*

Ecological Risk Evaluation of Dioxin's Effects on Wildlife*, Guam

*Ms. Tillquist evaluated the toxicity of dioxin to terrestrial and aquatic receptors. In support of an ecological risk assessment, provided technical assessment of dioxin hazards and potentially toxic threshold values.*

* *denotes projects completed with other firms*

# Heidi Tillquist

Environmental Toxicologist/Senior Program Manager

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Upper Clark Fork River Ecological Assessment*, Upper Clark Fork River, Montana

*Ms. Tillquist provided technical support for the ecological risk assessment and toxicological evaluations. Terrestrial and aquatic screening-level ecological risk assessments were conducted by Ms. Tillquist to evaluate the potential effects of heavy metals on the Clark Fork River ecosystem. In cooperation with the U.S. Environmental Protection Agency (USEPA) Region VIII, developed food web exposure models and provided extensive chemical profile documentation to justify the selection of aquatic and terrestrial toxicity reference values for arsenic, cadmium, copper, lead, and zinc. Estimated exposure and risk using computer models. Ms. Tillquist submitted multiple documents to the USEPA in support of the advancement of science in the risk assessment process as rebuttals to the State of Montana's legal position.*

Evaluation of 210 Chemicals: Physical Chemistry, Acute Toxicity, and Human Health Protection*, Nationwide

*Ms. Tillquist co-authored a book and accompanying CD-ROM that describes the toxicity, physical chemistry, emergency response procedures, material handling procedures, and regulatory compliance information of 210 chemicals. Information was compiled from various computerized databases.*

Evaluation of Chronic Effects to Aquatic Biota from Organochlorine Exposure, Rocky Mountain Arsenal*, Colorado

*Ms. Tillquist was awarded grant as co-principal investigator to evaluate the sublethal effects of organochlorine pesticide exposure on fish via food web exposure at the Rocky Mountain Arsenal. Specifically, the project evaluated toxic effects using bioenergetic models and used field data to validate the model.*

**Environmental Assessments**

Bureau of Land Management, Over the River™ Art Project Environmental Impact Statement and Event Management Plan*, Colorado

*Lead Public Safety Risk Assessor. Ms. Tillquist evaluated public safety risks associated with the project, including boating accidents, emergency access, and sufficiency of emergency personnel and equipment. The artists, Christo and the late Jeanne-Claude, propose to drape curtains across the Arkansas River as a temporary form of art. Since the project would occur on federal lands, Ms. Tillquist helped prepare a draft EIS as a third-party consultant to the BLM's Royal Gorge Field Office. The project will take three years to construct, display, and disassemble, affecting more than 3,500 acres of land. Public concerns ranged from impacts to bighorn sheep, aesthetics, socio-economic impacts, and public safety and emergency access along the narrow road that parallels the river through the Arkansas River canyon. Ms. Tillquist prepared a semi-quantitative risk assessment on how the project could potentially impact public safety. The four-volume draft EIS evaluated several alternatives that reduced the size or duration of the exhibit. The Draft EIS was published in July 2010, with the Final EIS and Record of Decision issued in February 2011.*

Environmental Assessment of Chatfield Reservoir Drawdown*, Denver, Colorado

*Ms. Tillquist provided technical direction and analyzed impacts associated with potential drawdown. Denver Water proposed to construct and operate a pump station to convey raw water from Chatfield Reservoir to the municipal water supply system during drought conditions. Construction of the pump station and drawdown of the reservoir required the approval of the U.S. Army Corps of Engineers. The Environmental Assessment evaluated the potential impacts from several drawdown and refill scenarios. While the drawdown would affect recreational opportunities, water quality, and fish and wildlife habitat at the reservoir, the No Action alternative (no pump station, but high evaporative losses) also would substantially impact these same resources.*

* *denotes projects completed with other firms*

# Heidi Tillquist

Environmental Toxicologist/Senior Program Manager

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Pima County Wastewater District, Applicability of U.S. EPA Water Quality Criteria in the Arid West*, Arizona and Other Western States

*Project Manager. Ms. Tillquist evaluated the applicability of national water quality criteria (AWQC) for the arid West, particularly for effluent-dominated systems. The evaluation process included the evaluation of four AWQC, looking at duration and frequency of exceedances, sensitivity of local biota, and speed of aquatic system recovery. Various AWQC-modifying procedures, such as the Recalculation Procedure and the Biotic Ligand Model, were reviewed to determine their appropriateness and usefulness for site-specific modification of the AWQC. Results of this project were published in a special publication, "Relevance of Ambient Water Quality Criteria for Ephemeral and Effluent-Dependent Watercourses of the Arid Western U.S.," by the Society of Environmental Toxicology and Analytical Chemistry.*

State of Wyoming, Evaluation of the Effects of Water Depletion on Endangered Species, Litigation Support, North Platte River*, Wyoming and Nebraska

*Ms. Tillquist was responsible for evaluating correlations between water levels, fish populations, and whooping crane and plover populations. The effects of North Platte water depletions on endangered whooping crane and plovers were contested in Federal Court. Both these species use the North Platte drainage during their seasonal migrations as a foraging and resting area. Ms. Tillquist provided a technical evaluation of whooping crane population trends and its relationship to discharge at Grand Island, Nebraska. Results indicated that while discharge rates can directly affect habitat suitability for cranes and forage fish for plovers, these factors have not had any measurable effect of whooping crane populations.*

Programmatic Environmental Impact Statement for Herbicide Application throughout the Western U.S.*

*Lead Technical Advisor for toxicological evaluations of herbicides and their environmental fate and persistence in the environment. Ms. Tillquist assisted in the preparation of a Programmatic EIS for the BLM that evaluated the application of nine herbicides on BLM-administered lands throughout the West. Ms. Tillquist developed an ecological risk assessment to evaluate exposure pathways and potential effects to multiple receptors, ranging from non-target plant species to aquatic biota and terrestrial wildlife species. The nine herbicides included bromacil, chlorsulfuron, diflufenzopyr, diquat, diuron, fluridone, imazapic, sulfmeturon methyl, and tebuthiuron. To evaluate the toxicity of these nine herbicides, Ms. Tillquist review, synthesized, and summarized information from the Environmental Protection Agency registration data and the peer-reviewed literature to develop toxicity benchmarks (toxicity reference values). These benchmark values were subsequently used in the ecological risk assessment and programmatic EIS.*

**Mining**

Bureau of Land Management, Cameco Resources In-Situ Uranium Mine Environmental Impact Statement*, Gas Hills, Wyoming (Lead Public Safety Risk Assessor)

*Cameco proposes to develop the Gas Hills In-situ Recovery Uranium Mine Project. The project area covers approximately 8,500 surface acres (approximately 13 square miles) of federal, state and private lands. The Bureau of Land Management's Lander Field Office is the lead agency for the environmental analysis. The Project is permitted by the Wyoming Department of Environmental Quality and is licensed by the U.S. Nuclear Regulatory Commission. Unlike conventional mining practices, in-situ removal mining methods utilize a solution consisting of oxygen and carbon dioxide or bicarbonate injected via conventional water wells into uranium ore-bearing rock formations in the subsurface. The solution dissolves the uranium ore from the rock formations into the circulating groundwater. The resultant uranium-bearing groundwater is recovered by pumping wells located adjacent to the injection wells. The groundwater containing uranium is then processed through an ion-exchange facility where the uranium is precipitated onto a resin bead media. The resin beads containing uranium would then be transported to the Cameco Smith Ranch-Highland facility for processing into uranium yellowcake. After the uranium has been removed, the resin bead media would be returned to the Project site for re-use. The distance one-way from the Gas Hills to Smith Ranch-Highland is approximately 140 road miles.*

* denotes projects completed with other firms

# Heidi Tillquist

Environmental Toxicologist/Senior Program Manager

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Beartrack Mine, NPDES Issues and Biological Opinion*, Napias Creek, Idaho

*Ms. Tillquist was the project manager for a study that evaluated the toxicity of heavy metals to trout. Because of extremely low water hardness (less than 10 mg/L of $CaCO_3$), the permitted discharge of metals, particularly copper, were extremely low for this mine. Ms. Tillquist developed a site-specific sampling plan to collect the necessary data for the development of a site-specific translator value for the mine's National Pollutant Discharge Elimination System permit. Samples were collected using ultra-clean sampling techniques and were analyzed to detect metal concentrations at very low concentrations. Results from these analyses were used to develop a translator value, allowing the mine to continue to discharge effluent.*

Water Quality Evaluation*, Nevada

*Ms. Tillquist was the environmental toxicologist and risk assessor evaluating the impacts of selenium and mercury from a mine. The U.S. Fish and Wildlife Service (USFWS) expressed concerns that elevated concentrations of contaminants derived from the Big Springs Mine, particularly mercury and selenium, have affected or have the potential to affect aquatic biota in the North Fork of the Humboldt River. The USFWS concern was enhanced by the presence of endangered Lahontan cutthroat trout and other species of concern. Critically evaluated the USFWS-proposed field sampling plan and questioned whether the data that would be collected could credibly discern any adverse effects attributable to the Big Springs Mine from normal environmental variability. As a result of the critique, the USFWS revised its field sampling plan and entered into consultation with Independence Mining Co. regarding alternative approaches.*

Atlanta Gold, National Pollutant Discharge Elimination System Permit*, Atlanta, Idaho

*Project Manager. Mining operations in Atlanta, Idaho, have occurred since the 1870s. As a result of these activities, mine drainage is currently being released at 25 different locations. The primary contaminant of concern is arsenic. Atlanta Gold needs to obtain a National Pollutant Discharge Elimination System (NPDES) permit for these existing discharges. To expedite the NPDES process, the Environmental Protection Agency (EPA) Region 10 agreed to third-party preparation of the NPDES application, EPA Fact Sheet, and the EPA permit.*

Mining Company, Evaluation of Dietary Metals Toxicity to Rainbow Trout*, Western U.S.

*Ms. Tillquist conducted literature research to compile and synthesize data related to dietary metal exposure to trout. In some mining areas, metals concentrations in benthic macroinvertebrates are elevated compared to reference sites. Some scientists have expressed concern that trout may be exposed to potentially toxic levels of metals via dietary exposure. Ms. Tillquist analyzed the published literature and established concentrations of metals in the diets that are considered to have no observable adverse effects as well as the lowest concentration demonstrated to have an adverse effect on survival or growth. This information was presented at the 1999 Society of Environmental Toxicology and Analytical Chemistry.*

Identification of Potential Habitat for the Endangered Lahontan Cutthroat Trout*, Walker River and Carson River, Nevada, California

*Ms. Tillquist identified drainages within the Walker and Carson River basins that contain potential habitat for future restoration work for off-site mitigation for Lahontan cutthroat trout habitat. As a result of the project, suitable habitat was identified for the mining client, who subsequently purchased the property with its associated water rights and successfully conducted off-site habitat mitigation.*

**Electrical Power Generation and Transmission**

Bureau of Indian Affairs and Williams Company, Wanapa Energy Center Environmental Impact Statement*, Hermiston and Umatilla, Oregon

*Ms. Tillquist evaluated water rights and researched water laws applicable to the project, particularly those related to threatened anadromous salmon species. As a third-party contractor for the Bureau of Indian Affairs, Ms. Tillquist evaluated the potential impacts associated with the construction and operation of the Wanapa Energy Center, a power generating plant. Ms. Tillquist evaluated issues associated with water rights and laws pertaining to water withdrawal, given the presumption by Diamond Generating (developer) that the water rights to be used were "reserved" municipal water rights and that these city water rights predated the in-stream flow requirements for the Columbia River. Also, the amount of water withdrawn and the method used to withdraw water were evaluated to determine if they could have potential impacts on federally listed Pacific salmon. Finally, water quality issues were evaluated to assess potential impacts of the effluent water used to cool the power generating equipment and to predict effects to the environment from the discharged water into the environment.*

* denotes projects completed with other firms

# Heidi Tillquist

Environmental Toxicologist/Senior Program Manager

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Tri-State Generation and Transmission Association, Environmental Assessment and Alternative Evaluation*, New Mexico

*Provided technical support, evaluated data, and prepared the majority of the environmental assessment and alternatives evaluation. Tri-State applied for financial assistance from the Rural Utilities Services (RUS) in order to construct a simple-cycle combustion turbine generating facility near Lordsburg, New Mexico. As part of the RUS application process, Ms. Tillquist developed an Alternatives Evaluation which evaluated alternative sites for the power plant. A Site Selection Study also was produced; RUS used this Site Selection Study as its Environmental Assessment (with public scoping).*

Power Plant Application for Certificate*, San Bernardino County, California

*Wildlife Toxicologist evaluating risk to endangered biota from nitrogen deposition. The U.S. Fish and Wildlife Service expressed concerns about the potential negative effects of supplemental atmospheric nitrogen deposition on native plant communities originating from the new Mountainview Power Plant. Ms. Tillquist evaluated the likelihood of changes in the vegetative communities based on their location, growth periods, and estimated amount of nitrogen deposition. Sensitivity to nitrogen enrichment was assessed. The analysis indicated that the amount of additional atmospheric nitrogen deposition was not appreciable, particularly when compared to the sizeable background concentrations in the Los Angeles Air Basin.*

**Solar Energy**

Stirling Energy Systems (SES), LLC, SES Solar Two Project*, Imperial County, California (Lead Biologist)

*SES submitted an application to the Bureau of Land Management (BLM) for development of the proposed SES Solar Two Project, a concentrated solar electrical generating facility capable of generating 750 megawatts (MW) of renewable power. The proposed SES Solar Two Project site is located on approximately 6,140 acres of federal land managed by the BLM and approximately 300 acres of privately owned land, in Imperial County, California. The project would consist of approximately 30,000 SunCatchers, with a total generating capacity of 750 MW. The proposed SES Solar Two Project also includes an electrical transmission line, water supply pipeline, and a site access road. A new 230-kV substation would be constructed on-site, connected to the existing San Diego Gas & Electric Imperial Valley Substation via a 10.3-mile, double-circuit, 230-kV transmission line. Just over 7.5 miles of the new line would be constructed off-site. An off-site 6-inch diameter water supply pipeline would be constructed 3.4 miles from the Westside Main Canal to the project boundary. The BLM and CEC have executed a Memorandum of Understanding concerning their intent to conduct a joint environmental review of the project in a single NEPA/CEQA process. Ms. Tillquist provided review and technical input to the BLM's and CEC's environmental analysis. Ms. Tillquist revised CEC's document under an extremely tight timeline to make the document compliant with BLM minimum standards. Major concerns included biological impacts to desert bighorn sheep and desert tortoise.*

* *denotes projects completed with other firms*

# Heidi Tillquist

Environmental Toxicologist/Senior Program Manager

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Bureau of Land Management and California Energy Commission, Ivanpah Solar Energy Projects*, San Bernardino County, California

*Biological Lead, handling wildlife and special status species issues. BrightSource Energy, Inc. proposed the development three separate solar thermal power plants within a 3,600-acre project site located in the desert in San Bernardino County, California. When constructed, the 392-megawatt project will be the world's largest solar energy project, nearly doubling the amount of solar thermal electricity currently produced in the U.S. It also will be the largest fully solar-powered steam turbine. Ms. Tillquist also helped prepare a Supplemental and Final EIS as a third-party contractor to the BLM. Ms. Tillquist also worked cooperatively with the California Energy Commission (CEC) to ensure the CEC siting committee issued a proposed decision consistent with the BLM's Record of Decision. BrightSource's proprietary Luz Power Tower (LPT) technology enables the company to employ a low-impact environmental design. Instead of the extensive land grading and concrete pads, BrightSource mounts mirrors (heliostats) on individual poles that are placed directly into the ground, allowing the solar field to be built around the natural contours of the land and avoid areas of sensitive vegetation. This design also allows for vegetation to co-exist within the solar field. The Final EIS was published in July 2010 with construction in fall 2010.*

**Inhalation Toxicology**

National Institute of Health, Retention and Clearance of Radioactive Particles from Intermediate Airways in Beagle Dogs, Lovelace Inhalation Toxicology Research Institute*, New Mexico

*Ms. Tillquist was a summer intern who received a grant to examine the movement and retention of small inhaled particles within the intermediate airways of lungs. In the lung, particulate matter tends to be trapped either in the upper airways or deep within the lung. Little was known about the ability of the intermediate airways to clear or retain particulate matter. Based on a grant from the National Institutes of Health, Ms. Tillquist developed a new technique for exposing intermediate airways (bronchioles). Clearance and retention rates of various-sized particulate within the lung were evaluated by using particles labeled with radioactive cesium and strontium. In addition to this basic research, was involved in the post-operative performance evaluation of lung transplants, a relatively new surgical procedure. Finally, Ms. Tillquist acted as a technician for measurement of radioactive materials in various tissues and other matrices for a variety of other projects.*

National Toxicology Program, Acute $Ni^{63}SO_4$ Inhalation Exposures in Mice and Rats, Lovelace Inhalation Toxicology Research Institute*, New Mexico

*Ms. Tillquist was the lead technician responsible to several National Toxicology Program studies. As part of the National Toxicology Program's evaluation of nickel compounds, conducted acute aerosol exposures of laboratory animals (over 100 animals) in order to evaluate the metabolism of nickel. Radioactive nickel was used to trace metabolic pathways. This work required Level B laboratory conditions (respirators, protective clothing, shower-in/shower-out procedures) as well as constant monitoring for radiological contamination.*

National Toxicology Program, Chronic NiO, $NiSO_4$, and $Ni_3S_2$ Inhalation Exposures in Rats and Mice, Lovelace Inhalation Toxicology Research Institute*, New Mexico

*Ms. Tillquist was the lead technician responsible to several National Toxicology Program studies. The National Toxicological Program (NTP) routinely evaluates the toxicity of compounds in the environment. Nickel compounds are used in a number of manufacturing processes. Ms. Tillquist was responsible for the supervision, monitoring, and laboratory measurements associated with three large inhalation toxicology studies (>3,500 animals) for the NTP. Ms. Tillquist ensured that staff followed Good Laboratory Practices (GLP procedures), maintained Quality Assurance of the associated data and other project-related paperwork. This work involved Level B laboratory conditions (respirators, protective clothing, shower-in/shower-out procedures).*

* denotes projects completed with other firms

# Heidi Tillquist

Environmental Toxicologist/Senior Program Manager

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**Water Quality Assessments**

Climax Mine, Evaluation of the Effects of Aqueous Aluminum on Aquatic Biota of Tenmile Creek*, Climax, Colorado

*Ms. Tillquist evaluated eight years of fish and macroinvertebrate community data to determine if any temporal or spatial trends related to water quality, specifically aluminum, were apparent. Whole-effluent toxicity (WET) test results for this same period were summarized and, again, were correlated to aluminum concentrations. Finally, a review on the toxicity of aluminum to aquatic biota was written to summarize the state-of-the-science knowledge of aluminum toxicity in aquatic systems, which has changed dramatically since the ambient water quality criteria were developed for aluminum. Results showed that although aluminum concentrations were above national ambient water quality criteria and local background levels, concentrations of aluminum were not having any demonstrable effect on aquatic biota. Rather, patterns of improvement were observed in the biological data since 1995, coinciding with the implementation of significant changes in the water treatment procedures at the Climax water treatment facility. Moreover, laboratory WET testing showed no acute or chronic toxicity when aluminum was above ambient water quality criteria.*

Beartrack Mine, Review of Biological Opinion on Chinook and Steelhead: Critique and Re-evaluation, Tributary of the Snake River*, Idaho

*Ms. Tillquist conducted a systematic evaluation of water quality in a Snake River tributary to determine if salmonids would be adversely affected by metal concentrations. The National Marine Fisheries Service (NMFS) originally concluded in a Biological Opinion that the continued operation of the mine jeopardized the successful reintroduction of Chinook salmon into this watershed. This conclusion was based on water quality data, which occasionally exceeded the national ambient water quality criteria. Ms. Tillquist re-evaluated the water quality data using a more extensive dataset and conducted a broad, weight-of-evidence evaluation that evaluated aquatic community health. Temporal and spatial trends in water quality and fish and benthic macroinvertebrate community structure were examined to determine if any adverse effects exist which are attributable to the operation of the mine. Specifically, this assessment evaluated the likelihood of adverse effects to federally listed salmonids. This assessment found there was no evidence of adverse impacts from the operation of the mine. Furthermore, there were statistically significant indications that the aquatic community health (measured as density and diversity) has recently improved, perhaps due to the mining company's restoration of historic placer mining areas in the watershed. As a result, the NMFS was forced to recant its original position and revised their Biological Opinion to indicate a no jeopardy finding.*

Aquatic Toxicity Assessment of Leachate from the Cortez Landfill Superfund Site, Delaware Water Gap*, Pennsylvania/ Delaware

*Ms. Tillquist investigated leachate from a Superfund site into a National Park area. In the 1970s, barrels containing unknown contamination were illegally dumped in a landfill in New Jersey. By the late 1980s, material from these barrels was leaching into surrounding properties and into the Delaware River and the landfill was designated as a Superfund site. Notably, there was an increased prevalence of illness in the surrounding areas. This portion of the Delaware River was part of the Delaware River Gap National Park, administrated by the National Park Service. Through a grant from the National Park Service, assessed the aquatic toxicity of leachate entering the Delaware River using Microtox® and several routine aquatic toxicity tests.*

Water Quality Criteria Evaluation*, Nationwide (Technical Lead)

*Ms. Tillquist is providing support on toxicological data and associated environmental impacts. National water quality criteria promulgated by the U.S. Environmental Protection Agency (USEPA) are applicable over a normal range of water hardness. However, the validity of extrapolating criteria to unusually hard or soft waters is unknown. Ms. Tillquist conducted a literature evaluation to determine whether application of the USEPA's criteria for metals is appropriate. Additionally, Ms. Tillquist conducted a series of aquatic toxicity tests with copper in both hard and soft waters. Neither the literature evaluation nor the toxicity tests supported the extrapolation of criteria beyond these hardness limits.*

* *denotes projects completed with other firms*

# Heidi Tillquist

Environmental Toxicologist/Senior Program Manager

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**Wildlife Biology**

Biomonitoring of the Cache la Poudre River*, Colorado

*Ms. Tillquist provided technical support for a long-term (i.e., over 10 years) biomonitoring project, fish community structure program. The study area encompassed the Poudre River in northern Colorado with the intent to evaluate if changes in water quality attributable to Eastman Kodak have negatively impacted the Cache la Poudre River ecosystem. Habitat was evaluated using U.S. Environmental Protection Agency's Rapid Bioassessment Protocol, while the fish community was assessed using the Index of Biotic Integrity. Large scale, long-term trends in the fish community appeared to be primarily affected by human disturbance activities such as channelization. Ms. Tillquist conducted fieldwork and analyzed data as part of an Index of Biotic Integrity assessment. Fish collected by electrofishing and seining were identified, weighed, measured, and examined for disease. Flow rates, habitat type, and habitat quality were quantitatively evaluated.*

Survey of Fish Assemblage in the Headwaters of East Plum Creek*, Colorado

*Ms. Tillquist conducted field surveys for fish in small streams on U.S. Air Force Academy lands. The Air Force Academy was evaluating the potential environmental impacts of increased training activities in undeveloped areas of the Academy's property. In conjunction with this assessment, conducted fish surveys in the intermittent portions of upper East Plum Creek. Electrofishing gear and seines were used to sample the creek and beaver ponds. No fish were found in these reaches.*

Museum of Southwestern Biology, University of New Mexico, Field Surveys of Fish in Plain Streams of the Southwestern U.S.*, New Mexico, Texas, Colorado

*Ms. Tillquist conducted field surveys for the collection and systematic identification of fish throughout New Mexico, Colorado, and Texas. Special emphasis was placed on the identification of new or existing endangered fish species. Through this work, the Rio Grande silvery minnow was identified and this species subsequently has been listed as an endangered species, largely due to the publication of this fieldwork. She helped curate specimens into the Museum of Southwestern Biology.*

Carbon Dioxide Pipeline Project Environmental Assessment*, Wyoming (Project Wildlife Biologist)

*Anadarko proposed to construct the 125-mile-long Salt Creek Carbon Dioxide Pipeline. Ms. Tillquist conducted sage-grouse, mountain plover, and raptor surveys. Data from these field reconnaissance surveys were used to assist with pipeline route selection and to identify areas with seasonal construction constraints. The pipeline has been successfully permitted and constructed.*

Nesting Habitat Evaluation and Improvement for Threatened Dusky Canada Geese, Prince William Sound & Copper River Delta*, Cordova, Alaska

*Ms. Tillquist evaluated areas on the Copper River Delta for their potential as nesting habitat for the endangered Dusky Canada goose. Once suitable sites were identified, artificial nesting structures and islands were constructed. Nesting success was documented through the breeding season to determine if artificial nesting structures were effective. Ms. Tillquist also participated in breeding waterfowl surveys and banded geese. She also evaluated and constructed in-stream habitat improvement structures for anadromous fish and collected water quality data.*

* denotes projects completed with other firms

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Cooper, A. R., H. Tillquist, L. M. Overholt, and D. C. Jamison. Cooper's Acute Toxic Exposures (with CD-ROM). *CRC Press, Inc.*, 1996.

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## CERTIFICATE OF SERVICE

I certify that on this 10th day of July, 2015, a true and correct copy of this **JOINT MOTION IN LIMINE TO EXCLUDE EVIDENCE PERTAINING TO KEYSTONE'S PROPOSED CHANGES TO FINDINGS OF FACT** was filed on the Public Utilities Commission of the State of South Dakota e-filing website. And also on this day, a true and accurate copy was sent via email to the following (or US Mail first-class postage prepaid where no email is given):

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