BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

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	)	Docket 14-001 **DAKOTA RURAL ACTION'S MOTION AND SUPPORTING MEMORANDUM TO COMPEL DISCOVERY**

Pursuant to SDCL §15-6-37(a), Dakota Rural Action ("DRA"), by and through counsel, hereby moves the South Dakota Public Utilities Commission (the "Commission") for an order compelling TransCanada Keystone Pipeline, LP ("TransCanada"), to provide substantive, non-evasive answers to DRA's First Interrogatories to TransCanada numbered 7, 8, 12, 13, 15, 16, 17, 21, 23, 25, 26, 30, 40, 48, 56, 57, 58, 60, 76, 83, and 86, and to the documents requested by DRA its First Request for Production of Documents to TransCanada numbered 1, 9, 10, 12, 13, 26, 28, 29, 30, 31, 33, 34, 36, 37, 38, 42, 44, 46, 48, 50, 51, 53, 55, and 56. Because the information sought in these discovery requests and requests for production of documents is relevant and discoverable, TransCanada's objections should be overruled and TransCanada should be directed to provide meaningful answers and to produce documents responsive to the subject discovery and document requests.

In compliance with SDCL §15-6-37(a)(2), counsel for DRA hereby certify that they have in good faith conferred or attempted to confer with counsel for TransCanada in an effort to secure the information or material sought through discovery requests prior to filing this motion.

Factual Background

On September 15, 2014, TransCanada, after having failed to commence construction of its proposed Keystone XL Pipeline project (the "Pipeline") for more than four years, filed its petition

seeking recertification of findings of fact and conditions set forth in the Commission's Amended Final Decision and Order dated June 29, 2010 (the "Original Permit"), which granted TransCanada authority to construct the proposed Pipeline subject to a number of conditions. Under SDCL §49-41B-27, if construction of the proposed Pipeline has not commenced within four years of issuance of the Original Permit, TransCanada is required certify to the Commission, prior to commencing construction, that the Pipeline continues to meet the conditions upon which the Original Permit was issued. That means each and every one of the fifty conditions under which the Original Permit was issued.

Notwithstanding the objections of a number of intervenors including DRA, and notwithstanding the wide scope of subject matter areas requiring certification that were contained in the conditions to the Original Permit, on December 17, 2014, the Commission acceded to TransCanada's request to set an unreasonably compressed scheduling order in these proceedings (the "Scheduling Order"). The inevitable result of this action, as has been argued by various intervenors is that they have been prejudiced by the Commission's ruling in favor of TransCanada, which has had the effect of not affording adequate time to permit complete, full, and exhaustive discovery into all of the conditions to the Original Permit.

On January 6, 2015, DRA served its First Interrogatories and First Request for Production of Documents on TransCanada. On February 6, 2015, TransCanada served its responses to DRA's discovery requests (See **Exhibit 1**, *Keystone's Responses to Dakota Rural Action's First Interrogatories to TransCanada Keystone Pipeline, LP*, and **Exhibit 2**, *Keystone's Responses to Dakota Rural Action's First Request for Production of Documents*).

Interestingly, TransCanada itself acknowledged the unreasonably short time frame it successfully managed to obtain from the Commission in the Scheduling Order. In Interrogatory No. 2, DRA asked:

> "Prior to answering these interrogatories, have you made due and diligent search of all books, records, and papers of the Applicant with the view of eliciting all information available in this action?"

TransCanada responded by stating:

> "Yes, to the extent reasonably practicable in attempting to respond to over 800 discovery requests within the time allowed." (Exhibit 1, p. 2-3.)

In effect, TransCanada is admitting that it did not conduct a complete and accurate search of its records in responding to DRA's discovery requests. Consequently, DRA does not know whether TransCanada complied with South Dakota's discovery rules, as TransCanada is only willing to state that it engaged in a "reasonably practicable" effort to comply – whatever "reasonably practicable" means. In fact, to the extent that it is only willing to state that it engaged in "reasonably practicable" efforts to comply, TransCanada has for all practical purposes admitted that it has not provided full, accurate, and meaningful responses to legitimate discovery requests.

Legal Standard Mandates Compelling Discovery

Under Public Utilities Commission Administrative Rule 20:10:01:22.01, an order to compel may be granted by the Commission upon the showing of good cause by a party to the proceeding. Additionally, this rule sets forth that discovery is to proceed "in the same manner as in the circuit courts of this state." A.R.S.D. 20:10:01:22.01.

In South Dakota circuit court discovery is governed by SDCL §15-6-26(b):

> Unless otherwise limited by order of the court in accordance with these rules, the scope of discovery is as follows:
>
> (1) In general. Parties may obtain discovery regarding any matter, not privileged, which is relevant to the subject matter involved in the pending action, whether it relates to the

> claim or defense of the party seeking discovery or to the claim or defense of any other party, including the existence, description, nature, custody, condition and location of any books, documents, or other tangible things and the identity and location of persons having knowledge of any discoverable matter. It is not ground for objection that the information sought will be inadmissible at the trial if the information sought appears reasonably calculated to lead to the discovery of admissible evidence.

The ability to engage in meaningful and complete discovery is an essential component to affording parties to proceedings due process rights. SDCL §15-6-26(b) covers the scope of discovery. That statute provides, in part, that:

> **"Parties may obtain discovery regarding any matter, not privileged, which is relevant to the subject matter involved in the pending action**, whether it relates to the claim or defense of the party seeking discovery or to the claim or defense of any other party, including the existence, description, nature, custody, condition and location of any books, documents, or other tangible things and the identity and location of persons having knowledge of any discoverable matter. **It is not ground for objection that the information sought will be inadmissible at the trial if the information sought appears reasonably calculated to lead to the discovery of admissible evidence**. SDCL §15-6-26(b)(1) (emphasis added).

The South Dakota Supreme Court has ruled that the discovery rules are to be accorded a "broad and liberal treatment." *Kaarup v. St. Paul Fire and Marine Insurance Co*., 436 N.W.2d 17, 21 (S.D. 1989). "A broad construction of the discovery rules is necessary to satisfy the three distinct purposes of discovery (1) narrow the issues; (2) obtain evidence for use at trial; (3) secure information that may lead to admissible evidence at trial." *Id*. at 19 (citing 8 C. Wright and A Miller, Federal Practice and Procedure, §2001 (1970)).

Furthermore, "[t]he proper standard for ruling on a discovery motion is whether the information sought is "relevant to the subject matter involved in the pending action...." SDCL 15–6–26(b)(1). This phraseology implies a broad construction of "relevancy" at the discovery stage because one of the purposes of discovery is to examine information that may lead to admissible evidence at trial." *Id*.

Discovery Sought to be Compelled – Interrogatories

DRA's specific interrogatories TransCanada should be compelled to answer are set forth as follows:

DRA Interrogatory No. 7

DRA sought information regarding leaks and spills of crude oil from pipelines owned or operated by TransCanada and, in connection with these leaks and spills, requested information concerning TransCanada's Integrity Management Plan, SCADA (supervisory control and data acquisition) specifications, and Emergency Response Plan. While TransCanada provided a schedule setting forth numerous leaks and spills, it objected to providing its Integrity Management Plan, SCADA specifications, and Emergency Response Plan in connection with the listed spills and leaks on the basis that they were "confidential and not relevant" (see Exhibit 1, p. 11). TransCanada does not get to make the call as to what is "relevant" with respect to discovery. The applicable standard for discovery is that answers are required to be provided if they might lead to discovery of admissible evidence. Furthermore, in the event TransCanada truly believes the requested information is confidential, it can seek a protective order – which it has not requested. Given the pre-filed testimony of Evan Vokes in these proceedings about TransCanada's corporate culture of cutting costs and sacrificing pipeline safety in order to increase profitability (see **Exhibit 3**, *Testimony of Evan Vokes on Behalf of Dakota Rural Action*), it would appear that leaks and spills with respect to the proposed Pipeline are a virtual inevitability. Therefore, the information requested by DRA is highly relevant and should be disclosed.

DRA Interrogatory Nos. 8, 12, 13, 15, 16, 17, 26, 30, 33, 34, and 40

DRA is aggregating these discovery requests because, in various aspects, they all seek information regarding forecasts TransCanada developed with respect to crude oil demand, refinery capacity,

and other business factors that play into the decision as to whether or not the Pipeline is truly necessary. TransCanada objected to these requests because, among other things, it believes any response is outside the Commission's jurisdiction and seeks information that it does not have (see Exhibit 1, pp. 12, 15, 16, 18-20, etc.). Information sought by DRA is relevant because it directly addresses the need for the proposed Pipeline and directly addresses the specific findings made by the Commission in the Original Permit as noted in DRA's interrogatories. TransCanada's response defies credibility in that it asks DRA and the Commission to believe that it did not engage in any economic forecasting prior to launching a multi-billion dollar project. No company would do that. The failure to do so would constitute a serious breach of a corporate officer's fiduciary duty to that corporation. This response frankly undermines TransCanada's credibility with respect to the entire discovery process in these proceedings. TransCanada has not provided an adequate basis for objecting to DRA's discovery requests and should be compelled to completely disclose the information requested by DRA.

DRA Interrogatory No. 21

DRA requested that TransCanada inform it whether a failure by TransCanada to design, construct, test, or operate the proposed Pipeline in accordance with the special conditions developed by the Pipeline Hazardous Materials and Safety Administration (PHMSA), and set forth in Appendix Z to the Department of State, January 2014 Final Supplemental Environmental Impact Statement (FSEIS), would be a violation of federal law, and if so, to identify: (a) the law(s) under which enforcement of these special conditions would be brought; (b) the enforcing agency; and (c) all correspondence between TransCanada and PHMSA. This is an important issue because it goes directly to TransCanada's compliance with law and the conditions placed upon it by the Commission. TransCanada's response was inadequate in that it replied as follows:

> This request seeks information that is beyond the scope of the PUC's jurisdiction and Keystone's burden under SDCL § 49-41B-27. This request also seeks information addressing an issue that is governed by federal law and is within the province of PHMSA. In addition, this request depends on a hypothetical condition and is therefore speculative and improper as to form. It is also overly broad and burdensome to the extent that it seeks all correspondence between TransCanada and PHMSA, and asks for information that is not relevant and not likely to lead to the discovery of admissible evidence under SDCL § 15-6-26(b). Without waiving the objection, unless and until the Department issues a Record of Decision and a Presidential Permit, the recommendations in the Final EIS are not binding on Keystone. (See Exhibit 1, p. 21-22).

TransCanada is trying to have it both ways. The Commission's Original Permit clearly requires compliance with laws and regulations, yet TransCanada takes the position that any such compliance is outside the Commission's purview. While TransCanada asserts that providing correspondence between it and PHMSA is burdensome, that is not a sufficient rationale for dodging DRA's legitimate discovery request. Disclosure of TransCanada's correspondence with PHMSA could very well delineate any concerns PHMSA may have with respect to TransCanada's ability to construct the proposed Pipeline in compliance with law. That question is not hypothetical, but very real, in light of the pre-filed testimony of Evan Vokes in these proceedings about TransCanada's corporate culture of ignoring rules governing pipeline safety (see Exhibit 3). Consequently, TransCanada should be compelled to fully respond to this discovery request.

DRA Interrogatory No. 23

DRA sought information concerning the dates on which WCSB (Western Canadian Sedimentary Basin) crude oil transportation was disrupted due to spill or leak incidents. In response, TransCanada simply provided a spreadsheet setting forth a list of spills or leaks. See **Exhibit 4**, attached hereto. The information provided by TransCanada was not fully responsive to DRA's request because, while it set forth the date of each spill/leak incident, it failed to specify a range of dates in association with each spill during which crude oil transportation was disrupted. This information is relevant because the length of time of disruption could provide DRA with

information concerning the nature of potential pipeline damage or defects, along with information concerning TransCanada's ability to repair damaged or defective pipeline segments in a timely manner. TransCanada should be compelled to fully respond to this discovery request.

DRA Interrogatory No. 25

Because of public disclosures made by TransCanada that enhancements to the proposed Pipeline will result from it SCADA systems, it is reasonable to assume that software and data systems will be vulnerable to hackers. DRA sought information regarding TransCanada's proposed data security for the Pipeline. It is important for DRA, the Commission, and the public to know whether TransCanada has adequate date security systems and controls in place. This is information that should be disclosed because it directly affects the integrity and operations of the proposed Pipeline. Yet TransCanada objected to answering this request because largely it didn't think it was "prudent" to do so (see Exhibit 1, p. 24). Again, that is not TransCanada's call. The public has a right to know whether or not TransCanada has adequate and effective countermeasures in place to thwart hackers. This is a core operational and safety issue that is highly relevant to these proceedings. TransCanada should be compelled to answer DRA's request.

DRA Interrogatory No. 40

DRA asked TransCanada to state potential for pipeline transportation to replace rail transportation for shipments from the WCSB and the Williston Basin to PADDs 1 and 5. This information is relevant given public statements by Pipeline supporters that transportation of tar sands crude oil via pipeline is safer than rail. TransCanada objected on the basis that this information is not within the purview of the Commission and that it does not have this information. Again, TransCanada's response defies credibility in that it asks DRA and the Commission to believe that it did not engage in any economic forecasting with respect to marketplace competition prior to launching a multi-billion

dollar project. TransCanada has not provided an adequate basis for objecting to DRA's discovery requests and should be compelled to completely disclose the information requested by DRA.

DRA Interrogatory No. 48

In this interrogatory, DRA asked TransCanada to provide information concerning the worst case discharge and describe in detail the worst case scenario that would result from damage caused to the Pipeline from the high swelling potential of the Cretaceous and Tertiary rocks located in the Missouri River Plateau – which occurs due to this land form's susceptibility to instability in the form of slumps and earth-flows, including landslides. Additionally, DRA requested that TransCanada provide the locations where such ground swelling could be anticipated, and requested documents supporting TransCanada's answer. In answering, TransCanada appears to believe that the geology of South Dakota is a confidential homeland security matter, as that formed the basis for its failure to fully answer DRA's discovery request. TransCanada provided no statutory or regulatory authority for claiming a "homeland security" exemption to the discovery rules. If any such rule exists, TransCanada should file a motion for a protective order instead of putting DRA in the position of having to ask the Commission to compel discovery – but given we are at the point where no time is left to reach any other resolution, DRA requests that the Commission compel TransCanada to fully its discovery request.

DRA Interrogatory No. 56

DRA asked TransCanada to describe the worst case scenario of a worst case discharge into the Little Missouri, Cheyenne, and White River crossings, and to identify documents used to provide answers. While TransCanada provided a partial answer it objected on the following grounds:

> "This request seeks information that is confidential. The location and volume of a worst case scenario spill are kept confidential for homeland security reasons." (See Exhibit 1, p. 50).

Again, TransCanada provided no statutory or regulatory authority for claiming a "homeland security" exemption to the discovery rules and should be compelled to fully answer DRA's discovery request because the impacts of a worst-case spill scenario could potentially have a devastating effect upon watersheds and water systems throughout South Dakota, and to populations downstream from spills for several hundred miles, and affect drinking water intakes for hundreds of thousands of people in cities like Lincoln, NE; Omaha, NE; Nebraska City, NE; St. Joseph, MO; and Kansas City, MO (see **Exhibit 5**, Stansbury, "*Analysis of Frequency, Magnitude and Consequence of Worst-Case Spills From the Proposed Keystone XL Pipeline*", p. 2).

DRA Interrogatory No. 57

DRA asked TransCanada to describe the worst case scenario which could occur from the Keystone XL pipeline as it passes under channels, adjacent flood plains and flood protection levees, as well as to identify any documents which would support its answers. Once again, TransCanada provided a partial answer, but objected to fully answering on the following grounds:

> "This request seeks information that is confidential. The location and volume of a worst case scenario spill are kept confidential for homeland security reasons." (See Exhibit 1, p. 52).

Again, TransCanada provided no statutory or regulatory authority for claiming a "homeland security" exemption to the discovery rules and should be compelled to fully answer DRA's discovery request because the impacts of a worst-case spill scenario could potentially have a devastating effect upon watersheds and water systems throughout South Dakota, and to populations downstream from spills for several hundred miles, and affect drinking water intakes for hundreds of thousands of people in cities like Lincoln, NE; Omaha, NE; Nebraska City, NE; St. Joseph, MO; and Kansas City, MO (see Exhibit 5, p. 2).

DRA Interrogatory No. 58

Again, because of its strong interest in protecting the precious and increasingly scarce water resources of South Dakota, DRA requested that TransCanada, in light of the spill risk assessment it provided in the Commission's HP09-001 docket, to explain leaks and spills on pipelines operated by the corporation, and to provide additional details concerning worst-case spill scenarios posed by the Pipeline. Continuing its game of "hide the ball", TransCanada again asserted confidentiality and unsupported "homeland security" concerns in refusing to provide a full and complete answer to DRA's legitimate discovery request. Given the importance of protecting South Dakota's water resources, TransCanada should not be permitted to avoid fully answering this question. DRA requests that the Commission issue its order compelling TransCanada to fully answer.

DRA Interrogatory No. 60

Focusing specifically on protection of the water resources of Tripp County, South Dakota, DRA asked TransCanada to describe in detail the impact of a worst case scenario spill into the shallow and surficial aquifers in Tripp County from the proposed Pipeline, and to identify any documents which would support TransCanada's answers. You guessed it. Once again, while providing a partial answer, TransCanada refused to fully answer on the basis of "confidentiality" and "homeland security" (see Exhibit 1, pp. 54-57). DRA re-asserts its prior responses set forth above with respect to this issue.

DRA Interrogatory No. 76

DRA requested information from TransCanada regarding locations in South Dakota where slope instability poses a threat of ground movement along the proposed Pipeline route, along with TransCanada's current Integrity Management Plan ("IMP") showing incorporation of locations where slope instability poses a potential threat to the Pipeline. TransCanada contends it not

required to answer DRA's discovery request because it is "overly broad and unduly burdensome," "seeks the discovery of information that is not relevant and not likely to lead to the discovery of admissible evidence," that the IMP is "beyond the scope" of the Commission's jurisdiction and TransCanada's burden in these proceedings, that it seeks information "addressing an issue that is governed by federal law and is within the exclusive province of the PHMSA," and that DRA's request seeks information that is "confidential and proprietary" (see Exhibit 1, pp. 75-75). TransCanada's objections are not well-founded. The request is narrowly-tailored and, hence, cannot be "overly broad and unduly burdensome." If TransCanada is taking the position that it does not have this information, perhaps it should not be in the pipeline business, as understanding and documenting soil conditions and stability are critical to pipeline safety and integrity. Slope instability could lead to a pipeline shear, resulting in serious ground and water contamination from a spill. To the extent TransCanada suggests that this is not in the Commission's purview, it is mistaken. The conditions appended to the Original Permit clearly require TransCanada to comply with federal regulations as a condition of receiving a permit. While the content of an IMP may indeed be governed and preempted under federal law, the Commission has required TransCanada to comply with those laws. DRA is entitled to disclosure of the requested information in discovery in order to be able to determine whether TransCanada is actually meeting – or for that matter, if it is even capable of meeting – the conditions set by the Commission. As for TransCanada's unsubstantiated assertion that the information sought by DRA is "confidential," TransCanada has failed to provide any basis for such a broad assertion, and regardless, the information sought is important to affording DRA and the Commission an opportunity to get a better understanding of the risks posed by the proposed Pipeline due to slope instability along South Dakota's varied geology.

DRA Interrogatory No. 83

DRA asked TransCanada to identify the most recent IMP submitted to the Commission and other appropriate agencies, including but not limited to sections in it related to High Consequence Areas ("HCAs"). TransCanada objected to answering this interrogatory on substantially the same grounds asserted in its objection to DRA Interrogatory No. 76, set forth above (see Exhibit 1, pp. 80-81). For the same reasons as set forth above, DRA suggests that TransCanada's objections have no legal basis and that it should be compelled to fully answer because DRA is entitled to receive complete information and an understanding of whether the IMP is adequate or even whether it meets applicable requirements under federal law. This is relevant due to the conditions TransCanada agreed to comply with in the Original Permit.

DRA Interrogatory No. 86

DRA asked TransCanada that in event of a worst case discharge or substantial release of crude oil into farmland and/or water resources and/or an explosion of the proposed Pipeline near homes or towns with people, to explain how it would have a "minimal" effect on the health, safety, or welfare of its inhabitants. DRA further asked TransCanada to identify the documents it relied upon to answer these questions. TransCanada objected on the basis that DRA's request was "argumentative and improper in form," that it "calls for speculation and assumes facts not in evidence and is therefore beyond the scope of discovery," and that the Commission previously determined that TransCanada had met its burden on this issue. TransCanada's objections have no legal basis. DRA and, more importantly, the citizens of South Dakota, are entitled to know the risks posed by the proposed Pipeline to their health, welfare, and safety. To the extent TransCanada argues this is not an issue, DRA is entitled to discovery to determine how TransCanada reached such an improbable

conclusion – particularly in the context of testimony contending that TransCanada de-emphasizes safety considerations in favor of profitability (see Exhibit 3).

Discovery Sought to be Compelled – Document Production

DRA's specific interrogatories TransCanada should be compelled to answer are set forth as follows:

DRA Request for Production No. 1

DRA requested that TransCanada produce all documents identified or referred to in its Answers to DRA's First Interrogatories. To the extent TransCanada failed to produce documents in response to any specific interrogatory as set forth above, DRA contends that TransCanada has no legal basis for failing to disclose documents for the reasons described with respect to each of the foregoing interrogatories in this motion to compel.

DRA Request for Production No. 9

DRA requested all documents concerning TransCanada's decision to use API SL X70M high-strength steel for the Pipeline in lieu of API SL X80M high-strength steel. TransCanada objects on the basis that this request is "overly broad and unduly burdensome" (see Exhibit 2, p. 5). TransCanada's objection has no basis because DRA is entitled to discover details concerning pipeline components and materials, as the selection of materials by TransCanada could have significant impact on the proposed Pipeline's integrity. These concerns are heightened in light of pre-filed testimony suggesting that TransCanada uses sub-standard materials, sacrificing safety in favor of profits (see Exhibit 3).

DRA Request for Production No. 10

DRA requested all documents concerning TransCanada's decision to use decision to use fusion-bonded epoxy ("FBE") coating on the proposed Pipeline, including but not limited to, contracts or

other agreements with the manufacturer of the FBE product, and any communications between TransCanada and such manufacturer. TransCanada objects on the basis that this request is "overly broad and unduly burdensome" and "not relevant or likely to lead to the discovery of admissible evidence" (see Exhibit 2, pp. 5-6). TransCanada's objection has no basis because DRA is entitled to discover details concerning pipeline components and materials, as the selection of materials, including coatings such as FBE, by TransCanada could have significant impact on the proposed Pipeline's integrity. These concerns are heightened in light of pre-filed testimony suggesting that TransCanada uses sub-standard materials, sacrificing safety in favor of profits (see Exhibit 3).

DRA Request for Production No. 12

DRA requested all documents showing location of power lines for pumping stations proposed for the Pipeline, the location of proposed pumping stations and mainline valves for the Pipeline in South Dakota, and including, but not limited to all communications between TransCanada's staff, consultants, advisors, or other parties concerning location and operation of pumping stations, mainline valves, and the proposed conversion of valves to remote control operations. TransCanada refused to provide the requested documents because it believes DRA's request is "overly broad, unduly burdensome, not relevant, and not likely to lead to the discovery of admissible evidence." The information sought by DRA is important and relevant given the prospect that pipeline leaks and spills often in connection with pumping stations and valves. On this basis, DRA is entitled to know what watersheds in South Dakota run a heightened risk of contamination when spills or leaks inevitably occur. In addition, TransCanada again relies the overused "homeland security" trope to refuse to provide DRA with documents disclosing the location of pump stations and mainline valves. As shown above, TransCanada's assertion has no basis.

DRA Request for Production No. 13

DRA made a very basic request for TransCanada's documents concerning compliance with PHMSA regulations and conditions, along with TransCanada's communications with federal regulators regarding compliance issues. TransCanada again objected on the basis that providing this information is "overly broad and unduly burdensome." While this request may indeed produce a large volume of documentation, it is crucial for DRA and the people of South Dakota to understand TransCanada's compliance regime and whether or not any special concessions were negotiated between TransCanada and federal regulators, not to mention information describing whether regulators raised any concerns regarding TransCanada's compliance efforts. The Commission clearly placed the burden on TransCanada to comply with federal law as a condition of the Original Permit, so the information sought is highly relevant. DRA is entitled to receive this information.

DRA Request for Production No. 26

DRA requested documents containing information concerning the failure of FBE coating referenced in the update to Finding 68. While TransCanada provided an explanation for the failure of the FBE coating, it failed to produce the requested documents (see Exhibit 2, pp. 12-13). The Commission should compel TransCanada to comply with DRA's discovery request.

DRA Request for Production No. 28

DRA requested documents containing information regarding TransCanada's decision to use horizontal directional drilling to cross waterways, including but not limited to all documents discussing or describing the decision-making process engaged in to determine which waterways would be crossed using horizontal directional drilling. While TransCanada provided a one-

sentence answer, it failed to produce the requested documents (see Exhibit 2, p. 13). The Commission should compel TransCanada to comply with DRA's discovery request.

DRA Request for Production No. 29

DRA requested documents, including but not limited to forecasts and projections of tax revenue accruing to the State of South Dakota should construction and operation of the Pipeline commence. While TransCanada produced a schedule of taxes paid (see **Exhibit 6**, attached hereto), its limited response was non-responsive to DRA's request for forecasts and projections. The instructions to DRA's request for production of contains a definition of the term "documents" (see **Exhibit 7**, p. 2). Documents are defined as:

> "The term "document" is to be interpreted in the broadest sense permitted under the South Dakota Rules of Civil Procedure codified in SDCL Title 15, and includes tangible things and any media upon which information is recorded, stored, or placed, including without limitation, writings, e-mails, drawings, graphs, charts, photographs, and other data compilations from which information can be obtained and translated, if necessary, through detection devices into reasonably usable form."

It is unreasonable for TransCanada to suggest that the only documents in its possession that relate to DRA's discovery request consist of the schedule attached hereto as Exhibit 6, meaning that TransCanada has failed to comply with DRA's legitimate request.

DRA Request for Production No. 30

TransCanada objected to DRA's request for production; however, DRA suggests that the documents sought in this request would be covered under its Request No. 1 set forth above, so DRA re-asserts its response to TransCanada's objections.

DRA Request for Production No. 31

DRA Requested documents concerning TransCanada's efforts to obtain and comply with applicable permitting referenced in Condition 2, including but not limited to copies of any permits obtained. This information is relevant to determine whether TransCanada is complying with the

conditions of the Original Permit, yet TransCanada refuses to produce the requested documents because it thinks DRA's request is "overly broad, unduly burdensome, not relevant, and not likely to lead to the discovery of admissible evidence" (see Exhibit 2, p. 14).

DRA Request for Production No. 33

DRA requested all documents concerning or discussing proposed adjustments or deviations in the route of the Pipeline, including but not limited to copies of notices to affected land owners. In response, TransCanada simply provided route variation maps (see Exhibit 2, p. 15). The instructions to DRA's request for production of contains a definition of the term "documents" (see Exhibit 7, p. 2). Documents are defined as:

> "The term "document" is to be interpreted in the broadest sense permitted under the South Dakota Rules of Civil Procedure codified in SDCL Title 15, and includes tangible things and any media upon which information is recorded, stored, or placed, including without limitation, writings, e-mails, drawings, graphs, charts, photographs, and other data compilations from which information can be obtained and translated, if necessary, through detection devices into reasonably usable form."

It is unreasonable for TransCanada to suggest that the only documents in its possession that relate to DRA's discovery request consist of route variation maps, meaning that TransCanada has failed to comply with DRA's legitimate request.

DRA Request for Production No. 34

DRA requested all documents concerning the appointment of a public liaison officer by TransCanada, and all documents containing information regarding communications between the public liaison officer and landowners affected by the Pipeline. TransCanada failed to respond to this request, objecting on the basis that the documents sought by DRA were "overly broad, unduly burdensome, not relevant, and not likely to lead to the discovery of admissible evidence" (see Exhibit 2, p. 15). TransCanada's objection is off-base. The appointment of a public liaison officer is a direct mandate of the conditions contained in the Original Permit. DRA is entitled to see the

requested documents, as any such documents could reveal TransCanada's noncompliance with conditions of the Original Permit and issues raised by landowners regarding their treatment at the hands of TransCanada.

DRA Request for Production No. 36

DRA requested all documents containing information concerning TransCanada's efforts to comply with mitigation measures set forth in the Construction Mitigation and Reclamation Plan submitted to the Commission. TransCanada completely failed to comply with request, only stating that the recommendations contained in the US State Department's Final EIS are not binding upon it until such time as action is taken by the federal government (see Exhibit 2, p. 16). TransCanada was non-responsive to DRA's request and the Commission should compel TransCanada to comply with DRA's request for production.

DRA Request for Production No. 37 and 38

Both of these document requests by DRA relate to development of construction/reclamation units ("Con/Rec Units") by TransCanada. TransCanada's objection that DRA's request is unduly burdensome and overly broad is off the mark. The request specifically focuses on a category of documents related to Con/Rec Units, so by its nature is narrowly tailored. Furthermore, TransCanada is non-responsive in that when asked for all documents, simply referred to Appendix R of the Department of State FSEIS (see Exhibit 2, p. 16). TransCanada should be compelled to produce the requested documents.

DRA Request for Production No. 42

DRA requested all documents containing information regarding consultations between TransCanada and the South Dakota Department of Game, Fish and Parks. While TransCanada provided a narrative of its consultations, it provided no documents in response to DRA's request, objecting on the basis that

requiring it to produce documents was "overly broad and unduly burdensome" (see Exhibit 2, pp. 17-18).

DRA Request for Production No. 44

This is a critical request for DRA which, because of its concerns that the Pipeline will negatively affect South Dakota's increasingly scarce water resources, seeks all documents describing or containing information regarding TransCanada's efforts to comply with conditions regarding construction of the Pipeline near wetlands, water bodies, and riparian areas, such documents including but not limited to compliance plans, construction plans, mitigation plans, and communications with any regulatory agency in such regard. TransCanada failed to respond to DRA's request, stating only that it "has not yet received its permit authorization for wetland construction" (see Exhibit 2, p. 19). TransCanada's response is woefully inadequate and the Commission should enter its order compelling TransCanada to comply with DRA's discovery request.

DRA Request for Production No. 46

DRA seeks production of all documents that reference or identify private and new access roads to be used or required during construction of the Pipeline. TransCanada simply asserts that this information is confidential for "homeland security" reasons without providing any explanation as to why, or what legal basis it has for such a sweeping assertion. DRA has addressed TransCanada's specious attempts at cloaking information in the trappings of some alleged homeland security regime above. The Commission should compel TransCanada to comply with DRA's request and produce the requested documents.

DRA Request for Production No. 48

DRA seeks all documents referencing agreements reached with landowners, including but not limited to any agreements reached with landowners modifying any requirements or conditions

established by the Commission. TransCanada refuses to provide any documents, instead, objecting on the basis that DRA's request is "request is overly broad, unduly burdensome, and not likely to lead to the discovery of admissible evidence" (see Exhibit 2, pp. 20-21). TransCanada's objections are misplaced. DRA and the public need to know if TransCanada is upholding the conditions set forth in the Original Permit, and this request was designed to help determine whether, in its communications with landowners along the proposed Pipeline route, TransCanada remains in compliance. The Commission should compel TransCanada to produce the requested documents.

DRA Request for Production No. 50

DRA requested all documents containing information regarding assessments performed in connection with TransCanada's activities in HCAs, including but not limited to documents referencing efforts by TransCanada to comply with 49 C.F.R. Part 195, and any communications or consultations with the South Dakota Geological Survey, the Department of Game Fish and Parks, affected landowners and government officials. This request is reasonable in that TransCanada must comply with the law. Compliance is a condition of the Original Permit. Yet TransCanada first asserts that this information is confidential, and second, claims it is not within the Commission's jurisdiction (see Exhibit 2, p. 21). These objections have no basis. First, the Original Permit demands compliance with all laws – that is a condition. Whether or not TransCanada is in compliance with those conditions is a core question in these proceedings. That is a question to which DRA is entitled to get answers and receive documents. With respect to TransCanada's claims of confidentiality, a bald assertion that PHMSA requires it is insufficient. DRA is entitled to discovery and the Commission should compel production. To the extent TransCanada has a basis for claiming confidentiality, it should seek a protective order instead of simply refusing to respond to legitimate discovery request.

DRA Request for Production No. 51

DRA requested all documents where TransCanada identified hydrologically sensitive areas as required by Condition Number 35 of the Original Permit. TransCanada completely failed to comply with request, only stating that based on the current route in South Dakota which was evaluated in the Department of State FSEIS (2014) in Sections 3.3 and 4.3, the High Plains Aquifer in southern Tripp County is the only vulnerable and beneficially useful aquifer identified as being crossed by the proposed Pipeline in South Dakota (see Exhibit 2, p. 22). TransCanada was non-responsive to DRA's request in that it provided no documents. The Commission should compel TransCanada to comply with DRA's request for production.

DRA Request for Production No. 53

DRA requested all documents containing information regarding TransCanada's efforts to comply with protection and mitigation requirements of the US Fish and Wildlife Service and SDGFP with respect to any endangered species. In response, TransCanada simply referred to the Biological Assessment and Biological Opinion contained in the State Department Final EIS and Final Supplemental EIS (see Exhibit 2, p. 22). The instructions to DRA's request for production of contains a definition of the term "documents" (see Exhibit 7, p. 2). Documents are defined as:

> "The term "document" is to be interpreted in the broadest sense permitted under the South Dakota Rules of Civil Procedure codified in SDCL Title 15, and includes tangible things and any media upon which information is recorded, stored, or placed, including without limitation, writings, e-mails, drawings, graphs, charts, photographs, and other data compilations from which information can be obtained and translated, if necessary, through detection devices into reasonably usable form."

It is unreasonable for TransCanada to suggest that the only documents in its possession that relate to DRA's discovery request consist of the State Department's Final EIS and Final Supplemental EIS, meaning that TransCanada has failed to comply with DRA's legitimate request and that the Commission should compel production of documents as requested by DRA.

DRA Request for Production No. 55

DRA requested all documents referencing or containing information concerning cultural or paleontological resources along the proposed Pipeline route. TransCanada responded by simply referencing the State Department's FSEIS and stating that the paleontological monitoring plan for South Dakota is "not being produced because it is confidential/privileged information" (see Exhibit 2, p. 23). TransCanada's answer is non-responsive. TransCanada has provided nothing to back up its claim that the requested information is confidential or privileged, leaving DRA with the conclusion that TransCanada is not responding to its requests in good faith.

DRA Request for Production No. 56

Finally, DRA requested the incident reports for each and every spill or leak related to a pipeline operated by TransCanada companies since January 1, 2010. TransCanada simply provided a spreadsheet listing pipeline spills and leaks (see Exhibit 4), but failed to provide the requested incident reports – claiming that production was "overly broad and unduly burdensome" (see Exhibit 2, p. 23). TransCanada's position is ludicrous. First, pipeline spills are serious matters, and it defies credibility to suggest that the requested incident reports are not readily accessible to TransCanada where production would be a burden. Second, DRA requested incident reports for TransCanada and its "Affiliates," a defined term in DRA's First Request for Production of Documents. Without full and complete disclosure of the requested documents, DRA will not be able to make a meaningful inquiry as to TransCanada's safety record and standards, thereby being deprived of the basic due process rights it should be entitled to receive in proceedings of public bodies. The information sought by DRA is extremely relevant to these proceedings because the integrity and safety of TransCanada's pipelines is a key issue.

Conclusion

Throughout its responses to DRA's discovery requests, TransCanada has been less than forthcoming. Its reasons for doing so generally fall into three categories: (1) it believes that compliance with South Dakota's discovery rules is simply too burdensome, as in TransCanada simply doesn't want to be bothered with answering or taking the time to gather and produce documents, (2) that information sought is outside the Commission's jurisdiction, or (3) that it is entitled to withhold documents under some nebulous confidentiality scheme or for some unsubstantiated "homeland security" rationale. A full and fair hearing is essential. Due process demands it. Absent complete and thorough discovery, it is impossible to conduct a hearing capable of fully and carefully examining matters in dispute. Unless the Commission grants DRA's motion to compel discovery, having an open, full and fair hearing in this matter will not be possible. Such a result would deprive DRA and other intervenors of their due process rights under law.

TransCanada filed its petition seeking certification of the conditions of the Original Permit. For it to now claim that having to produce documents and answer questions concerning its compliance with conditions set forth in the Original Permit is unduly burdensome is disingenuous. Likewise, its' attempt to argue that the Commission lacks jurisdiction over certain compliance matters is also specious, given the mere existence of the Commission's authority to impose conditions requiring regulatory compliance with federal and state law. The purpose of these proceedings is to examine those issues in a full and fair hearing. Finally, TransCanada's various claims of confidentiality ring hollow as it provides no legal rationale other than a bare assertion to make this claim. DRA's motion to compel should be sustained and TransCanada ordered to answer fully, non-evasively, and completely to DRA's discovery requests.

Respectfully submitted,

/s/ Bruce Ellison

Bruce Ellison
518 6th Street #6
Rapid City, South Dakota 57701
Telephone: (605) 348-1117
Email: belli4law@aol.com

and

MARTINEZ MADRIGAL & MACHICAO, LLC

By: */s/ Robin S. Martinez*

Robin S. Martinez, MO #36557/KS #23816
616 West 26th Street
Kansas City, Missouri 64108
816.979.1620 phone
888.398.7665 fax
Email: robin.martinez@martinezlaw.net

Attorneys for Dakota Rural Action

INDEX OF EXHIBITS

Exhibit 1, Keystone's Responses to Dakota Rural Action's First Interrogatories to TransCanada Keystone Pipeline, LP.

Exhibit 2, Keystone's Responses to Dakota Rural Action's First Request for Production of Documents.

Exhibit 3, Testimony of Evan Vokes on Behalf of Dakota Rural Action.

Exhibit 4, TransCanada documents no. 0774-0784, schedule of pipeline leaks and spills.

Exhibit 5, Stansbury, "Analysis of Frequency, Magnitude and Consequence of Worst-Case Spills From the Proposed Keystone XL Pipeline".

Exhibit 6, TransCanada documents no. 0768-0773, schedule of tax payments.

Exhibit 7, Dakota Rural Action's First Request for Production of Documents.

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

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	)))))))	HP14-001 **KEYSTONE'S RESPONSES TO DAKOTA RURAL ACTION'S FIRST INTERROGATORIES TO TRANSCANADA KEYSTONE PIPELINE, LP**

Applicant TransCanada makes the following responses to interrogatories pursuant to SDCL § 15-6-33, and responses to requests for production of documents pursuant to SDCL § 15-6-34(a). These responses are made within the scope of SDCL 15-6-26(e) and shall not be deemed continuing nor be supplemented except as required by that rule. Applicant objects to definitions and directions in answering the discovery requests to the extent that such definitions and directions deviate from the South Dakota Rules of Civil Procedure.

GENERAL OBJECTION

Keystone objects to the instructions and definitions contained in Dakota Rural Action's First Set of Interrogatories and Requests for Production of Documents to the extent that they are inconsistent with the provisions of SDCL Ch. 15-6. *See* ARSD 20:10:01:01.02. Keystone's answers are based on the requirements of SDCL §§ 15-6-26, 15-6-33, 15-6-34, and 15-6-36.

INTERROGATORIES

INTERROGATORY NO. 1. Please identify the person or persons providing each answer to an Interrogatory or portion thereof, giving the full name, address of present residence, date of birth, business address and occupation. [Applicable Finding or Condition No.: all]

ANSWER: Given the extremely broad scope volume of more than 800 discovery requests received by Keystone in this docket, a range of personnel were involved in answering the interrogatories. Keystone will designate the following witnesses with overall responsibility for the responsive information as related to the Conditions and proposed changes to the Findings of Fact, which are identified in Appendix C to Keystone's Certification Petition: Corey Goulet, President, Keystone Projects, 450 1st Street S.W., Calgary, AB Canada T2P 5H1; Steve Marr, Manager, Keystone Pipelines & KXL, TransCanada Corporation, Bank of America Center, 700 Louisiana, Suite 700, Houston, TX 77002; Meera Kothari, P. Eng., 450 1st Street, S.W., Calgary, AB Canada T2P 5H1; David Diakow, Vice President, Commercial, Liquids Pipeline, 450 1st Street S.W., Calgary, AB Canada T2P 5H1; Jon Schmidt, Vice President, Environmental & Regulatory, exp Energy Services, Inc., 1300 Metropolitan Boulevard, Suite 200, Tallahassee, FL 32308; Heidi Tillquist, Senior Associate, Stantec Consulting Ltd., 2950 E. Harmony Rd., Suite 290, Fort Collins, CO 80528.

INTERROGATORY NO. 2. Prior to answering these interrogatories, have you made due and diligent search of all books, records, and papers of the Applicant with the view of eliciting all information available in this action? [Applicable Finding or Condition No.: all]

ANSWER: Yes, to the extent reasonably practicable in attempting to respond to over 800 discovery requests within the time allowed.

INTERROGATORY NO. 3. Describe the current status of the following permits and plans required prior to the start of construction of the KXL Pipeline:

A. Permits from US Army Corps of Engineers, S.D. Regulatory Office, including under:

1) §§404/401 of Clean Water Act, for authorization of discharge of fill material into waters of the United States including wetlands or other action;

2) §10 Rivers and Harbors Act, for authorization of pipeline crossings of navigable waters of the United States or other action;

3) Section 106 of the Natural Historic Preservation Act (NHPA), including consultation with potentially impacted Tribes and/or other action;

B. Permits from U.S. Fish and Wildlife Service, S.D. Ecological Services Field Office, including under the Endangered Species Act, Section 7 Consultation, to consider lead agency findings of impacts on federal-listed species, to provide a Biological Opinion if the Project is likely to adversely affect federally-listed or proposed species or their habitats, or other action;

C. Permits from Farm Service Agency of the Natural Resources Conservation Service, including the Crop Reserve Program, for authorization of crossing areas enrolled in the Crop Reserve Program, or other action;

D. Permit(s) from or Plan(s) Required to the S.D. Department of Environment and Natural Resources (DENR), including under:

1) National Pollutant Discharge Elimination System General Permit for Discharges of Hydrostatic Test Water, regarding proposed discharge into waters of the United States and construction dewatering of waters of the State, or other action;

2) Surface Water Withdrawal Permit, for temporary surface water withdrawal, or other action;

3) SDCL Chapter §34A-18, required submission of an Oil Spill Response Plan or Updated Plan to DENR, or other action;

E. Consultation with SD Game Fish and Parks Department, under State Listed Threatened and Endangered Species;

F. Any Updated Review and Comment from S.D. State Historical Society, State Preservation Office, under §106 of the NHPA, on activities regarding jurisdictional cultural resources;

G. Crossing Permits from S.D. Department of Transportation for crossing State highways;

H. Crossing Permits from County Road Departments for crossing of county roads;

I. Flood plain, Conditional Use, and building permits where required from County and Local Authorities.

[Applicable Finding or Condition No.: Conditions 1, 2; Findings 12(1)-(3), 60, 88, 90, 97-99]

ANSWER:

A. 1) No permit applications have been submitted to the US Army Corps of Engineers, S.D. Regulatory Office.

A. 2) No waterbody crossing in South Dakota requires permitting under the Section 10 of the Rivers and Harbor Act.

A. 3) The Department of State is the lead agency for the consultation process under the Section 106. See Section 4.11, Cultural Resources of the Department of State FSEIS (2014) for a full discussion of the Project's compliance with Section 106.

B. Keystone has not received any permits from the US Fish and Wildlife Service. The US Fish and Wildlife Service issued a Biological Opinion for the Project on May 15, 2013. The Biological Opinion is found in Appendix H of the Department of State FSEIS (2014)

C. In South Dakota, Keystone has not received any permits from the Farm Service Agency of Natural Resources Conservation Service.

D. 1) Keystone has received a General Permit for Temporary Discharge Activities on April 11, 2013 from the SD Department of Environment and Natural Resources.

D. 2) Keystone has not received a Surface Water Withdrawal Permit from SD Department of Environment and Natural Resources.

D. 3) Keystone has not submitted an Oil Response Plan to DENR.

E. The following is a summary of Keystone's consultation history with SD Game, Fish, and Parks as documented in the USFWS issued May 2013 Biological Opinion.

- June 10, 2008: Keystone met with staff from USFWS and South Dakota Department of Game, Fish, and Parks (SDGFP), at the SDGFP office in Pierre, South Dakota, to discuss issues pertaining to wildlife, special status species, and sensitive habitat that could potentially occur in the Project area. The goal of the meeting was to gather input on agency recommendations based on the information sent to them in April 2008 for species occurrence, habitat assessments, and future field surveys. Keystone incorporated comments from the meeting into survey protocols and BMPs for future agency verification.

- January/February 2009: Keystone initiated section 7 consultation with the USFWS. Keystone continued discussions with BLM, and state wildlife agency offices for South Dakota that included state-specific special status species survey protocols and BMPs for the species identified as potentially occurring during the 2008 meetings. A summary of the findings from the 2008 biological field surveys was included in the discussions.

- January 27, 2009: Keystone met with staff from the USFWS and SDGFP at the SDGFP office in Pierre, South Dakota, to discuss issues pertaining to special status species surveys. The goals of the meeting were to verify Keystone's survey approach, BMPs, discuss required field surveys, and review the information that was sent to the USFWS in the January/February 2009, informal consultation package. The USFWS and SDGFP provided additional recommendations to Keystone's sensitive species mitigation approach to be updated prior to final agency concurrence.

- October 23, 2012: A meeting was held between the USFWS, Department, SDGFP, BLM, and Keystone regarding the greater sage–grouse and a compensatory mitigation plan for the species in South Dakota. Discussions included a management plan and avoidance, minimization, and mitigation strategies.

F. Consultation with the SD SHPO is ongoing. Questions regarding specific cultural resources are resolved in a timely manner and would continue in the same manner in the future.

G. Thirteen crossing permits and twenty-four temporary approach permit applications have been filed with the State of South Dakota Department of Transportation (SD DOT) for the pipeline to cross under the state road rights-of-way. All crossing and temporary approach permits have been received from the SD DOT.

H. A total of 103 crossing permit applications have been filed for the pipeline to cross under all county road rights-of-way. Of the 103 applications filed, 101 have been acquired as of December 30, 2014.

I. The special use permits required for Harding County and Meade County pump stations have been approved. Of the remaining four pump stations, three do not require a special use permit. Special use permits applicable to valve sites, contractor yards, and contractor camps will be obtained prior to construction.

INTERROGATORY NO. 4. Do you agree that diluted bitumen spills require different spill response techniques and different equipment types and amounts as compared to (a) a spill of conventional crude oil and (b) a spill of Williston Basin light crude oil? Please explain your answer and list any scientific study(ies) providing the basis for your answer. [Applicable Finding or Condition No.: Amended Condition 31-42]

ANSWER: Crude oils are naturally variable; however, they share a range of common characteristics and properties that are important for emergency response purposes. The characteristics of the crude oils transported by Keystone XL are not unique and are transported throughout the US by truck, rail, pipelines, barges, and tankers. Crude oils has been safely transported by pipelines for decades. The Emergency Response Plan (ERP) will identify a range of appropriate standard response techniques that may be implemented in the event of a crude oil release. Ultimately, site-specific conditions, including the type of crude oil released, will assist in characterizing the nature of the release, its movement and fate within the environment, and selecting the most appropriate measures for containment and cleanup. The final version of the Keystone Pipeline Emergency Response Plan (ERP) is complete and complies with 49 C.F.R.

Part 194. The Keystone ERP will be amended to include Keystone XL. The ERP also addressed in the FSEIS at http://keystonepipeline-xl.state.gov/documents/organization/221189.pdf.

INTERROGATORY NO. 5. Do you agree that diluted bitumen is heavier than conventional crude and results in greater expenses to remediate leaks or spills? Please explain your answer and identify any known scientific study(ies) providing the basis for your answer. [Applicable Finding or Condition No.: Amended Condition 31-42/]

ANSWER: Physical characteristics of diluted bitumen are comparable to heavy conventional crude oil and consequently remediation costs would be anticipated to be equivalent. Diluted bitumen (API gravity of approximately 20-22) is heavier than light conventional crude oils (API gravity of approximately 35 to 40), but is consistent with heavy conventional crude oils (API gravity of approximately 19-22). All have API gravities greater than 10, indicating that the oils will float if released into water. The physicochemical properties and environmental fate of diluted bitumen are the same as that of heavy conventional crude oils. Thus, leaks and spills of diluted bitumen would not be expected to result in greater remediation expenses. A number of scientific studies have been conducted on the environmental fate and effects of diluted bitumen and other heavy crude oils, including:

Environment Canada. 2013. Properties, Composition and Marine Spill Behaviour, Fate and Transport of Two Diluted Bitumen Products from the Canadian Oil Sands. Federal Government Technical Report.

Rymell, Matthew. 2009. RP595 Sunken and submerged oils – behavior and response. February 2009. BMT Cordah. Available from:

http://www.dft.gov.uk/mca/s_mca_019_sunken__and__submerged_oils_final_report_270209_pub_1.pdf

SL Ross. 2012. Meso-scale Weathering of Cold Lake Bitumen/Condensate Blend. SL Ross Environmental Research Limited. Ottawa, Ontario.

INTERROGATORY NO. 6. Do you agree that soil and rocks that are contaminated by oil spills cannot be cleaned but instead must be removed and disposed of in hazardous waste facilities? Please explain your answer and list any scientific study(ies) providing the basis for your answer.

A. If so, do you agree that reclamation efforts for oil spills of the magnitude of the worst case discharge amount for the Keystone XL Pipeline fail to recover 100% of the oil contaminating the ground?

B. Identify the Documents created by or on your behalf which would show the basis for your answer to this Interrogatory.

[Applicable Finding or Condition No.: Amended Condition 32-38]

ANSWER: Keystone does not agree with this statement. Although removal and disposal of contaminated materials is an effective and well established means of limiting the area affected by a crude oil spill, it is not the only option. In the event of a release affecting soils in South Dakota, Keystone would be required to meet the state's soil remediation standards. This can be accomplished using a number of active remediation techniques, including removal of crude oil, dual-pump recovery, total fluids recovery, bioslurping, air sparging, chemical oxidation, and enhanced biodegradation through the addition of oxygen and nutrients into the

soil (Sutherson 1997). In addition, natural biodegradation and attenuation would ultimately allow for a return to preexisting conditions in soil.

Sutherson, S.S. 1997. Remediation Engineering: Design concepts. CRC Press, Boca Raton, FL.

A. Due to the volatility of many crude oil constituents (e.g., BTEX), a significant portion of crude oil will evaporate soon after being released to the environment. Fate modeling of diluted bitumen indicates that approximately 20% of released crude oil would evaporate within 6 hours of a spill (NOAA 2015). Additional processes such as photodegradation and biodegradation also naturally decrease the volume of crude oil in the environment. Thus, a significant fraction of the discharge volume of a crude oil spill would not be available for recovery due to these natural weathering processes.

If there is an accidental release from the proposed Project, Keystone would implement the remedial measures necessary to meet the federal, state, and local standards that are designed to help ensure protection of human health and environmental quality. Cleanup standards for the state of South Dakota are available in the South Dakota Department of Environment and Natural Resources' Petroleum Assessment and Cleanup Handbook (http://denr.sd.gov/des/gw/spills/handbook/hand_book.aspx). Additional information on remediation is presented in Section 4.13 of the FSEIS, Potential Releases.

B. NOAA. 2015. ADIOS2. Oil Spill response tool – documentation. http://response.restoration.noaa.gov/adios

INTERROGATORY NO. 7. For each incident since January 1, 2010 in which any pipeline transporting crude oil constructed by TransCanada and its Affiliates leaked or spilled pipeline contents, please provide the:

A. Date;

B. Location:

C. Amount of materials leaked or spilled;

D. Duration of leak or spill before (i) the control center being notified, (ii) pump shut down, (iii) valve shutoff, (iv) national response center notified, and (v) arrival of responders on the scene;

E. Duration of reclamation of affected soil and/or water resources;

F. Established and documented cause of leak/spill;

G. For each such spill, provide a copy of the Integrity Management Plan, the operational manual for the pipeline, the specifications for the SCADA system, and the ERP for each spill in the US and Canada;

H. Identify the documents which support your answers, above.

[Applicable Finding or Condition No.: Findings 12(2)-(3), 41-45, 47, 103; Amended Condition 32-38]

OBJECTION AND ANSWER: Please see the spreadsheet attached as Keystone 0774-0784. Keystone's Integrity Management Plan, SCADA specifications, and Emergency Response Plan are confidential and not relevant for the reasons identified elsewhere in these responses.

INTERROGATORY NO. 8. Describe any forecasts you have developed with respect to (i) re-exports of WCSB crude oil from PADD3, (ii) product exports from PADD 3, (iii) US domestic demand for PADD 3 refinery output, and (iv) total PADD 3 refinery output.

A. Identify the documents upon which this answer is based.

[Applicable Finding or Condition No.: Findings 14, 24-29]

OBJECTION AND RESPONSE: This request seeks information that is beyond the scope of the PUC's jurisdiction and Keystone's burden of proof under SDCL § 49-41B-27. It is within the purview of the United States Department of State to determine whether the proposed project is in the national interest, under the applicable Presidential Executive Order. This request also may seek information that is not within Keystone's custody or control and is not maintained by Keystone in the ordinary course of business. Keystone is a provider of transportation service. It does not own the oil that is transported, is not a refiner, and does not make decisions about potential exports of crude oil or refined products. The oil forecast information that Keystone relied on in Appendix C to its Certification was derived from the following sources: The Final Supplemental Environmental Impact Statement; the CAPP Crude Oil Forecast, Markets and Transportation June 2014; and the Energy Information Agency Annual Energy Outlook 2014. These documents, except for the FSEIS, which is available at http://keystonepipeline-xl.state.gov/finalseis/index.htm, are marked as Keystone 0001-0467.

INTERROGATORY NO. 9. What companies, if any, were partners or investors with TransCanada in the construction and operation of the KXL pipeline in 2009 which are no longer participating in the proposed project? [Applicable Finding or Condition No.: Findings 24-29]

ANSWER: Conoco Phillips is no longer participating in the Project as of August 14, 2009.

INTERRROGATORY NO. 10. Identify the companies which have binding contractual commitments with TransCanada or its Affiliates to ship WCSB or Williston Basin crude oil through the KXL Pipeline. For each such company:

A. Provide the termination dates, opt-out dates, or other material dates in the contractual commitments of shippers with the contractual commitments that underpin the viability and need for the project;

B. Identify all documents and sources for your answers.

[Applicable Finding or Condition No.: Findings 17, 24, 29]

OBJECTION: The identity of Keystone's shippers and the terms of their contracts have substantial commercial and proprietary value, are subject to substantial efforts by Keystone to protect this information from actual and potential competitors, and are required to be maintained on a confidential basis pursuant to the terms of the contracts between Keystone and its shippers and Section 15(13) of The Interstate Commerce Act.

INTERROGATORY NO. 11. Provide and describe in detail the development schedule for the Project and describe how the development schedule for the Project is consistent with the contractual commitments made by TransCanada. Identify all documents and sources for your answers. [Applicable Finding or Condition No.: Findings 17, 24, 29]

ANSWER: Currently, Keystone has not identified a date to commence construction, nor does it have a pipeline construction contract in place.

Construction of the proposed Project would begin after Keystone obtains all necessary permits, approvals, and authorizations. Keystone anticipates that he proposed Project would be placed into service approximately two years after receiving such authorizations. As currently planned, the proposed Project would be constructed using 10 spreads of approximately 46 to 122 miles long (*see* FSEIS Table 2.1-13). Final spread configurations and the final construction schedule may result in the use of more or fewer spreads than those indicated. Time periods and

key milestones including the relationship between contractor mobilization, start of construction (pre-welding), start and end of welding, post-welding and clean-up, and contractor demobilization are described in the FSEIS in Section 2.1.10.1 Schedule and Workforce. (FSEIS, pages 2.1-69 and 70).

Keystone will comply with all conditions set out in its permits including the SDPUC Order, including condition 12 to, once known, 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. Keystone will also comply with condition 10 to, not later than six months prior to the commencement of construction, commence a program to notify and educate state, county, and municipal agencies on the planned construction schedule and the measures that such agencies should begin taking to prepare for construction impacts and the commencement of project operations. Additionally, in the Special Conditions Recommended by PHMSA, number 17 Construction Plans and Schedule, Keystone will at least 90 days prior to the anticipated construction start date submit its construction plans and schedule to the appropriate PHMSA Directors for review. Subsequent plans and schedule revisions must also be submitted to the appropriate PHMSA Directors, on a monthly basis. (FSEIS, Appendix Z, Compiled Mitigation Measures, page 70.)

INTERROGATORY NO. 12. Is there currently a growing (i) demand for crude oil US refineries, and (ii) demand for petroleum products by US consumers?

A. Please explain your answer;

B. Identify all sources for your answer;

C. How and why has this changed since 2009?

[Applicable Finding or Condition No.: Findings 14, 17]

OBJECTION AND RESPONSE: This request seeks information that is beyond the scope of the PUC's jurisdiction and Keystone's burden of proof under SDCL § 49-41B-27. It is within the purview of the United States Department of State to determine whether the proposed project is in the national interest, under the applicable Presidential Executive Order. This request also may seek information that is not within Keystone's custody or control and is not maintained by Keystone in the ordinary course of business. The oil forecast information that Keystone relied on in Appendix C to its Certification was derived from the following sources: The Final Supplemental Environmental Impact Statement; the CAPP Crude Oil Forecast, Markets and Transportation June 2014; and the Energy Information Agency Annual Energy Outlook 2014. These documents, except for the FSEIS, which is available at http://keystonepipeline-xl.state.gov/finalseis/index.htm, are marked as Keystone 0001-0467.

INTERROGATORY NO. 13. Identify the forecasts of "additional crude oil production from the WCSB" and the Williston Basin that create a need for the Keystone XL Pipeline.

A. As per such forecasts, state the potential impact of current low oil prices on these forecasts.

B. Identify the basis for your answers to these Interrogatories.

[Applicable Finding or Condition No.: Finding 24]

OBJECTION AND RESPONSE: This request seeks information that is beyond the scope of the PUC's jurisdiction and Keystone's burden of proof under SDCL § 49-41B-27. It is within the purview of the United States Department of State to determine whether the proposed project is in the national interest, under the applicable Presidential Executive Order. This request

also may seek information that is not within Keystone's custody or control and is not maintained by Keystone in the ordinary course of business. Keystone is a provider of transportation service. It does not own the oil that is transported, is not a refiner, and does not make decisions about potential exports of crude oil or refined products. The oil forecast information that Keystone relied on in Appendix C to its Certification was derived from the following sources: The Final Supplemental Environmental Impact Statement; the CAPP Crude Oil Forecast, Markets and Transportation June 2014; and the Energy Information Agency Annual Energy Outlook 2014. These documents, except for the FSEIS, which is available at http://keystonepipeline-xl.state.gov/finalseis/index.htm, are marked as Keystone 0001-0467.

INTERROGATORY NO. 14. Does TransCanada agree that domestic U.S. crude oil supplies are increasing?

A. Please explain your answer;

B. Identify documents which support your answer to this Interrogatory.

[Applicable Finding or Condition No.: Finding 26]

ANSWER: According to the Department of State FSEIS 1.4.2.3, U.S. production of crude oil has increased significantly, from approximately 5.5 million bpd in 2010 to 6.5 million bpd in 2012 and 7.5 million bpd by mid-2013. Even with the domestic production growth the U.S. is expected to remain a net importer of crude oil well into the future.

INTERROGATORY NO. 15. Provide a list of U.S. refineries that TransCanada expects to increase demand for WCSB and Williston Basin oil.

A. For each refinery, state the basis for TransCanada's claim that the refinery will increase such demand for crude oil;

B. Identify the refineries in PADD 3:

i. That could be served by the proposed KXL Project that are currently expanding refining capacity or have announced plans to expand their refining capacity;

ii. That TransCanada experts to import less offshore crude oil and replace it with crude oil that would be transported by the Project;

iii. That are "optimally configured to process heavy crude slates";

C. Identify the new refineries and refinery expansions that are currently proposed to be constructed in PADD 3;

D. Itemize the annual heavy crude oil imports into PADD 3 by country since 2010. For each, state whether the costs of crude oil production in the source country are greater, the same, or less than the cost of heavy crude oil production in the WCSB;

E. State whether pipeline expansions from the WCSB and the Williston Basin to the U.S. Gulf Coast operated by Enbridge (or companies affiliated with Enbridge) provide crude oil transportation services to the refineries that TransCanada claims would be served by the KXL Project. Please provide a detailed explanation for your answer.

F. Identify and describe the proposed delivery locations of the Keystone System in PADD 3.

G. Identify all pipelines in PADD 3 to which the Keystone System is connected;

H. State the year in which TransCanada expects the Keystone XL Pipeline to be fully utilized;

I. Describe the impact of growing crude oil production in PADD 3 on the demand in PADD 3 for crude oil from the WCSB and Williston Basin;

J. Describe the size of the potential market for Williston Basin light sweet crude oil in PADD 3 and state whether or not such market is limited in size by production of light sweet crude oil in PADD 3;

K. Identify the basis for your answers to these Interrogatories and identify all documents relied upon by you in answering this Interrogatory.

[Applicable Finding or Condition No.: Findings 24, 26 and 27]

OBJECTION AND RESPONSE: This request seeks information that is beyond the scope of the PUC's jurisdiction and Keystone's burden of proof under SDCL § 49-41B-27. It is within the purview of the United States Department of State to determine whether the proposed project is in the national interest, under the applicable Presidential Executive Order. This request also may seek information that is not within Keystone's custody or control and is not maintained by Keystone in the ordinary course of business. Keystone is a provider of transportation service. It does not own the oil that is transported, is not a refiner, and does not make decisions about potential exports of crude oil or refined products. The oil forecast information that Keystone relied on in Appendix C to its Certification was derived from the following sources: The Final Supplemental Environmental Impact Statement; the CAPP Crude Oil Forecast, Markets and Transportation June 2014; and the Energy Information Agency Annual Energy Outlook 2014. These documents, except for the FSEIS, which is available at http://keystonepipeline-xl.state.gov/finalseis/index.htm, are marked as Keystone 0001-0467.

INTERROGATORY NO. 16. Identify each existing pipeline that comprise the "insufficient pipeline capacity" identified by TransCanada as a factor driving the need for the KXL Project. For each of these pipelines:

A. Provide current usage as a percentage of each respective pipeline's total capacity;

B. Identify the basis for your answers to these Interrogatories.

[Applicable Finding or Condition No.: Finding 24]

OBJECTION AND RESPONSE: This request seeks information that is beyond the scope of the PUC's jurisdiction and Keystone's burden of proof under SDCL § 49-41B-27. It is within the purview of the United States Department of State to determine whether the proposed project is in the national interest, under the applicable Presidential Executive Order. This request also seeks information that is not within Keystone's custody or control and is not maintained by Keystone in the ordinary course of business. Without waiving the objection, the demand evidenced by Keystone's binding shipper commitments demonstrates insufficient pipeline capacity.

INTERROGATORY NO. 17. Given competing crude oil pipelines to Cushing, Oklahoma, and PADD 3 and forecast low oil prices, does TransCanada still contend its KXL pipeline is necessary and will allow North American crude oil to replace U.S. reliance on unstable sources of off-shore crude oil?

A. Please explain your answer;

B. Identify all documents and sources for your answer;

C. How and why has this changed since 2009?

[Applicable Finding or Condition No.: Findings 14, 17]

ANSWER: Shippers have committed to long-term binding contracts, which support 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 North Dakota and Canadian crude supplies.

INTERROGATORY NO. 18. Provide the total current capacity of existing pipelines to transport crude oil from the WCSB and the Williston Basin to the U.S. Gulf Coast and identify the source(s) for your answer. [Applicable Finding or Condition No.: Finding 24]

ANSWER: Specifics to operating capacity of third-party pipelines are under the responsibility of the pipeline owners and are beyond Keystone's control.

INTERROGATORY NO. 19. Identify all other pipeline operations of TransCanada and its Affiliates, which since 2009 are utilizing the same pipeline materials, dimensions, and seals as proposed for the KXL pipeline through South Dakota, and described in Findings 18 and 28. [Applicable Finding or Condition No.: Findings 18, 28]

OBJECTION AND RESPONSE: To the extent that it seeks information for pipelines other than crude oil pipelines, this request seeks information that is not relevant and not likely to lead to the discovery of admissible evidence. Without waiving the objection, the Keystone I, Cushing Extension and Gulf Coast segments of the Keystone system are using similar materials to that of the proposed KXL pipeline.

INTERROGATORY NO. 20. Identify each pipeline operated by TransCanada and its Affiliates which have operated at 900,000 bpd, giving the pipeline name, location, dates of such operation, together with:

A. Identification of each such pipeline which subsequently developed a leak or spill, regardless of whether the pipeline was at that time operating at 900,000 bpd, giving date, location, amount spilled/leaked, damage caused;

B. Identify the documents upon which your answer(s) to these Interrogatories were based; [Applicable Finding or Condition No.: Findings 15, 18, 28]

ANSWER: Keystone and its affiliates do not operate any pipelines at 900,000 bpd.

INTERROGATORY NO. 21. State whether a failure by TransCanada to design, construct, test, or operate the proposed KXL Project in accordance with the special conditions developed by the Pipeline Hazardous Materials and Safety Administration (PHMSA), and set forth in Appendix Z to the Department of State, January 2014 Final Supplemental Environmental Impact Statement (FSEIS), would be a violation of federal law. If so:

A. Identify the law(s) under which enforcement of these special conditions would be brought;

B. Identify the enforcing agency;

C. Identify all correspondence between TransCanada and the PHMSA.

D. Identify the documents upon which your answer(s) to these Interrogatories were based; [Applicable Finding or Condition No.: Conditions 1-3; Findings 22, 28]

OBJECTION AND RESPONSE: This request seeks information that is beyond the scope of the PUC's jurisdiction and Keystone's burden under SDCL § 49-41B-27. This request also seeks information addressing an issue that is governed by federal law and is within the province of PHMSA. In addition, this request depends on a hypothetical condition and is therefore speculative and improper as to form. It is also overlybroad and burdensome to the extent that it seeks all correspondence between TransCanada and PHMSA, and asks for information that is not relevant and not likely to lead to the discovery of admissible evidence under SDCL § 15-6-26(b). Without waiving the objection, unless and until the Department

issues a Record of Decision and a Presidential Permit, the recommendations in the Final EIS are not binding on Keystone.

INTERROGATORY NO. 22: Identify all other crude oil pipeline operations of TransCanada and its Affiliates which, since 2009, have or are operating at a maximum operating pressure (MOP) of equal to or greater than 1,440 psig generally and/or 1,600 psig MOP for specific low elevation segments of pipeline with the same design factor and pipe wall thickness as described in Finding 19, close to the discharge of pump stations:

A. For each such pipeline which subsequently developed a leak or spill, regardless of the psig MOP the pipeline was operating at the time, giving date, location, amount spilled/leaked, psig MOP at which pipeline was operating at the time, and describe the amount and nature of damage caused by such a leak or spill;

B. Identify any documents upon which your answers to these Interrogatories were based; [Applicable Finding or Condition No.: Findings 19, 28]

ANSWER: There are currently no crude oil pipelines operating equal to or greater than 1,440 psig generally and/or 1,600 psig MOP.

INTERROGATORY NO. 23: For each spill/leak incident which has occurred from a pipeline transporting WCSB crude oil operated by TransCanada and its Affiliates since 2009, state the dates on which transportation of the crude oil through that pipeline was disrupted by planned maintenance, unplanned maintenance, power outages, spills, leaks, or any other causes. Identify any documents upon which your answers to this Interrogatory was based. [Applicable Finding or Condition No.: Finding 28]

ANSWER: See the spreadsheet attached as Keystone 0774-0784.

INTERROGATORY NO. 24: Explain why TransCanada has reduced the maximum operating pressure of the KXL pipeline at most locations to 1,307 psig;

A. State whether TransCanada has any plans to subsequently increase this general operating pressure;

B. If your answer to subpart A of this interrogatory is yes, what is the subsequent maximum operating pressure being contemplated for general use during pipeline operations?

[Applicable Finding or Condition No.: Conditions 31-38; Findings 19, 20]

ANSWER: On August 5 2010, TransCanada withdrew its application to the Pipeline Hazardous Materials and Safety Administration (PHMSA) for a special permit to design, construct and operate the pipeline at a 0.8 design factor and adopted the 57 additional safety measures that would have been required under the PHMSA special permit. The operating pressure reduction from 1,440 psig to 1,307 psig is a result of the use of the standard design factor (0.72) in accordance with 49 CFR 195.106 design pressure. TransCanada would be required to re-apply to PHMSA for a special permit in order to operate the pipeline at an increased design factor of 0.8 corresponding to an operating pressure of 1,440 psig. In addition, the attached Media Advisory, marked as Keystone 0647-0649, dated August 5, 2010, addresses this issue.

INTERROGATORY NO. 25: With regard to the plan for mainline valves to be remotely controlled, what guarantee can you give the PUC that TransCanada can prevent a cyber-security attack on the control system?

A. Describe the worst case scenario which could occur in the event of a computer systems security breach on the control system for the KXL Pipeline.

B. Describe the data security systems to be put in place to prevent any such system breach, identify any third-party vendor(s) providing system security software, hardware or monitoring, and identify the particular components or scopes of services such vendors will provide.

C. Identify any documents used to support your answer to this Interrogatory.

[Applicable Finding or Condition No.: Conditions 31-38; Finding 20]

ANSWER:

A. Once constructed, the Keystone XL pipeline will form part of North America's critical national energy infrastructure. Over time, actors such as terrorist organizations and hostile nation states can be expected to pursue their objectives by attempting to disrupt this critical infrastructure. Therefore, it is not prudent for TransCanada to publicly provide an opinion on how the adverse consequences of a cyber attack could be maximized.

B. Consistent with industry practice, TransCanada does not publicly disclose the details of the security systems it has in place. We believe that it is not prudent to make this information public because of the likelihood that it will assist, and, potentially encourage, attackers.

INTERROGATORY NO. 26. What is the current capacity contracted for WCSB crude oil from Canada? Identify any documents upon which you based your answer or which you are aware would be a basis for your answer. [Applicable Finding or Condition No.: Findings 14, 24-29]

OBJECTION: This request seeks information that is not within Keystone's custody and control. Keystone does not know the contractual details of other pipeline companies' commitments.

INTERROGATORY NO. 27. State whether there is a significant discount on the price currently of WCSB crude oil relative to West Texas Intermediate and Brent crude oils.

A. Please explain your answer;

B. Identify all documents which support your answers;

[Applicable Finding or Condition No.: Finding 27]

OBJECTION AND ANSWER: The scope of the question is too broad given the large number of crude oil grades available from the WCSB. The Canadian heavy benchmark discounts in 2014 range from $13 to $30.

A.
- Western Canadian crudes are priced against West Texas Intermediate (WTI).
- Canadian crudes are traded on Net Energy and TMX (NGX) trading exchanges.
- Canadian crude monthly blended indices are calculated using calendar moth volume weighted average between the two platforms.
- As an example, WCS blended indices for 2014 range from $13 to $30 discount to WTI monthly.

B. Responsive documents are attached as Keystone 1116-1118.

INTERROGATORY NO. 28: What is the current capacity contracted for Williston Basin oil? Identify any documents which would support your answer. [Applicable Finding or Condition No.: Findings 14, 24-29]

ANSWER: Shippers have committed about 65,000 barrels per day of capacity for transportation services on Bakken Marketlink.

INTERROGATORY NO. 29: Describe the changes in contracted capacity amounts and duration since 2009 from Canada and the Williston Basin and identify any documents which would support your answer. [Applicable Finding or Condition No.: Findings 14, 24-29]

ANSWER: Shippers have committed about 65,000 barrels per day of capacity for transportation services on Bakken Marketlink. Keystone also received additional commitments on Keystone XL Pipeline that would support an expansion of its total capacity from 700,000 barrels per day to 830,000 barrels per day. The contracted capacity amounts, delivery locations and duration of each of the commitments are confidential.

INTERROGATORY NO. 30. Regarding the "U.S. demand for petroleum products," i.e., produced for U.S. consumers and not for export to other countries:

A. What is the percent change since 2010?

B. What is the forecast for "U.S. demand for petroleum products" over the next 20 years?

C. What has been the annual import of crude oil for each year since 2010?

D. What is the forecast for offshore crude oil imports into the U.S. over the next 20 years?

E. Of the 15 million bpd of crude oil demand identified in revised Finding of Fact 25, state whether some of this demand is used to produce petroleum products for export from the U.S. If so provide the quantity of crude oil:

i. Needed for domestic demand for petroleum products;

ii. Needed to produce petroleum products for export;

F. Identify any documents which would support your answer;

[Applicable Finding or Condition No.: Findings 14, 24-29]

OBJECTION AND RESPONSE: This request seeks information that is beyond the scope of the PUC's jurisdiction and Keystone's burden of proof under SDCL § 49-41B-27. It is within the purview of the United States Department of State to determine whether the proposed project is in the national interest, under the applicable Presidential Executive Order. This request

also may seek information that is not within Keystone's custody or control and is not maintained by Keystone in the ordinary course of business. The oil forecast information that Keystone relied on in Appendix C to its Certification was derived from the following sources: The Final Supplemental Environmental Impact Statement; the CAPP Crude Oil Forecast, Markets and Transportation June 2014; and the Energy Information Agency Annual Energy Outlook 2014. These documents, except for the FSEIS, which is available at http://keystonepipeline-xl.state.gov/finalseis/index.htm, are marked as Keystone 0001-0467.

INTERROGATORY NO. 31. What is the status of pipeline and rail capacity to move oil from oil fields in the Williston Basin to the Baker, Montana on-ramp? Identify any documents which would support your answer. [Applicable Finding or Condition No.: Findings 14, 24-29]

OBJECTION AND ANSWER: This request seeks information that is not within Keystone's custody or control and is not maintained by Keystone in the ordinary course of business. Without waiving the objection, information regarding the Bakken on-ramp pipeline can be found in the Montana Department of Environmental Quality Certificate issued under the Montana Major Facility Siting Act available at http://www.deq.mt.gov/mfs/keystonexl/keystonecertificate.aspx.

INTERROGATORY NO. 32: Why would the existing Keystone I pipeline not be capable of shipping enough crude oil from the Western Canadian Sedimentary Basin (WCSB) to offset the need for unstable foreign oil supplies? Identify any documents which would support your answer. [Applicable Finding or Condition No.: Finding 14]

ANSWER: The Keystone Pipeline does not have sufficient capacity to meet additional demand.

INTERROGATORY NO. 33: What are the currently projected forecasts of production in the Western Canadian Sedimentary Basin (WCSB) and the Williston Basin over each of the next ten years? Identify any documents which would support your answer. [Applicable Finding or Condition No.: Findings 14, 24-29]

OBJECTION AND RESPONSE: This request seeks information that is beyond the scope of the PUC's jurisdiction and Keystone's burden of proof under SDCL § 49-41B-27. It is within the purview of the United States Department of State to determine whether the proposed project is in the national interest, under the applicable Presidential Executive Order. This request also seeks information that is not within Keystone's custody or control and is not maintained by Keystone in the ordinary course of business. The oil forecast information that Keystone relied on in Appendix C to its Certification was derived from the following sources: The Final Supplemental Environmental Impact Statement; the CAPP Crude Oil Forecast, Markets and Transportation June 2014; and the Energy Information Agency Annual Energy Outlook 2014. These documents, except for the FSEIS, which is available at http://keystonepipeline-xl.state.gov/finalseis/index.htm, are marked as Keystone 0001-0467.

INTERROGATORY NO. 34: Describe the impact of low oil prices on crude oil production in the WCSB and Williston Basin.

A. What is the effect on the forecast of demand for crude oil transportation services from the Williston Basin and WCSB given annual average West Texas Intermediate crude oil prices of $50/bbl, $60/bbl, $70/bbl, and $80/bbl?

B. In light of low oil prices, what will be the impact of the Enbridge pipelines from the WCSB and Williston Basin to the US Gulf Coast on the need for transportation services of the KXL pipeline?

C. Identify any documents which would support your answers;

[Applicable Finding or Condition No.: Findings 14, 24-29]

OBJECTION AND RESPONSE: This request seeks information that is beyond the scope of the PUC's jurisdiction and Keystone's burden of proof under SDCL § 49-41B-27. It is within the purview of the United States Department of State to determine whether the proposed project is in the national interest, under the applicable Presidential Executive Order. This request also seeks information that is not within Keystone's custody or control and is not maintained by Keystone in the ordinary course of business. The oil forecast information that Keystone relied on in Appendix C to its Certification was derived from the following sources: The Final Supplemental Environmental Impact Statement; the CAPP Crude Oil Forecast, Markets and Transportation June 2014; and the Energy Information Agency Annual Energy Outlook 2014. These documents, except for the FSEIS, which is available at http://keystonepipeline-xl.state.gov/finalseis/index.htm, are marked as Keystone 0001-0467.

INTERROGATORY NO. 35: Describe in detail, route changes in the proposed KXL pipeline since 2010, on a county by county basis, identifying specific land parcels to be affected by such changes. Identify any documents which would support your answers. [Applicable Finding or Condition No.: Finding 16]

ANSWER: Please see the attached route variation maps attached as Keystone 0470-0583.

INTERROGATORY NO. 36: Provide the dates on which pipe segments to be used in South Dakota were delivered to storage location in South Dakota or adjacent states.

A. For each such delivery of pipe segments, state the date on which an external fusion bonded epoxy (FBE) was applied;

B. Describe the materials comprising and dimensions of any covering placed over each shipment of delivered pipe segments on its arrival;

i. Provide the date of each covering of the respective pipe shipment after delivery;

C. As per the respective deliveries, state the longest time that any pipe segments were stored without protective covering;

D. Provide the FBE manufacturer's recommendations for protection of the FBE from the effects of outside storage;

E. Provide the pipeline manufacturer's recommendations for protection of FBE against the effects of outside storage;

F. Provide the manufacturer's suggested maximum amount of time of sunlight exposure of FBE without protective covering;

G. Describe the impact of UV radiation on FBE coating over time;

H. Provide the manufacturer's warrantees and guarantees for the FBE coating applied to the pipe segments;

I. Provide the manufacturer's warranties and guarantees for the pipe segments, including for the FBE;

J. Explain the elimination from use in the proposed Project of API 5L X80 high strength steel;

i. Describe how substituted material(s) would perform better than the API 5L X80 steel;

K. Identify any documents which would support your answers;

[Applicable Finding or Condition No.: Finding 18]

ANSWER:

A. January 2011- November 2011

B. Covering application commenced in October 2012 and was completed July 2013

C. Approximately 18 months

D. The manufacturer did not provide recommendation or direction for storage. Direction for storage is per TransCanada specification.

E. The manufacturer did not provide recommendation or direction for storage. Direction for storage is per TransCanada specification.

F. Per manufacture, pipe coated with FBE coatings can be stored for 730 days under most climatic weather conditions without commencement of deterioration of the coating. TransCanada specification provides criteria for minimum coating thickness requirements which would supersede any exposure time period. Applicable manufacturer warranties are related to application and workmanship to the specification

G. Sunlight exposure over a significantly extended period of time could cause a reduction in coating thickness and coating flexibility due to degradation by UV radiation

H. WARRANTY

Unless otherwise specified in the Order for Pipe, the Supplier hereby warrants that the Pipe, including, if applicable, the Work done thereto, shall meet and conform to the Specifications and the Technical Agreements, and such other product characteristics agreed to by the Parties in

writing, for a period of twelve (12) calendar months from the day the Pipe is incorporated into the Company's pipeline and the Company's pipeline is commissioned for regular service or eighteen (18) calendar months from the date of delivery of all Pipe to the Delivery Point, whichever is earlier. If during the aforesaid warranty period, the Company discovers any Pipe which fails to conform, the Company shall forthwith notify in writing the Supplier of such non-conformance. The Company and the Supplier shall jointly investigate any such non-conformance in an effort, in good faith, to determine the cause thereof, provided that such investigation shall not unreasonably delay any repair or replacement of the Pipe. If the Parties are unable to agree upon the cause of the non-conformance with this Agreement within ten (10) days of the date of the discovery of such non-conformance, either Party shall have the right to request that the matter be arbitrated pursuant to single party arbitration conducted in accordance with the then current International Chamber of Commerce's Rules of Arbitration.

If such non-conformance is discovered after title to the Pipe passes to the Company, the Company may, after notification to the Supplier, to the extent the Company, acting reasonably, deems practical under the circumstances, repair the same at the Supplier's risk and expense. If repair is not practical in the Company's opinion, acting reasonably, the Company agrees that the Supplier may replace the non-conforming Pipe in the event that the Supplier can secure such replacement at delivery dates at least as favorable as those available to the Company from other sources.

Any Pipe that is repaired or replaced pursuant to the warranties specified herein shall be warranted for a further period of twelve (12) calendar months from the day the Pipe is incorporated into the Company's pipeline and the Company's pipeline is commissioned for

regular service or eighteen (18) calendar months from the date of delivery of the Pipe to the Delivery Point, whichever is earlier.

If the non-conforming Pipe cannot be repaired and the Company elects not to replace such Pipe, the Company shall have the right to return, at the Supplier's expense and risk, any or all of the non-conforming Pipe delivered by the Supplier to the Company whereupon the Supplier shall immediately repay the Company, without Interest, all monies previously paid by the Company to the Supplier on account of the non-conforming Pipe so returned, together with all costs and expenses incurred by the Company in returning such Pipe.

The express warranties of the Supplier in this Agreement are the only warranties as to the Pipe and are in lieu of all other warranties in respect thereof, whether written, statutory, oral, express or implied including, without limitation, any warranty of merchantability or fitness for purpose. The rights and remedies contained in this Agreement are the Company's exclusive rights and remedies against the Supplier whatsoever in relation to, or arising out of, or in connection with the performance or conformance of the Supplier's obligations under these warranties.

I. WARRANTY

Unless otherwise specified in the Order for Pipe, the Supplier hereby warrants that the Pipe, including, if applicable, the Work done thereto, shall meet and conform to the Specifications and the Technical Agreements, and such other product characteristics agreed to by the Parties in writing, for a period of twelve (12) calendar months from the day the Pipe is incorporated into the Company's pipeline and the Company's pipeline is commissioned for regular service or eighteen (18) calendar months from the date of delivery of all Pipe to the

Delivery Point, whichever is earlier. If during the aforesaid warranty period, the Company discovers any Pipe which fails to conform, the Company shall forthwith notify in writing the Supplier of such non-conformance. The Company and the Supplier shall jointly investigate any such non-conformance in an effort, in good faith, to determine the cause thereof, provided that such investigation shall not unreasonably delay any repair or replacement of the Pipe. If the Parties are unable to agree upon the cause of the non-conformance with this Agreement within ten (10) days of the date of the discovery of such non-conformance, either Party shall have the right to request that the matter be arbitrated pursuant to single party arbitration conducted in accordance with the then current International Chamber of Commerce's Rules of Arbitration. If such non-conformance is discovered after title to the Pipe passes to the Company, the Company may, after notification to the Supplier, to the extent the Company, acting reasonably, deems practical under the circumstances, repair the same at the Supplier's risk and expense. If repair is not practical in the Company's opinion, acting reasonably, the Company agrees that the Supplier may replace the non-conforming Pipe in the event that the Supplier can secure such replacement at delivery dates at least as favorable as those available to the Company from other sources.

Any Pipe that is repaired or replaced pursuant to the warranties specified herein shall be warranted for a further period of twelve (12) calendar months from the day the Pipe is incorporated into the Company's pipeline and the Company's pipeline is commissioned for regular service or eighteen (18) calendar months from the date of delivery of the Pipe to the Delivery Point, whichever is earlier.

If the non-conforming Pipe cannot be repaired and the Company elects not to replace such Pipe, the Company shall have the right to return, at the Supplier's expense and risk, any or all of the non-conforming Pipe delivered by the Supplier to the Company whereupon the Supplier shall immediately repay the Company, without Interest, all monies previously paid by the Company to the Supplier on account of the non-conforming Pipe so returned, together with all costs and expenses incurred by the Company in returning such Pipe.

The express warranties of the Supplier in this Agreement are the only warranties as to the Pipe and are in lieu of all other warranties in respect thereof, whether written, statutory, oral, express or implied including, without limitation, any warranty of merchantability or fitness for purpose. The rights and remedies contained in this Agreement are the Company's exclusive rights and remedies against the Supplier whatsoever in relation to, or arising out of, or in connection with the performance or conformance of the Supplier's obligations under these warranties.

J. API 5L X80 high strength steel was contemplated as an option during the early stages of the Project. Material evaluation and selection was finalized during the detail design phase of the Project at which time Keystone selected grade X70 materials for use in the pipeline.

INTERROGATORY NO. 37: State whether any power lines have been permitted and constructed to provide power to pump stations by local power providers;

A. Identify each such power line;

B. State the cost of construction of the power line and identify the source(s) of the funds used for construction of each power line;

C. Identify the contractors or vendors who will be engaged to construct power lines.

D. If any State or Tribal permit or other authorization is required for any planned construction of power lines to pump stations:

i. Identify the permits which have been obtained, together with date permit granted;

ii. Identify permits which have not yet been obtained;

iii. Identify which permits have been applied for and are pending.

E. Identify any documents which would support your answers to this interrogatory.

[Applicable Finding or Condition No.: Finding 20]

ANSWER: No power lines have been constructed to pump stations for KXL in South Dakota. All required permits pertaining to power lines are completed by the individual power providers.

INTERROGATORY NO. 38. Describe each increased estimated cost of the KXL pipeline due to each of the following:

A. New technical requirements;

B. Inflation;

C. Project management;

D. New regulatory requirements;

E. Material storage issues;

F. Preservation;

G. Identify documents upon which you base your answers;

[Applicable Finding or Condition No.: Finding 23]

OBJECTION: This request seeks information that is not relevant and not likely to lead to the discovery of admissible evidence under SDCL § 15-6-26(b). In addition, Keystone does not

maintain a breakdown of the estimated project cost in the way requested, and requiring such a breakdown of costs would require the disclosure of information that has substantial commercial and proprietary value, and is subject to substantial efforts by Keystone to protect it from actual and potential competitors.

INTERROGATORY NO. 39. Identify companies currently interested in using the KXL pipeline to "further" diversify supply away from offshore foreign crude supply." For each company identified,

A. State whether they are interested in "Canadian crude;"

B. Identify documents upon which you base your answers;

[Applicable Finding or Condition No.: Finding 27]

OBJECTION: The identity of Keystone's shippers and the terms of their contracts have substantial commercial and proprietary value, are subject to substantial efforts by Keystone to protect this information from actual and potential competitors, and are required to be maintained on a confidential basis pursuant to the terms of the contracts between Keystone and its shippers. This request also seeks information that is beyond the scope of the PUC's jurisdiction and Keystone's burden of proof under SDCL § 49-41B-27. It is within the purview of the U.S. Department of State to determine whether the proposed project is in the national interest, under the applicable Presidential Executive Order.

INTERROGATORY NO. 40: Describe the potential for pipeline transportation to replace rail transportation for shipments from the WCSB and the Williston Basin to PADDs 1 and 5.

A. Provide the quantity of oil exported from the WCSB and the Williston Basin to PADDs 1 through 5 by rail from 2010 to the present;

B. Identify any documents which would support your answers;

[Applicable Finding or Condition No.: Finding 27]

OBJECTION AND RESPONSE: This request seeks information that is beyond the scope of the PUC's jurisdiction and Keystone's burden of proof under SDCL § 49-41B-27. It is within the purview of the United States Department of State to determine whether the proposed project is in the national interest, under the applicable Presidential Executive Order. This request also seeks information that is not within Keystone's custody or control and is not maintained by Keystone in the ordinary course of business. The oil forecast information that Keystone relied on in Appendix C to its Certification was derived from the following sources: The Final Supplemental Environmental Impact Statement; the CAPP Crude Oil Forecast, Markets and Transportation June 2014; and the Energy Information Agency Annual Energy Outlook 2014. These documents, except for the FSEIS, which is available at http://keystonepipeline-xl.state.gov/finalseis/index.htm, are marked as Keystone 0001-0467

INTERROGATORY NO. 41: List the changes in the KXL Project route since 2010 and identify any documents which would support your answers. [Applicable Finding or Condition No.: Finding 33]

ANSWER: Please refer to the attached route variation maps attached as Keystone 0470-0583.

INTERROGATORY NO. 42: Identify paleontological studies within the Upper Cretaceous or Tertiary strata of which you have knowledge were conducted after 2009 in the

proximate location of the currently proposed KXL pipeline route and identify any documents which would support your answers. [Applicable Finding or Condition No.: Findings 34, 36; Conditions 43, 44]

ANSWER: Paleontological fieldwork methodology, literature search information, and results can be found in Sections 3.1.2.2 and 3.1.2.3 of the Department of State FSEIS (2014). A list of reports detailing the results of all pre-construction paleontological field surveys can be found in Table 3.1-4 of the Department of State FSEIS (2014).

INTERROGATORY NO. 43: Identify Section 106 type "cultural resource" studies of which you have knowledge that were conducted after 2009 in the proximate location of the currently proposed KXL pipeline route and identify any documents which would support your answers. [Applicable Finding or Condition No.: Conditions 43, 44]

ANSWER: Cultural resources survey reports are listed in Section 3.11 of the Department of State FSEIS (2014), with results of the SD surveys detailed in Table 3.11-3.

INTERROGATORY NO. 44: TransCanada is to identify the exact locations of active, shut-in, and abandoned wells and any associated underground pipelines in the construction ROW, what is the status of such identification procedures? As to the wells and pipelines to be identified:

A. How long does TransCanada expect such an identification process will take before the Company would be willing to assure the PUC that all such wells and pipelines have been identified;

B. If "appropriate precautions" prove inadequate, describe in detail a worst case scenario, especially involving a river, tributary, or other water resources, involving:

i. An unidentified well;

ii. An unidentified pipeline;

iii. An identified well where the precautions fail;

iv. An identified pipeline where the precautions fail;

C. What circumstance(s) or event(s) could potentially cause the "appropriate precautions" to fail?

i. How is it determined what the specific appropriate precautions to be undertaken are for each kind of scenario?

ii. Who determines whether each specific precaution is "appropriate" to prevent environmental and/or human damage;

iii. As to appropriate precautions to be undertaken for each possible scenario, how is the PUC assured TransCanada actually implements or undertakes the precaution(s) necessary.

D. What specific precautions have been or are planned to be taken to protect the soils in the Sand Hills from contamination;

E. What specific precautions have been or are planned to be taken to protect the underground water resources of the Oglala Aquifer and other potentially affected aquifers from contamination;

F. What specific precautions have been or are planned to protect the surface and alluvial waters of the State and respective Tribes from contamination;

G. What type of gas or oil or related solutions or gases pumped or injected by a well within a mile or more along the general route of the KXL pipeline, could be involved in such a "worst case scenario"?

H. What type of gas or oil or related solutions or gases being transported by a pipeline within a mile or more along the general route of the KXL pipeline, could be involved in such a "worst case scenario"?

I. Identify any documents which would support your answers.

[Applicable Finding or Condition No.: Conditions 15, 16, 21, 22, 42]

ANSWER: TransCanada has not yet identified the locations of the wells and pipelines as stated. TransCanada does not differentiate between active and abandoned but does identify wells and pipeline within the construction right of way utilizing public data, survey data and One Calls at the time of construction.

INTERROGATORY NO. 45: What kind of "significant problems" are anticipated by the weathering of shale underlying almost all of Haakon, Jones and portions of Tripp Counties:

A. To access roads;

B. To structural foundations for roads, power lines, or other structures constructed in connection with the KXL pipeline (in answering, identify the type of foundations are of concern);

C. To the proposed KXL pipeline or part thereof;

D. Identify any documents which would support your answers.

[Applicable Finding or Condition No.: Conditions 15, 16, 18, 21, 22, 23, 42]

ANSWER: There are no "significant problems" anticipated concerning the weathering of shale in South Dakota.

INTERROGATORY NO. 46: Describe a leak, the existence of which "may suggest a threat to the integrity of the pipeline."

A. Other than aerial patrols, ground patrols, and public awareness, what steps have been taken to prevent a leak of this nature and magnitude or prevent or minimize its effect on the pipeline's integrity?

B. Identify documents which support and/or were used to provide your answers.

[Applicable Finding or Condition No.: Finding 95; Conditions 31-38]

ANSWER: A confirmed leak is in fact a loss of integrity, however a direct observation reported leak may not be a result of a pipeline release (e.g. an apparent sheen on standing water near the ROW) or the release may be from another line in a multi-pipeline corridor or at a foreign pipeline crossing. In this context, a leak which "may suggest a threat to the integrity of the pipeline" is a reported potential leak that has yet to be confirmed as originating from a Keystone line.

Prevention of leaks of this magnitude are addressed in the sections of the FSEIS discussing pipeline integrity, Sections 3.13 and 4.13. In addition to these answer, in regard to remote sensing technologies, several initiatives have been undertaken by Keystone. A pilot implementation of a fixed thermal imaging system at a pump station will be tested this year, in addition to three industry projects that Keystone is participating in:

- C-FER Technologies' ELDER joint industry project (JIP) that is evaluating the performance of four different cable based leak detection systems.
- A second C-FER Technologies JIP that is quantifying the physical phenomenon that occur at the ground surface that could be detected by various technologies.
- PHMSA's project entitled "INO Technologies Assessment as Leak Detection Systems for Hazardous Liquid Pipelines".

INTERROGATORY NO. 47: Describe the status of the written manual for normal operations, maintenance activities, and handling abnormal operating and emergencies.

A. Identify the latest draft of the written manual and all prior drafts;

B. Identify all documents which support or were used to provide your answers.

[Applicable Finding or Condition No.: Finding 96; Conditions 31-38]

ANSWER: As required by the Department of Transportation, Pipeline and Hazardous Material Safety Administration 49 CFR §195.402 Keystone has prepared and follows a manual of written procedures for conducting normal operations and maintenance activities and handling abnormal operations and emergencies. The current manual is version 07 and the original manual version 01 issued August 01, 2010. Other manual revisions are defined:

- Version 02 – 11/15/2011
- Version 03 – 04/15/2012
- Version 04 – 06/07/2012
- Version 05 – 07/16/2012
- Version 06 – 07/09/2013

The Operations and Maintenance (O&M) Manual U.S. Hazardous Liquids Pipelines and referenced versions were utilized in support of TransCanada's response.

INTERROGATORY NO. 48: Calculate the worst case discharge and describe in detail the worst case scenario that would result from damage caused to the Keystone XL pipeline from the "high swelling potential" of the Cretaceous and Tertiary rocks located in the Missouri River Plateau due to this land form's susceptibility to instability in the form of slumps and earth-flows, including landslides.

A. Provide the locations where such ground swelling can be anticipated;

B. Identify any documents which would support your answer;

[Applicable Finding or Condition No.: Finding 40, 77; Conditions 31-42]

OBJECTION AND RESPONSE: This request seeks information that is confidential. The volume and location of a worst case scenario spill are kept confidential for homeland security reasons. Without waiving the objection, Section 3 of Appendix A of the 2009 Keystone XL Risk Assessment (FSEIS Appendix P) discusses the state-specific incident frequencies for a variety of pipeline hazards, including ground movement and landslides. Within Section 3.5, specific failure mechanisms and mitigation measures relating to these natural hazards are also discussed. Pipelines are remarkably resilient to landslides and seismic events (CITE). If ground movement occurred and has the potential to affect the pipe's integrity, Keystone is required by federal regulations to inspect the pipe (49 CFR 195).

TransCanada's Integrity Management Program would continue to assess the Keystone XL Pipeline Project route and threats from outside forces (e.g., landslides) would be evaluated in a comprehensive and systematic program, as required by federal pipeline safety regulations (49 CFR 195). As part of the Integrity Management Program, Keystone evaluates the potential for a release along the entire length of its pipelines and determines what resources could potentially be affected by a release. This information is shared with TransCanada's Emergency Response staff to facilitate emergency response planning and to develop appropriate training scenarios.

A. Locations of ground swelling are identified in the FSEIS, Section 3.1 Geology. In Section 3.1 of the FSEIS, Table 3.1-6 and Figure 3.1.2-3 identify the high risk category Landslide Hazard Area (LSHR) areas for swelling soils and landslides.

Table 3.1-6 Locations within LSHR High-Risk Category along the Proposed Project Corridor

State	Start (MP)	End (MP)	Length
Montana	0.2	25.5	25.3
Montana	25.5	89.2	63.7
Montana	89.2	102.0	12.8
South Dakota	308.3	313.5	5.2
South Dakota	355.6	358.1	2.5
South Dakota	358.1	370.9	12.8
South Dakota	389.5	425.9	36.4
South Dakota	425.9	426.3	0.4
South Dakota	426.3	485.1	58.8
South Dakota	485.1	525.2	40.1
South Dakota	525.2	537.1	11.9
South Dakota	537.1	571.5	34.4
Nebraska	601.5	605.3	3.8
Nebraska	606.8	637.5	30.7
Total			338.8

Sources: USGS 2009a; PHMSA-NPMS 2007b

B. 49 CFR 194.105

U.S. Department of State (USDOS). 2014. Final Supplemental Environmental Impact Statement for the Keystone XL Project. Washington D.C. Includes all appendices of the FSEIS.

INTERROGATORY NO. 49: What lessons have been learned from previous pipeline construction, current right-of-way conditions and project requirements that have been incorporated into the Construction Mitigation and Reclamation (CMR) Plan? Identify any documents which would support your answers, including but not limited to the latest version of the CMR plan. [Applicable Finding or Condition No.: Finding 32, 37, 73; Conditions 13-30]

ANSWER: Lessons learned are incorporated through the changes to Keystone's CMR Plan, the current draft of which is attached to Exhibit C to Keystone's certification petition as Attachment A.

INTERROGATORY NO. 50: Provide a list of changes in the proposed KXL pipeline route since 2010.

A. For each change in the route:

i. State why the route was changed;

ii. State how the new route improves this Project when compared with the previously submitted route;

B. Identify any documents which would support your answers.

[Applicable Finding or Condition No.: Finding 33]

ANSWER: Please refer to the attached route variation maps attached as Keystone 0470-0583.

INTERROGATORY NO. 51: Describe the status of the development of procedures for handling and disposal of unanticipated contaminated soil discovered during construction, and consultation with relevant agencies thereon.

A. Identify any draft or final procures developed to date;

B. Identify any documents which would support your answers.

[Applicable Finding or Condition No.: Conditions 13-30]

ANSWER: Keystone has not yet drafted the Unanticipated Contaminated Soils Plan.

INTERROGATORY NO. 52: State whether or not TransCanada or its Affiliates have conducted any assessments or studies of potential risks to the structural integrity of the proposed KXL Pipeline from seismic activity. If so, describe the results of any such assessment or studies and describe the maximum impacts that could occur with respect to a pipeline rupture resulting

from seismic activity. Identify any documents which would support your answers. [Applicable Finding or Condition No.: Conditions 31-38]

ANSWER: Please refer to the FEIS section 3.1.4 Geologic Hazards.

INTERROGATORY NO. 53: Describe the status of TransCanada's efforts to obtain a permit process for water body crossings.

A. List the agency(ies) to whom TransCanada has submitted a permit application;

B. Identify all permit applications submitted;

C. List any permits which TransCanada needs to obtain prior to its proposed KXL pipeline construction for each of the water body crossings desired to be crossed.

D. Explain why horizontal directional drilling will not be used on water body crossing of perennial streams and intermittent water bodies;

E. Identify any documents which would support your answers.

[Applicable Finding or Condition No.: Finding 41; Conditions 1, 2, 13-30]

ANSWER: The following is the requested information addressing the permitting of the water body crossings:

A. To date, Keystone has not submitted any permit applications to any agencies for water body crossings in South Dakota. All permits for waterbody crossings, as required, will be filed closer to the time period of construction.

B. To date, Keystone has not submitted any permit applications for water body crossings in South Dakota. All permits for waterbody crossings, as required, will be filed closer to the time period of construction.

C. Keystone will permit all of the water body crossings in South Dakota under the US Army Corps of Engineers Nationwide General Permit (NWP) 12. Additionally, the South Dakota Department of Environment and Natural Resources is responsible for Clean Water Act permit certification under Section 401 and would review proposed stream and river crossings where necessary and may issue project-specific conditions.

D. The decision to use the horizontal directional drilling (HDD) crossing method was based on and evaluation of engineering and environmental factors and use of an HDD does not always provide the most suitable methodology for a waterbody crossing. During the Project design, TransCanada has complied with all regulations and permit stipulations in determining the proposed crossing method for each waterbody in South Dakota.

E. The Department of State FEIS (2014) Sections 4.3, Water Resources; 4.7 Fisheries; 4.8 Threatened and Endangered Species; and Appendix H.

INTERROGATORY NO. 54: Describe the maximum impacts that could occur from expected 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 by open-cut trenching of water crossings other than the Little Missouri, Cheyenne and White River crossings. Identify any documents which would support your answers. [Applicable Finding or Condition No.: Finding 41; Conditions 34, 41]

ANSWER: The Department of State FSEIS (2014) evaluates the impacts to instream habitat as a result of the construction and operation of the Project in the following locations:

a. Section 4.3.2.2, Surface Water

b. Section 4.3.3.2, Surface Water

c. Section 4.7.3.2, Construction impacts

d. Section 4.7.3.3 Proposed Project Operational Impacts

INTERROGATORY NO. 55: Describe the maximum impacts that could occur during or as a result of horizontal directional drilling to cross the Little Missouri, Cheyenne, and White River crossings. Identify any documents which would support your answers. [Applicable Finding or Condition No.: Finding 41, 82-83; Condition 22]

ANSWER: This issue is addressed several times in the FSEIS, as follows:

At page 4.3-21:

In some instances, pressurized fluids and drilling lubricants used in the HDD process have the potential to escape the active HDD bore, migrate through the soils, and come to the surface at or near the crossing construction site, an event commonly known as a frac-out. Measures identified in a required HDD contingency plan would be implemented, including monitoring of the directional drill bore, monitoring downstream for evidence of drilling fluids, and mitigation measures to address a frac-out should one occur.

At page 4.8-20 :

The HDD method avoids direct disturbance to the river, channel bed, or banks. While the HDD method poses a small risk of frac-out (i.e., release of bentonite-based drilling fluids), potential releases would be contained by best management practices that would be described within the HDD Contingency Plans required for drilled crossings. Most leaks of HDD fluids occur near the entry, exit locations for the drill, and are quickly contained and cleaned up. Frac-outs that may release drilling fluids into aquatic environments are difficult to contain primarily because bentonite readily disperses in flowing water and quickly settles in standing water.

Should this type of release occur, bentonite is non-toxic but in sufficient concentration may physically inhibit respiration of adult fish and eggs.

At page 4.7-11,12:

The HDD method for crossing waterbodies would be used to minimize disturbance to aquatic habitat, stream banks, and recreational or commercial fisheries. Impacts could occur if there is an unintended release of drilling fluids (i.e., a frac out) during the HDD operation. A frac out could release bentonitic drilling mud into the aquatic environment. The released drilling mud would readily disperse in flowing water or eventually settle in standing water.

Although bentonite is non-toxic, suspended bentonite may produce short-term impacts to the respiration of fish and aquatic invertebrates due to fouled gills. Longer-term effects could result if larval fish are covered and suffocate due to fouled gills and/or lack of oxygen. If the frac out occurred during a spawning period, egg masses of fish could be covered, thus inhibiting the flow of dissolved oxygen to the egg masses. Benthic invertebrates and the larval stages of pelagic organisms could also be covered and suffocate.

INTERROGATORY NO. 56: Describe the worst case scenario of a worst case discharge into the Little Missouri, Cheyenne, and White River crossings. Identify any documents which would support your answers. [Applicable Finding or Condition No.: Findings 41-52, 68-69, 82-83; Conditions 31-42]

OBJECTION AND RESPONSE: This request seeks information that is confidential. The location and volume of a worst case scenario spill are kept confidential for homeland security reasons. Without waiving the objection, worst case discharge data were provided to regulatory agencies in Appendix A of the 2009 Keystone XL Risk Assessment.

The 2009 Keystone XL Risk Assessment discussed the range of impacts based on abroad range of spill volumes that encompassed 99.6 percent of all historical spill volumes, thereby describing a reasonable worst case scenario for the Keystone XL Pipeline Project. The 2009 Keystone XL Risk Assessment discussed the spill volumes and a very conservative assessment (i.e., assessment intentionally overestimates) of the magnitude of potential impacts in flowing waterbodies (2009 Keystone XL Risk Assessment, Section 4.2.3.4 Water Resources).

For streams that are HDD, most spills would not be expected to reach the river since the burial depth often can prevent a release from reaching the waterbody. However, as a worst case scenario for the purposes of this information response, a worst case scenario is assumed to reach the river. In the 2009 Keystone XL Risk Assessment, Table 4-1 from the 2009 Keystone XL Risk Assessment describes stream categories based on stream flows. The White River and Little Missouri Rivers are categorized as a stream with upper moderate flow, while the Cheyenne River would fall into the high flow Stream category. All three streams are being HDD. Based on those stream flow categories, impacts to water quality and aquatic biota can be identified in 2009 Keystone XL Risk Assessment text in Section 4.2.3.4 and Tables 4.2, and 4.3 and 4.7 to 4.10.

2009 Keystone XL Risk Assessment

Table 4-1 Stream Categories

Category	Streamflow (cubic feet per second [cfs])	Top of Bank Stream Width (feet)	Representative Streams
Low Flow Stream	10 – 100	<50	Many unnamed intermittent tributaries in all states crossed, Bear Creek (MT), South Branch Timber Creek (NE)

Lower Moderate Flow Stream	100 – 1,000	50 – 500	Upper Sevenmile Creek (MT), Lone Tree Creek (MT), Little Blue River (NE)
Upper Moderate Flow Stream	1,000 – 10,000	500 – 1,000	Yellowstone River (MT), White River (SD), Niobrara River (NE)
High Flow Stream	>10,000	1,000 – 2,500	Missouri River (MT), Loup River (NE), Platte River (NE), Canadian River (OK), Red River (TX)

INTERROGATORY NO. 57: Describe the worst case scenario which could occur from the Keystone XL pipeline as it passes under channels, adjacent flood plains and flood protection levees. Identify any documents which would support your answers. [Applicable Finding or Condition No.: Findings 41-49; Conditions 31-42]

OBJECTION: This request seeks information that is confidential by statute. The location and volume of a worst case scenario spill are kept confidential for homeland security reasons. Without waiving the objection, when the pipe crosses channels and flood plains, scenarios would be dictated by stream flow rate (discharge) and are discussed in Section 4.2.3.4 of 2009 Keystone XL Risk Assessment. Impacts are described in Section 4.2.3.4 for channels. Floodplain crossings are covered in FEIS Section 4.3.3.3 and Section 4.3.3.4 discusses impacts to floodplains. Worst case would be spill into low flow stream (Table 4-2 in 2009 Keystone XL Risk Assessment). Spills at individual river crossings are rare with occurrence interval of 1/22,000 years to 1/830,000 years based on representative crossing distances (2009 Keystone XL Risk Assessment). Most spills are less than 3 barrels.

River crossings by pipelines are very common, number of incidents are low, and safety is not affected by material transported. Predicted Project-specific incident frequencies are provided in Section 3.0 of the 2009 Keystone XL Risk Assessment. Spills at individual river crossings are rare with occurrence interval of 1/22,000 years to 1/830,000 years based on representative crossing distances (2009 Keystone XL Risk Assessment).

INTERROGATORY NO. 58: In light of the spill risk assessment provided by TransCanada in the HP09-001 docket:

A. Explain the number of leaks along the Keystone I pipeline since 2008;

B. Explain the number of leaks from the other oil pipelines constructed and/or operated by TransCanada or its Affiliates;

C. What would be a worst case scenario discharge from the KXL pipeline? Please explain your answer;

D. Identify any documents which would support your respective answers.

[Applicable Finding or Condition No.: Findings 41-49, 51-52; Conditions 31-38]

OBJECTION AND RESPONSE: Subpart(c) requests information that is confidential by statue. The location and volume of a worst case scenario spill are confidential for homeland security reasons. Subpart (d) is overlybroad and unduly burdensome. There are thousands of pages of documents supporting Keystone's spill risk assessment. In addition, many of the documents contain information that is confidential and proprietary. Without waiving the objection:

A. Keystone has delivered more than 760 million barrels of oil from Canada to the United States markets since it began operation in July 2010. The small number of leaks that

have occurred on the pipeline have had nothing to do with the integrity of the pipe itself. They have all occurred at our pump stations and other above-ground facilities and have been related to leakage from small-diameter fittings and seals. They have all been cleaned up with no environmental impact. We designed the pipeline to ensure that all small diameter fittings, valves and seals are located above ground where they can be easily accessed for maintenance and repairs. All of our pump stations are designed to capture and contain oil on our property. In total, less than 450 barrels of oil, out of more than 760 million barrels transported, have come out of the pipeline since it began operations five years ago TransCanada is constantly striving to improve our performance and working towards our goal of having zero leaks or safety incidents. All pipeline leaks are thoroughly investigated regardless of their size in order to understand the cause and prevent future such incidents. The leaks are identified in the spreadsheet attached as Keystone 0774-0784.

B. None.

INTERROGATORY NO. 59: Describe in detail the impact of a worst case scenario spill from the proposed KXL Pipeline through the Sand Hills in South Dakota. Identify any documents which would support your answers. [Applicable Finding or Condition No.: Findings 43-49, 53; Conditions 16, 35]

OBJECTION AND ANSWER: This request seeks information that is not within Keystone's custody or control. Without waiving the objection, there are no Sand Hills in South Dakota. *See* Table 3.5.-2 of the Department of State FSEIS (2014).

INTERROGATORY NO. 60: Describe in detail the impact of a worst case scenario spill into the shallow and surficial aquifers in Tripp County from the proposed KXL Pipeline. Identify

any documents which would support your answers. [Applicable Finding or Condition No.: Findings 43-49, 53; Conditions 16, 35]

OBJECTION AND ANSWER: This request seeks information that is confidential by statute. The location and volume of a worst case scenario spill are confidential for homeland security reasons. Without waiving the objection, the 2009 Keystone XL Risk Assessment (FSEIS, Appendix P) described the movement of crude oil and its constituents in soils and groundwater. Field investigations of more than 600 historical petroleum hydrocarbon release sites indicate the migration of dissolved constituents typically stabilizes within several hundred feet of the crude oil source area (Newell and Conner 1998; USGS 1998). Over a longer period, the area of the contaminant plume may begin to reduce due to natural biodegradation. Removal of crude oil contamination will eliminate the source of dissolved constituents impacting the groundwater.

Spills are also discussed in the FSEIS in Section 4.1.3.4, including those in shallow and surficial aquifers. The fate and transport of benzene and other crude oil constituents is discussed in numerous studies and articles, including those referenced in the 2009 Keystone XL Risk Assessment, such as:

Freeze, R. A. and J. A. Cherry. 1979. Groundwater. Prentice Hall, Inc. Englewood Cliffs, New Jersey. 604 pp.

Minnesota Pollution Control Agency. 2005. Assessment of Natural Attenuation at Petroleum Release Sites. Guidance Document c-prp4-03, Petroleum Remediation Program, Minnesota Pollution Control Agency. April 2005. 11 pp.

Neff, J. M. 1979. Polycyclic aromatic hydrocarbons in the aquatic environment. Applied Science publ. Ltd., London. 262 pp.

Newell, C. J. and J. A. Connor. 1998. Characteristics of Dissolved Petroleum Hydrocarbon Plumes: Results from Four Studies. American Petroleum Institute Soil / Groundwater Technical Task Force. December 1998.

Spence, L. R., K. T. O'Reilly, R. I. Maagaw, and W. G. Rixey. 2001. Chapter 6 – Predicting the fate and transport of hydrocarbons in soil and groundwater. In :risk-based decision-making or assessing petroleum impacts at exploration and production sites. Edited by S. McMillen, R. Magaw, R. Carovillano, Petroleum Environmental Research Forum and US Department of Energy.

United States Geological Service (USGS). 1998. Groundwater Contamination by Crude Oil near Bemidji, Minnesota. US Geological Survey Fact Sheet 084-98, September 1998.

Additional references on this subject from the FSEIS include:

American Petroleum Institute (API). 1992. Review of Natural Resource Damage Assessments in Freshwater Environments: Effects of Oil Release into Freshwater Habitats. API Publ. No. 4514.

API. 1997. Petroleum in the Freshwater Environment: An annotated Bibliography 1946-1993. API Publ. No. 4640.

Grimaz, S., S. Allen, J. Steward, and G. Dolcetti. 2007. Predictive evaluation of the extent of the surface spreading for the case of accidental spillage of oil on ground. Selected Paper IcheaP8, AIDIC Conference series, Vol. 8, 2007, pp. 151-160.

Hult, M.F. 1984. Groundwater Contamination by Crude Oil at the Bemidji, Minnesota, Research Site: U.S. Geological Survey Toxic Waste—Ground-Water Contamination Study. Papers presented at the Toxic-Waste Technical Meeting, Tucson, Arizona, March 20-22. USGS Water Investigations Report 84-4188.

Weaver, J.W., R.J. Charbeneau, J.D. Tauxe, B.K. Lien, and J.B. Provost. 1994. The hydrocarbon spill screening model (HSSM) Volume 1: User's guide. USEPA/600/R-94/039a.U.S. Environmental Protection Agency, Office of Research and Development, Robert S. Kerr, Environmental Research Laboratory, Ada, OK

INTERROGATORY NO. 61: Identify the USGS or other geological, hydrological, geo-hydrological studies conducted in the areas including what is now the proposed KXL pipeline route through South Dakota, which:

A. Provide the thickness of the purportedly low permeability confining materials that would underlie the entirety of the proposed route either through the Sand Hills and over any shallow High Plains Aquifer;

B. Provide the thickness of the confining materials underlying the balance of the proposed pipeline route;

C. Provide the permeability of the sediment or bedrock underlying the proposed pipeline route for each part of the KXL pipeline;

D. Describe the composition of the sediments and/or bedrock underlying each part of the proposed route;

E. Describe the absence of any fractures (including micro-fractures), faults, karsts, sinkholes within a mile of the entirety of the proposed route and which might lengthen the "unlikely" travel of crude oil more than 300 feet from a spill site;

F. Describe the absence of channels in the underlying strata along each part of the proposed route which might lengthen the "unlikely" travel of crude oil more than 300 feet from a spill site;

G. Describe other factors which could lengthen the travel of crude oil beyond 300 feet from a spill site;

H. The location(s) of shallow aquifers along each part of the route;

I. The location(s) of surficial aquifers along each part of the route;

J. The location of domestic and livestock wells, public and private, within a mile of each part of the proposed route;

K. Describe the "appropriate" measures that TransCanada will take to prevent groundwater contamination;

L. Describe the "steps" to be taken to manage the flow of any ground water encountered;

M. Identify any documents which would support your respective answers.

[Applicable Finding or Condition No.: Findings 43-49, 53; Conditions 16, 35]

OBJECTION AND ANSWER: This request is overlybroad and unduly burdensome. This request may also seek information that is not within Keystone's custody or control and is not maintained by Keystone in the ordinary course of business.

Without waiving the objection, geological references and hydrogeological references are listed in chapters 3 and 4 in the FSEIS. Some pertinent additional references are:

Gutentag (1984): USGS Prof. Paper 1400-B

Downey (1986): USGS Prof. Paper 1402-E

Thamke et al (2014): USGS Scientific Inv. Report SIR 2014-5047.

In addition, lithologic logs available from the South Dakota Dept. Natural Resources at http://denr.sd.gov/des/wr/dblog.search.aspx and http://denr.sd.gov/data.aspx provide aquifer thickness data.

A. Geological references and hydrogeological references are listed in chapters 3 and 4 in the FSEIS. Some pertinent additional references are:

Gutentag (1984): USGS Prof. Paper 1400-B

Downey (1986): USGS Prof. Paper 1402-E

Thamke et al (2014): USGS Scientific Inv. Report SIR 2014-5047.

In addition, lithologic logs available from the South Dakota Dept. Natural Resources at http://denr.sd.gov/des/wr/dblog.search.aspx and http://denr.sd.gov/data.aspx provide aquifer thickness data.

B. Geological references and hydrogeological references are listed in chapters 3 and 4 in the FSEIS. Some pertinent additional references are:

Gutentag (1984): USGS Prof. Paper 1400-B

Downey (1986): USGS Prof. Paper 1402-E

Thamke et al (2014): USGS Scientific Inv. Report SIR 2014-5047.

In addition, lithologic logs available from the South Dakota Dept. Natural Resources at http://denr.sd.gov/des/wr/dblog.search.aspx and http://denr.sd.gov/data.aspx provide aquifer thickness data.

C. Geological references and hydrogeological references are listed in chapters 3 and 4 in the FSEIS. Some pertinent additional references are:

Gutentag (1984): USGS Prof. Paper 1400-B

Downey (1986): USGS Prof. Paper 1402-E

Thamke et al (2014): USGS Scientific Inv. Report SIR 2014-5047.

In addition, lithologic logs available from the South Dakota Dept. Natural Resources at http://denr.sd.gov/des/wr/dblog.search.aspx and http://denr.sd.gov/data.aspx provide aquifer thickness data.

D. Geological references and hydrogeological references are listed in chapters 3 and 4 in the FSEIS. Some pertinent additional references are:

Gutentag (1984): USGS Prof. Paper 1400-B

Downey (1986): USGS Prof. Paper 1402-E

Thamke et al (2014): USGS Scientific Inv. Report SIR 2014-5047.

In addition, lithologic logs available from the South Dakota Dept. Natural Resources at http://denr.sd.gov/des/wr/dblog.search.aspx and http://denr.sd.gov/data.aspx provide aquifer thickness data.

E. Geological references and hydrogeological references are listed in chapters 3 and 4 in the FSEIS. Some pertinent additional references are:

Gutentag (1984): USGS Prof. Paper 1400-B

Downey (1986): USGS Prof. Paper 1402-E

Thamke et al (2014): USGS Scientific Inv. Report SIR 2014-5047.

In addition, lithologic logs available from the South Dakota Dept. Natural Resources at http://denr.sd.gov/des/wr/dblog.search.aspx and http://denr.sd.gov/data.aspx provide aquifer thickness data.

In addition, consider the following:

Whitehead et al (1996): USGS Hydrologic Atlas HA 730-I

Hammond (1994): South Dakota Geol. Survey open file report UR-68

Lobmeyer (1985): USGS Prof. Paper 1402-D

Luckey et al (1986): USGS Prof. Paper 1400-D.

F. Geological references and hydrogeological references are listed in chapters 3 and 4 in the FSEIS. Some pertinent additional references are:

Gutentag (1984): USGS Prof. Paper 1400-B

Downey (1986): USGS Prof. Paper 1402-E

Thamke et al (2014): USGS Scientific Inv. Report SIR 2014-5047.

In addition, lithologic logs available from the South Dakota Dept. Natural Resources at http://denr.sd.gov/des/wr/dblog.search.aspx and http://denr.sd.gov/data.aspx provide aquifer thickness data.

G. Geological references and hydrogeological references are listed in chapters 3 and 4 in the FSEIS. Some pertinent additional references are:

Gutentag (1984): USGS Prof. Paper 1400-B

Downey (1986): USGS Prof. Paper 1402-E

Thamke et al (2014): USGS Scientific Inv. Report SIR 2014-5047.

In addition, lithologic logs available from the South Dakota Dept. Natural Resources at http://denr.sd.gov/des/wr/dblog.search.aspx and http://denr.sd.gov/data.aspx provide aquifer thickness data.

Lithologic logs available from the South Dakota Dept. Natural Resources at http://denr.sd.gov/des/wr/dblog.search.aspx and http://denr.sd.gov/data.aspx provide the thickness data. In addition, consider the following:

Davis and Putnam (2013): USGS Scientific Inv. Report SIR 2013-5069

Downey (1986): USGS Prof. Paper 1402-E

Gutentag (1984): USGS Prof. Paper 1400-A and 1400-B.

H. Geological references and hydrogeological references are listed in chapters 3 and 4 in the FSEIS. Some pertinent additional references are:

Gutentag (1984): USGS Prof. Paper 1400-B

Downey (1986): USGS Prof. Paper 1402-E

Thamke et al (2014): USGS Scientific Inv. Report SIR 2014-5047.

In addition, lithologic logs available from the South Dakota Dept. Natural Resources at http://denr.sd.gov/des/wr/dblog.search.aspx and http://denr.sd.gov/data.aspx provide aquifer thickness data.

In addition, consider the following:

Downey (1986): USGS Prof. Paper 1402-E

Gutentag et al (1984): USGS Prof. Paper 1400-B.

I. Geological references and hydrogeological references are listed in chapters 3 and 4 in the FSEIS. Some pertinent additional references are:

Gutentag (1984): USGS Prof. Paper 1400-B

Downey (1986): USGS Prof. Paper 1402-E

Thamke et al (2014): USGS Scientific Inv. Report SIR 2014-5047.

In addition, lithologic logs available from the South Dakota Dept. Natural Resources at http://denr.sd.gov/des/wr/dblog.search.aspx and http://denr.sd.gov/data.aspx provide aquifer thickness data.

J. Keystone has not yet identified the location of wells, but will do so before construction.

K. "In order to reduce the risk of spills, if permitted Keystone has agreed to incorporate additional mitigation measures in the design, construction, and operation of the proposed Keystone XL Project, in some instances above what is normally required, including:

- 59 Special Conditions recommended by PHMSA;
- 25 mitigation measures recommended in the Battelle and Exponent risk reports; and
- 11 additional mitigation measures.

Many of these mitigation measures relate to reductions in the likelihood of a release occurring. Other measures provide mitigation that reduces the consequences and impact of a spill should such an event occur. Mitigation measures are compiled I Appendix Z, Compiled Mitigation Measures, of this Supplemental EIS. Mitigation measures are actions that, if the proposed Project is determined to be in the national interest, Keystone would comply with as conditions of a Presidential Permit." (FSEIS Executive Summary, pg. ES-19").

In the FSEIS Appendix Z, Section 14.1, Potential Releases, Table 4, are listed the 59 Special Conditions recommended by the PHMSA. TransCanada has committed to complying with the PHMSA 59 Special Conditions as listed in Appendix Z of the FSEIS.

"These regulations are intended to ensure adequate protection for the public and to prevent crude oil pipeline accidents. Among other design standards, 49 CFR 195 and the proposed Project-specific special conditions specify pipeline material and qualification, minimum design requirements, and protection from internal, external, and atmospheric corrosion" (FSEIS Appendix H1-H2, pg. 2.0-32)".

L. Keystone would coordinate with the South Dakota Department of Environment and Natural Resources regarding specific steps to be taken in the event that potential contamination of groundwater was suspected. These steps may include, but may not be limited to, soil and groundwater sampling, installation of monitoring wells, and use of groundwater remediation technologies.

INTERROGATORY NO. 62: Describe the direct and indirect effects to people, other animals, plants and trees, fish, when exposed individually and or in combination to components of crude oil including: benzene, toluene, ethyl benzene and xylene. Identify any documents which would support your respective answers. [Applicable Finding or Condition No.: Findings 43-49; Conditions 31-37]

ANSWER: Effects to these receptors are discussed in the 2009 Keystone XL Risk Assessment and in the FSEIS (Chapter 4). Additional information, including effects of individual compounds, can be found in the Agency for Toxic Substances and Disease Registry (ATSDR) or the Hazardous Substances Data Bank (HSDB). Benzene is often used for screening for effects in petroleum products due its combined high water solubility and ability to cause toxicity at very low concentrations.

U.S. Department of Health and Human Services. 2015. Agency for Toxic Substances and Disease Registry (ATSDR). Internet website: http://www.atsdr.cdc.gov. Accessed January 21, 2015.

U.S. National Library of Medicine, Toxicology Data Network (TOXNET). 2015. Hazardous Substances Data Bank (HSDB). Internet website: http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB. Accessed January 21, 2015.

INTERROGATORY NO. 63: Provide an explanation of why the occurrence of a spill or leak that could affect the High Consequence Area (HCA) only once every 250 years over the 34.4 miles of HCA (Finding 50), while such a spill would purportedly occur once in 7,400 years per mile of pipeline (Finding 44). Identify any documents which would support your respective answer. [Applicable Finding or Condition No.: Findings 44, 50; Conditions 15-16, 35]

ANSWER: Finding of Fact 44 in the South Dakota Public Utilities Commission Amended Order states that, "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." This is calculated based on historical incident data from Pipeline and Hazardous Materials Safety Administration (PHMSA), as discussed in Section 3.0. The occurrence interval of 7,400 years is calculated by taking the inverse of the incident frequency (0.000135 incidents per mile per year). The result is an estimate, in years, of the time between spills. This is similar to the concept of flood recurrence intervals (i.e., 100-year floods).

Page 4-21 of the 2009 Keystone XL Risk Assessment shows that a spill affecting a High Consequence Area (HCA) in any state crossed by the Keystone XL Pipeline Project has an

occurrence interval of 53 years. This is calculated by taking the inverse of the incident frequency (measured as incidents per mile per year) multiplied by the miles of HCAs crossed (141.2 miles).

INTERROGATORY NO. 64: Describe the contents of the "information concerning activities of concern" to be made available to landowners and others. Identify any documents which would support your respective answer. [Applicable Finding or Condition No.: Finding 57; Condition 16]

ANSWER: Condition 16 does not address "information concerning activities of concern." With respect to Finding 57, it is landowners who are permitted to contact Keystone regarding "activities of concern." Accordingly, Keystone does not know specifically what activities may be of concern to individual landowners. In the context of the Finding, it is likely that such activities can be expected to involve farming operations above the pipeline.

INTERROGATORY NO. 65: Describe the worst case scenario for landowners of a spill from the proposed pipeline onto only land, as well as other risks deemed "low" by the PUC. Identify any documents which would support your respective answer. [Applicable Finding or Condition No.: Findings 57; Conditions 16, 31-38]

ANSWER: Keystone cannot speak to risks deemed "low" by the PUC.

INTERROGATORY NO. 66: Provide a list of claims or complaints (of any kind) made to the Commission by landowners along the Keystone I pipeline corridor since 2008. Identify any documents which would support your respective answer. [Applicable Finding or Condition No.: Finding 57; Conditions 49-50]

OBJECTION AND ANSWER: Assuming that the request is for a list of claims or complaints made by landowners along the Keystone Pipeline corridor in eastern South Dakota to

the PUC since 2008, this information is publicly available on the PUC website. To the extent that the request is for complaints made by landowners along the Keystone XL Pipeline corridor since 2008, the request is vague, overlybroad, unduly burdensome, and seeks discovery of information that is not relevant and not likely to lead to the discovery of admissible evidence under SDCL 15-6-26(b). All complaints reported to the liaison by the SDPUC are documented by the liaison and reported quarterly. These reports are available at: https://puc.sd.gov/dockets/hydrocarbonpipeline/2009/publicliaisonreports.aspx. Without waiving the objection, attached as Keystone 0785-1115 are documents related to landowner complaints or concerns regarding damages resulting from Keystone XL's use of the easement, which is within the scope of Amended Permit Condition 49.

INTERROGATORY NO. 67: Identify the latest version of the Unanticipated Discovery Plan, including any prior drafts. [Applicable Finding or Condition No.: Finding 58; Condition 43]

ANSWER: The Unanticipated Discovery Plan can be found within the Programmatic Agreement in Appendix E of the Department of State FSEIS (2014).

INTERROGATORY NO. 68. Explain why TransCanada has sought a special permit from the PHMSA for authorization "to design, construct, and operate the Project up to 80% of the steel pipe specified minimum yield strength at most locations."

A. Identify and describe all spills/leaks from TransCanada pipeline operations since 2009 in Canada which have involved a "0.8 design factor" and therefore involving use of steel pipe up to 80% of the specified minimum yield strength.

B. Identify documents upon which your answers are based.

[Applicable Finding or Condition No.: Findings 60-61]

ANSWER: Keystone is no longer seeking a special permit from PHMSA.

A. There are currently no TransCanada crude oil pipelines operating at 0.8 design factor in Canada.

B. Keystone's decision to withdraw its special permit request is explained in a Media Advisory dated August 5, 2010, attached as Keystone 0647-0649.

INTERROGATORY NO. 69: Explain why it is expected that any special permit issued by PHMSA would exclude pipeline segments in High Consequence Areas (HCAs).

A. Describe the potential risks of using pipeline segments with a design factor of 0.80 rather than 0.72, as required by 49 CFR § 195.106.

B. Identify documents upon which your answers are based.

[Applicable Finding or Condition No.: Findings 60-62]

ANSWER: Keystone has withdrawn its request for a Special Permit. Hypothetically, if Keystone were to reapply for a Special Permit, it is reasonable to anticipate that such a Permit would exclude pipeline segments in HCAs since the Special Permit for the original Keystone Pipeline excluded such areas.

INTERROGATORY NO. 70: Explain how application of the "0.8 design factor and API 5L PSL2 X70 high-strength steel pipe" with thinner walls would "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." [Applicable Finding or Condition No.: Finding 63]

OBJECTION: This request seeks information that is beyond the scope of the PUC's jurisdiction and Keystone's burden of proof under SDCL 49-41B-27. The issue is within the

exclusive jurisdiction of PHMSA. Keystone has withdrawn its application for a special permit. Without waiving the objection, on August 5 2010, TransCanada withdrew its application to the Pipeline Hazardous Materials and Safety Administration (PHMSA) for a special permit to design, construct and operate the pipeline at a 0.8 design factor and adopted the 57 additional safety measures that would have been required under the PHMSA special permit.

INTERROGATORY NO. 71: With regard to over-pressure events:

A. What are the potential causes of over-pressurization?

B. Describe the failures of the SCADA system that could cause a full rupture of the KXL Pipeline;

C. Describe TransCanada's maintenance and operational protocols and system redundancies that are intended to prevent failure of the SCADA system;

D. Describe the ability of the SCADA system to detect leaks in the Keystone I pipeline from 2008 through today;

E. Describe improvements in SCADA technology since 2010;

F. Describe actions TransCanada has taken to prevent a cyber-attack on the SCADA monitoring system;

G. Identify documents upon which your answers are based.

[Applicable Finding or Condition No.: Finding 72, 92-94; Conditions 31-38]

ANSWER:

A. There are two main causes of over-pressurization in pipelines: static pressure, and dynamic pressure. Static pressure excursions can occur during steady-state operation due to differences in elevation along the pipeline. In a static pressure excursion situation, it is possible

to see pressures in excess of the pipeline's MOP at points of low elevation along the line. Dynamic pressure excursions result from a disturbance which causes a change in fluid velocity. Disturbances can result from events such as valve closure and pump shutdowns. Automated and independent pressure control and overpressure protection systems are designed to protect against static and dynamic overpressure.

B. Potential threats contributing to releases from small to large volumes are described within section 3.13.3.10 of the FSEIS. Equipment malfunctions including those of SCADA components are addressed within this section. Associated threats have been addressed through the following:

- Design practices including system fail safe functionality, key component and power supply redundancy (including key pressure and level sensors).
- Functional validation of systems including factory and site acceptance testing as well as comprehensive point to point verification between SCADA and associated field devices.

C. TransCanada has a dedicated team to provide operational support for its SCADA systems. The team provides 7x24 on-call SCADA support, primarily to the Oil Control Center. Additionally, automated monitoring systems alert the SCADA team in the event that a SCADA system requires maintenance. The support team ensures that routine maintenance is performed on the SCADA systems, as required. Non-routine maintenance is managed through a risk-based integrity management process. The design of the Keystone XL SCADA system includes, at a minimum, dual redundant components at both the primary and backup Oil Control Centers.

D. TransCanada utilizes a state of the art Computational Pipeline Monitoring (CPM) leak detection system capable of identifying leaks down to the size of 1.5 to 2.0% of pipeline flow rate within a 2-hour window.

TransCanada has maintained the CPM to meet or exceed this level of leak detection sensitivity since the beginning of operations. The Keystone pipeline is monitored 24/7 by a dedicated Leak Detection controller within the Oil Control Center who is trained to identify and to respond to emerging events.

E. TransCanada actively funds and participates with Industry in the evaluation and development of leak detection technologies to augment our current systems. Examples of this effort include:

1. **New Generation of Rarefaction Wave Leak Detection**

This technology utilizes negative pressure waves generated to detect the onset of a leak. These waves travel from the origination point down both directions of the pipeline through the pipeline fluid at the speed of sound of the fluid medium and attenuate over distance as they travel. Dynamic pressure sensors installed at facilities with power and communication accesses (pump stations, mainline valves, etc.) can then measure these pulsations and detect the start of a leak and locate the leak by calculating the difference of arrival time of the pulsations at the two ends of the pipeline section.

2. **In Line Inspection Leak Detection**

An acoustic In Line Inspection (ILI) tool that is launched and received on a periodic basis like any other In Line Inspection (ILI) tool and is propelled by the commodity in the line. This technology claims to be able to detect leaks smaller than the current threshold of CPM systems; however, detection only occurs as the tool passes the leak location and is therefore not a continuous real time monitoring system.

3. **Infrared thermal camera for facilities**

The camera based leak detection technology functions by employing Infrared and color video cameras to detect temperature differences between objects of interest and the surrounding environment. Software analytics then attempt to determine whether the detection constitutes a leak or an environmental transient such as a wild animal, weather or other event (snow, rain, etc.). In the event of a detected leak, confirmation can be obtained through color cameras and

real time notifications would be sent the Control Center and/or control room as pre-specified. This technology is still its infancy.

4. Aerial or Ground Patrol Leak Detection

This is a transportable leak detection technology designed for aerial or ground. This technology takes advantage of the difference of light absorption rates between the atmosphere and hydrocarbon vapors to detect hydrocarbon leak. Performance depends on the selected spectrum band, visible or non-visible, and the analysis algorithm vendors choose.

5. Cable Based External Leak Detection Systems

Cable based leak detection systems are buried along the pipeline to provide external means of leak detection. Different cable based technologies apply different physical principles to detect phenomena accompanying a leak as temperature change (DTS), leakage caused sound and vibration (DAS), and existence of hydrocarbon liquid (HSC) or hydrocarbon vapor molecules (VST) outside the pipe. These can be used as independent means of detection outside of the mass balance CPM systems. Despite its long history of use for leak detection at oil and gas facilities and pipeline security, application for leak detection on long-haul transmission pipelines is a recent emerging development.

Some of the above technologies are in a state of development, while others are commercially available today yet their practical application to long haul transmission pipelines such as Keystone XL has not been established. As part of our commitment to safety, TransCanada continues to evaluate these new and evolving leak detection technologies to potentially augment the best in class leak detection capabilities of our current system and for potential implementation on new pipelines including Keystone XL.

F. Consistent with industry practice, TransCanada does not publicly disclose the details of the security systems it has in place. We believe that it is not prudent to make this information public because of the likelihood that it will assist, and, potentially encourage, attackers.

INTERROGATORY NO. 72: Describe how TransCanada will report its full compliance with the CMR to the Commission, so that the Commission can confirm that TransCanada will minimize impacts on cultivated lands, grasslands, wetlands, streams, and

waterways? Identify documents upon which your answers are based. [Applicable Finding or Condition No.: Finding 73]

ANSWER: Keystone will submit quarterly progress reports to the Commission that summarize the status of construction and environmental control activities as directed by Amended Permit Condition #8. Keystone has incorporated environmental inspectors into its CMR Plan Rev4 and will obtain follow-up information reports from such inspections upon the completion of each construction spread to help ensure compliance the CMR Plan Rev4 to the Commission as directed by Amended Permit Condition #14.

INTERROGATORY NO. 73: Describe the status of TransCanada's training of each of local first responders along the proposed route of the KXL Pipeline.

A. Identify each first responder entity along the Keystone I pipeline routes for which TransCanada has provided training and describe this training;

B. Describe how the training for the Keystone XL Pipeline will differ from the training provided for the Keystone I pipeline;

C. Identify documents upon which your answers are based.

[Applicable Finding or Condition No.: Finding 100; Conditions 10, 15]

ANSWER: Emergency response training is addressed in detail at Appendix D of the Keystone Pipeline System Emergency Response Plan attached as Appendix I of the State Department January 2014 Final Supplemental EIS.

See http://keystonepipeline-xl.state.gov/documents/organization/221231.pdf

Specific training for Keystone XL has not yet been established but will be similar to that described in the Keystone ERP above.

INTERROGATORY NO. 74: Do you admit that ground movement can cause abnormal movement of the proposed KXL pipeline?

A. Describe incidents where ground movement has resulted in abnormal movement of the Keystone I or other pipeline similar to the proposed KXL Pipeline;

B. Identify documents upon which your answers are based.

[Applicable Finding or Condition No.: Finding 101; Conditions 31-38]

ANSWER: Because there are no areas of high ground movement potential along the Keystone XL route in South Dakota, Keystone does not expect any incidents of ground movement. There have been no incidents of ground movement resulting in abnormal movement of the Keystone I pipeline.

INTERROGATORY NO. 75: Since 49 CFR Part 195 would require TransCanada Keystone to conduct an "internal inspection" of any pipe section(s) potentially moved by abnormal ground movement, describe the timeframe within which an inspection would take place considering the time required to transport personnel and equipment from their staging area to the most distant segment of the KXL Pipeline in South Dakota, and the time required to notify and mobilize inspectors to their staging area. Identify documents upon which your answers are based. [Applicable Finding or Condition No.: Finding 101; Conditions 31-38]

ANSWER: It would take between one and two weeks to mobilize and conduct an internal inspection.

INTERROGATORY NO. 76: Identify the location(s) where slope instability poses a potential threat of ground movement along the Project route.

A. Identify TransCanada's most current Integrity Management Plan (IMP) showing incorporation of locations where slope instability poses a potential threat to the pipeline;

B. Identify documents upon which your answers are based.

[Applicable Finding or Condition No.: Finding 79; Conditions 8, 15, 20-21]

OBJECTION AND ANSWER: To the extent that it seeks information outside South Dakota, this request is overlybroad and unduly burdensome and seeks the discovery of information that is not relevant and not likely to lead to the discovery of admissible evidence under SDCL 15-6-26(b). In addition, the request for the Integrity Management Plan is beyond the scope of the PUC's jurisdiction and Keystone's burden under SDCL § 49-41B-27. This request also seeks information addressing an issue that is governed by federal law and is within the exclusive province of the PHMSA. The PUC's jurisdiction over the Integrity Management Plan is preempted by federal law. See 49 C.F.R. Part 194; 49 U.S.C. § 60104(c). This request further seeks information that is confidential and proprietary. See Amended Final Order, HP 09-001, Condition ¶ 36. Public disclosure of the Integrity Management Plan would commercially disadvantage Keystone. Without waiving the objection, please refer to FSEIS Chapter 3 Affected Environment, Section 3.1.2 Environmental Setting, Section 3.1.2.5 Landslide. Also, see Chapter 4 Environmental Consequences, Section 4.1.3.4 Geologic Hazards Landslides.

INTERROGATORY NO. 77: What is the status of preparation and publication of the "public awareness programs" required to be prepared by 49 CFR Part 195? Identify the documents upon which your answers are based. [Applicable Finding or Condition No.: Finding 102; Conditions 1-3, 6-7]

ANSWER: Keystone's existing public awareness program will be updated prior to KXL pipeline commencing service to incorporate any updated materials.

INTERROGATORY NO. 78: Describe the status of preparation of different construction and reclamation techniques for the variety of geological for differing soils conditions, slopes, vegetation and land use along the pipeline route, in consultation with the National Resource Conservation Service, construction/reclamation unit. Identify documents upon which your answers are based. [Applicable Finding or Condition No.: Finding 80; Conditions 15-16]

ANSWER: The preparation of different construction and reclamation techniques for the variety of geological for differing soils conditions, slopes, vegetation and land use along the pipeline route, in consultation with the National Resource Conservation Service, construction/reclamation unit has been completed. The 2013 Construction/Reclamation Unit Specifications contains this information and are found in Appendix R of the Department of State FSEIS (2014).

INTERROGATORY NO. 79: With regard to the inspectors that TransCanada will have "on a construction spread" during construction:

A. What is the number of inspectors to be onsite;

B. What is the number of such inspectors who will be "environmental inspectors;"

C. Describe the minimum qualifications for such environmental inspectors;

D. What is the distance of each construction spread that an individual environmental inspector will be responsible for monitoring on any given day of construction;

E. In what manner and how often or under what circumstances will these inspectors submit their documentation of their findings to the Commission;

F. Identify documents upon which your answers are based.

[Applicable Finding or Condition No.: Finding 85; Condition 14]

ANSWER: The final Project construction schedule has not been determined.

A. The number of inspectors including Environmental Inspectors (EIs) and the configuration of the EIs along the Project route in South Dakota will not be determined until the final Project schedule is determined.

B. There will be a minimum of one environmental inspector per spread.

C. The minimum requirements for an environmental inspector will be specified by Keystone during the hiring process.

D. Environmental inspectors are not stationary. They review procedures and activities along a spread based upon what work may be occurring on that spread on a given day. They then review and report on compliance by moving between the different spread activities that are occurring on a given day.

E. Keystone will submit quarterly progress reports to the Commission that summarize the status of construction and environmental control activities as directed by Amended Permit Condition #8. Keystone has incorporated environmental inspectors into its CMR Plan Rev4 and will obtain follow-up information reports from such inspections upon the completion of each construction spread to help ensure compliance the CMR Plan Rev4 to the Commission as directed by Amended Permit Condition #14.

F. The Department of State FSEIS (2014), The Amended Permit Conditions issued by the Commission.

INTERROGATORY NO. 80: Identify all bonding requirements with which TransCanada must comply for construction of the KXL Pipeline. In answering, also state the current bond amount under SDCL §49-41B-38 for damage to highways, roads, bridges and other related facilities during and after construction.

A. Describe in detail how figures for perceived repair and reclamation were determined;

B. Has TransCanada committed itself to pay any costs of repair or reclamation above the bond amount, should the bond amount prove too low to cover the total cost thereof?

[Applicable Finding or Condition No.: Finding 88; Condition 23]

OBJECTION AND RESPONSE: This request is not relevant or likely to lead to the discovery of admissible evidence to the extent that it seeks information outside South Dakota. Without waiving the objection, the bond requirements for Keystone XL are stated in the June 2010 Amended Final Order at Condition 23(f). The amount of the bond was proposed by Keystone and recommended by staff witness Binder in Docket HP 09-001.

INTERROGATORY NO. 81: State whether or a bond requirement exists with respect to damage to rivers, streams, shallow or surface or deeper aquifers during construction. If so, state the bond amount.

A. Describe in detail how figures for perceived repair and reclamation were determined;

B. Has TransCanada committed itself to pay any costs of repair or reclamation above the bond amount, should the bond amount prove too low to cover the total cost thereof?

[Applicable Finding or Condition No.: Finding 88; Conditions 23, 49]

ANSWER: The bond requirement referenced in the response to No. 80 above is the only bond requirement in South Dakota.

INTERROGATORY NO. 82: Describe each proposed location in South Dakota and adjacent states of spill response equipment prepositioned to respond to a spill from the KXL Pipeline.

A. For each such location, estimate the time required to mobilize personnel to their assigned equipment and the time required for this equipment to travel to the most distant point on the pipeline in South Dakota from its storage location, showing the distance travelled and assumed speeds;

B. Identify the documents upon which you relied to answer these questions;

[Applicable Finding or Condition No.: Finding 98; Conditions 31-38]

ANSWER: Oil spill response equipment (amounts, types and locations) that are owned by TransCanada are listed in Appendix A of the Keystone Emergency Response Plan, which was filed as a confidential document with the PUC in HP 07-001. The Keystone ERP will be amended to accommodate Keystone XL. PHMSA requires response times as outlined in the table below. TransCanada locates equipment and people that are transported by air, land and water to ensure that regulatory guidelines are meant.

INITIAL RESPONSE ACTIONS - SUMMARY PERSONNEL AND PUBLIC SAFETY IS FIRST PRIORITY			
RESPONSE TIMES*			
US DOT Tier	1	2	3
High Volume Area	6 HR	30 HR	54 HR
All Other Areas	12 HR	36 HR	60 HR

CONTROL

- Eliminate sources of ignition
- Isolate the source of the discharge, minimize further flow

NOTIFY

- Make internal and external notifications
- Activate local Company personnel as necessary
- Activate response contractors and other external resources as necessary

CONTAIN

- Begin spill mitigation and response activities
- Monitor and control the containment and clean-up effort
- Protect the public and environmental sensitive areas

* Response resources and personnel available to respond within time specified after discovery of a worst case discharge per US DOT 49 CFR Part 194.115 (Keystone ERP. Sec 3.1).

INTERROGATORY NO. 83: Identify the most recent IMP submitted to the Commission and other appropriate agencies, including but not limited to sections in it related to HCAs. [Applicable Finding or Condition No.: Finding 102; Conditions 1-2]

OBJECTION: This request seeks information that is beyond the scope of the PUC's jurisdiction and Keystone's burden under SDCL § 49-41B-27. This request also seeks information addressing an issue that is governed by federal law and is within the exclusive province of PHMSA. The PUC's jurisdiction over the integrity management plan is preempted by federal law. See 49 C.F.R. Part 194; 49 U.S.C. § 60104(c). This request further seeks

information that is confidential and proprietary. See Amended Final Order, HP 09-001, Condition ¶ 36. Public disclosure of the Integrity Management Plan would commercially disadvantage Keystone.

INTERROGATORY NO. 84: Itemize the property tax payments paid by TransCanada and its Affiliates to respective South Dakota towns, cities, and counties each year since 2010 for the Keystone I pipeline:

A. Compare TransCanada's property tax estimates for the Base Keystone Pipeline prepared prior to its construction to TransCanada's actual payments and explain any discrepancy;

B. Identify the documents upon which you relied to answer these questions;

[Applicable Finding or Condition No.: Finding 23, 102, 108; Conditions]

ANSWER: Keystone has paid $14,128,224 in property taxes in South Dakota from 2009 through and including 2013. 2014 real property taxes are due and payable in 2015. Keystone paid Beadle County $1,796,731; Brookings County $5,734; Clark County $1,602,403; Day County $2,294,723; Hanson County $627,561; Hutchinson County $2,015,399; Kingsbury County $955,201; Marshall County $1,533,417; McCook County $568,591; Miner County $1,782,412; and Yankton County $1,040,782; 2009 through 2013. The documents on which the answer is based are the tax bills rendered by the county treasurer in each county.

In HP07-0100, the base Keystone Pipeline docket, the company first estimated ad valorem on property taxes spread among host counties in the first year as $6.5 million, then amended the estimate to $9.1 million. Calculations were based on an "all in" cost of construction of approximately $300 million, later amended to $500, million. The estimate assumed that the pipeline would be assessed based on its construction cost. The Department of

Revenue chose not to use construction cost as the basis for the assessment. In 2011, the legislature changed the way the value of agricultural property was assessed for ad valorem real property tax purposes. The change in valuation method has resulted in a substantial increase in the assessed value of agricultural property. An increase in the assessed valuation of one category of property affects the local need and local contribution calculations under the South Dakota school aid formula and affects the way the county, city, township and school levies are spread across other categories of property. A combination of the method of assessment, levies and the change in agricultural land valuation assessment methodology explains the difference. Documents used for the answer include the tax bills rendered, a summary thereof marked as Keystone 0768-0773, and Exhibit TC14 HP07-0100 Docket.

INTERROGATORY NO. 85: With respect to the jobs you allege will be brought to South Dakota by the KXL pipeline project:

A. State the number, job title, and expected duration of the temporary construction related jobs expected;

i. State what percentage of current South Dakota citizens, as opposed to persons who move to South Dakota for a job, are expected to be hired for each job title.

ii. Is there any preference for South Dakota citizens to obtain any or all of these temporary jobs?

iii. State the number and percentage of the total construction jobs expected to be filled by out-of-state workers.

B. State the number, type, and expected duration of the permanent jobs expected in South Dakota;

i. State the number of permanent jobs expected to be held by current South Dakota citizens, as opposed to someone who moves from out of state to South Dakota to take the job.

ii. Will there any preference for South Dakota citizens to obtain any or all of the permanent jobs to be created in South Dakota?

C. Identify the documents upon which you relied to answer these questions;

[Applicable Finding or Condition No.: Finding 23, 102, 108; Conditions 1-2]

ANSWER:

A. Assuming this question refers to 'average annual jobs' - It is estimated that Project construction in South Dakota will support 3,500 jobs across all sectors, of which between 1,038 and 1,500 jobs will be directly construction-related. The 3,500 jobs supported by construction of the Project are considered 'average annual jobs', defined as one position that is filled for one year, while the 2,700 to 3,900 temporary construction personnel are expected to be employed for the 4- to 8-month seasonal construction period over 1 to 2 years.

i. It is estimated that between 270 and 390 temporary construction positions created in South Dakota will be filled by residents of the State.

ii. Jobs are filled based on the availability of qualified personnel.

iii. It is estimated that between 2,430 and 3,510 temporary construction positions created in South Dakota will be filled by non-South Dakota residents.

B. Approximately 25 permanent employees and 15 temporary contractors will be distributed along the proposed pipeline route, including the route in South Dakota. Job duration is commensurate with operations of the pipeline and titles will vary.

i. Jobs are filled based on the availability of qualified personnel.

ii. Jobs are filled based on the availability of qualified personnel.

C. Section 4.10 of the Final SEIS.

INTERROGATORY NO. 86: Should there be a worst case discharge or even a substantial release of crude oil into farmland and/or water resources and/or an explosion of the pipeline near homes or towns with people, explain how the Project will have a "minimal" effect on the health, safety, or welfare of its inhabitants. Identify the documents upon which you relied to answer these questions.

[Applicable Finding or Condition No.: Finding 23, 102, 108; Conditions 1,2, 31-36]

OBJECTION: This request is argumentative and improper in form. It calls for speculation and assumes facts not in evidence and is therefore beyond the scope of discovery under SDCL § 15-6-26(b). The PUC found in its conclusions of law, ¶ 6, that Keystone met its burden of proof on this issue.

Dated this 5TH day of February, 2015.

TRANSCANADA KEYSTONE PIPELINE, LP
by its agent, TC Oil Pipeline Operations, Inc.

By _____

Its Director, Authorized Signatory

Subscribed and sworn to before me

this 5th day of February, 2015.

_____

John W. Love, Lawyer
Notary Public - Canada

OBJECTIONS

The objections stated to Dakota Rural Action's Interrogatories and Request for Production of Documents were made by James E. Moore, one of the attorneys for Applicant TransCanada herein, for the reasons and upon the grounds stated therein.

Dated this 6th day of February, 2015.

WOODS, FULLER, SHULTZ & SMITH P.C.

By _____

William Taylor
James E. Moore
Post Office Box 5027
300 South Phillips Avenue, Suite 300
Sioux Falls, SD 57117-5027
Phone: (605) 336-3890
Fax: (605) 339-3357
Email: Bill.Taylor@woodsfuller.com
James.Moore@woodsfuller.com
Attorneys for Applicant TransCanada

CERTIFICATE OF SERVICE

I hereby certify that on the 6th day of February, 2015, I sent by e-mail transmission, a true and correct copy of Keystone's Responses to Dakota Rural Action's First Interrogatories, to the following:

Bruce Ellison
518 6th Street #6
Rapid City, SD 57701
belli4law@aol.com
Attorney for Dakota Rural Action

Robin S. Martinez
Martinez Madrigal & Machicao, LLC
616 West 26th Street
Kansas City, MO 64108
robin.martinez@martinezlaw.net
Attorney for Dakota Rural Action

_____
One of the attorneys for TransCanada

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

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	HP14-001 **KEYSTONE'S RESPONSES TO DAKOTA RURAL ACTION'S FIRST REQUEST FOR PRODUCTION OF DOCUMENTS**

Applicant TransCanada makes the following responses to interrogatories pursuant to SDCL § 15-6-33, and responses to requests for production of documents pursuant to SDCL § 15-6-34(a). These responses are made within the scope of SDCL 15-6-26(e) and shall not be deemed continuing nor be supplemented except as required by that rule. Applicant objects to definitions and directions in answering the discovery requests to the extent that such definitions and directions deviate from the South Dakota Rules of Civil Procedure.

GENERAL OBJECTION

Keystone objects to the instructions and definitions contained in Dakota Rural Action's First Set of Interrogatories and Requests for Production of Documents to the extent that they are inconsistent with the provisions of SDCL Ch. 15-6. *See* ARSD 20:10:01:01.02. Keystone's answers are based on the requirements of SDCL §§ 15-6-26, 15-6-33, 15-6-34, and 15-6-36.

REQUEST FOR PRODUCTION OF DOCUMENTS

1. All documents identified or referred to in your Answers to DRA's First Interrogatories to you. *[Applicable Finding or Condition No.: all]*

ANSWER: *See* responses to DRA interrogatories 7, 8, 12, 13, 15, 23, 24, 27, 30, 33, 34, 35, 40, 41, 50, 58, 66, 68, and 84.

2. All documents and correspondence presented to any expert in connection with the above-captioned proceedings, or received from any expert, including but not limited to emails, letters, engagement documents, resumes, curriculum vitaes, reports, analysis, spreadsheets, schedules, and any drafts thereof. *[Applicable Finding or Condition No.: all]*

ANSWER: Keystone does not intend to call any retained expert witnesses.

3. The most recent resume or curriculum vitae of each expert whom you expect to call as an expert witness at the hearing before the Commission. *[Applicable Finding or Condition No.: all]*

ANSWER: Keystone does not intend to call any retained expert witnesses. Keystone will offer prefiled direct testimony from the following persons, each of whom will testify to the changes identified in Keystone's tracking table for that person's area of expertise:

(1) Corey Goulet, President, Keystone Projects, 450 1st Street S.W., Calgary, AB Canada T2P 5H1; (403) 920-2546; Project purpose, Overall description; Construction schedule; Operating parameters; Overall design; Cost; Tax Revenues
(2) Steve Marr, Manager, Keystone Pipelines & KXL, TransCanada Corporation, Bank of America Center, 700 Louisiana, Suite 700, Houston, TX 77002; (832) 320-5916; same; CMR Plan, Con/Rec Units, HDD's
(3) Meera Kothari, P. Eng., 450 1st Street S.W., Calgary, AB Canada T2P 5H1; (832) 320-5190; same; Design and Construction; PHMSA compliance
(4) David Diakow, Vice President, Commercial, Liquids Pipeline, 450 1st Street S.W., Calgary, AB Canada T2P 5H1; (403) 920-6019; Demand for the Facility

(5) Jon Schmidt, Vice President, Environmental & Regulatory, exp Energy Services, Inc., 1300 Metropolitan Boulevard, Suite 200, Tallahassee, FL 32308; (850) 385-5441; Environmental Issues; CMR Plan, Con/Rec Units, HDD's
(6) Heidi Tillquist, Senior Associate, Stantec Consulting Ltd., 2950 E. Harmony Rd., Suite 290, Fort Collins, CO 80528; (970) 449-8609; High Consequence Areas, Spill Calculations

Resumes for each witness are attached as Keystone 1341-1374.

4. The written reports of experts who are expected to testify on behalf of TransCanada. *[Applicable Finding or Condition No.: all]*

ANSWER: Keystone does not intend to call any retained expert witnesses.

5. All correspondence between TransCanada or its Affiliates and the Commission or Commission staff concerning the Project. *[Applicable Finding or Condition No.: all]*

ANSWER: With the exception of communications from Keystone's project liaison, neither TransCanada or its affiliates has had any correspondence with the Commission or its staff concerning the Project, beyond the certification filed September 15, 2014.

6. All documents concerning production and transportation of crude oil from the Williston Basin area, including but not limited to, projections of crude oil supply to be transported via the proposed Project, and any agreements or commitments entered into with oil producers and refiners with respect to any production from the Williston Basin area. *[Applicable Finding or Condition No.: Finding 14]*

OBJECTION AND RESPONSE: The identity of Keystone's shippers and the terms of their contracts have substantial commercial and proprietary value, are subject to substantial efforts by Keystone to protect this information from actual and potential competitors, and are required to be maintained on a confidential basis pursuant to the terms of the contracts between

Keystone and its shippers and Section 15(13) of The Interstate Commerce Act. This request seeks information that is beyond the scope of the PUC's jurisdiction and Keystone's burden of proof under SDCL § 49-41B-27. It is within the purview of the United States Department of State to determine whether the proposed project is in the national interest, under the applicable Presidential Executive Order. This request also may seek information that is not within Keystone's custody or control and is not maintained by Keystone in the ordinary course of business. The oil forecast information that Keystone relied on in Appendix C to its Certification was derived from the following sources: The Final Supplemental Environmental Impact Statement; the CAPP Crude Oil Forecast; Markets and Transportation June 2014; and the Energy Information Agency Annual Energy Outlook 2014. These documents, except for the FSEIS, which is available at http://keystonepipeline-xl.state.gov/finalseis/index.htm, are marked as Keystone 0001-0467.

7. All documents concerning a change in routing of the Project between 2010 and the present date, including but not limited to, any parcel maps showing the precise location of the proposed Project through South Dakota. *[Applicable Finding or Condition No.: Finding 16]*

ANSWER: Please refer to the route variation maps attached as Keystone 0470-0583.

8. All documents setting forth TransCanada's proposed construction schedule for the Project, and all contracts for construction of the proposed Project and all contracts or other documents relating to commitments made with respect to the Project by shippers. *[Applicable Finding or Condition No.: Finding 17]*

ANSWER: Keystone currently has not set a date to commence construction, nor does it have any construction contracts in place. Construction of the proposed Project would begin after Keystone obtains all necessary permits, approvals, and authorizations. Keystone anticipates that the proposed Project would be placed into service approximately 2 years after receiving such authorizations. (FSEIS, page 2.1-69).

9. All documents concerning the decision to use API 5L X70M high-strength steel for the Project in lieu of API 5L X80M high-strength steel. *[Applicable Finding or Condition No.: Finding 18]*

OBJECTION: This request is overlybroad and unduly burdensome because it requests "all documents" concerning the decision to use API 5L X70M high-strength steel. Without waiving the objection, API 5L X80 high strength steel was contemplated as an option during the early stages of the Project. Material evaluation and selection was finalized during the detail design phase of the Project at which time Keystone selected grade X70 materials for use in the pipeline.

10. All documents concerning the decision to use fusion-bonded epoxy (FBE) coating on the proposed pipeline, including but not limited to, contracts or other agreements with the manufacturer of the FBE product, and any communications between TransCanada and such manufacturer. *[Applicable Finding or Condition No.: Finding 18]*

OBJECTION: This request is overlybroad and unduly burdensome because it requests "all documents" concerning the decision to use fusion-bonded epoxy coating on the proposed pipeline. It also seeks information that is not relevant or likely to lead to the discovery of

admissible evidence under SDCL 15-6-26(b) to the extent that it seeks all communications between TransCanada and the manufacturer of the coating.

11. All documents, including internal communications between TransCanada's or its Affiliates' staff, consultants, advisors, or other parties concerning the appropriate pipeline operating pressure for the Project. *[Applicable Finding or Condition No.: Finding 19]*

OBJECTION AND ANSWER: This request is overlybroad, unduly burdensome, not relevant, and not likely to lead to the discovery of admissible evidence. Without waiving the objection, the operating pressure is in accordance with 49 CFR 195.106.

12. All documents showing location of power lines for pumping stations proposed for the Project, the location of proposed pumping stations and mainline valves for the Project in South Dakota, and including, but not limited to all communications between TransCanada's or its Affiliates' staff, consultants, advisors, or other parties concerning location and operation of pumping stations, mainline valves, and the proposed conversion of valves to remote control operations. *[Applicable Finding or Condition No.: Finding 20]*

OBJECTION AND ANSWER: This request is overlybroad, unduly burdensome, not relevant, and not likely to lead to the discovery of admissible evidence. In addition, the location of pump stations and mainline valves is confidential for reasons related to homeland security. Without waiving the objection, please refer to FSEIS 2.1.12.3 Electrical Distribution Lines and Substations.

13. All documents concerning compliance by TransCanada with 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"), including but not limited to any and all communications between TransCanada's or its Affiliates' staff, consultants, advisors, or other parties, and PHMSA, DOS, or other federal agencies concerning regulatory compliance, approvals, or waivers of applicable regulations with respect to the Project. *[Applicable Finding or Condition No.: Finding 22]*

OBJECTION: This request seeks information that is beyond the scope of the PUC's jurisdiction and Keystone's burden under SDCL 49-41B-27. This request also seeks information that is governed by federal law and is within the province of PHMSA. The request is also overlybroad and unduly burdensome by requesting any and all communications between TransCanada, including its consultants, and PHMSA related to the Project.

14. All documents concerning the increase in projected costs for the Project, including but not limited to draft or final budgets, pro-formas, estimated cost schedules, and communications between TransCanada's or its Affiliates' staff, consultants, advisors, or other parties regarding the increased estimated costs of the Project. *[Applicable Finding or Condition No.: Finding 23]*

OBJECTION: This request seeks information that is not relevant and not likely to lead to the discovery of admissible evidence under SDCL § 15-6-26(b). In addition, Keystone does not maintain a breakdown of the estimated project cost in the way requested, and requiring such a breakdown of costs would require the disclosure of information that has substantial commercial

and proprietary value, and is subject to substantial efforts by Keystone to protect it from actual and potential competitors.

15. All documents setting forth forecasts of "additional crude oil production from the WCSB" and Williston Basin, including any documents discussing the impact of current low oil prices on such forecasts. *[Applicable Finding or Condition No.: Finding 24*

OBJECTION: This request seeks information that is beyond the scope of the PUC's jurisdiction and Keystone's burden of proof under SDCL § 49-41B-27. It is within the purview of the United States Department of State to determine whether the proposed project is in the national interest, under the applicable Presidential Executive Order. This request also may seek information that is not within Keystone's custody or control and is not maintained by Keystone in the ordinary course of business. The oil forecast information that Keystone relied on in Appendix C to its Certification was derived from the following sources: The Final Supplemental Environmental Impact Statement; the CAPP Crude Oil Forecast, Markets and Transportation June 2014; and the Energy Information Agency Annual Energy Outlook 2014. These documents, except for the FSEIS, which is available at http://keystonepipeline-xl.state.gov/finalseis/index.htm, are marked as Keystone 0001-0467.

16. All documents setting forth binding shipper commitments to utilize the Project. *[Applicable Finding or Condition No.: Finding 24]*

OBJECTION: The identity of Keystone's shippers and the terms of their contracts have substantial commercial and proprietary value, are subject to substantial efforts by Keystone to protect them from actual and potential competitors, and must be maintained on a confidential

basis pursuant to the terms of the contracts between Keystone and its shippers and Section 15(13) of the Interstate Commerce Act.

17. All documents, including but not limited to communications between TransCanada's or its Affiliates' staff, consultants, advisors, or other parties discussing or containing information stating or indicating that existing or new refineries will import less crude oil and, instead, replace it with crude oil transported via the Project. *[Applicable Finding or Condition No.: Finding 24]*

OBJECTION AND RESPONSE: This request seeks information that is beyond the scope of the PUC's jurisdiction and Keystone's burden of proof under SDCL § 49-41B-27. It is within the purview of the United States Department of State to determine whether the proposed project is in the national interest, under the applicable Presidential Executive Order. This request also may seek information that is not within Keystone's custody or control and is not maintained by Keystone in the ordinary course of business. The oil forecast information that Keystone relied on in Appendix C to its Certification was derived from the following sources: The Final Supplemental Environmental Impact Statement; the CAPP Crude Oil Forecast, Markets and Transportation June 2014; and the Energy Information Agency Annual Energy Outlook 2014. These documents, except for the FSEIS, which is available at http://keystonepipeline-xl.state.gov/finalseis/index.htm, are marked as Keystone 0001-0467.

18. All documents discussing or setting forth TransCanada's or its Affiliates' forecasts of US demand for petroleum products. *[Applicable Finding or Condition No.: Finding 25]*

OBJECTION AND RESPONSE: This request seeks information that is beyond the scope of the PUC's jurisdiction and Keystone's burden of proof under SDCL § 49-41B-27. It is within the purview of the United States Department of State to determine whether the proposed project is in the national interest, under the applicable Presidential Executive Order. This request also may seek information that is not within Keystone's custody or control and is not maintained by Keystone in the ordinary course of business. The oil forecast information that Keystone relied on in Appendix C to its Certification was derived from the following sources: The Final Supplemental Environmental Impact Statement; the CAPP Crude Oil Forecast, Markets and Transportation June 2014; and the Energy Information Agency Annual Energy Outlook 2014. These documents, except for the FSEIS, which is available at http://keystonepipeline-xl.state.gov/finalseis/index.htm, are marked as Keystone 0001-0467.

19. All documents setting forth or discussing whether or if crude oil from the WCSB is sold at a "significant discount" from other sources. *[Applicable Finding or Condition No.: Finding 27]*

ANSWER: Responsive documents are attached as Keystone 1119-1120.

20. All documents setting forth, discussing, or describing whether or if shipment of crude oil via the Project will replace rail transportation for crude oil shipments from the WCSB. *[Applicable Finding or Condition No.: Finding 27]*

OBJECTION: This request seeks information that is not within Keystone's custody or control and is not maintained by Keystone in the ordinary course of business. This issue is addressed in the Final Supplemental Environmental Impact Statement and is publicly available.

21. All documents setting forth binding commitments from shippers to use the Project, including but not limited to copies of contracts between TransCanada (and its Affiliates) and such shippers. *[Applicable Finding or Condition No.: Finding 29]*

OBJECTION: The identity of Keystone's shippers and the terms of their contracts have substantial commercial and proprietary value, are subject to substantial efforts by Keystone to protect this information from actual and potential competitors, and are required to be maintained on a confidential basis pursuant to the terms of the contracts between Keystone and its shippers and Section 15(13) of The Interstate Commerce Act.

22. All documents describing soil types and conditions along the currently-proposed Project route through South Dakota. *[Applicable Finding or Condition No.: Finding 33]*

ANSWER: Appendix M of the Department of State FSEIS (2014) identifies soil types crossed by the Project route in South Dakota. Section 3.2.2.2 of the Department of State FSEIS (2014) describes the soil types crossed by the Project route in South Dakota.

23. All documents describing, discussing, or setting forth plans for the Project to cross perennial streams and rivers, intermittent streams, and ephemeral streams in South Dakota, including but not limited to all documents concerning the methodology used by TransCanada (and its Affiliates) or its agents in determining construction plans for the Project across such waterways. *[Applicable Finding or Condition No.: Finding 41]*

ANSWER: The following documents provide the requested information:

a. The CMR Plan Rev4

b. The following portions from the Department of State FSEIS (2014): Section 4.3.3.2 and Appendix D1, Waterbody Crossing Tables.

Prior to construction, Keystone will consult with the US Army Corps of Engineers as part of the permitting process under Section 404 of the CWA regarding the proposed crossing methodology for each jurisdictional waterbody crossed in South Dakota.

24. All documents concerning the reduction in the length of the proposed Project potentially affecting High Consequence Areas. *[Applicable Finding or Condition No.: Finding 50]*

ANSWER: During the detailed engineering design phase of the Project, the route was adjusted. Please refer to the attached route variation maps. In doing so, the route deviated away from DOT designated HCA areas thereby reducing total HCA miles crossed by the Project.

25. All documents concerning TransCanada's (or its Affiliates') decision to withdraw its request to the PHMSA for a special permit referenced in Finding 60. *[Applicable Finding or Condition No.: Finding 60]*

ANSWER: The Media Advisory attached as Keystone 0647-0649 explains the decision.

26. All documents containing information concerning the failure of FBE coating referenced in the update to Finding 68. *[Applicable Finding or Condition No.: Finding 68]*

ANSWER: Base Keystone experienced a localized external corrosion wall loss due to DC stray current interference from foreign utility colocation which caused sacrificing significant amounts of protective current to other pipelines in the shared Right-of-Way. This adversely

affected CP current distribution to the Keystone line. This anomaly was found during proactive and routine high resolution in-line inspection. This issue has been reviewed, remediated and updates to the CP design where colocation occur have been implemented. In South Dakota specifically, no such location exists for colocation of multiple pipelines in a shared Right-of-Way. However, Keystone has applied these updates to its design and existing CP "construction bridge to energization" plan to address potential for DC stray current interference due to foreign utility crossings and paralleling utilities.

27. All documents containing information concerning construction/reclamation unit mapping referenced in Finding 80, including but not limited to the construction/reclamation unit mapping. *[Applicable Finding or Condition No.: Finding 80]*

ANSWER: The 2013 Construction/Reclamation Unit Specifications contain this information and are found in Appendix R of the Department of State FSEIS (2014).

28. All documents containing information regarding TransCanada's (or its Affiliates') decision to use horizontal directional drilling to cross waterways, including but not limited to all documents discussing or describing the decision-making process engaged in to determine which waterways would be crossed using horizontal directional drilling. *[Applicable Finding or Condition No.: Finding 83]*

ANSWER: The decision to horizontal directional drill water bodies is based on the width of the water body, terrain changes at the crossing and potential for scour and migration of the water body.

29. All documents, including but not limited to forecasts and projections of tax revenue accruing to the State of South Dakota should construction and operation of the Project commence. *[Applicable Finding or Condition No.: Finding 107]*

ANSWER: An itemization of taxes paid is attached as Keystone 0768-0773.

30. All documents evidencing TransCanada's or its Affiliates' compliance efforts with applicable laws and regulations related to construction and operation of the Project. *[Applicable Finding or Condition No.: Condition 1]*

OBJECTION: This request is overlybroad and unduly burdensome by requesting "all documents" concerning TransCanada's compliance with applicable laws and regulations related to construction and operation of the project.

31. All documents concerning TransCanada's or its Affiliates' efforts to obtain and comply with applicable permitting referenced in Condition 2, including but not limited to copies of any permits obtained. *[Applicable Finding or Condition No.: Condition 2]*

OBJECTION AND RESPONSE: This request is overlybroad, unduly burdensome, not relevant, and not likely to lead to the discovery of admissible evidence. Without waiving the objection, Keystone addressed the status of permitting in its answer to DRA's interrogatory number 3.

32. All documents concerning TransCanada's or its Affiliates' compliance with the recommendations set forth the DOS's Final Environmental Impact Statement, including but not limited to documents discussing or concerning compliance with Section 106 of the National Historic Preservation Act. *[Applicable Finding or Condition No.: Condition 3]*

OBJECTION AND RESPONSE: This request is overlybroad and unduly burdensome. Without waiving the objection, unless and until the DOS issue a Record of Decision and a Presidential Permit, the recommendations in the Final EIS are not binding on Keystone. Compliance with Section 106 of the NHPA is the responsibility of the DOS.

33. All documents concerning or discussing proposed adjustments or deviations in the route of the Project, including but not limited to copies of notices to affected land owners. *[Applicable Finding or Condition No.: Condition 6]*

ANSWER: Please refer to the route variation maps attached as Keystone 0470-0583.

34. All documents concerning the appointment of a public liaison officer by TransCanada for the Project, and all documents containing information regarding communications between the public liaison officer and landowners affected by the Project. *[Applicable Finding or Condition No.: Condition 7]*

OBJECTION: This request is overlybroad, unduly burdensome, not relevant, and not likely to lead to the discovery of admissible evidence. The PUC approved the liaison, and her quarterly and monthly reports are available on the PUC's website.

35. All documents containing information with respect to contacts or communications with state, county and municipal emergency response, law enforcement and highway, road and other infrastructure management agencies regarding the Project. *[Applicable Finding or Condition No.: Condition 10]*

ANSWER: Attached as Keystone 0650-0767 are documents related to contacts with state and local emergency responders related to first responder training.

36. All documents containing information concerning TransCanada's or its Affiliates' efforts to comply with mitigation measures set forth in the Construction Mitigation and Reclamation Plan submitted to the Commission. *[Applicable Finding or Condition No.: Condition 13]*

ANSWER: Unless and until the Department of State issues a Record of Decision and a Presidential Permit, the recommendations in the Final EIS are not binding on Keystone.

37. All documents containing information regarding consultations, including but not limited to communications, with Natural Resources Conservation Services ("NRCS") regarding development of construction/reclamation units ("Con/Rec Units"). *[Applicable Finding or Condition No.: Condition 15]*

OBJECTION AND ANSWER: This request is overlybroad and unduly burdensome. Without waiving the objection, attached as Keystone 0636-637 is a Contact Record with NRCS dated June 7, 2010.

38. All Con/Rec Units developed in connection with the Project, including but not limited to drafts and supporting studies or documents. *[Applicable Finding or Condition No.: Condition 15]*

ANSWER: The 2013 Construction/Reclamation Unit Specifications contain this information and are found in Appendix R of the Department of State FSEIS (2014).

39. All documents provided to landowners affected by the Project explaining trenching and topsoil and subsoil/rock removal, segregation and restoration methods for their property. *[Applicable Finding or Condition No.: Condition 16]*

ANSWER: Landowners and a project representative complete a "Keystone Pipeline Project Landowner/Tenant Construction Restrictions Binding Agreement," which covers rock disposal, topsoil stripping, and restoration preferences. All agreements will be completed before construction begins, unless a landowner refuses to complete the agreement. A template agreement is attached as Keystone 1116-1118.

40. All documents containing information regarding trucking or hauling contractors to be used in construction of the Project, including but not limited to agreements with such trucking or hauling contractors. *[Applicable Finding or Condition No.: Condition 17]*

ANSWER: Keystone currently has no contractors retained to undertake trucking and hauling.

41. All documents containing information or describing the methodology to be used by TransCanada (or its Affiliates) for valuing trees. *[Applicable Finding or Condition No.: Condition 19]*

ANSWER: There is not a methodology for valuing merchantable timber, but if a property contains timber, it is identified on the "Keystone Pipeline Project Landowner/Tenant Construction Restrictions Binding Agreement. Keystone pays fair market value for the affected acreage.

42. All documents containing information regarding consultations between TransCanada (or its Affiliates) and South Dakota Game, Fish and Parks. *[Applicable Finding or Condition No.: Condition 20(c)]*

OBJECTION AND RESPONSE: This request is overlybroad and unduly burdensome. Without waiving the objection, the following is a summary of Keystone consultation history with SD Game, Fish, and Parks as documented in the USFWS issued May 2013 Biological Opinion (Appendix H of the of the Department of State FSEIS (2014)).

- June 10, 2008: Keystone met with staff from USFWS and South Dakota Department of Game, Fish, and Parks (SDGFP), at the SDGFP office in Pierre, South Dakota, to discuss issues pertaining to wildlife, special status species, and sensitive habitat that could potentially occur in the Project area. The goal of the meeting was to gather input on agency recommendations based on the information sent to them in April 2008 for species occurrence, habitat assessments, and future field surveys. Keystone incorporated comments from the meeting into survey protocols and BMPs for future agency verification.
- January/February 2009: Keystone initiated section 7 consultation with the USFWS. Keystone continued discussions with BLM, and state wildlife agency offices for South Dakota that included state-specific special status species survey protocols and BMPs for the species identified as potentially occurring during the 2008 meetings. A summary of the findings from the 2008 biological field surveys was included in the discussions.
- January 27, 2009: Keystone met with staff from the USFWS and SDGFP at the SDGFP office in Pierre, South Dakota, to discuss issues pertaining to special status species surveys. The goals of the meeting were to verify Keystone's survey approach, BMPs, discuss required field surveys, and review the information that was sent to the USFWS in the January/February 2009, informal consultation package. The USFWS and SDGFP provided additional recommendations

to Keystone's sensitive species mitigation approach to be updated prior to final agency concurrence.

- October 23, 2012: A meeting was held between the USFWS, Department, SDGFP, BLM, and Keystone regarding the greater sage–grouse and a compensatory mitigation plan for the species in South Dakota. Discussions included a management plan and avoidance, minimization, and mitigation strategies.

43. All documents describing the development of frac-out plans in areas where horizontal directional drilling will occur in connection with the Project, including but not limited to any frac-out plans developed. *[Applicable Finding or Condition No.: Condition 21]*

ANSWER: Keystone currently has no contractors retained to undertake construction. When Keystone employs a pipeline contractor, that contractor will develop the plan, subject to Keystone's approval as required by Condition 21. This issue is addressed in Section 7.4.5 of the CMR Plan.

44. All documents describing or containing information regarding TransCanada's or its Affiliates' efforts to comply with conditions regarding construction of the Project near wetlands, water bodies, and riparian areas, such documents including but not limited to compliance plans, construction plans, mitigation plans, and communications with any regulatory agency in such regard. *[Applicable Finding or Condition No.: Condition 22]*

ANSWER: Keystone has not yet received its permit authorization for wetland construction.

45. All documents containing or referencing adverse weather land protection plans developed in connection with the Project. *[Applicable Finding or Condition No.: Condition 25]*

ANSWER: The Adverse Weather Plan has not yet been prepared, but will be filed with the Commission two months prior to the start of construction as stated in Condition #25.

46. All documents that reference or identify private and new access roads to be used or required during construction of the Project. *[Applicable Finding or Condition No.: Condition 28]*

OBJECTION: This request seeks information that is confidential for homeland security reasons.

47. All documents referencing or containing information regarding winterization plans provided to landowners affected by the Project, including but not limited to plan(s) developed. *[Applicable Finding or Condition No.: Condition 29]*

ANSWER: TransCanada/Keystone will have a winterization plan prepared prior to construction. The winterization plan will be provided to affected landowners if winter conditions prevent reclamation until spring. No documents related to winterization plans have been provided to landowners to date.

48. All documents referencing agreements reached with landowners, including but not limited to any agreements reached with landowners modifying any requirements or conditions established by the Commission in connection with the Project. *[Applicable Finding or Condition No.: Condition 30]*

OBJECTION: This request is overlybroad, unduly burdensome, and not likely to lead to the discovery of admissible evidence under SDCL § 15-6-26(b).

49. All documents containing information regarding compliance by shippers with crude oil specifications. *[Applicable Finding or Condition No.: Condition 31]*

OBJECTION: The identity of Keystone's shippers and the terms of their contracts have substantial commercial and proprietary value, are subject to substantial efforts by Keystone to protect this information from actual and potential competitors, and are required to be maintained on a confidential basis pursuant to the terms of the contracts between Keystone and its shippers and Section 15(13) of The Interstate Commerce Act. Until Keystone commences operations on the Keystone XL Project and shippers begin tendering crude oil for shipment, shippers do not "comply" with the crude oil specifications in Keystone's tariff.

50. All documents containing information regarding assessments performed in connection with your activities in "high consequence areas", including but not limited to documents referencing efforts by you to comply with 49 C.F.R. Part 195, and any communications or consultations with the South Dakota Geological Survey, the Department of Game Fish and Parks ("SDGFP"), affected landowners and government officials. *[Applicable Finding or Condition No.: Condition 34]*

OBJECTION: To the extent that it seeks information about High Consequence Areas, this request seeks information that is confidential and Keystone is required by PHMSA to keep this information confidential. This request seeks information outside the jurisdiction of the PUC.

51. All documents where you have identified hydrologically sensitive areas as required by Condition Number 35. *[Applicable Finding or Condition No.: Condition 35]*

ANSWER: Based on the current route in South Dakota which was evaluated in the Department of State FSEIS (2014) in Sections 3.3 and 4.3, the High Plains Aquifer in southern Tripp County is the only vulnerable and beneficially useful aquifer identified as being crossed by the Project in South Dakota.

52. All documents containing information regarding noise-producing facilities in connection with the Project, including but not limited to any studies conducted regarding noise levels, and any noise mitigation measures. *[Applicable Finding or Condition No.: Condition 39]*

ANSWER: Responsive documents marked as Keystone 0592-0599 are attached.

53. All documents containing information regarding TransCanada's or its Affiliates' efforts to comply with protection and mitigation requirements of the US Fish and Wildlife Service ("USFWS") and SDGFP with respect to any endangered species. *[Applicable Finding or Condition No.: Condition 41]*

ANSWER: *See* the Biological Assessment and Biological Opinion contained in the State Department Final EIS and Final Supplemental EIS.

54. All documents containing information or details regarding location of drain tiles, including but not limited to all documents containing information regarding the potential for drain tiles to operate as conduits for contaminants in connection with construction or operation of the Project. *[Applicable Finding or Condition No.: Condition 42]*

ANSWER: There are no known drain tile crossings in South Dakota.

55. All documents referencing or containing information concerning cultural or paleontological resources along the Project route, including but not limited to all documents identifying cultural and paleontological resources, consultations and communications with the Bureau of Land Management and Museum of Geology at the South Dakota School of Mines and Technology. *[Applicable Finding or Condition No.: Condition 44]*

ANSWER: Cultural resources survey reports are listed in Section 3.11 of the Department of State FSEIS (2014), with results of the SD surveys detailed in Table 3.11-3. The Unanticipated Discovery Plan for cultural resources can be found within the Programmatic Agreement in Appendix E of the Department of State FSEIS (2014). The paleontological survey reports are listed in Table 3.1-4 of the FSEIS, with results of the SD surveys detailed in Table 3.1-5. The paleontological monitoring plan for South Dakota is not being produced because it is confidential/privileged information. There were no consultations with BLM or the Museum of Geology at the South Dakota School of Mines and Technology for the Project route in South Dakota.

56. The incident reports for each and every spill or leak related to a pipeline operated by TransCanada and its Affiliates since January 1, 2010. *[Applicable Finding or Condition No.: Findings 12(2)-(3), 41-45, 47, 103; Conditions 32-38]*

OBJECTION AND ANSWER: This request is overlybroad and unduly burdensome. Without waiving the objection, documents attached as Keystone 0774-0785 are responsive to this request.

OBJECTIONS

The objections stated to Dakota Rural Action's Request for Production of Documents were made by James E. Moore, one of the attorneys for Applicant TransCanada herein, for the reasons and upon the grounds stated therein.

Dated this 6th day of February, 2015.

WOODS, FULLER, SHULTZ & SMITH P.C.

By _____
William Taylor
James E. Moore
Post Office Box 5027
300 South Phillips Avenue, Suite 300
Sioux Falls, SD 57117-5027
Phone: (605) 336-3890
Fax: (605) 339-3357
Email: Bill.Taylor@woodsfuller.com
James.Moore@woodsfuller.com
Attorneys for Applicant TransCanada

CERTIFICATE OF SERVICE

I hereby certify that on the 6th day of February, 2015, I sent by e-mail transmission, a true and correct copy of Keystone's Responses to Dakota Rural Action's First Request for Production of Documents, to the following:

Bruce Ellison
518 6th Street #6
Rapid City, SD 57701
belli4law@aol.com
Attorney for Dakota Rural Action

Robin S. Martinez
Martinez Madrigal & Machicao, LLC
616 West 26th Street
Kansas City, MO 64108
robin.martinez@martinezlaw.net
Attorney for Dakota Rural Action

_____
One of the attorneys for TransCanada

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

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	)	Docket 14-001 **TESTIMONY OF EVAN VOKES ON BEHALF OF DAKOTA RURAL ACTION**

Statement for the South Dakota Public Utilities Commission

The current management of TransCanada is in my opinion, a very significant technical threat to the safety of pipelines, including the proposed KXL pipeline through South Dakota and Nebraska.

I have a Master's Degree in Materials Engineering and worked for five years at TransCanada Pipelines; I witnessed both firsthand and from the sidelines the effects of their political/business decisions that flew in the face of common sense and science. In 2012, I was terminated without cause, as I was pointing out how wrong the business model followed by management of this corporation was and what a threat to public safety they were. The reason why an employee such as myself knows so much is that my small department of 12 engineers operated as a small Engineering Specialist company within the corporation, although project managers did not have to engage us for projects. Our department owned many of the engineering specifications and my name appeared on several of these specifications, or I was a contributor to many core engineering specifications. As such, I saw the successes but more frequently, we saw the failures and firefighting required when a pipeline project was in trouble. I have given testimony on the public record before the Canadian Senate where I answered the question; what I did to stop the problem. The fact is the problem has not stopped because the same players are carrying on the same way.

Currently, in 2015, I have had to help another ex-TransCanada Pipelines employee that was being harmed by TransCanada and the National Energy Board after he spent a year bringing forward major code violations that were an immediate threat to the public, yet in the recent Reuters stories, in their official communications, TransCanada and the National Energy Board maintain the farcical position that nothing is wrong. As I have seen the evidence, TransCanada's and the regulators response to an employee's serious engineering allegations were not dealt with for over a year and some still are not. It reminds me of the recent crash landing of an AirCanada Flight in Halifax Nova Scotia, where the political powers called an obvious crash landing that destroyed a large commercial jet, "a hard landing" regardless of the fact that the plane contacted terra firma remote to the runway.

I have presented a lot of material over the last few years that is preserved as part of the permanent public record, but for now I want to start with a rupture of a new generation pipeline called the North Central Corridor Buffalo West section, consisting of 30 miles of 36 inch pipe that was the

best technology the world can expect to see from a technical engineering perspective. This TransCanada pipeline provides fuel gas to the Oil Sands extraction in Fort McMurray Alberta and is very relevant as it ruptured in October 2013 as a result of cost/schedule decisions that were made by my peers and project managers in August 2008, and the regulators not dealing with a major problem and falsification of documentation with this line in 2009. The last insult to public safety was after the line ruptured, when the regulators and TransCanada reported that no one was within 30 miles of the site – notwithstanding the existence of documentation showing that people were literally standing on rupture site hours before it blew up.

Notwithstanding all the other construction deficiencies, the long lead materials were understrength and failed pressure testing before construction commenced months later. Ordering new materials for large diameter pipelines takes quite a while. I did not know that the failed materials were used in North Central Corridor to preserve the construction schedule until PHMSA flagged expanded fittings on the Keystone Phase II expansion. When I was shown pictures of the metallographic cross sections of both Buffalo West and Keystone failed fittings in 2010, it was obvious that the necessary quality control steps were also ignored when the Keystone fittings were ordered. Approximately 600 of these fittings are in service in United States and an equal number in Canada. Neither PHMSA nor the National Energy Board have made a positive action requiring replacement of these substandard fittings since discovering them, regardless of the fact that this problem has now resulted in a rupture on North Central Corridor Buffalo West. From a purely metallurgical pipeline point of view there is no functional difference between an oil or gas pipeline. The only difference is in how the fluid is moved mechanically. However, the use of substandard materials have a further meaning in that the Keystone phase II pump-stations did not meet the minimum federal regulations or engineering design for construction, and the PHMSA special permit for construction which required mandatory quality control was not adhered to.

I had a history of involvement with Keystone from initial construction that persists to the present day as engineering work persists for incredibly long periods. I was heavily involved in the construction of Keystone in Canada for the 500 miles of new construction, spending over one month directly on-site for the automated ultrasonic inspection of girth welds. On Keystone Phase II we were forced into allowing the Keystone project to allow substandard inspection techniques at the direction of the then-Director of Engineering.

While my primary responsibility was Non-Destructive Examination, because of my flexibility afforded with respect to education and industry experience, my engineering opinions were engaged for materials and welding engineering consultations, information requests, and nonconformance dispositions. As such, my Engineering group had a ring-side seat to a most spectacular event, the deterioration of quality management practices in both Canada and United States on a pipeline with mandatory quality control. My peers and I were constantly overruled by management on code violations and other technical matters (which I can prove), while the Keystone project became a legend in inefficiency. Some of the examples of unskilled practice of engineering I saw submitted to regulators have had serious repercussions – yet no one has been held accountable. After fighting many levels of managers, I wrote a response to an invitation from CEO Russ Girling, who was surprised these projects were working out so poorly. I pointed out that many of these events were no surprise to me and my peers, but just the way science was working itself out independently of the “learned” opinions and business practices of managers.

I can assure you that trying to correct a management path at TransCanada was career-ending as I pointed out the misdeeds of company officials and managers. I sought the truth and made a series of information requests to the National Energy Board while I was still employed by TransCanada that resulted in my procuring documents that show clearly that TransCanada has too close a relationship and direct influence with regulators so as to allow TransCanada to ignore law. This situation has allowed and will continue to allow TransCanada to construct its pipelines in a manner which too often ignores quality control issues necessary for the pipeline to be capable of being operated in a manner which would be safe for the environment and in compliance with applicable laws, regulations and permit conditions. Indeed, PHMSA is aware of many of these misdeeds, such as entire pipeline sections that do not have a legitimate code-compliant inspection, yet the pipelines remain in service.

Significantly, and for example, the information requests reveal a problem with the original SNC Lavalin Engineering design of the Keystone pumpstations. I found out about this problem in 2011 when a TransCanada lawyer sent me information showing that the corporation victimized an inspector for a practice of contractor self-inspection. It was the Keystone project, and TransCanada lawyers that told the regulator they were implementing contractor self-inspections in a PowerPoint presentation months earlier. When things went wrong, they blamed the inspectors for a management policy for which I can produce evidence of both occurrence and response. There are many engineering problems with Keystone that persist unrectified to the present day, such as salt induced microcracking on large amount of pipe that was ordered for the Keystone XL section. I can show the pictures but I can't tell exactly which pipe it is.

If I had to pick an immediate threat to public safety, I could not, nor could anyone else; but I can tell you that there are hundreds of incidences of code violations and forbidden construction practices by TransCanada that are buried in ditches across North America and figuratively in files that many people take home containing proof, in case they become problems. Many of these problems are immediate danger issues waiting for something to disturb them before they propagate into failed pipelines, but they may never become problems.

On the Gulf Coast section of Keystone, the violations were obvious and were documented by landowners, activists and PHMSA, just the same as they always are. For instance, TransCanada maintains that they are just doing due diligence by removing 200 anomalies (which is a politically correct way of saying substandard workmanship) from the pipeline as sections. I have been on larger pipeline jobs here no anomalies had to be cut out, as the defects are reflective of construction contractors not following the code of construction and inspectors not enforcing rules. When TransCanada told everyone that the removal was due diligence, it wasn't. Removal of the sections containing those 200 anomalies have now resulted in 400 welds that are not pressure tested, which is the fundamental test to make sure the pipeline is safe to operate. After I was dismissed from TransCanada a former work peer forwarded a TransCanada Keystone project post mortem and ad nauseam, the PowerPoint repeats the same endless message that things will get better on the Keystone Gulf Coast project with all the lessons learned on Keystone I, II and Bison. If so, why was Keystone Gulf Coast just the same, and how will this renamed section of Keystone XL be better?

In the post mortem presentation, there were pictures where the pipe has fallen off the skid piles, and many references to substandard inspections, but additionally there are TransCanada internal reports showing incompetence in inspection that I did not write.

Keystone Gulf Coast pipe was photographed by landowners and activists with an extensive list of problems as follows: pipe falling off the skid piles or ready to fall off skid piles, heavy equipment marks consistent with collision with the pipes, serious coating damage present from the pipe not being handled according to minimum standards, repair coatings were shown as incorrectly applied, and extensive evidence of pipes installed on top of large rocks. The Non-Government Organization, Public Citizen, has hundreds of photographs of code violations and even the Houston Chronicle printed pictures of a code violation holding up construction activities in a manner that would soon be resulting in damage to the pipe. Humorously, the subject of the Houston Chronicle news article covered delays to the Keystone pipeline schedule while they were repairing the very subject matter of the photograph.

During Keystone Gulf Coast construction, I had written a letter to PHMSA admonishing them for substandard engineering oversight on Gulf Coast, which then issued warning letters for substandard practices to TransCanada. Obviously the same practices that CEO Russ Girling wrote about to us employees in 2011 are still at play – so how has any of this improved over the years before, during and after my presence at TransCanada? For all the promises, what has PHMSA done to proactively stop substandard pipeline from being buried? Keystone Gulf coast should have been pressure tested a second time, as it is now high risk.

The classic example is the 2010 Bison Wyoming to North Dakota project, where TransCanada directors called us into the pipeline project after the quality management people left the project for unknown reasons. It was a technical disaster and even PHMSA saw what a joke the inspection was as evidenced by the PHMSA inspection reports. There was so much wrong that it was going to be death by a thousand cuts. Essentially the environmental concerns were so overwhelming that the project could not maintain quality control measures. In response, TransCanada simply let the contractor do its own thing. The pipe was installed with dents, gouges, and welds that did not meet the minimum code requirements so they could avoid nesting schedules of owls and other environmental concerns; but PHMSA once again said nothing. During the initial phases of remediation after this pipeline was put into service, I was asked three times to write letters to PHMSA stating that dents were not associated with welds when the evidence in fact showed that dents were associated with welds. There is a strong documented history that the pressure by TransCanada managers to write a favorable report only stopped when the pipeline ruptured.

PHMSA's failure report of this pipeline is a travesty of engineering as it was a failure of inspection under the mandatory quality assurance system that led to the pipe being struck by a large excavator four times in one mile that caused the rupture. There are so many more lethal problems left with the line that a reoccurrence is likely. The report fails to address the adjacent weld that tore out as it was one of the welds with insufficient inspection. It is not relevant that PHMSA report could not conclude the metallurgical mechanism of the gouge that caused the failure. Gouges are lethal defects in any pipeline code. As part of my effort to stop the madness, I had even gone as far as to send TransCanada internal audit committee very clear pictures of Bison code and safety violations that were sanctioned by project management; yet the committee claimed the pictures were of

insufficient resolution. It could not be any clearer that what I saw and photographed, and PHMSA reported on, were all sanctioned by project management personal, who were all promoted after the pipeline ruptured.

All of these and many more problems are forbidden by TransCanada policies, but in reality are sanctioned by managers as low risk problems that benefit project cost and schedule. These sanctioned activities benefited managers before, during, and after my tenure at TransCanada. Many of these decision makers are non-professional or are professionals that have made very unskilled engineering decisions. Regardless of who made the decision, science does not care but rather asks its own questions based on matters of fact. TransCanada loves putting forward information far from the truth, but my story has been confirmed multiple times by both science and the regulators – refuting the position TransCanada takes in public.

As a comparison, you do not have to believe in gravity for it to work. Similarly, TransCanada's "experts" will tell the Commission that my opinion has no relevance. However, this does not change the fact that TransCanada is a corporation with no responsible direction. This is the future South Dakota faces as it makes the decision to permit construction of the Keystone XL Pipeline.

I would be happy to **testify before** the South Dakota Public Utility Commission and to produce evidence to support my claims, as this is a public safety issue that will not be going away anytime soon.

EVAN VOKES

April 2, 2015
Date

Exhibit 4

Year	Reference ID	Date	Facility	State	Substance	Volume	Unit	Description	
2010		2010-may-21	Carpenter PS	South Dakota	Crude	5	gallon	Failure of a 1½" below ground fitting connected to the mainline isolation valve.	
2010		2010-jun-23	Rosewell PS	South Dakota	Crude	100	gallon	during maintenance from a small fitting attached to the sump pump	
2010		2010-aug-10	Freeman PS	South Dakota	Crude	2	gallon	Failure of a 1" fitting attached to the pig trap receiver.	
2010		2010-aug-19	Hartington PS	Nebraska	Crude	10	gallon	Failure of ½" above ground fitting.	
2011	209437	2011-Jan-05	Ferney PS	South Dakota	Crude	5	gallon	Pump #2 casing and unit piping was found to be covered with a film of oil. Unit was isolated for further investigation on source of oil. Containment and remediation procedures implemented	
2011	209521	2011-Jan-07	Severance _2_1 valve	Kansas	Crude	5	gallon	Downstream 6 inch riser on remote main line block valve developed a small leak around the valve packing. Oil was cleaned up on pipe and absorbent materials applied to valve and associated piping. Initial remediation actions were implemented and site was stabilized for the evening	
2011	209562	2011-Jan-08	Freeman PS	South Dakota	Crude	1	gallon	OIL WAS DISCOVERED COMING OUT OF THE INSULATION OF THE PUMP BODY DRAIN VALVE ON THE OUTBOARD SIDE OF UNIT 4 AT FREEMAN PUMP/PIG STATION. UPON REMOVING THE INSULATION IT WAS DISCOVERED THAT THE INSDE VALVE OF THE TWO DRAIN VALVES WAS LEAKING FROM THE UPSTREAM SIDE.	
2011	210062	2011-Jan-26	Hope PS	Kansas	Crude	1.5	gallon	During Sump Commissioning a valve was opened to fill the sump tank. As the tank was being filled it was noticed that oil was backing up on the pump seal flush drains. Oil ran out of Unit 1 pump seal chamber onto the pump base and weeped over the front end of the base. Oil ran out of Unit 2 pump seal chambers onto the pump base and was contained. Oil backed up into the seal chambers on Unit 3 but not onto the base. We shut down the sump filling and identified the leak source and began clean up allowing the seal chambers to drain out we isolated the seal flush lines to continue the sump commissioning	
2011	210233	2011-Jan-30	Turney PS	Missouri	Crude	10	gallon	Outboard seal on Pump #2 failed resulting in approximately 10 gallons of oil being discharged on the ground, the pump, pump base and associated piping. Unit was isolated for further investigation and clean up. Containment and remediation procedures implemented	
2011	210615	2011-Feb-09	Hope PS	Kansas	Crude	4	gallon	On Final inspection before leaving the pump station I discovered oil on the pump skid of Unit 3 at Hope PS. Discovering the (pump suction side drain line) root valve to have oil on the pump side of the body. The amount of oil looks to be about 3 1/2 to 4 gallons with about 1 1/2 gallons leaving the pump skid.	
2011	210697	2011-Feb-11	David City PS	Nebraska	Crude	75	gallon	after repacing mechanical seal on outboard of unit 3 at david city a start was put in unit. unit went down on a hi hi on outboard pressure transmiter. a technician then tried to bleed the transmiter of oil. there was no oil in the transmiter to bleed. the unit was reset and another start was put in the unit. the unit ran for 1 minute and the outboard seal failed releasing oil	
2011	210803	2011-Feb-15	Hope PS	Kansas	Crude	2	gallon	Found oil underneath Hope Pump Unit 1 leaking from the discharge drain valve on the pump 1" bleed valve. This amounted to approximately 1 1/2 gallons of crude oil on the pump skid. Isolated the Unit pump and looking around the site discovered a 3" ball valve on Unit 1 suction side drain valve to have a small leak of crude oil from the bonnet and bolted body area not the piping flanges. Station Inlet first 3" drain valve to also have a leak from the bonnet area of the valve. This amounted to approximately 1 quart of crude oil on the site rock below the valve.	
2011	210951	2011-Feb-17	Rock PS	Kansas	Crude	4.5	gallon	A Station drain valve was discovered leaking oil from the bolted body connection.	
2011	211479	2011-Mar-09	Luvern PS	Nebraska	Crude	2	gallon	A leak occurred on the thermal relief pipe loop around the pump suction valve. The leak was at the downstream gasketed flange of the thermal relief device. Aproximately 2 gallons of oil in the immediate vacinity of the suction valve. surface rock and snow was wetted with oil	
2011	211685	2011-Mar-16	Seneca PS	Kansas	Crude	504	gallon	Technician was dispatched to site to investgate SDL on Pump #4. Pump and unit piping were found to be covered in oil. Unit was isolated to investigate source of oil.	
2011	212568	2011-Apr-11	Turney PS	Missouri	Crude	4	cups	Discovered leak out of the vent on mainline block valve at Turney station injected grease in the emergency fitting removed vent and installed 3/4" valve in place of vent	

2011	219941	2011-Apr-26	Ludden PS	North Dakota	Crude	4	cups	Ludden station, discharge relief valve, 3/4" nipple leaking oil. 1" piping has seen vibration, possibly causing leak.	
2011	220020	2011-Apr-28	Rock 2A Valve	Kansas	Crude	2	gallon	clouding of the rock around the inlet side blow down valve stinger. observed crude oil residue and oily rock just below the immediate grade. Reviewed the area valves and flanges but no signs of leaks.	
2011	220309	2011-May-07	Ludden PS	North Dakota	Crude	16800	gallon	Oil release at Ludden pump station. Line shutdown after indication of station pressure loss and call from PDL.	
2011	220877	2011-May-25	Rosewell PS	South Dakota	Crude	2	gallon	Roswell station, A4 suction pressure transmitter, 1/2 inch nipple leaking where threaded into manifold	
2011	220963	2011-May-28	Severance PS	Kansas	Crude	10	gallon	Oil release at Severance pump station. Station was ESD and isolated	
2011	222206	2011-Jul-06	Turney PS	Kansas	Crude	0.5	gallon	At the start of a planned excavation around the 3 valve cluster at Turney PS a sheen of oil and droplets were witnessed in the excavation.	
2011	222237	2011-Jul-07	Seneca PS	Kansas	Crude	7	gallon	On site to remove NP pump for retrim job. While draining down pump failed to open a valve to facilitate draining of pump piping. When crew cracked flange it allowed remaining oil to leak onto skid with approx. 3 reaching the ground (total of 7 gal.) before it could be contained.	
2011	223197	2011-Aug-02	Turney PS	Kansas	Crude	5	teaspoons	Technician noticed small amount of oil (less than 2 tablespoons) had seeped from a gasket on the station discharge piping and dripped on the rocks below.	
2011	223728	2011-Aug-12	Burns PS	Kansas	Crude	2	cups	Will draining water off the valve yoke at Burns Station on MOV 0204 the valve packing had leaked 2qt of crude oil into the yoke	
2011	225968	2011-Mar-11	St Paul PS	Missouri	Crude	1	teaspoons	While performing facility check at St Paul Pump Station Unit 2 (A2-MPM-02) small oil stain on skid below discharge pump flange. crude oil has been weeping from Pump flange side. New Gasket installed	
2011	229220	2011-Dec-06	Edinburg PS	North Dakota	Crude	4	cups	While inspecting the Rexa control valve, small amont of oil on the ground below less than a quart	
2012	232758	2012-Mar-26	Rosewell PS	South Dakota	Crude	10	teaspoons	while doing routine morning walk around. crude oil on one of the vents of the discharge piping between the rexa and the check valve. seeping at certain harmonics from a threaded connection on the vent fabrication. A	
2012	234766	2012-May-15	Cushing	Oklahoma	Crude	0.05	gallon	During a Routine Inspection of the Cushing Meter Station, the technician found that the upstream flange on the Pressure Control Valve was weeping oil onto the support for the valve. The volume of oil is minimal and has not left the base of the support. replace the gasket on the upstream side of the PCV.	
2012	236179	2012-Jun-18	Seneca PS	Kansas	Crude	10	gallon	While bringing A4 back into service after bracing work there was a small amount of oil released onto the pump and skid. It is suspected that the release was due to oil backing up in the drain line and then coming up out the seal covers. All oil was recovered and station was returned to normal operations	
2012	236542	2012-Jun-25	Carpenter PS	South Dakota	Crude Oil	4	cups	While performing a facility inspection at Carpenter pump station a leak was discovered on unit 4 suction pressure transmitter. Unit was placed in local and isolation valve was closed to stop fitting from dripping product. approximately 1 quart of oil had leaked onto ground. Oil was cleaned up and oily rock was placed into 55 gallon drum for disposal. Ralston fitting appeared to be OK but was replaced anyway then unit was turned back over to OCC.	
2012	237402	2012-Jul-13	Carpenter PS	South Dakota	Crude	6	cups	OCC called stating that we had a seal Inboard seal HI HI pressure on unit 3 at Carpenter. Once onsite discovery that approximately 1 ½ quarts of oil had leaked out and was totally contained on the pump skid. Oil was cleaned up and rags were placed in waste drums. Unit was placed into Local removing it from service until seal is replaced.	
2012	238538	2012-Aug-08	FREMA + 12 Valve	South Dakota	Crude	4	cups	Vapor detection contractor was conducting testing on the valve body drain line through the use of their patented innoculent.	
2012	238893	2012-Aug-15	Patoka	Illinois	Crude	3	gallon	After completing Vibration testing noticed oil on the relief skid between the upstream hand valve and the M&J relieif valva south run. Isolated south run drained piping to sump. cleaned up piping and picked up some stained rock.	
2012	241758	2012-Oct-10	Cushing	Oklahoma	Crude	2	gallon	Technician was doing a walk through of the facility, noticed a small amount of oil on MLV 104 and on the ground around it. Upon further investigation it was determined the the oil had came out of the condensate weep hole on the stem of the valve when the valve was opened to flow through Cushing.	
2013	254716	2013-Apr-23	Cushing	Oklahoma	Crude	5	gallon	During maintenance activity on meter bank2 meter. Approximate amount spilled is three to five gallons	

2013	256402	2013-May-13	Ponca City PS	Oklahoma	Crude			During the US Keystone Sulzer Pump Drain removal project at Ponca City, Oklahoma, crews discovered a broken small bore clamp on Temperature Transmitter 101 & 102. These clamps were installed as part of the Bracing Reliability Program.	
2013	258211	2013-Jun-06	Edinburg PS	North Dakota	Crude	1	gallon	While starting pump 4 noticed oil coming from out board seal area. Called OCC and ESDed the pump about 1 gallon of crude came out of outboard seal area.	
2013		2013 Dec 20	Winnsboro	Texas	Crude	3	Ounces	Today during line filling of the Winnsboro Pump station a leak occurred on the threaded body bleed of a manual drain valve on the station discharge piping. Approximately 3 ounces leaked out. The leak was corrected by tightening the body bleed fitting and cleanup performed immediately. It was discovered during inspection of piping during the line fill operations.	
2014		2014 Jan 07	Bryan PS	Oklahoma	Crude	0.5	Gallon	a minor leak was discovered. The pump station was wet commissioned on December 30, 2013 and the leak was not present when the facility was checked on January 6, 2014. A construction crew on site to complete punch list items discovered the approximately ½ gallon leak coming from a screwed body type 1 ½ inch valve. This valve is a body drain valve used to drain the gate valve body on the NPS 30 pig launcher valve. The screwed valve was tightened to stop the leak and cleanup commenced.	
2014		2014 Jan 24	Cromwell PS	Oklahoma	Crude	2	Teaspoons	On January 24th 2014 a drip was discovered on the 1 ½ " body bleed valve at the Cromwell Pump Station 3-valve cluster. The estimated volume released was two teaspoons. All impacted gravel was picked up and placed in a containment bucket. The valve was tightened and is scheduled for replacement	
2014		2014 Mar 19	Nederland	Texas	Crude	5	Gallon	Technician discovered a grease fitting dripping on a drain valve, at Nederland Delivery terminal. The 2" valve is the meter case isolation valve for draining meter #2300, meter bank #1	
2014		2014 Mar 26	Nederland	Texas	Crude	1	Cup	Less than one cup oil was found seeping from packing gland FE-2320. This was realized on close of day walk around a 18:57 hrs Completed clean up 21:19 hrs.	
2014		2014 Mar 27	Nederland	Texas	Crude	1	Cup	leak was found on meter (that is not in-service). Estimate leakage is around one cup or less released. The oil was seeping from the O-ring or gasket on the meter vent.	
2014		2014 Apr 12	Cushing 01A valve	Oklahoma	Crude	1	Pint	small release at Cushing 01A. The oil escaped from around the indicator on one of the two riser valves. A small amount of oil ran down the side of the valve, riser and on the gravel.	
2014		2014 Apr 15	Nederland	Texas	Crude	1	Ounce	Techs discovered a small release today Delta - 04A/downstream riser valve. The release came from around the stem on the needle valve assembly, below the pressure transmitter. The jam nut was found backed off and the stem packing nut was loose, allowing the oil to release around the valve stem	
2014		2014 Jun 03	Cushing	Oklahoma	Crude	0.5	Gallon	a small release was notice at the downstream flange of PCV-7218 (Approximately .5 gallon). Product appeared to be relieving at the flange through the gasket. Most of the product was contained on the concrete support for this valve. A small amount ran down the side to the ground.	
2014		2014 Jun 23	Cushing	Oklahoma	Crude	2	Gallons	a minor release at Cushing Terminal during wet commissioning activities.	
2014		2014 Jun 26	Ponca City PS	Oklahoma	Crude	3	Gallons	mechanical failure occurred on Ponca City Pump Station Unit #3 outboard. Approximately 3 gallons of crude oil escaped onto the pump skid. No oil hit the ground.	
2014	12499	2014 Jul 07	Nederland	Texas	Crude	1	Gallon	a small crude oil release at Nederland Delivery Terminal. The oil escaped from a meter run control valve on Meter Bank #1, run #4. The oil has ran down the valve, below the meter bank and onto the gravel/soil below.	
2014	2657	2014 Jul 09	Bryan PS	Oklahoma	Crude	1	Pint	small crude oil release at Bryan Pump Station on MOV 103. The oil escaped from around the threads of a loose grease fitting and ran down the valve, onto the soil below.	

2014	12819	2014 Jul 09	Nederland	Texas	Crude	<1	Gallon	small crude oil release at Nederland Delivery Terminal, on MOV 2201; pig receiver trap bypass valve. It appears the stem packing was leaking inside the valve stem cover and recent heavy rains floated the oil out of the valve stem cover. The oil ran down the side of the valve, with a very small amount dripping onto the soil below.	
2014	14270	2014 Jul 24	Nederland	Texas	Crude	1.5	Barrels	Nederland Tank Terminal, Valve 2201, a bypass valve on the mainline receiver pig trap. OCC was contacted and closed an upstream mainline valve to stop the leak.	
2014	14885	2014 Jul 29	Bryan PS	Oklahoma	Crude	20	Gallons	technician was performing an annual PM at Bryan pump station in Oklahoma on the sump tank levels which includes the rising of the level to test alarm set points, approximately 20 gallons estimated of oil was released out of unit #1 due to back up in the sump piping and the unit drain valve not being closed during the test.	
2014	15770	2014 Aug 10	Nederland	Texas	Crude	1	Ounce	Nederland MOV-2205, a 36 inch ball valve inlet to meter bank 2. The amount released is less than one ounce. Due to the location of the release being downstream of the pig receiver	
2014	15907	2014 Aug 12	Lufkin	Texas	Crude	4	Ounces	During Pigging Operations at Lufkin Pump Station, a small amount of Light Crude Oil constituting 3-4 ounces was released onto the soil immediately below the PIG Launcher Trap Closure Door. Pigging project team was in the process of the loading a PIG into the Receiver Trap. Construction team had laid plastic down underneath the Closure Door and the Catch Basin was positioned atop the plastic. Following the PIG Trap Drain and LO/TO Isolation, the Door was cracked open to let residual oil near the door fall into the Basin and be sucked up by a vacuum truck. The minor turbulence of the flow from the bottom of the door splashed some oil back behind onto the plastic sheeting. A small hole was torn in the plastic by the hook-up valve stem on the end of the Catch Basin. The oil made its' was thru the hole and onto the ground.	
2014	17307	2014 Aug 26	Ferney PS	South Dakota	Crude	5	Ounces	6" discharge riser, 6" valve, button head grease fitting leaked 5 OZ oil on pipe, and ground.	
2014	17183	2014 Aug 27	Cushing	Oklahoma	Crude	4	Ounces	Approx 4 ounces of crude oil seeped from a flange within the prover piping at Cushing Delivery Terminal. The oil escaped from the upstream flange of MOV control valve 2293.	
2014	17312	2014 Aug 27	Centralia PS		Crude	2	Gallons	While working on unit three the inboard on unit 4 leaked enough oil past the mechanical seal to fill the piping from the closed seal drain valve to the bootom of the seal housing and spilled approx. 8 quarts of oil on the skid. Oil did not reach the ground.	
2014	18358	2014 Sep 15	Cushing	Oklahoma	Crude	4	Ounces	The PSV on MOV 7291 had a plug that was not tight,and it caused a minor leak (4.oz) onto valve below. No oil touched the ground. The leak was stopped by tightening the plug	
2014	18440	2014 Sep 15	Saint Paul PS	Missouri	Crude	1	Ounce	during a weekly inspection technician noticed a small oil streak coming from the high point vent on top of unit 3 suction piping	
2014	18789	2014 Sep 18	Niagra PS	North Dakota	Crude	0.5	Gallons	During station reload, Immediately upon noticing oil coming out from seal cover the seal drain was opened and oil going on to skid was stopped.	
2014	19869	2014 Oct 2	Lucas Terminal	Texas	Crude	3	Gallons	During morning inspection of Meter bank 2, a small leak coming from the packing gland on the top of the meter. Approximately 3 gallon of crude oil leaked onto the ground.	
2014	21695	2014 Oct 29	Lufkin PS	Texas	Crude	0.5	Gallons	a release of approximately one-half gallons of crude occurred at a discharge Pressure Transmitter stainless flex pipe, which released at the bottom end of the loop;	
2014	22385	2014 Nov 10	Nederland	Texas	Crude	<1	Cup	found oil on top of meter. No oil on the ground. One cup oil speep on equipment.	
2015	25799	2015 Jan 02	Middletown PS	Missouri	Crude	3	Cups	During Weekly inspection a very small amount of oil was noticed on the station bypass valve. Further inspection revealed the oil was coming from the stem extension vent. Approximatly 3 cups of oil was on the ground.	
2015	26018	2015 Jan 08	Salisbury PS	Missouri	Crude	0.5	Cups	1/2 cup of oil discovered under flange at Salisbury pump station on flange on MOV 0203.	

2015	26404	2015 Jan 13	Cushing	Oklahoma	Crude	4	Gallons	During routine inspections it was discover MOV 204 had leaked oil onto the valve and surrounding piping. It was estimated 4.5 gallons was present with less than .5 on the ground.	
2015	26690	2015 Jan 16	Cushing	Oklahoma	Crude	2	Ounces	2 inch drain ball valve experienced a leak from the valve body due to losen bolts on body of valve. Valve dripped approximately 2 oz of crude on the rocks below. Valve was not actively leaking when found.	

Year	Reference ID	Date	Facility	Substance
2010	200202	7-Jul-10	Pump Stn 25 (Portage La Prairie)	Crude
2010	200206	7-Jul-10	Pump Stn 25 (Portage La Prairie) + 25 km	Crude
2010	200363	10-Jul-10	Pump Stn 22 (Crandall) + 26.4 km	Crude
2010	200363	10-Jul-10	Pump Stn 22 (Crandall) + 39.7 km	Crude
2010	200363	10-Jul-10	Pump Stn 21 (Moosomin) + 31.8 km	Crude
2010	200363	10-Jul-10	Pump Stn 21 (Moosomin) + 42.5 km	Crude
2010	200400	12-Jul-10	Hardisty Terminal	Crude
2010	200793	16-Jul-10	Elm Creek Pigging Stn	Crude
2010	200795	16-Jul-10	Elm Creek Pigging Stn	Crude
2010	200798	16-Jul-10	Elm Creek Pigging Stn	Crude
2010	200891	19-Jul-10	Pump Stn 25 (Portage La Prairie)	Crude
2010	200963	20-Jul-10	Pump Stn 21 (Moosomin) + 30 km	Crude
2010	201342	26-Jul-10	Hardisty Terminal	Crude
2010	201709	27-Jul-10	Pump Stn 17 (Regina)	Crude
2010	203569	26-Aug-10	Pump Stn 7 (Monitor)	Crude
2010	206857	20-Oct-10	Pump Stn 25 (Portage La Prairie) + 9.9 km	Crude
2010	207727	8-Nov-10	Pump Stn 26 (Carmen)	Crude
2010	207980	12-Nov-10	Pump Station 18 (Kendal)	Crude
2010	208257	20-Nov-10	Pump Stn 11 (Cabri)	Crude
2010	208287	19-Nov-10	Pump Stn 6 (Lakesend)	Crude
2010	208332	22-Nov-10	Hardisty Terminal	Crude
2010	208514	30-Nov-10	Pump Stn 15 (Caron)	Crude
2010	208869	9-Dec-10	Pump Stn 17 (Regina)	Crude
2010	208914	10-Dec-10	Pump Stn 19 (Grenfell)	Crude
2010	209179	18-Dec-10	Pump Stn 9 (Bindloss)	Crude
2010	209184	18-Dec-20	Pump Stn 19 (Grenfell)	Crude
2010	209217	20-Dec-10	Pump Stn 14 (Chaplin)	Crude
2010	209246	21-Dec-10	Pump Station 17 (Regina)	Crude
2011	209466	6-Jan-11	Hardisty Terminal	Crude
2011	209519	7-Jan-11	Pump Station 18 (Kendal)	Crude
2011	210390	28-Jan-11	Hardisty Terminal	Crude
2011	210386	2-Feb-11	Hardisty Terminal	Crude
2011	210658	10-Feb-11	Pump Station 22 (Crandall)	Crude
2011	210462	9-Mar-11	Hardisty Terminal	Crude
2011	210464	9-Mar-11	Pump Station 10 (Liebenthal)	Crude
2011	212155	22-Mar-11	Pump Station 24 (Wellwood)	Crude
2011	212093	23-Mar-11	Pump Station 8 (Oyen)	Crude
2011	212094	23-Mar-11	Pump Station 8 (Oyen)	Crude
2011	212193	30-Mar-11	Pump Station 8 (Oyen)	Crude
2011	220515	13-May-11	Hardisty Terminal	Crude
2011	220538	15-May-11	Pump Station 15 (Caron)	Crude
2011	220571	16-May-11	Pump Station 20 (Whitewood)	Crude
2011	220640	17-May-11	Hardisty Terminal	Crude
2011	220922	26-May-11	Pump Station 9 (Bindloss)	Crude
2011	221265	5-Jun-11	Pump Station 17 (Regina)	Crude
2011	221270	7-Jun-11	Hardisty Terminal	Crude
2011	221381	9-Jun-11	Pump Stn 19 (Grenfell)	Crude
2011	223157	1-Aug-11	Hardisty Terminal	Crude
2011	223171	2-Aug-11	Pump Station 12 (Stewart Valley)	Crude
2011	223326	3-Aug-11	Pump Station 15 (Caron)	Crude
2011	223415	5-Aug-11	Pump Station 8 (Oyen)	Crude
2011	223448	7-Aug-11	Pump Station 8 (Oyen)	Crude

2011	223450	7-Aug-11	Pump Stn 6 (Lakesend)	Crude
2011	223472	7-Aug-11	Pump Station 20 (Whitewood)	Crude
2011	223530	9-Aug-11	Pump Station 11 (Cabri)	Crude
2011	224694	6-Sep-11	Hardisty Terminal	Crude
2011	224866	11-Sep-11	Pump Station 12 (Stewart Valley)	Crude
2011	225081	15-Sep-11	Pump Station 16 (Belle Plaine)	Crude
2011	225843	30-Sep-11	Pump Station 9 (Bindloss)	Crude
2011	226139	13-Oct-11	Pump Station 9 (Bindloss)	Crude
2011	226619	25-Oct-11	Pump Station 16 (Belle Plaine)	Crude
2011	227194	8-Nov-11	Hardisty Terminal	Crude
2011	227227	9-Nov-11	Hardisty Terminal	Crude
2011	227690	21-Nov-11	Hardisty Terminal	Crude
2011	227849	25-Nov-11	Burstall Control Valve/Pigging Station	Crude
2011	228047	30-Nov-11	Elm Creek Pigging Station	Crude
2011	228540	12-Dec-11	Hardisty Terminal	Crude
2011	228822	12-Dec-11	Pump Station 21 (Moosomin)	Crude
2011	229075	22-Dec-11	Pump Station 16 (Belle Plaine)	Crude
2011	229190	30-Dec-11	Hardisty Terminal	Crude
2012	229303	5-Jan-12	Pump Station 13 (Herbert)	Crude
2012	229382	9-Jan-12	Hardisty Terminal	Crude
2012	229384	9-Jan-12	Elm Creek Pigging Station	Crude
2012	230096	24-Jan-12	Pump Station 16 (Belle Plaine)	Crude
2012	230577	3-Feb-12	Pump Station 21 (Mossomin)	Crude
2012	231183	16-Feb-12	Pump Station 24 (Wellwood)	Crude
2012	231361	21-Feb-12	Pump Station 8 (Oyen)	Crude
2012	232166	9-Mar-12	Pump Station 16 (Belle Plaine)	Crude
2012	232266	12-Mar-12	Pump Station 15 (Caron)	Crude
2012	232304	13-Mar-12	Hardisty Terminal	Crude
2012	232335	14-Mar-12	Portage La Prairie (PS 25) + 9.9 km	Crude
2012	232412	15-Mar-12	Stewart Valley (PS 12) + 31.2 km	Crude
2012	232516	19-Mar-12	Chaplin Pump Station (PS 14) + 32.8 km	Crude
2012	232517	19-Mar-12	Belle Plaine Pump Station (PS 16) + 6.4 km	Crude
2012	232518	19-Mar-12	Belle Plaine Pump Station (PS 16) + 33.1 km	Crude
2012	232519	19-Mar-12	Regina Pump Station (PS 17) + 26.4 km	Crude
2012	232520	19-Mar-12	Kendal Pump Station (PS 18) + 8.2 km	Crude
2012	232521	19-Mar-12	Kendal Pump Station (PS 18) + 32.8 km	Crude
2012	232552	20-Mar-12	Grenfell Pump Station (PS 19) + 26.2 km	Crude
2012	232554	20-Mar-12	Whitewood Pump Station (PS 20) + 24.7 km	Crude
2012	232641	20-Mar-12	Hardisty Terminal	Crude
2012	232807	27-Mar-12	Pump Station 17 (Regina)	Crude
2012	233236	9-Apr-12	Hardisty Terminal	Crude
2012	233337	12-Apr-12	Pump Station 15 (Caron)	Crude
2012	233389	13-Apr-12	Pump Station 17 (Regina)	Crude
2012	233400	13-Apr-12	Pump Station 22 (Crandall)	Crude
2012	233459	16-Apr-12	Pump Station 15 (Caron)	Crude
2012	233533	17-Apr-12	Hardisty Terminal	Crude
2012	235221	28-May-12	Pump Station PS 25 (Portage La Prairie)	Crude
2012	235242	29-May-12	Hardisty Terminal	Crude
2012	235401	31-May-12	Pump Station 15 (Caron)	Crude
2012	235599	5-Jun-12	Pump Station 21 (Moosomin)	Crude
2012	235890	11-Jun-12	Pump Station 15 (Caron)	Crude
2012	235917	12-Jun-12	Hardisty Terminal	Crude
2012	235968	12-Jun-12	Hardisty Terminal	Crude
2012	235968	12-Jun-12	Hardisty Terminal	Crude
2012	236186	18-Jun-12	Pump Station 19 (Grenfell)	Crude

2012	237375	12-Jul-12	Hardisty Terminal	Crude
2012	238775	14-Aug-12	Hardisty Terminal	Crude
2012	242789	25-Oct-12	Hardisty Terminal	Crude
2012	243627	13-Nov-12	Pump Station 6 (Lakesend)	Crude
2012	244020	20-Nov-12	Hardisty Terminal	Crude
2012	244020	20-Nov-12	Hardisty Terminal	Crude
2012	244020	20-Nov-12	Hardisty Terminal	Crude
2013	246824	10-Jan-13	Grenfell Pump Station 19	Crude
2013	247846	24-Jan-13	Belle Plaine Pump Station 16	Crude
2013	248429	1-Feb-13	Hardisty Terminal	Crude
2013	249250	11-Feb-13	Whitewood Pump Station 20	Crude
2013	252227	20-Mar-13	Hardisty Interconnects	Crude
2013	253639	9-Apr-13	Carman Pump Station 26	Crude
2013	255059	26-Apr-13	Hardisty Terminal	Crude
2013	257282	24-May-13	Hardisty Terminal	Crude
2013	260408	26-Jun-13	Hardisty Terminal	Crude
2013	259849	2-Jul-13	Monitor Pump Station 7	Crude
2013	259937	2-Jul-13	Hardisty Terminal	Crude
2013	260161	6-Jul-13	Caron Pump Station 15	Crude
2013	260507	10-Jul-13	Grenfell Pump Station 19	Crude
2013	266865	17-Sep-13	Lakesend Pump Station 6	Crude
2013	268880	6-Oct-13	Hakett Pump Station 27	Crude
2013	271558	29-Oct-13	Hardisty Terminal	Crude
2013	272095	6-Nov-13	Kendall Pump Station 18	Crude
2013	273490	24-Nov-13	Chaplain Pump Station 14	Crude
2013	274596	5-Dec-13	Cabri Pump Station 11	Crude
2013	275632	19-Dec-13	Hardisty Interconnects	Crude
2014	917	30-Jan-14	Hardisty Terminal	Crude
2014	1970	18-Feb-14	Kendall Pump Station 18	Crude
2014	3598	17-Mar-14	Hardisty Terminal	Crude
2014	5129	8-Apr-14	Portage La Prairie-Carman OP/L / ID: 3111	Crude
2014	5614	15-Apr-14	Oyen Pump Station	Crude
2014	7565	12-May-14	Hardisty Terminal	Crude
2014	9078	2-Jun-14	Carman Pump Station 26	Crude
2014	9204	3-Jun-14	Hardisty Terminal	Crude
2014	10849	19-Jun-14	Hardisty Terminal	Crude

Volume	Unit	Comments
0.01	Litres	Body Bleed Leak
0.01	Litres	Body Bleed Leak
0.5	Litres	Body Bleed Leak
	Litres	Body Bleed Leak
	Litres	Body Bleed Leak
	Litres	Body Bleed Leak
10	Litres	Spray during water draw operation
1	Litres	Drain Line Leak
0.5	Litres	Body Bleed Leak
0.5	Litres	Body Bleed Leak
0.01	Litres	Body Bleed Leak
1	Litres	Body Bleed Leak
1	Litres	Valve Stem leak
0.1	Litres	Loose threaded PSV
20	Litres	Release during bypass line removal
0.25	Litres	Threaded Pleeco fitting leak
0.01	Litres	Valve Stem Leak
0.01	Litres	Leak from the valve stem o-ring on Pump #3
1	Litres	Seal Failure
0.5	Litres	Body Bleed Leak
200	Litres	Line pressure caused thermal relief to open into sump with subsequent sump overflow
0.25	Litres	Leak on Coupling end from a 1/2 SS drain pipe on Pump #1
0.02	Litres	Drain Pipe Leak under Pump #1
0.11	Litres	Leaks on Drive-end & Non-drive end (Pump #1) and Drive-end (Pump #2)
0.1	Litres	Swagelok fitting Leak on pump
0.02	Litres	Swagelok fitting Leak on pressure transmitter
0.5	Litres	Bearing Housing Leak
0.005	Litres	Swagelok fitting Leak on Drain Pipe on Pump
22.7	Litres	Valve stem packing leak on Valve MOV-2040
0.01	Litres	Leak from the valve stem o-ring on Pump #3
0.47	Litres	Threaded connection between pressure transmitter and pipe
1	Litres	Valve stem packing leak on Valve MOV-2040
1	Litres	Unit 1 & 2 leaks into pump housing drain area
2	Litres	Valve stem packing leak on Valve MOV-2040
0.25	Litres	Fitting leak at end of closed body vent valve
2	Litres	Leak from undersized drain line below pump
2	Litres	Bearing isolator leaking on non-drive end of pump 5
2	Litres	Bearing isolator leaking on non-drive end of pump 4
0.5	Litres	Missing case temperature thermowell
40	Litres	Valve stem packing leak on Valve MOV-2040
10	Litres	Failed gauge on the pig receiver
0.005	Litres	Body bleed leak on #2 discharge valve
2	Litres	Valve stem packing leak on Valve MOV-2030
0.01	Litres	Improper tubing installation
0.02	Litres	Leak on suction side valve riser
0.01	Litres	Cracked weld on NPS 3/4 pipe below the MP#4 pump
0.01	Litres	Seepage of unit 2 pressure transmitter flange gasket
4	Litres	Packing stem leak on MOV-2231
40	Litres	Mechanical seal failure resulted in a release of 100 litres
1	Litres	Leak from cracked NPS 1 cam lock fitting
0.1	Litres	High nitrogen purge cause oil to overspray secondary containment
0.24	Litres	Premature removal of injection line while reflooding the station

0.35	Litres	Release from 1/4" vent line while plico valve was marginally open
5	Litres	Loose hose sprayed oil during refilling operation
4	Litres	High point vent hose end came out of sump
250	Litres	Stem packing leak on MOV 2014
0.05	Litres	Unit #2 body bleed nipple thread leak
2	Litres	Leak on the non-drive end of the pump skid
0.01	Litres	Weeping PSV after removing its bracing
0.2	Litres	Grease fitting ball check did not hold after re-lubrication
0.5	Litres	Body bleed leak on station suction MOV 101
0.06	Litres	Oil dripping from NPS 10 flange on the BP-03 recycle line
0.01	Litres	4 of 6 NPS 3/4 valves on NPS 2 bypass are weeping
3	Litres	Stem packing leak on MOV-2211
0.6	Litres	NPS 4 drain valve oil release because of missing NPS 1/4 plug
0.25	Litres	Receiver Barrel Door Dripped Oil onto concrete
0.1	Litres	Stem packing leak on MOV-2211 and MOV-2231
0.005	Litres	Pig launcher door seal leak
40	Litres	Lube Line Units Valves failed to seal
0.01	Litres	Stem packing leak on MOV-2281
0.01	Litres	Threading plug is leaking
3	Litres	Packing leak on Gibson Inlet Valve
0.25	Litres	Oil leaking from bottom of pig launcher door
0.5	Litres	Outboard pump seal failure
30	Litres	Leak from pig receiver door
0.5	Litres	Oil seeping from discharge piping connection
5	Litres	Oil seeping from drain line connector
0.1	Litres	Oil seeping from pleco plug
0.02	Litres	Trace oil seeping Unit A3 IB pump seal leakage housing
6	Litres	Gibsons Valve stem packing leak
0.25	Litres	Leaking blowdown valve
0.13	Litres	Leaking blowdown valve
0.5	Litres	Leaking blowdown valve
0.25	Litres	Leaking blowdown valve
0.25	Litres	Leaking blowdown valve
0.5	Litres	Leaking blowdown valve
0.25	Litres	Leaking blowdown valve
0.5	Litres	Leaking blowdown valve
0.5	Litres	Leaking blowdown valve
0.25	Litres	Leaking blowdown valve
2	Litres	Booster Pump # 3 Seal Leak
0.05	Litres	Loose fitting on NPS 4 drain line
2	Litres	Stem packing leak on MOV-2281
136	Litres	Oil from pig receiver overflowed the catch tray
0.2	Litres	leaks on three sulzer pump drive end drains
0.1	Litres	Stem leak fro NPS 1/2 swagelok valve
0.2	Litres	Trace oil leaking from NPS 2 drain pipe mod
0.25	Litres	Oil leaked flange due to thermal expansion
2	Litres	Stem seal vent leak
4	Litres	Valve packing leak on MOV-2040
0.01	Litres	Leak on launcher kicker valve #2
0.002	Litres	Body bleed leak on Unit A3 suction valve
0.01	Litres	Valve stem leak on MOV-203
2	Litres	Valve packing leak on MOV-2291
1.5	Litres	Valve packing leak on MOV-2521
1.5	Litres	Valve packing leak on MOV-2522
0.002	Litres	MLV 1011 - leak on NPS 1/2 pipe nipple

0.06	Litres	Oil Mist on Suction line to Mainline Pumps
0.5	Litres	Valve packing leak on MOV-2042
1	Litres	Accidental valve opening prior to full isolation
9	Litres	Both seal housings on LKSND #5 overflowed
1	Litres	Check vlave cover leaks on boosters 2
1	Litres	Check vlave cover leaks on boosters 3
1	Litres	Check vlave cover leaks on boosters 3
0.01	Litres	Valve stem leak
0.02	Litres	Leaking outboard seal
1	Litres	Valve stem leak due to thermal expansion
0.125	Litres	Injection pump discharge piping thread leak
3.78	Litres	Suction header maintenance leak
1000	Litres	Inboard and outboard seal failure on Unit #3
19	Litres	Oily water spillage during water draw callibration
19	Litres	Unpressurized leak on the pump discharge flange
7.6	Litres	Body bleed pleco plug located at the bottom of the valve.
0.05	Litres	Minor crude oil leak on 1 inch threaded fitting.
2000	Litres	Oil Release during tie-in preparation between Hardisty A and Hardisty B
0.125	Litres	Leak from the threaded base of the injection skid PSV.
0.1	Litres	1/2 swagelock fitting on the tubing on unit #1 MOV 1011 suction valve
0.5	Litres	Leak from inboard seal housing
0.05	Litres	Pin hole leak in the weld on a 90 degree NPS 1 fitting
0.001	Litres	Loose bolt on flow meter allowed oil to seep from the meter body
0.5	Litres	Leak from A2 inboard pump
0.015	Litres	Leak from stem
1	Litres	Suction Valve Thermal Relief Leak
1	Litres	Leak from gate valve body relief on MOV 2010
15	Litres	Plug leak
0.5	Litres	Seal on pump 3 failed
0.5	Litres	Leak path through the mounting base o-ring on 3 of 4 vertical pumps
5	Litres	Body bleed leak from a cracked valve under the launcher
0.1	Litres	Removal of boroscope while cleaning sump drain system
50	Litres	Leak from a loosening union
0.25	Litres	Body bleed leak from "Pieco" Mainline bypass valve MOV-0102.
0.015	Litres	Drip on pump #5 base
0.05	Litres	Drip on pump skid no. 1

Analysis of Frequency, Magnitude and Consequence of Worst-Case Spills From the Proposed Keystone XL Pipeline

John Stansbury, Ph.D., P.E.

Executive Summary

TransCanada is seeking U.S. regulatory approval to build the Keystone XL pipeline from Alberta, Canada to Texas. The pipeline will transport diluted bitumen (DilBit), a viscous, corrosive form of crude oil across Montana, South Dakota, Nebraska, Kansas, Oklahoma and Texas. As part of the regulatory process, TransCanada is required by the National Environmental Policy Act (NEPA) to evaluate the potential environmental impacts of a pipeline spill. The Clean Water Act (CWA) also requires TransCanada to estimate the potential worst-case discharge from a rupture of the pipeline and to pre-place adequate emergency equipment and personnel to respond to a worst-case discharge and any smaller spills. The Keystone XL environmental assessment documents (e.g., Draft Environmental Impact Assessment) as well as the environmental impacts documents for the previously built Keystone pipeline, can be found on the US State Department web site. It is widely recognized that the environmental assessment documents for the Keystone XL pipeline are inadequate, and that they do not properly evaluate the potential environmental impacts that may be caused by leaks from the pipeline (e.g., USEPA 2011a). The purpose of this paper is to present an independent assessment of the potential for leaks from the pipeline and the potential for environmental damage from those leaks.

The expected frequency of spills from the Keystone XL pipeline reported by TransCanada (DNV, 2006) was evaluated. According to TransCanada, significant spills (i.e., greater than 50 barrels (Bbls)) are expected to be very rare (0.00013 spills per year per mile, which would equate to 11 significant spills for the pipeline over a 50 year design life). However, TransCanada made several assumptions that are highly questionable in the calculation of these frequencies. The primary questionable assumptions are: (1) TransCanada ignored historical data that represents 23 percent of historical pipeline spills, and (2) TransCanada assumed that its pipeline would be constructed so well that it would have only half as many spills as the other pipelines in service (on top of the 23 percent missing data), even though they will operate the pipeline at higher temperatures and pressures and the crude oil that will be transported through the Keystone XL pipeline will be more corrosive than the conventional crude oil transported in existing pipelines. All of these factors tend to increase spill frequency; therefore, a more realistic assessment of expected frequency of significant spills is 0.00109 spills per year per mile (from the historical data (PHMSA, 2009)) resulting in 91 major spills over a 50 year design life of the pipeline.

The CWA requires that TransCanada estimate the "worst-case spill" from the proposed pipeline (ERP, 2009). TransCanada's calculation of the worst-case spill from the proposed Keystone XL pipeline was not available at the time of this assessment, so an assessment of the methods used by TransCanada for the existing Keystone pipeline and a comparison of the results of those methods with the methods recommended in this analysis were made. The worst-case spill volume at the Hardisty Pumping Station on the Keystone (the original pipeline will be referred to as simply the Keystone pipeline while the proposed pipeline is the Keystone Xl pipeline) pipeline predicted using methods recommended in this analysis was 87,964 barrels (Bbl), while the worst-case spill predicted using TransCanada's methods was 41,504 Bbl (ERP, 2009). The difference is a factor of more than 2 times. The primary difference between the two methods was the expected time to shut down the pumps and valves on the pipeline.

TransCanada used 19 minutes (TransCanada states that it expects the time to be 11.5 minutes for the Keystone XL pipeline). Since a very similar pipeline recently experienced a spill (the Enbridge spill), and the time to finally shutdown the pipeline was approximately 12 hours, and during those 12 hours the pipeline pumps were operated for at least 2 hours, it is clear that the assumption of 19 minutes or 11.5 minutes is not appropriate for the shut-down time for the worst-case spill analysis. Therefore, worst-case spill volumes are likely to be significantly larger than those estimated by TransCanada. The worst-case spill volumes from the Keystone XL pipeline for the Missouri, Yellowstone, and Platte River crossings were estimated by this analysis to be 122,867 Bbl, 165,416 Bbl, and 140,950 Bbl, respectively. In addition, this analysis estimated the worst-case spill for a subsurface release to groundwater in the Sandhills region of Nebraska to be 189,000 Bbl (7.9 million gallons).

Among numerous toxic chemicals that would be released in a spill, the benzene (a human carcinogen) released from the worst-case spill into a major river (e.g., Missouri River) could contaminate enough water to form a plume that could extend more than 450 miles at concentrations exceeding the Safe Drinking Water Act Maximum Contaminant Level (MCL) (i.e., safe concentration for drinking water). Therefore, serious impacts to drinking water intakes along the river would occur. Contaminants from a release at the Missouri or Yellowstone River crossings would enter Lake Sakakawea in North Dakota where they would adversely affect drinking water intakes, aquatic wildlife, and recreation. Contaminants from a spill at the Platte River crossing would travel downstream unabated into the Missouri River for several hundred miles and affect drinking water intakes for hundreds of thousands of people in cities like Lincoln, NE; Omaha, NE; Nebraska City, NE; St. Joseph, MO; and Kansas City, MO, as well as aquatic habitats and recreational activities. In addition, other constituents from the spill would pose serious risks to aquatic species in the river. The Missouri, Yellowstone, and Platte Rivers all provide habitat for threatened and endangered species including the pallid sturgeon, the interior least tern, and the piping plover. A major spill in one of these rivers could pose a significant threat to these species.

The benzene released by the worst-case spill to groundwater in the Sandhills region of Nebraska would be sufficient to contaminate 4.9 billion gallons of water at concentrations exceeding the safe drinking water levels. This water could form a plume 40 ft thick by 500 ft wide by 15 miles long. This plume, and other contaminant plumes from the spill, would pose serious health risks to people using that groundwater for drinking water and irrigation.

Introduction

TransCanada is seeking U.S. regulatory approval to build the Keystone XL pipeline from Alberta, Canada to Texas. The pipeline will transport diluted bitumen (DilBit), a viscous, corrosive form of crude oil across Montana, South Dakota, Nebraska, Kansas, Oklahoma, and Texas. As part of the regulatory process, TransCanada is required by the National Environmental Policy Act (NEPA) to evaluate the potential environmental impacts of a pipeline spill. The Clean Water Act (CWA) also requires TransCanada to estimate the potential worst-case discharge from a rupture of the pipeline and to pre-place adequate emergency equipment and personnel to respond to a worst-case discharge and any smaller spills. The Keystone XL environmental assessment documents (e.g., Draft Environmental Impact Assessment) as well as the environmental impacts documents for the previously built Keystone pipeline, can be found on the US State Department web site. It is widely recognized that the environmental assessment documents for the Keystone XL pipeline are inadequate, and that they do not properly evaluate the potential environmental impacts that may be caused by leaks from the pipeline (e.g., USEPA, 2011a). The purpose of this paper is to present an independent assessment of the potential for leaks from the pipeline and the potential for environmental damage from those leaks.

In addition to evaluating potential environmental damage from pipeline leaks, TransCanada is required by law to pre-position emergency equipment and personnel to respond to any potential spill. This paper does not address these requirements. However, an independent assessment of TransCanada's emergency response plans for the previously built Keystone pipeline was done by Plains Justice (Blackburn, 2010). This document clearly shows that the emergency response plan for the Keystone pipeline is woefully inadequate. Considering that the proposed Keystone XL pipeline will cross much more remote areas (e.g., central Montana, Sandhills region of Nebraska) than was crossed by the Keystone pipeline, there is little reason to believe that the emergency response plan for Keystone XL will be adequate.

Since spills from these pipelines will occur, and since they will be extremely difficult and expensive to clean up (likely tens to hundreds of millions of dollars), it is imperative that TransCanada be required to be bonded for these clean-up costs before any permits are granted. This proposed requirement is supported by the recent Enbridge spill, where a smaller crude-oil pipeline leak released crude oil into a tributary of the Kalamazoo River, and early clean-up costs, as reported by the U.S. EPA, have exceeded $25 million.

Worst-Case Spill

One of the requirements of the CWA is to calculate the worst-case potential spill from the pipeline. An assessment of the potential worst-case spill from the Keystone pipeline was conducted by TransCanada; however, some of the methods and assumptions in that assessment are in question. The primary focus of this paper is to provide an independent assessment of the worst-case spill from the Keystone XL pipeline and to compare that to the assessment done by TransCanada.

Spill frequency

To support understanding of the potential impacts due to releases from the pipeline, an assessment of the likely frequency of spills from the pipeline is made. TransCanada calculated the likely frequency of a pipeline spill for the Keystone XL pipeline in the Draft Environmental Impact Statement (ENTRIX, 2010) using statistics from the Pipeline and Hazardous Materials Safety Administration (PHMSA). Nation-wide statistics from PHMSA for spills from crude oil pipelines show 0.00109 significant (i.e., greater than 50 Bbl) spills per mile of crude oil pipelines per year. When this rate is applied to the Keystone XL pipeline with a length of 1,673 miles, the expected frequency of spills is 1.82 spills per year (0.00109 spills/mi * 1,673 mi). Adjusting the nation-wide PHMSA data to only include data from the states through which the Keystone XL pipeline will pass results in a frequency of 3.86 spills per year for the pipeline length (ENTRIX, 2010). The state-specific data are more applicable to the Keystone location; however, the smaller state-specific data base might over-estimate spill frequency. Therefore, the frequency of 1.82 per year is adopted as the best available value for this assessment. Assuming a design life of 50 years for the pipeline, 1.82 spills per year results in 91 expected significant spills (i.e., greater than 50 barrels) for the Keystone Pipeline project. According to the TransCanada Frequency-Volume Study of the Keystone Pipeline (DNV, 2006), 14 percent of the spills would likely result from a large hole (i.e., greater than 10 inches in diameter). Using the 14 percent value, the 91 expected spills during a 50-year lifetime for the pipeline would result in 13 major spills (i.e., from holes larger than 10 inches in the pipeline).

However, TransCanada diverged from historical data and modified the estimate of the expected frequency of spills from the pipeline (DNV, 2006). The company's primary rationale for reducing the frequency of spills from the pipeline was that modern pipelines are constructed with improved materials and methods. Therefore, TransCanada assumed that pipelines constructed with these new improved

materials and methods are likely to experience fewer leaks. The revised expected frequency for spills was reported in the Frequency-Volume Study (DNV, 2006) to be 0.14 spills/year over the 1,070 miles from the Canadian border to Cushing, OK. This value was adjusted to 0.22 spills per year for the total 1,673 miles of pipeline, including the Gulf Coast Segment (ENTRIX, 2010). Using the 0.22 spills/year, TransCanada predicted 11 spills greater than 50 barrels would be expected over a 50-year project life.

This reduced frequency estimated by TransCanada is probably not appropriate for a couple of reasons. First, the study of the revised frequency ignored some of the historical spill data; i.e., the spill cause category of "other causes" in the historical spill data set (DNV, 2006). The "other causes" category was assigned for spills with no identified causes. Since this category represents 23 percent of the total spills, this is a significant and inappropriate reduction from the spill frequency data. In addition, the assumed reduction in spill frequency resulting from modern pipeline materials and methods is probably overstated for this pipeline. TransCanada used a reduction factor of 0.5 in comparison to historical data for this issue. That is, according to TransCanada, modern pipeline construction materials and methods would result in half as many spills as the historical data indicate. However, the PHSMA data used in the TransCanada report were from the most recent 10 years. Therefore, at least some of the pipelines in the analysis were modern pipelines. That is, the initial frequency estimate was calculated in part with data from modern pipelines; therefore, a 50 percent reduction of the frequency estimates is highly questionable based on the data set used. More importantly, DilBit, the type of crude oil to be transported through the Keystone XL pipeline will be significantly more corrosive and abrasive than the conventional crude oil transported in most of the pipelines used in the historical data set. The increased corrosion and abrasion are due to 15 – 20 times the acidity (Crandall, 2002), 5 – 10 times the sulfur content (Crandall, 2002), and much higher levels of abrasive sediments (NPRA, 2008) compared to conventional crude oil. In addition, the high viscosity of DilBit requires that the pipeline be operated at elevated temperatures (up to 158oF for DilBit and ambient temperature for conventional oil) and pressures (up to 1440 psi for DilBit and 600 psi for conventional oil) compared to conventional crude oil pipelines (ENTRIX, 2010). Since corrosion and pressure are the two most common failure mechanisms resulting in crude oil releases from pipelines (DNV, 2006), increased corrosion and pressure will likely negate any reduced spill frequency due to improvement in materials and methods. Although pipeline technology has improved, new pipelines are subject to proportionally higher stress as companies use this improved technology to maximize pumping rates through increases in operational pressures and temperatures, rather than to use this improved technology to enhance safety margins.

Also, TransCanada relies heavily on "soft" technological improvements, such as computer control and monitoring technology, rather than only on "hard" improvements, such as improved pipe fabrication technology. Whereas "hard" technological improvements are built into pipelines, "soft" improvements require an ongoing commitment of monitoring and maintenance resources, which should not be assumed to be constant over the projected service life of the pipeline, and are also subject to an ongoing risk of error in judgment during operations. As demonstrated by the spill from Enbridge's pipeline into the Kalamazoo River, as pipelines age maintenance costs increase, but pipeline company maintenance efforts may be insufficient to prevent major spills, especially if operators take increased risks to maintain return on investment. Moreover, TransCanada assumes that future economic conditions will allow it to commit the same level of maintenance resources from its first year to its last year of operation. Given future economic uncertainty, this is not a reasonable assumption. It is reasonable to assume that decades from now TransCanada or a future owner will likely fail to commit adequate maintenance resources, fail to comply with safety regulations, or take increased operational risks during periods of lower income. Overtime, PHMSA should assume that the risk of spill from the Keystone XL Pipeline will increase due to weakening of "soft" technological enhancements. Over the service life of the pipeline it is not reason-

able to rely on TransCanada's "soft" technological improvements to the same extent as built-in "hard" improvements.

The TransCanada spill frequency estimation consistently stated the frequency of spills in terms of spills per year per mile. This is a misleading way to state the risk or frequency of pipeline spills. Spill frequency estimates averaged per mile can be useful; e.g., for extrapolating frequency data across varying pipeline lengths. However, stating the spill frequency averaged per mile obfuscates the proper value to consider; i.e., the frequency of a spill somewhere along the length of the pipeline. Stating the spill frequency in terms of spills per mile is comparable to acknowledging that although some 33,000 deaths from automobile accidents occur annually in the U.S., the average annual fatality rate across 350 million people is only 0.000094; therefore, fatalities from automobile accidents are so rare as to be unimportant. In other words, it is of little importance to know the risk (frequency) of a release in any particular mile segment (frequency per mile); rather it is important to know the risk of a release from the pipeline. As shown above, the expected number of spills for the pipeline over the pipeline lifetime ranges between 11 and 91 spills, depending on the data and assumptions used.

In summary, there is no compelling evidence to reduce the frequency of spills because of modern materials and methods. The increased corrosiveness and erosiveness of the product being transported will likely cancel any gains due to materials and methods improvements and soft technological safeguards will likely become less effective over time. Moreover, the modified frequency stated by TransCanada should not have been reduced by omitting an important failure category. The frequency of spills should have been stated as frequency of spills across the pipeline length per year and per pipeline lifetime. Therefore, the best estimate for spill frequency is the value from the PHSMA historical data set resulting in 1.82 spills/yr or 91 significant spills over the pipeline lifetime. Table 1 compares the predicted number of spills over the lifetime of the pipeline computed from TransCanada's assumptions and from historical data.

Table 1: Predicted Number of Spills from Keystone XL Pipeline Over a 50-Year Lifetime.

	TransCanada Estimate	Estimates Using Historical Data
Spills per year per mile	0.00013[(a)]	0.00109[(a)]
Pipeline spills per year	0.22[(b)]	1.82[(b)]
Pipeline spills per 50-year lifetime	11[(c)]	91[(c)]
Pipeline spills from > 10 inch hole	1.54[(d)]	12.74[(d)]

(a) ENTRIX, 2010

(b) spills/year-mile *1673 miles

(c) spills/year* 50 years of pipeline lifetime

(d) spills/lifetime * 14 percent spills from > 10 inch hole

Most Likely Spill Locations

Crude oil could be spilled from any part of the pipeline system that develops a weakness and fails. Likely failure points include welds, valve connections, and pumping stations. A vulnerable location of special interest along the pipeline system is near the side of a major stream where the pipeline is underground but at a relatively shallow depth. At these locations, the pipeline is susceptible to high rates of corrosion because it is below ground (DNV, 2006). Since the pipeline is below ground, small initial leaks due to corrosion-weakened pipe would potentially go undetected for extended periods of time (e.g., up to 90 days) (DNV, 2006) providing conditions for a catastrophic failure during a pressure spike.

In these locations, pressures would be relatively high due to the low elevation near the river crossing. In addition, major leaks at these locations are likely to result in large volumes of crude oil reaching the river.

In addition to river crossings, areas with shallow groundwater overlain by pervious soils (such as the Sandhills region in Nebraska) where slow leaks could go undetected for long periods of time (e.g., up to 90 days) (DNV, 2006), pose risks of special concern.

Worst Case Spill Volume

The volume of a spill is calculated in two parts: the pumping rate volume and the drain-down volume. The pumping rate volume is the volume of crude oil that is pumped from the leaking pipe during the time between the pipe failure and stoppage of the pumps. The time to shut down the pumps after a leak can be divided into two phases: the time to detect the leak, and the time to complete the shut-down process. The pumping rate volume also depends on the size of the hole in the pipe and the pressure in the pipe. The drain-down volume is the volume of crude oil that is released after the pumps are stopped, as the crude oil in the pipe at elevations above the leak drains out. The following sections explain how the pumping rate volume, the drain-down volume, and the total spill volume is calculated.

Pumping Rate Volume

The pumping rate volume is calculated as:

$$PRV = PR * (DT + SDT)$$

Where:

PRV = pumping rate volume (Bbl)

PR = pumping rate (Bbl/min)

DT = detection time (time required to detect and confirm a leak and order pipeline shut-down (min))

SDT = shut-down time (time required to shut down pumps and to close valves (min))

TransCanada's Frequency-Volume Study (DNV, 2006) states that detection of a leak in an underground pipeline section can range from 90 days for a leak less than 1.5 percent of the pipeline flow rate to 9 minutes for a leak of 50 percent of the pipeline flow rate. The 90-day time to detection is for a very slow leak that would not be detected by the automatic leak detection system. The 9 minute time to detection is for a leak that is large enough to be readily detected by the leak detection system. However, this time estimate is questionable because, as has been shown by experience, it is difficult for the leak detection system to distinguish between leaks and other transient pressure fluctuations in a pipeline transporting high viscosity materials such as DilBit. For example, in the Enbridge pipeline spill, signals from the leak detection system were misinterpreted, and up to 12 hours elapsed between the time of the leak and final pipeline shut-down (Hersman, 2010). During the 12-hour period between the initial alarm and the final shut-down, the pipeline pumps were operated intermittently for at least two hours. It should be noted that the location of the Enbridge spill was a populated area where field verification of the leak should have been quick and easy. Indeed, local residents called 911 complaining about petroleum odors (likely from the leak) 10 hours before the pipeline was shut down. In the case of the Keystone XL pipeline, leaks could occur in remote areas (e.g., central Montana, or the Sandhills region of Nebraska) where direct observation would only occur by sending an observer to the suspected site; this could take many hours.

TransCanada states that the time to complete the pipeline shut-down sequence is 2.5 minutes (ERP, 2009). Therefore, using TransCanada's time estimates, for a 1.5 percent leak, the total time between leak initiation and shut-down could be up to 90 days, and for a large (>50 percent) leak, the total time between leak initiation and shut-down would be 11.5 minutes (ERP, 2009).

However, given the difficulty for operators to distinguish between an actual leak and other pressure fluctuations, the shut-down time for the worst case volume calculation should not be considered to be less than 30 minutes for a leak greater than 50 percent of the pumping rate. This would allow for 4 alarms (5 minutes apart) to be evaluated by operators and a 5th alarm to cause the decision to shut down. In addition, the time to shut down the systems (pumps and valves) would require another 5 minutes. The assumption that the decision to shut the pipeline down can be made after a single alarm, as is suggested by TransCanada (ERP, 2009) is unreasonable considering the difficulty in distinguishing between a leak and a pressure anomaly. The ability to make the decision to shut down the pipeline after 5 alarms is likely a reasonable "best-case" assumption. However, this "best-case" does not describe the "worst case" conditions that are being assessed here. Rather, the worst case should consider confusing and confounding circumstances where a shut-down decision is not clear and where the leak site is remote and not verifiable in a short time period. The total time is then considered to be between 30 minutes (a best-case scenario) and 12 hours (the time for the Enbridge final shut-down) from leak initiation to shut-down. Considering that the Keystone XL pipeline will cross extremely remote areas and that verification of a leak could take many hours, a shut-down time of 2 hours (i.e., the time the pumps were operated during the Enbridge shutdown process) is a reasonable time for the worst-case analysis.

Therefore, for the worst-case spill for a large leak, a shut-down time of 2 hours is assumed. With a maximum pumping rate of 900,000 Bbl/d, and a shut-down time of 2 hours, the pumping rate volume is 75,000 Bbl (900,000 Bbl/d * 1 d/24 hr * 2 hr). This pumping rate volume (75,000 Bbl) is used in the calculation of the total worst-case spill volume for all high-rate leaks (i.e., greater than 50 percent flow-rate).

The worst-case spill for a small leak could occur where the pipeline is buried and in a remote location (such as central Montana or the Sandhills region of Nebraska), and where direct observation would be infrequent. According to TransCanada documents (DNV, 2006), a slow leak of less than 1.5 percent of the pumping rate could go undetected for up to 90 days. However, since pipeline inspections are scheduled every few weeks, it is likely that the oil would reach the surface and be detected before the entire 90 days elapsed. Assuming that the pipeline is buried at a depth of 10 feet and that the 1.5 percent leak (75,802 ft^3/d) is on the bottom of the pipe, oil would fill the pore spaces in the soil mostly in a downward direction, but it would also be forced upward toward the surface. Assuming that the oil initially fills a somewhat conical volume that extends twice as far below the pipeline as above it, the oil would emerge at the surface within about one day (volume of a cone 30 feet deep with a base diameter of 30 feet is 7,068 ft^3). Therefore, the leak would likely be detected in 14 days during the next inspection (assuming bi-weekly inspections). A 1.5 percent spill at a pumping rate of 900,000 Bbl/d over 14 days would result in a release of 189,000 Bbl (7.9 million gallons).

Table 2: Pumping Rate Volume for Various Sized Leaks

Leak as percent of Pumping Rate[a]	Detection and Shut-Down Time	Pumping Rate Volume[d]
<1.5 percent	14 days[b]	189,000 Bbl
100 percent	2 hours	75,000 Bbl
100 percent	11.5 minutes[c]	7,188 Bbl

(a) Design pumping rate for Keystone XL = 900,000 Bbl/d. Calculation of worst-case spill requires 100 percent of pumping rate.

(b) Time between pipeline inspections.(DNV, 2006)

(c) TransCanada's assumed shut-down time (ERP, 2009)

Drain-Down Volume

The drain-down volume is the volume in the pipe between the leak and the nearest valve or the nearest high point. Some oil in locally isolated low spots will tend to remain in the pipe. TransCanada arbitrarily assigned a drain-down factor of 0.6 for the Keystone XL pipeline, meaning that 40 percent of the oil in the draining pipeline at elevations above the leak will be captured in low spots. However, since siphon effects will tend to move much of the oil even in local low spots, the 40 percent retention factor is likely too high for a worst-case analysis. PHMSA regulations require valves to be placed on either side of a major water crossing. If these valves are working, they should limit the amount of crude oil that drains from the pipeline to the amount that is between the valves. However, to calculate a worst case spill, the volume should be calculated assuming that at least some of the valves fail (recall the failures of the safety devices in the recent Gulf oil spill). If the valves fail, the drain-down volume would be limited by the major high elevation points on either side of the leak, with a reasonable adjustment for residual crude oil remaining in the pipeline. For this worst-case analysis, a reasonable estimate for residual crude oil remaining in the pipeline is assumed at 20 percent of the total volume of oil at elevations above the leak. All of these parameters are site-specific; therefore, for this assessment, the worst case drain-down volumes will be calculated for several of the river crossings of the Keystone XL pipeline, including the Missouri, Yellowstone, and Platte Rivers.

The drain-down volume is calculated using:

$$DDV = PLDV * DF$$

Where:

DDV = Drain Down volume (Bbl)

PLDV = Pipeline Drain Volume (Bbl) (volume of pipeline either side of the leak to next valve or high elevation point)

DF = Drainage Factor (80 percent)

Worst-Case Release Calculation for the Missouri River Crossing

The Missouri River crossing is located at mile post (MP) 89 along the Keystone XL pipeline. The upstream valve is located at MP84, and the downstream valve is located at MP 91. The river is at an elevation of 2,035 feet. Figure 1 shows the elevation profile of the crossing at the Missouri River. Since there are no major high elevations between the river and the valve at MP 84, it is likely that nearly all of the oil in the pipeline between the valve and a hypothetical leak at the river will be siphoned or drained via gravity. If the valve at MP 84 fails, all of the oil in the pipeline between that point and the next valve (MP 81.5) could drain since the pipeline rises gradually in elevation between MP 84 and MP 81 (eleva-

tion of 2,225 feet). If the valve on the downstream side of the crossing (MP 91) fails, oil in the pipeline up to the major high point at MP 93 could drain to the hypothetical leak at the river crossing.

There are several scenarios that could affect the drain-down volume. In the worst-case scenario both valves could fail, and the drain-down volume would then be the cross-sectional area of the pipe, times the length of pipeline draining times 80 percent. For this scenario, the length of pipe is 11.5 miles (MP 81.5 to MP 93). The cross-sectional area of the 36 inch pipe is 7.07 ft^2. Thus the drain-down volume is $3.43x10^5$ ft^3 (61,164 Bbls, 2.57 million gallons). However it is highly unlikely that both valves will fail at the same time.

A second scenario would occur if both valves operated correctly but the siphon effect removed the oil from the high point downstream of the valve at MP 84. Under this scenario, the length of drained pipe is 7 miles, and the resulting drain-down volume is $2.09x10^5$ ft^3 (37,230 Bbls, 1.56 million gallons).

A third scenario would occur if both valves operated correctly,and the siphon effect did not remove the oil between the high point at MP 86.5 and the valve at MP 84. In this scenario, the length of drained pipe is 4.5 miles (valve at MP 91 to the high point at MP 86.5), and the drain-down volume is $1.34x10^5$ ft^3 (23,934Bbls, 1.01 million gallons).

A fourth scenario would occur if one of the valves fails. To be conservative, the valve closest to the river will be the assumed failed valve. In this scenario, the drain-down distance would be 9 miles (between the valve at MP 84 and the high point at MP 93). The resulting drain-down volume would be 2.69×10^5 ft^3 (9 mi * 5,280 ft/mi * 7.07 ft^2 * 0.8) (47,867 Bbl, 2.01 million gallons).

While the first scenario is very unlikely, valve failure is a reasonable consideration in the worst-case spill analysis. So for the purposes of this analysis the fourth scenario, where one of the valves fails, is used to calculate the worst-case spill drain-down volume for the Missouri River crossing site. Therefore, using the fourth drain-down scenario, the drain-down volume is 47,867Bbls. Adding the pumping rate volume of 75,000 Bbl, the worst-case release volume for the Missouri River crossing is 122,867 Bbl (5.16 million gallons).

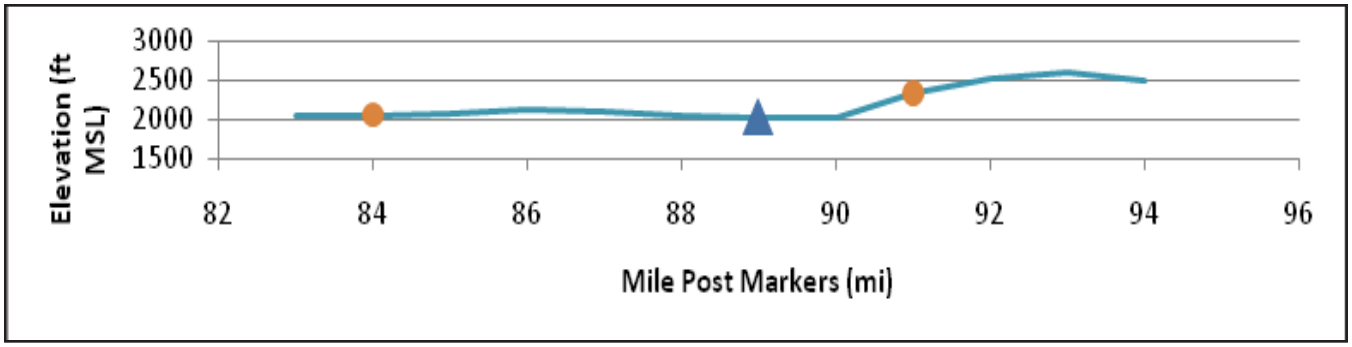


Figure 1: Horizontal profile of surface elevations at the Missouri River crossing. Note that the vertical axis is exaggerated compared to the horizontal axis. Solid circles show locations of pipeline valves. The solid triangle shows the location of the river crossing.

Worst Case Release Volume Calculation for the Yellowstone River

The crossing on the Yellowstone River is at MP 196.5 which is at an elevation of 2,125 feet. The closest upstream valve is at MP 194.5 at an elevation of 2,230 feet. The nearest major high point on the upstream side is at MP 183 at an elevation of 2,910 feet. The closest valve on the downstream side is at MP 200 at an elevation of 2,506 which is also the high point on the downstream side of the crossing. Figure 2 shows the elevation profile for the crossing at the Yellowstone River.

The first scenario for drain-down volume is if all valves work properly. The drain-down volume is 80 percent of the volume between the valves (the cross-sectional area of the pipe (7.07 ft^2) times the pipe length between the valves (5.5. miles)) which equals $1.64x10^5$ ft^3 (29,252 Bbl, 1.23 million gallons).

Another scenario considers the volume if the valve at MP 194.5 does not work. In this case, the drain-down volume is the volume of the pipe between the two high elevations which are at MP 183 and MP 200 (17 miles). In this scenario the drain-down volume is $5.07x10^5$ ft^3 (90,416 Bbl, 3.80 million gallons). Assuming failure of the valve at mile-post 194.5 is a reasonable assumption for conditions of the worst-case spill volume. The total worst-case volume is then the drain-down volume of 90,416 Bbl plus the pumping rate volume of 75,000 Bbl totaling 165,416 Bbl (6.95 million gallons).

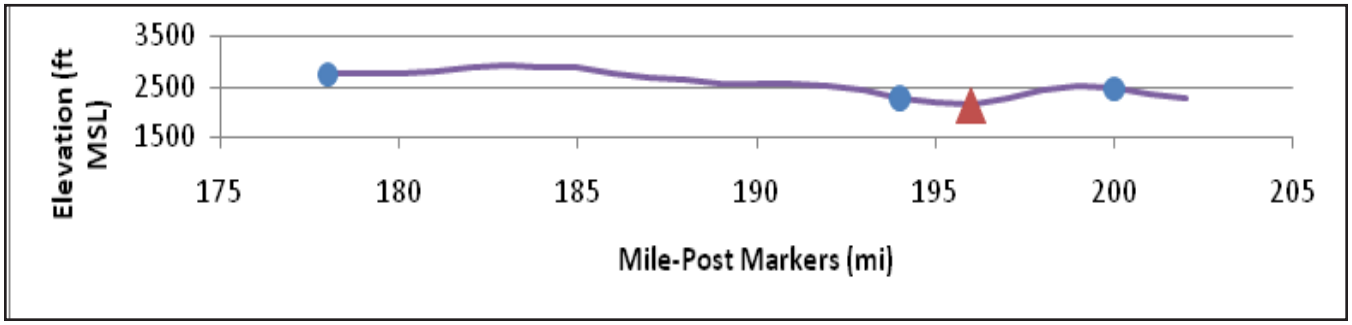


Figure 2: Horizontal profile of surface elevations at the Yellowstone River crossing. Note that the vertical axis is exaggerated compared to the horizontal axis. Solid circles show locations of pipeline valves. The solid triangle shows the location of the river crossing.

Worst-Case Release Volume Calculation for the Platte River, NE

The Keystone XL Pipeline is proposed to cross the Platte River in Nebraska at MP 756.5. There is an upstream valve at MP 747.6 and a downstream valve at MP 765. Figure 3 shows the elevation profile for the crossing at the Platte River. A reasonable worst-case spill scenario is to consider the valve at MP 765 (i.e., closest to the river) to fail. The drain-down volume would then be the pipeline volume between the high point at MP 760 and the valve at MP 747.6. The resulting drain-down volume would be $3.70x10^5$ ft^3 (65,950 Bbl, 2.77 million gallons). Adding the pumping rate volume, the worst-case spill at the Platte River crossing would be 140,950 Bbl (5.92 million gallons).

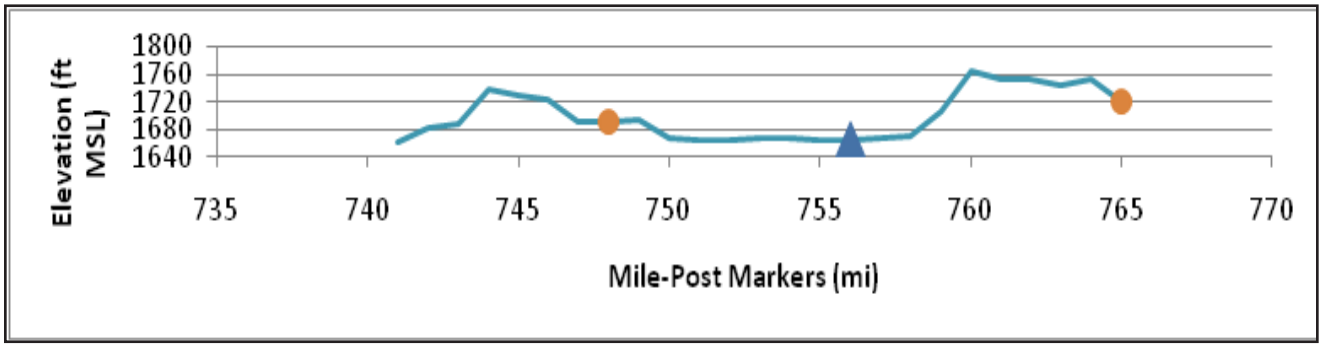


Figure 3: Horizontal profile of surface elevations at the Platte River crossing. Note that the vertical axis is exaggerated compared to the horizontal axis. Solid circles show locations of pipeline valves. The solid triangle shows the location of the river crossing.

Table 3: Worst-Case Spill Volume Estimates.

Location	Estimate from this analysis		
	Pumping Rate Volume (Bbl)	Drain Down Volume (Bbl)	Total Release (Bbl)
Groundwater	189,000[a]	NA	189,000
Missouri River	75,000[b]	47,867[c]	122,867
Yellowstone River	75,000[b]	90,416[c]	165,416
Platte River	75,000[b]	65,950[c]	140,950

(a) 900,000 Bbl/d (Keystone XL design pumping rate)* 1.5percent leak * shut-down time of 14 days

(b) 900,000 Bbl/d (Keystone XL design pumping rate) * shut-down time of 2 hours

(c) Expected volume to drain from ruptured pipeline after pumps and valves closed

Comparison to TransCanada methods

TransCanada calculated the total Worst-Case Release Volume in a way that appears to be flawed. The worst-case volume was calculated from (ERP, 2009):

$$WCV = ALV + PRV$$

Where:

WCV = worst-case volume (Bbl)

ALV = adjusted line volume (Bbl)

PRV = pumping rate volume (Bbl) i.e., pumping rate (Bbl/min) * time to shut-down (min)

The adjusted line volume was calculated from:

$$ALV = (ILFV – PRV) * 0.60$$

Where:

ILFV = initial line fill volume (Bbl) i.e., the volume of the pipe between the leak and the nearest valve on both sides of the leak.

0.60 = drain-down factor where 60 percent of the oil in the pipe will drain after shut-down.

For the Hardisty Pump Station/Regina Pump Station (Keystone pipeline) calculation, the ILFV was stated as 63,346 Bbl. The pumping rate was 662,400 Bbl/day, and the time to shut down was 19 minutes (10 minutes of evaluation of whether a leak had occurred and 9 minutes to shut down the system). This resulted in a PRV of 8,740 Bbl, and an ALV of 32,763 Bbl. The ALV plus the PRV resulted in a total release of 41,503 Bbl.

TransCanada does not explain how the initial line fill volume is calculated. They simply provide a value (ERP, 2009). For the Hardisty Pump Station/Regina Pump Station calculation, they state the value to be 63,346 Bbl. There is no way to verify this value. Whatever method was used, the value should be the pipeline volume between the leak and the high points of elevation on both sides of the leak. TransCanada then, in what appears to be a flawed process, subtracts the pumping rate volume from the initial line fill volume. It is not clear why this subtraction was done. Apparently, TransCanada considered that since the PRV would be pumped out of the pipeline during the leak discovery and shut-down time, that volume of oil would not be still in the pipeline during draining. However, even though the PRV would be removed from the pipeline during shutdown time, an equal amount would be pumped into the draining section. Therefore, the DDV should be calculated as simply the volume of the drain-

ing pipeline modified by the fraction of oil trapped in local low points. That is, the PRV should not have been subtracted from the ILFV. The result of subtracting the PRV from the ILFV was then multiplied by 0.60 to account for 40 percent of the oil in the pipe being caught in locally low spots in the pipeline and failing to drain out. Certainly some of the oil in the pipe will fail to drain, especially in locally low spots; however, considering siphon effects, it is very likely that nearly all of the oil will drain even through the locally low spots. Therefore, the 60 percent drain factor is likely to be a significant underestimate of the fraction of oil that will drain. For this worst case spill analysis, a drainage factor of 80 percent is a more reasonable assumption.

Table 4 shows the PRV, DDV, and total worst-case release estimates for the Hardisty Pumping Station on the original Keystone pipeline using methods recommended in this analysis and methods used by TransCanada (ERP, 2009). Note that the PRV values using the method of this paper are much larger than those using TransCanada's method because the assumed shut-down time is much shorter in TransCanada's method (19 minutes compared to 2 hours). The drain-down volumes used for both methods are the reported drain-down volumes from TransCanada's method because sufficient detail was not available in the TransCanada report (ERP, 2009) to allow a comparison of methods.

Table 4: Worst-Case spill volume estimate using the method recommended in this analysis and the method used by TransCanada for the Keystone Pipeline.

	Estimate from this Paper			TransCanada Estimate[a]		
	PRV (Bbl)	DDV (Bbl)	Total Release (Bbl)	PRV (Bbl)	DDV (Bbl)	Total Release (Bbl)
Hardisty Pumping Station	55,200[b]	32,764[c]	87,964	8,740[d]	32,764[c]	41,504

(a) ERP, 2009

(b) Pumping rate volume = 662,400 Bbl/d (Hardisty) * shut-down time of 2 hours

(c) Drain-down volume reported by TransCanada (ERP, 2009)

(d) Pumping rate = 662,400 Bbl/d * shut-down time of 19 min

Impacts from Worst-Case Spill

Impacts to the Air

The primary impacts to the air will be from benzene, hydrogen sulfide, and light molecular weight constituents of the DilBit. The DilBit will be pumped at high temperatures (up to 158°F) and pressures (up to 1440 psi) causing these compounds to volatilize into the air at the site of the spill. The Occupational Health and Safety Agency (OSHA) acceptable concentration of benzene in the air for a workplace is 3.25 mg/m^3 (NIOSH, 1990) for short-term (8-hour) exposures. Since benzene is denser than air, it could accumulate in low-lying areas that are protected from the wind. Under these conditions, the benzene concentration could be above acceptable levels for inhalation. The basements of buildings located above groundwater plumes could also trap benzene gases that exceed safe levels. This could have serious consequences for the occupants of such a building, who may not be aware that a plume of benzene lies beneath the building.

Hydrogen sulfide is another toxic gas that could cause dangerous conditions at the site. The OSHA acceptable concentration for a workplace is 14 mg/m^3 for an 8-hour exposure and 21 mg/m^3 for even a momentary exposure (NIOSH, 1990). The concentrations of hydrogen sulfide in the air are

expected to be above acceptable levels in areas near a spill site (Enbridge, 2010) and will likely be a serious health threat to emergency workers, remediation workers, and possibly to local residents.

In addition to toxicity effects, benzene, hydrogen sulfide, and the light molecular weight fractions of the oil could create explosive conditions as they volatilize from the spilled oil. Again, this risk will be greatest in areas that are protected from the wind and where concentrations could reach the explosive limits.

Impacts to Terrestrial Resources

The proposed pipeline will cross numerous types of terrestrial habitats (e.g., upland prairies, lowland prairies, woodlands, northern high plains, etc.) as it passes from Canada to Texas. Each of these habitats is unique in terms of its physical conditions (e.g., soils, climates), biological communities, and human communities. Because the physical, biological, and human conditions are so varied in these habitats, the potential impacts from a spill will be different for each type of habitat and location. Therefore, it is not possible to thoroughly assess the potential impacts to terrestrial habitats in this paper.

In general, a primary negative impact caused by a crude oil spill on land will be burial and smothering of plants and ground-dwelling animals. The spilled DilBit will form a very dense and thick layer over the ground that will kill essentially any organisms that are contacted. This effect will be localized to the immediate area of the spill, and most animals will be able to avoid contact with the oil. However, some animals may inadvertently contact the oil (e.g., birds landing in the oil) and be harmed or killed. In addition, the spill will release toxic constituents such as benzene, hydrogen sulfide, light molecular weight oil fractions, and polycyclic aromatic hydrocarbons (PAHs), all of which will have toxic effects on local wildlife. A significant concern arises when the pipeline crosses habitats of the numerous threatened or endangered species that are found along the pipeline route. Finally, the spill could affect human communities via exposures to the toxic constituents.

Impacts to Surface Water Resources

The primary constituents of concern in surface water are: benzene, PAHs, hydrogen sulfide, and bulk crude oil. The amounts of these constituents in the surface water are affected by several factors including: the concentration of the constituent in the crude oil, the solubility of the constituent, and the turbulence and velocity of the water. Constituents of special concern are benzene and certain PAHs because they are carcinogenic.

Benzene makes up 0.1 to 1.0 percent of DilBit crude oil (Shell Canada, 2008), and it is relatively soluble in water. The amount of benzene that will be dissolved in the water can be estimated from the octanol-water partition coefficient (a measure of how much of a contaminant will dissolve into the water) which is 131.8 for benzene (LaGrega et al., 2001). Using the octanol-water relationship, and assuming that the benzene concentration in the DilBit is 1 per cent (~$1x10^4$ mg/L), results in a benzene water concentration immediately at the oil/water interface of 75 mg/L ($1x10^4$ mg/L ÷ 131.8). This benzene concentration is 15,000 times the MCL for benzene of 0.005 mg/L. Since the temperature of the DilBit will be up to 158°F, the actual water concentration at the spill will likely be somewhat higher than this calculation, which is based on an octanol-water partition coefficient for ambient temperatures. The benzene concentration will decrease with distance from the oil/water interface. TransCanada's Risk Assessment calculated that the average (mixed) benzene concentration in surface water for a 10,000 Bbl spill in a 10,000 ft^3/sec stream would be 2.2 mg/L (ENTRIX, 2010); however, this calculated concentration assumes that all of the benzene would be released into the water within one hour (likely over-estimates resulting concentrations) and that the benzene is immediately mixed across the entire stream (under-

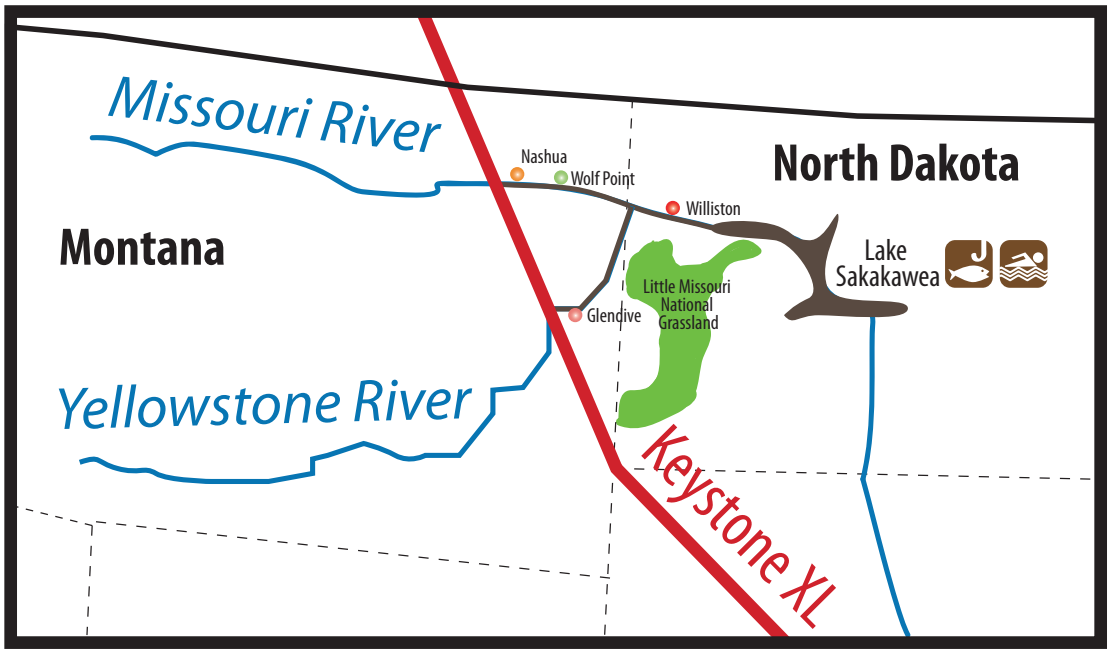
estimates resulting concentrations). Note that 2.2 mg/L is 440 times the MCL for benzene. In most cases, the benzene will form a plume that travels downstream from the spill site. The concentration in the plume will gradually decrease as it moves farther from the spill site.

Besides human health risks from contaminated drinking water supplies, benzene also poses risks to aquatic species. The EPA Region III screening water concentration for benzene designed to be protective of aquatic biota is 0.370 mg/L (EPA, 2011b). The predicted benzene concentration at the oil/water interface is 75 mg/L which is 200 times higher than the screening concentration. Therefore, negative ecological impacts due to toxicity are expected, at least in localized areas where benzene is actively dissolving from the oil.

If a spill of 150,000 Bbl (i.e., in the range of predicted worst-case spill volumes) were to occur in a stream with a flow of 10,000 ft^3/sec and a velocity of 3 ft/sec (e.g., the Missouri River below Fort Peck dam has a flow of 9,225 cfs, and the Yellowstone River at Miles City, MT has a flow of 11,180 cfs (USGS, 2009)), the mass and resulting plume of the benzene in the water could be characterized as follows. Assuming that benzene makes up 1.0 percent of the DilBit, 150,000 Bbl of DilBit would contain approximately $2.3x10^5$ Kg of benzene (150,000 Bbl * 42 gal/Bbl * 3.788 L/gal * 1 Kg/L * 0.01). If 80 percent of the benzene is lost via volatilization and product removal during and immediately after the spill, $4.77x10^4$ Kg of benzene would remain in the stream. This benzene would dissolve through time into the water from the DilBit mixture. To be released into the water, the benzene in the mass of crude would have to diffuse to the oil/water interface. Since the composition of DilBit is variable and since the thickness of the crude mass is case-specific (i.e., depends on turbulence, temperature, etc.), it is not possible to predict precisely the rate at which the benzene will diffuse to the oil/water interface; however, a reasonable assumption would be that 5 percent of the benzene would reach the oil/water interface per day. If this assumption is too high, these calculations will over estimate the water concentrations but underestimate the duration of the negative impacts, and if it is too small, the opposite will be true. Assuming 5 percent of the benzene is released into the water per day, over 2.3 million grams of benzene will be released to the water per day. This will result in a water concentration of 0.09 mg/L ($2.3x10^6$ g/d * sec/10,000 ft^3 * 1d/86,400 sec * 1,000 mg/g * 35.3 ft^3/m^3 * 0.001 m^3/L) once the contaminant plume completely mixes across the entire width of the stream (several miles downstream of the spill). This concentration exceeds the MCL of 0.005 mg/L by 18.8 times. As the benzene plume migrates downstream, the concentration will decrease because of processes such as degradation and volatilization. Reported half-lifes of benzene in surface water range from 1 to 6 days (USEPA, 1986). Assuming a half-life of 3 days, a stream velocity of 3 ft/sec, and a tributary contribution of 20 cfs/mi (the measured value for the Missouri River downstream of the proposed crossing (USGS, 2009)), the plume would reach over 450 miles before its concentration would drop to the MCL and be safe for public water intakes. The plume length was modeled using a series of 10-mile long river reaches with first-order decay ($k=-0.231d^{-1}$) and increased flow of 200 cfs/10 mi reach.

Contaminants from a release at the Missouri or Yellowstone River crossing would enter Lake Sakakawea in North Dakota where they would adversely affect drinking water intakes, aquatic wildlife, and recreation. Contaminants from a spill at the Platte River crossing would travel downstream unabated into the Missouri River for several hundred miles affecting drinking water intakes for hundreds of thousands of people (e.g., Lincoln, NE; Omaha, NE; Nebraska City, NE; St. Joseph, MO; Kansas City, MO) as well as aquatic habitats and recreational activities. In addition, other constituents from the spill would pose serious risks to humans and to aquatic species in the river.

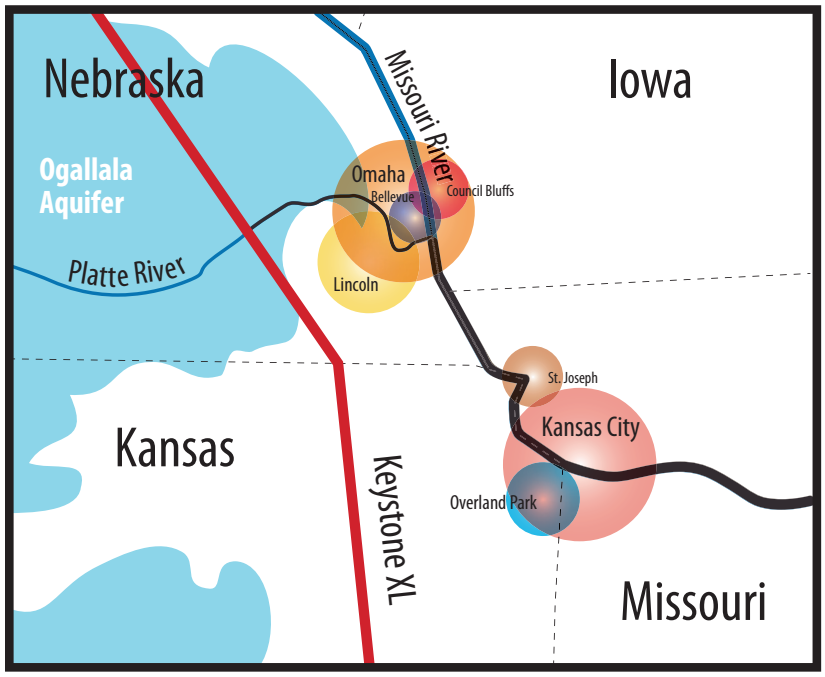
Worst-case spill at the Missouri River or Yellowstone River crossing.



A spill at either crossing could release millions of gallons of crude oil into the rivers and extending downstream as far as Lake Sakakawea, polluting drinking water, and threatening endangered species and recreation areas.

Populations affected by a worst-case spill at the Platte River

- Kansas City - approx. 447K
- Omaha - approx. 420K
- Lincoln - approx. 241K
- Overland Park- approx. 167K
- St. Joseph - approx. 73K
- Council Bluffs - approx. 60K
- Bellevue - approx. 48K



Population estimates based on available data from the U.S. Census Bureau, http://quickfacts.census.gov. Circles representing these cities are for illustrative purposes and are not to scale.

Of course other assumptions (e.g., shorter half-life) would give somewhat different results. For example, assuming that benzene makes up only 0.3 percent of DilBit and that 10 percent of the benzene is released per day, the calculated plume length would be reduced to around 200 miles. However, since the case-specific details are not known at this point, the precise impacts cannot be calculated; however, it has been clearly shown that if a worst-case spill occurs in a major stream, the impacts would be serious, far-reaching, and long-lasting, and claims to the contrary should be challenged.

The concentrations of PAHs (e.g., benz(a)pyrene) are not specified in the Material Safety Data Sheet (MSDS) for DilBit (Shell Canada, 2008). Also, the risk assessment done for the pipeline (ENSR, 2006) discusses the presence of PAHs, but doesn't detail specific concentrations. Therefore, this analysis will assume that PAHs make up 2 percent of DilBit, and that benz(a)pyrene (BaP) makes up one-tenth of the PAHs or 0.2 percent of the DilBit. This is likely an underestimate. PAHs are not as soluble or as mobile in surface water as is benzene. Much of the released PAH mass will sorb to sediments and remain closer to the location of the spill. However, they will be transported downstream with suspended solids and sediments, and the PAH fraction that does dissolve will form a plume and also be transported downstream. Since they are less soluble and mobile than benzene, PAHs pose less of a threat to municipal water intakes. Using the octanol-water coefficient for benz(a)pyrene (BaP) of 1.1×10^6 (LaGrega et al., 2001), the BaP concentration at the oil/water interface would be 0.0018 mg/L (1.8 μ g/L). This concentration exceeds the MCL for BaP of 0.0002 mg/L by a factor of about ten; however, this concentration would be quickly reduced as the plume mixes in the stream. Therefore, based on the assumption that PAHs make up 2 percent of the DilBit, drinking water is probably not significantly threatened from release of PAHs.

However, PAHs are toxic to aquatic organisms. The EPA Region III water quality criteria for benz(a)pyrene to protect aquatic species is 0.015 μ g/L (EPA, 2011b). In addition, there are several other PAHs with water quality values to protect aquatic species (e.g., benzo(a)anthracene (0.018 μ g/L), fluoranthene (0.04 μ g/L), and naphthalene (1.1 µg/L)) that are likely to have concentrations that exceed water quality criteria in a major spill. Therefore, the estimated concentration of PAHs is approximately 100 times the allowable level for protection of aquatic life.

Hydrogen sulfide is very volatile, and much of it will likely volatilize to the air during a major spill. However, some of the hydrogen sulfide will dissolve into the surface water and cause toxic effects to the aquatic biota. The EPA Region III screening water concentration protective of aquatic species is 2.0 μ g/L. Since the hydrogen sulfide will quickly volatilize, it is expected that these toxic effects will be limited to areas near the spill.

Bitumen, which makes up most of the DilBit, is more dense than water, so it will sink to the bottom and smother any aquatic plants or sediment-dwelling organisms. These effects will be limited to the immediate area of the spill and are expected to pose a significant risk primarily if the stream is the habitat to threatened or endangered species. Since the Missouri, Yellowstone, and Platte Rivers all provide habitat to threatened and endangered species, including the pallid sturgeon, interior least tern, and piping plover, these impacts should be considered potentially significant.

Table 5: Benzene Plume Development for Spill of 150,000 Bbl into a 10,000 cfs Stream.

	Estimate From This Analysis
Spill Volume	150,000 Bbl
Stream Discharge	10,000 cfs
Fully Mixed Concentration[(a)]	0.09 mg/L

Ratio of Concentration to MCL [b]	18.8
Length of Plume > MCL [c]	450 miles
Duration of Release to Water [d]	20 days

(a) mg/sec benzene release to stream ÷ L/sec of flow (10,000 cfs = 283,286 L/sec)

(b) fully mixed concentration ÷ 0.005 mg/L

(c) assumes half-life of 3 d; velocity of 3 ft/sec;

(d) assumes 5 percent of benzene is released from DilBit mass per day

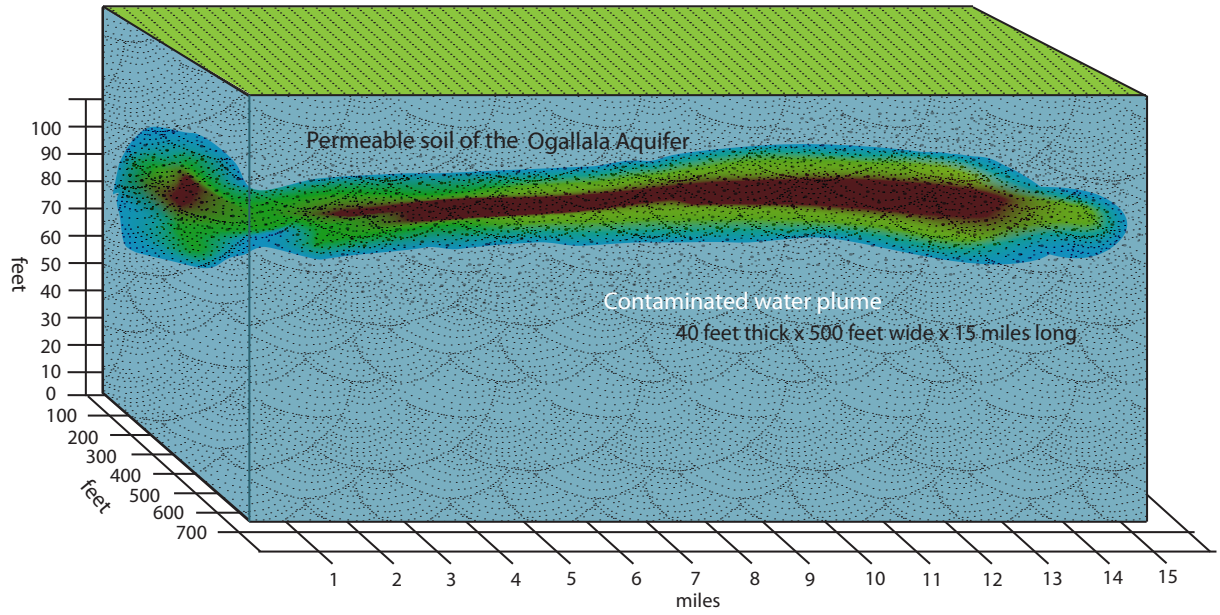
Impacts to Groundwater Resources

The primary constituent of concern for a spill into groundwater is benzene. Since DilBit is very viscous, the bulk crude oil will not likely migrate through the soil to groundwater in large quantities. However, if a small, underground leak remains undetected for an extended period of time, a large amount of benzene will be released with the DilBit. The released benzene could then be transported to groundwater via infiltrating rainwater. According to a TransCanada publication "Frequency-Volume Study of Keystone Pipeline" (DNV, 2006), a leak of 1.5 percent of total flow could remain undetected for 90 days. For this analysis, the discovery and shut-down time is assumed to be 14 days which corresponds to the time between pipeline inspections. At the design flow rate of 900,000 Bbl/d, a 1.5 percent leak would release 189,000 Bbl (7.9 million gallons) of DilBit in 14 days. Since DilBit is 0.1 to 1.0 percent benzene, this would result in a release of up to 79,380 gallons of benzene.

A spill of the magnitude of 189,000 Bbl of DilBit would occupy approximately 2.65×10^6 cubic feet of subsurface sands with a porosity of 0.4 (189,000 Bbl * 5.61 ft^3/Bbl ÷ 0.4). Assuming that the DilBit mass occupies a somewhat cylindrical volume and that the aquifer is 20 feet below the pipeline, the DilBit would spread to an area approximately 335 feet in diameter (335 feet diameter X 30 feet high). A reasonable worst-case 100-year, 24-hour storm would deposit 6 inches of rain water on the site. In the Sandhills of Nebraska, nearly all of this water would infiltrate. Six inches of water infiltrating onto a contaminated area of 8.8×10^4 ft^2 (335 feet diameter) results in 4.4×10^4 cubic feet of water (8.8×10^4 ft^2 * 0.5 ft infiltrating water) contacting the DilBit. Using the octanol-water partition coefficient of 131.8 (LaGrega et al., 2001), the benzene concentration in the infiltrating water would be approximately 75 mg/L. The 4.4×10^4 cubic feet of water at a concentration of 75 mg/L equates to 9.35×10^7 milligrams of benzene. Thus, this storm would transport 9.35×10^7milligrams of benzene to the groundwater. Once in the groundwater, the benzene plume would migrate down-gradient, potentially to down-gradient water supplies or basements where it could pose a cancer risk to residents. The 9.35×10^7milligrams of benzene in the groundwater, if evenly distributed (not likely) could pollute 1.9×10^{10} L (4.9×10^9 gallons) of groundwater at the MCL, enough water to form a plume 40 feet thick by 500 feet wide by more than 15 miles long (assuming porosity of 0.4) at the MCL. These plume dimensions are given for illustrative purposes only. The actual dimensions of a groundwater plume cannot be determined with the available information. Of course, the benzene would not be evenly distributed; however, the plume would still be many miles long. In addition, future storms would transport additional benzene to the groundwater increasing the size of the plume.

The worst-case site for such a spill is in the Sandhills region of Nebraska. The Sandhills are ancient sand dunes that have been stabilized by grasses. Because of their very permeable geology, nearly 100 percent of the annual rainfall infiltrates to a very shallow aquifer, often less than 20 feet below the surface. This aquifer is the well-known Ogallala Aquifer that is one of the most productive and important aquifers in the world.

Worst-case spill above the Nebraska Sandhills.



A spill over 14 days, releasing 7.9 million gallons of crude oil could contaminate 4.9 billion gallons of water and form a plume 40 feet thick by 500 feet wide by 15 miles long. By comparison:

The length of the plume is equal to 264 football fields.
Manhattan is 13.4 miles long.
The volume of the plume (1,584,000,000 feet^3) is equal to that of 19,631 Olympic sized pools.

Table 6: Benzene Plume from a189,000 Bbl Spill to Groundwater.

Volume of released DilBit (Bbl)	189,000
Volume of benzene in spill (gal)	79,380
Mass of benzene dissolved in groundwater (mg)	$9.35x10^7$
Volume of contaminated water > MCL (gal)	$4.9x10^9$
Equivalent plume dimensions	40 feet X 500 feet X 15 miles

References

Crandall, G. (2002) Non-Conventional Oil Market Outlook. Presentation to: International Energy Agency, Conference on Non-Conventional Oil, 2002 p.4, http://www.iea.org/work/2002/calgary/Crandall.pdf (last accessed January 12, 2011). As cited in"Tar Sands Pipelines Safety Risks". A Joint Report by: Natural Resources Defense Council, National Wildlife Federation, Pipeline Safety Trust, and Sierra Club, February 2011.

DNV Consulting (2006) Frequency-Volume Study of Keystone Pipeline.Report No. 70015849-2 rev 1.Report forTransCanada Pipelines, Ltd. May 2006.

Enbridge (2010 Enbridge Line 6B 608 Pipeline Release, Marshall Michigan, Health and Safety Plan, Enbridge. Inc. 2010. http://epa.gov/enbridgespill/pdfs/finalworkplanpdfs/enbridge_final_healthsafety_20100819.pdf. Last accessed March 15, 2011.

ENSR (2006) Pipeline Risk Assessment and Environmental Consequence Analysis. Prepared for: Keystone Pipeline Project, TransCanada Keystone Pipeline, LP. ENSR Corporation, June 2006, document No.: 10623-004.

ENTRIX(2010) Draft Environmental Impact Statement for the Keystone XL Oil Pipeline Project. Applicant for Presidential Permit: TransCanada Keystone, LP. April 6, 2010. Submitted by: ENTRIX, Inc. Seattle, WA.

ERP (2009) TransCanada Emergency Response Plan: Worst Case Discharge Analysis and Scenarios. Appendix B, Version 21.0.1. O'Brien's Response Management Inc.

Hersman, D. (2010 Testimony before Committee on Transportation and Infrastructure, September 15, 2010. Deborah Hersman, Chairman of the National Transportation Safety Board. http://www.ntsb.gov/speeches/hersman/daph100915.html (last accessed January 12, 2011). As cited in "Tar Sands Pipelines Safety Risks". A Joint Report by: Natural Resources Defense Council, National Wildlife Federation, Pipeline Safety Trust, and Sierra Club, February 2011.

NIOSH (1990) NIOSH Pocket Guide to Chemical Hazards. National Institute for Occupational Safety and Health. US Department of Health and Human Services.

NPRA (2008) NPRA Q&A and Technology Forum: Answer Book, Champion's Gate, FL: Natinal Petrochemical and Refiners Association, 2008, Question 50: Desalting, http://www.npra.org/forms/upload/Files/17C4900000055.filename.2008_QA_Answer_Book.pdf (last accessed March 15, 2011).

PHMSA (2009) Hazardous Liquid Incident Files.U.S. Department of Transportation.Office of Pipeline Safety.Data for 1997 - 2008. http://primis.phmsa.dot.gov/comm/reports/psi.htm. Pipeline and Hazardous Materials Safety Administration. Last accessed on March 25, 2011.

Shell Canada Ltd. (2008) Material Safety Data Sheet for Albian Heavy Synthetic Crude.

USEPA (1986) Superfund Public Health Evaluation Manual. Office of Emergency and Remedial Response, Washington, DC.

USEPA (2011a) Letter to U.S. State Department (Mr. Jose W. Fernandez, Asst. Secretary and Dr. Kerri-Ann Jones, Asst. Secretary), June 6, 2011.

USEPA (2011b) U.S. EPA Region III Risk-Based Concentration Table. http://www.epa.gov/reg3hwmd/risk/human/index.htm. Last accessed March 15, 2011.

The attached report, "**Analysis of Frequency, Magnitude and Consequence of Worst-Case Spills from the Proposed Keystone XL Pipeline", was written solely by Dr. John Stansbury who is solely responsible for its contents. Dr. Stansbury is employed by the University of Nebraska, but the report** does not represent the opinion or views of the University or the UNL Water Center.

The purpose of the report is to provide decision-makers (e.g., State Legislators, Congressmen, State Department representatives) an independent and unbiased assessment, based on available data, of the magnitude and impacts of potential worst-case spills from the Keystone XL pipeline. The intended use of this report is neither to lobby for or against the proposed pipeline. Rather it is intended to provide unbiased information to decision-makers to assist them in making informed decisions regarding the pipeline.

Any questions or comments regarding this report should be directed to Dr. Stansbury (jstansbury2@unl.edu).

TransCanada Keystone Pipeline, LP
South Dakota Property Taxes
Tax Years 2011 - 2013

Attachment: BN-Int59

Tax Year / Year of Payment	2013 / 2014	2012 / 2013	2011 / 2012	2010 / 2011	2009 / 2010	
County						**Total**
Beadle County Treasurer	481,173	500,931	484,184	318,178	12,264	1,796,731
Brookings County Treasurer	2,200	1,430	1,289	815		5,734
Butte County Treasurer *	732	671				1,403
Clark County Treasurer	472,587	398,157	372,013	359,646		1,602,403
Day County Treasurer	579,830	494,120	448,391	464,958	307,424	2,294,723
Haakon County Treasurer *	33	22	22			77
Hanson County Treasurer	184,180	152,425	138,847	152,109		627,561
Harding County Treasurer *	135	140	99			375
Hutchinson County Treasurer	604,009	518,362	461,516	424,505	7,007	2,015,399
Jones County Treasurer *	34	32	31			98
Kingsbury County Treasurer	257,392	224,234	203,991	169,585		855,201
Marshall County Treasurer	353,389	305,527	271,177	286,611	316,713	1,533,417
McCook County Treasurer	163,775	136,149	129,241	139,426		568,591
Meade County Treasurer *	300	290	291			881
Miner County Treasurer	526,953	452,323	409,046	391,047	3,042	1,782,412
Tripp County Treasurer *	1,053	938	447			2,439
Yankton County Treasurer	309,181	251,379	225,512	247,966	6,744	1,040,782
	3,936,956	3,437,130	3,146,097	2,954,846	653,194	14,128,224

Per Docket HP07-001, TransCanada had originally estimated that the first full year of operations would produce a property tax liability of $6.5 Million state-wide. An estimate by county was not provided.

* These payments represent the property taxes on land currently owned at proposed Keystone XL pump station sites.

TransCanada Keystone Pipeline, LP
South Dakota Property Taxes
Tax Years 2011 - 2013

Attachment: S-F107_08

Tax Year / Year of Payment	2013 / 2014	2012 / 2013	2011 / 2012	2010 / 2011	2009 / 2010	Total
County						
Beadle County Treasurer	481,173	500,931	484,184	318,178	12,264	1,796,731
Brookings County Treasurer	2,200	1,430	1,289	815		5,734
Butte County Treasurer *	732	671				1,403
Clark County Treasurer	472,587	398,157	372,013	359,646		1,602,403
Day County Treasurer	579,830	494,120	448,391	464,958	307,424	2,294,723
Haakon County Treasurer *	33	22	22			77
Hanson County Treasurer	184,180	152,425	138,847	152,109		627,561
Harding County Treasurer *	135	140	99			375
Hutchinson County Treasurer	604,009	518,362	461,516	424,505	7,007	2,015,399
Jones County Treasurer *	34	32	31			98
Kingsbury County Treasurer	257,392	224,234	203,991	169,585		855,201
Marshall County Treasurer	353,389	305,527	271,177	286,611	316,713	1,533,417
McCook County Treasurer	163,775	136,149	129,241	139,426		568,591
Meade County Treasurer *	300	290	291			881
Miner County Treasurer	526,953	452,323	409,046	391,047	3,042	1,782,412
Tripp County Treasurer *	1,053	938	447			2,439
Yankton County Treasurer	309,181	251,379	225,512	247,966	6,744	1,040,782
	3,936,956	3,437,130	3,146,097	2,954,846	653,194	14,128,224

* These payments represent the property taxes on land currently owned at proposed Keystone XL pump station sites.

TransCanada Keystone Pipeline, LP
South Dakota Property Taxes
Tax Years 2011 - 2013

Attachment: DRA-Int84

Tax Year / Year of Payment	2013 / 2014	2012 / 2013	2011 / 2012	2010 / 2011	2009 / 2010	Total
County						
Beadle County Treasurer	481,173	500,931	484,184	318,178	12,264	1,796,731
Brookings County Treasurer	2,200	1,430	1,289	815		5,734
Butte County Treasurer *	732	671				1,403
Clark County Treasurer	472,587	398,157	372,013	359,646		1,602,403
Day County Treasurer	579,830	494,120	448,391	464,958	307,424	2,294,723
Haakon County Treasurer *	33	22	22			77
Hanson County Treasurer	184,180	152,425	138,847	152,109		627,561
Harding County Treasurer *	135	140	99			375
Hutchinson County Treasurer	604,009	518,362	461,516	424,505	7,007	2,015,399
Jones County Treasurer *	34	32	31			98
Kingsbury County Treasurer	257,392	224,234	203,991	169,585		855,201
Marshall County Treasurer	353,389	305,527	271,177	286,611	316,713	1,533,417
McCook County Treasurer	163,775	136,149	129,241	139,426		568,591
Meade County Treasurer *	300	290	291			881
Miner County Treasurer	526,953	452,323	409,046	391,047	3,042	1,782,412
Tripp County Treasurer *	1,053	938	447			2,439
Yankton County Treasurer	309,181	251,379	225,512	247,966	6,744	1,040,782
	3,936,956	3,437,130	3,146,097	2,954,846	653,194	14,128,224

Per Docket HP07-001, TransCanada had originally estimated that the first full year of operations would produce a property tax liability of $6.5 Million state-wide. An estimate by county was not provided.

* These payments represent the property taxes on land currently owned at proposed Keystone XL pump station sites.

TransCanada Keystone Pipeline, LP
South Dakota Property Taxes
Tax Years 2011 - 2013

Attachment: IEN-Int106

Tax Year / Year of Payment	2013 / 2014	2012 / 2013	2011 / 2012	2010 / 2011	2009 / 2010	Total
County						
Beadle County Treasurer	481,173	500,931	484,184	318,178	12,264	1,796,731
Brookings County Treasurer	2,200	1,430	1,289	815		5,734
Butte County Treasurer *	732	671				1,403
Clark County Treasurer	472,587	398,157	372,013	359,646		1,602,403
Day County Treasurer	579,830	494,120	448,391	464,958	307,424	2,294,723
Haakon County Treasurer *	33	22	22			77
Hanson County Treasurer	184,180	152,425	138,847	152,109		627,561
Harding County Treasurer *	135	140	99			375
Hutchinson County Treasurer	604,009	518,362	461,516	424,505	7,007	2,015,399
Jones County Treasurer *	34	32	31			98
Kingsbury County Treasurer	257,392	224,234	203,991	169,585		855,201
Marshall County Treasurer	353,389	305,527	271,177	286,611	316,713	1,533,417
McCook County Treasurer	163,775	136,149	129,241	139,426		568,591
Meade County Treasurer *	300	290	291			881
Miner County Treasurer	526,953	452,323	409,046	391,047	3,042	1,782,412
Tripp County Treasurer *	1,053	938	447			2,439
Yankton County Treasurer	309,181	251,379	225,512	247,966	6,744	1,040,782
	3,936,956	3,437,130	3,146,097	2,954,846	653,194	14,128,224

* These payments represent the property taxes on land currently owned at proposed Keystone XL pump station sites.

TransCanada Keystone Pipeline, LP
South Dakota Property Taxes
Tax Years 2011 - 2013

Attachment: IEN-Int87

Tax Year / Year of Payment	2013 / 2014	2012 / 2013	2011 / 2012	2010 / 2011	2009 / 2010	
County						**Total**
Beadle County Treasurer	481,173	500,931	484,184	318,178	12,264	1,796,731
Brookings County Treasurer	2,200	1,430	1,289	815		5,734
Butte County Treasurer *	732	671				1,403
Clark County Treasurer	472,587	398,157	372,013	359,646		1,602,403
Day County Treasurer	579,830	494,120	448,391	464,958	307,424	2,294,723
Haakon County Treasurer *	33	22	22			77
Hanson County Treasurer	184,180	152,425	138,847	152,109		627,561
Harding County Treasurer *	135	140	99			375
Hutchinson County Treasurer	604,009	518,362	461,516	424,505	7,007	2,015,399
Jones County Treasurer *	34	32	31			98
Kingsbury County Treasurer	257,392	224,234	203,991	169,585		855,201
Marshall County Treasurer	353,389	305,527	271,177	286,611	316,713	1,533,417
McCook County Treasurer	163,775	136,149	129,241	139,426		568,591
Meade County Treasurer *	300	290	291			881
Miner County Treasurer	526,953	452,323	409,046	391,047	3,042	1,782,412
Tripp County Treasurer *	1,053	938	447			2,439
Yankton County Treasurer	309,181	251,379	225,512	247,966	6,744	1,040,782
	3,936,956	3,437,130	3,146,097	2,954,846	653,194	14,128,224

* These payments represent the property taxes on land currently owned at proposed Keystone XL pump station sites.

TransCanada Keystone Pipeline, LP
South Dakota Property Taxes
Tax Years 2011 - 2013

Attachment: S-107

Tax Year / Year of Payment	2012 / 2013	2011 / 2012	2010 / 2011	Total
County				
Beadle County Treasurer	500,931	484,184	318,178	1,303,293
Brookings County Treasurer	1,430	1,289	815	3,534
Butte County Treasurer *	671			671
Clark County Treasurer	398,157	372,013	359,646	1,129,816
Day County Treasurer	494,120	448,391	464,958	1,407,469
Haakon County Treasurer *	22	22		44
Hanson County Treasurer	152,425	138,847	152,109	443,381
Harding County Treasurer *	140	99		240
Hutchinson County Treasurer	518,362	461,516	424,505	1,404,383
Jones County Treasurer *	32	31		63
Kingsbury County Treasurer	224,234	203,991	169,585	597,810
Marshall County Treasurer	305,527	271,177	286,611	863,315
McCook County Treasurer	136,149	129,241	139,426	404,816
Meade County Treasurer *	290	291		581
Miner County Treasurer	452,323	409,046	391,047	1,252,416
Tripp County Treasurer *	938	447		1,385
Yankton County Treasurer	251,379	225,512	247,966	724,857
	3,437,130	3,146,097	2,954,846	14,128,224

Per Docket HP07-001, TransCanada had originally estimated that the first full year of operations would produce a property tax liability of $6.5 Million state-wide. An estimate by county was not provided.

* These payments represent the property taxes on land currently owned at proposed Keystone XL pump station sites.

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

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	Docket HP14-001 **DAKOTA RURAL ACTION'S FIRST REQUEST FOR PRODUCTION OF DOCUMENTS TO TRANSCANADA KEYSTONE PIPELINE, LP**

Party-Intervenor Dakota Rural Action ("DRA"), pursuant to SDCL § 15-6-34, hereby requests that Petitioner TransCanada Keystone Pipeline, LP ("TransCanada") produce the following-described documents and other tangible things for inspection and copying at the offices of Martinez Madrigal & Machicao, LLC, 616 West 26th Street, Kansas City, Missouri 64108, or at a mutually agreeable location, during the usual hours of business, within the response date set forth in the Public Utilities Commission's Order in the above-captioned dated December 17, 2014.

Definitions

1. All words and phrases used in these requests for production of documents shall have their ordinary English meaning, except as otherwise defined herein.

2. The terms "you" or "your" mean TransCanada, its general partner(s) and Affiliates, and its agents, representatives, servants, attorneys, and any other individual or entity acting on its behalf.

3. The term "Affiliates" means TransCanada Corporation, TransCanada PipeLines Limited, TransCanada PipeLine USA Ltd., TransCanada Oil Pipelines Inc., TransCanada American Investments Ltd., TransCanada Keystone Pipeline, LLC, 701671 Alberta Ltd., TransCanada Energy Ltd., and Nova Gas Transmission Ltd.; the term "Affiliates" also means those additional subsidiary entities of TransCanada Corporation including, but not limited to TransCanada Hydro Northeast Inc., TransCanada Power Marketing, Ltd., Iroquois Gas Transmission System, L.P., Northern Border Pipeline Company, ANR Pipeline Company, Gas Transmission Northwest Corporation, TC Pipelines, LP, Great Lakes Gas Transmission Limited Partnership, Tuscarora Gas Transmission Company, Portland Natural Gas Transmission System, Bison Pipeline LLC, GTN LLC, Bruce Power A L.P., Bruce Power L.P., Trans Quebec & Maritimes Pipeline Inc., CrossAlta Gas Storage & Services Ltd., and TransGas de Occidente S.A., Foothills Pipe Lines, Ltd.

4. The term "person" includes natural persons and business entities, including corporations, trusts, partnerships, joint ventures, and any other association or group of persons.

5. The term "regarding," "reflecting," or "relating to" mean with respect to the subject matter of the interrogatory, explicitly or implicitly mentioning or dealing with the subject matter, demonstrating, evidencing, showing, concerning, explaining, elaborating upon, or providing any information whatsoever with respect to the subject matter referenced.

6. The term "Petition" means the Petition filed by TransCanada with the Public Utilities Commission of the State of South Dakota, Docket No. HP14-001, captioned *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.*

7. The terms "KXL Pipeline" or "Project" mean the Keystone XL Pipeline project, a portion of which is proposed to be constructed in South Dakota.

8. The term "DRA" means Dakota Rural Action.

9. The term "Commission" means the Public Utilities Commission of the State of South Dakota.

10. The words "describe in detail," or words of similar import, mean to state separately all factual bases for the allegation requested to be described and/or to give a detailed description of the thing, event, or entity asked to be described, including (a) the identity of each personal having any knowledge of each fact or opinion relating to the allegation, thing, event, or entity to be described; (b) the identity of each document evidencing or relating to the answer given; and (c) all relevant dates or time periods.

11. The term "document" is to be interpreted in the broadest sense permitted under the South Dakota Rules of Civil Procedure codified in SDCL Title 15, and includes tangible things and any media upon which information is recorded, stored, or placed, including without limitation, writings, e-mails, drawings, graphs, charts, photographs, and other data compilations from which information can be obtained and translated, if necessary, through detection devices into reasonably usable form.

12. The terms "communicate" and "communication" mean any disclosure, transfer or exchange of information, by any means or manner, including without limitation, any correspondence, writing, memorandum, facsimile transmission, telephone conversation, oral conversation, electronic (e-mail) or computer messages or other electronic transmission.

13. The term "identify" means:

a. with respect to a natural person, state the person's full name, present address, and telephone number (or, if unknown, the last known address and telephone number), and

the name, address, and telephone number of the person's present employer (or, if unknown, the name, address, and telephone number of the last know employer);

b. with respect to a person other than a natural person, state the full name of the entity, the type of entity identified, its present business address and telephone number, and the names of its officers or managing partners; and

c. with respect to a document or communication, provide a description of the document and its contents and purpose, and state the full name of the person(s) who received the document, the date of the document's creation or formulation, and the name, address, and telephone number of its present custodian.

14. The singular shall include the plural, and vice versa, and words of either gender shall include both genders.

Instructions

1. This request for production extends to all documents and other tangible things in the possession of TransCanada, or subject to the custody and control of any of its agents or Affiliates.

2. You are required to serve upon DRA's attorneys written Responses, which shall state with respect to each Request for Production that the requested documents will be produced, except to the extent that you make written objections to particular items, stating the specific legal basis for each objection. If you do not produce any documents in response to a Request for Production, please so indicate in the written response.

3. Each of these requests is deemed to be a continuing discovery request and in the event that later you obtain any documents or tangible things response to these requests, please promptly amend your written responses to these requests and produce such additional documents or tangible things.

4. Please organize and label each document to correspond with the Request number to which the documents respond to, or produce each document in the file in which it is kept in the usual course of business.

5. If you claim that any document or tangible thing requested in these requests is protected from disclosure by virtue of privilege, work product doctrine, or otherwise, please describe the nature of the communication, documents or things not produced or disclosed in a manner that allows DRA and the Commission to assess the applicability of the privilege or protection, including, the date and names of the individuals drafting, sending or receiving each communication or document, the date each communication or document as drafted, sent or received, the number of pages or length of each communication or document, the general nature of the information communicated or documented, and a statement of the privilege claims.

6. If any document or tangible thing was, but is no longer, in your possession, subject to your control, or in existence, state:

a. Whether it is missing or lost, and if so, the name and current address and phone number of the persons who have knowledge of it;

b. Whether it has been destroyed, and if so, the circumstances under which it was destroyed and the name and current address and phone number of the persons who destroyed it or who have knowledge of its destruction;

c. Whether it has been transferred voluntarily or involuntarily, and in each instance explain the circumstances surrounding the authorization for each disposition and state the date or approximate date of its disposition; and

d. The identity of the person who has possession, custody, or control of the document.

REQUESTS FOR PRODUCTION

1. All documents identified or referred to in your Answers to DRA's First Interrogatories to you. *[Applicable Finding or Condition No.: all]*

2. All documents and correspondence presented to any expert in connection with the above-captioned proceedings, or received from any expert, including but not limited to emails, letters, engagement documents, resumes, curriculum vitaes, reports, analysis, spreadsheets, schedules, and any drafts thereof. *[Applicable Finding or Condition No.: all]*

3. The most recent resume or curriculum vitae of each expert whom you expect to call as an expert witness at the hearing before the Commission. *[Applicable Finding or Condition No.: all]*

4. The written reports of experts who are expected to testify on behalf of TransCanada. *[Applicable Finding or Condition No.: all]*

5. All correspondence between TransCanada or its Affiliates and the Commission or Commission staff concerning the Project. *[Applicable Finding or Condition No.: all]*

6. All documents concerning production and transportation of crude oil from the Williston Basin area, including but not limited to, projections of crude oil supply to be transported via the proposed Project, and any agreements or commitments entered into with oil producers and refiners with respect to any production from the Williston Basin area. *[Applicable Finding or Condition No.: Finding 14]*

7. All documents concerning a change in routing of the Project between 2010 and the present date, including but not limited to, any parcel maps showing the precise location of the proposed Project through South Dakota. *[Applicable Finding or Condition No.: Finding 16]*

8. All documents setting forth TransCanada's proposed construction schedule for the Project, and all contracts for construction of the proposed Project and all contracts or other documents relating to commitments made with respect to the Project by shippers. *[Applicable Finding or Condition No.: Finding 17]*

9. All documents concerning the decision to use API 5L X70M high-strength steel for the Project in lieu of API 5L X80M high-strength steel. *[Applicable Finding or Condition No.: Finding 18]*

10. All documents concerning the decision to use fusion-bonded epoxy (FBE) coating on the proposed pipeline, including but not limited to, contracts or other agreements with the manufacturer of the FBE product, and any communications between TransCanada and such manufacturer. *[Applicable Finding or Condition No.: Finding 18]*

11. All documents, including internal communications between TransCanada's or its Affiliates' staff, consultants, advisors, or other parties concerning the appropriate pipeline operating pressure for the Project. *[Applicable Finding or Condition No.: Finding 19]*

12. All documents showing location of power lines for pumping stations proposed for the Project, the location of proposed pumping stations and mainline valves for the Project in South Dakota, and including, but not limited to all communications between TransCanada's or its Affiliates' staff, consultants, advisors, or other parties concerning location and operation of pumping stations, mainline valves, and the proposed conversion of valves to remote control operations. *[Applicable Finding or Condition No.: Finding 20]*

13. All documents concerning compliance by TransCanada with 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"), including but not limited to any and all communications between TransCanada's or its Affiliates' staff, consultants, advisors, or other parties, and PHMSA, DOS, or other federal agencies concerning regulatory compliance, approvals, or waivers of applicable regulations with respect to the Project. *[Applicable Finding or Condition No.: Finding 22]*

14. All documents concerning the increase in projected costs for the Project, including but not limited to draft or final budgets, pro-formas, estimated cost schedules, and communications between TransCanada's or its Affiliates' staff, consultants, advisors, or other parties regarding the increased estimated costs of the Project. *[Applicable Finding or Condition No.: Finding 23]*

15. All documents setting forth forecasts of "additional crude oil production from the WCSB" and Williston Basin, including any documents discussing the impact of current low oil prices on such forecasts. *[Applicable Finding or Condition No.: Finding 24]*

16. All documents setting forth binding shipper commitments to utilize the Project. *[Applicable Finding or Condition No.: Finding 24]*

17. All documents, including but not limited to communications between TransCanada's or its Affiliates' staff, consultants, advisors, or other parties discussing or containing information stating or indicating that existing or new refineries will import less crude oil and, instead, replace it with crude oil transported via the Project. *[Applicable Finding or Condition No.: Finding 24]*

18. All documents discussing or setting forth TransCanada's or its Affiliates' forecasts of US demand for petroleum products. *[Applicable Finding or Condition No.: Finding 25]*

19. All documents setting forth or discussing whether or if crude oil from the WCSB is sold at a "significant discount" from other sources. *[Applicable Finding or Condition No.: Finding 27]*

20. All documents setting forth, discussing, or describing whether or if shipment of crude oil via the Project will replace rail transportation for crude oil shipments from the WCSB. *[Applicable Finding or Condition No.: Finding 27]*

21. All documents setting forth binding commitments from shippers to use the Project, including but not limited to copies of contracts between TransCanada (and its Affiliates) and such shippers. *[Applicable Finding or Condition No.: Finding 29]*

22. All documents describing soil types and conditions along the currently-proposed Project route through South Dakota. *[Applicable Finding or Condition No.: Finding 33]*

23. All documents describing, discussing, or setting forth plans for the Project to cross perennial streams and rivers, intermittent streams, and ephemeral streams in South Dakota, including but not limited to all documents concerning the methodology used by TransCanada (and its Affiliates) or its agents in determining construction plans for the Project across such waterways. *[Applicable Finding or Condition No.: Finding 41]*

24. All documents concerning the reduction in the length of the proposed Project potentially affecting High Consequence Areas. *[Applicable Finding or Condition No.: Finding 50]*

25. All documents concerning TransCanada's (or its Affiliates') decision to withdraw its request to the PHMSA for a special permit referenced in Finding 60. *[Applicable Finding or Condition No.: Finding 60]*

26. All documents containing information concerning the failure of FBE coating referenced in the update to Finding 68. *[Applicable Finding or Condition No.: Finding 68]*

27. All documents containing information concerning construction/reclamation unit mapping referenced in Finding 80, including but not limited to the construction/reclamation unit mapping. *[Applicable Finding or Condition No.: Finding 80]*

28. All documents containing information regarding TransCanada's (or its Affiliates') decision to use horizontal directional drilling to cross waterways, including but not limited to all documents discussing or describing the decision-making process engaged in to determine which waterways would be crossed using horizontal directional drilling. *[Applicable Finding or Condition No.: Finding 83]*

29. All documents, including but not limited to forecasts and projections of tax revenue accruing to the State of South Dakota should construction and operation of the Project commence. *[Applicable Finding or Condition No.: Finding 107]*

30. All documents evidencing TransCanada's or its Affiliates' compliance efforts with applicable laws and regulations related to construction and operation of the Project. *[Applicable Finding or Condition No.: Condition 1]*

31. All documents concerning TransCanada's or its Affiliates' efforts to obtain and comply with applicable permitting referenced in Condition 2, including but not limited to copies of any permits obtained. *[Applicable Finding or Condition No.: Condition 2]*

32. All documents concerning TransCanada's or its Affiliates' compliance with the recommendations set forth the DOS's Final Environmental Impact Statement, including but not limited to documents discussing or concerning compliance with Section 106 of the National Historic Preservation Act. *[Applicable Finding or Condition No.: Condition 3]*

33. All documents concerning or discussing proposed adjustments or deviations in the route of the Project, including but not limited to copies of notices to affected land owners. *[Applicable Finding or Condition No.: Condition 6]*

34. All documents concerning the appointment of a public liaison officer by TransCanada for the Project, and all documents containing information regarding communications between the public liaison officer and landowners affected by the Project. *[Applicable Finding or Condition No.: Condition 7]*

35. All documents containing information with respect to contacts or communications with state, county and municipal emergency response, law enforcement and highway, road and other infrastructure management agencies regarding the Project. *[Applicable Finding or Condition No.: Condition 10]*

36. All documents containing information concerning TransCanada's or its Affiliates' efforts to comply with mitigation measures set forth in the Construction Mitigation and Reclamation Plan submitted to the Commission. *[Applicable Finding or Condition No.: Condition 13]*

37. All documents containing information regarding consultations, including but not limited to communications, with Natural Resources Conservation Services ("NRCS") regarding development of construction/reclamation units ("Con/Rec Units"). *[Applicable Finding or Condition No.: Condition 15]*

38. All Con/Rec Units developed in connection with the Project, including but not limited to drafts and supporting studies or documents. *[Applicable Finding or Condition No.: Condition 15]*

39. All documents provided to landowners affected by the Project explaining trenching and topsoil and subsoil/rock removal, segregation and restoration methods for their property. *[Applicable Finding or Condition No.: Condition 16]*

40. All documents containing information regarding trucking or hauling contractors to be used in construction of the Project, including but not limited to agreements with such trucking or hauling contractors. *[Applicable Finding or Condition No.: Condition 17]*

41. All documents containing information or describing the methodology to be used by TransCanada (or its Affiliates) for valuing trees. *[Applicable Finding or Condition No.: Condition 19]*

42. All documents containing information regarding consultations between TransCanada (or its Affiliates) and South Dakota Game, Fish and Parks. *[Applicable Finding or Condition No.: Condition 20(c)]*

43. All documents describing the development of frac-out plans in areas where horizontal directional drilling will occur in connection with the Project, including but not limited to any frac-out plans developed. *[Applicable Finding or Condition No.: Condition 21]*

44. All documents describing or containing information regarding TransCanada's or its Affiliates' efforts to comply with conditions regarding construction of the Project near wetlands, water bodies, and riparian areas, such documents including but not limited to compliance plans, construction plans, mitigation plans, and communications with any regulatory agency in such regard. *[Applicable Finding or Condition No.: Condition 22]*

45. All documents containing or referencing adverse weather land protection plans developed in connection with the Project. *[Applicable Finding or Condition No.: Condition 25]*

46. All documents that reference or identify private and new access roads to be used or required during construction of the Project. *[Applicable Finding or Condition No.: Condition 28]*

47. All documents referencing or containing information regarding winterization plans provided to landowners affected by the Project, including but not limited to plan(s) developed. *[Applicable Finding or Condition No.: Condition 29]*

48. All documents referencing agreements reached with landowners, including but not limited to any agreements reached with landowners modifying any requirements or conditions established by the Commission in connection with the Project. *[Applicable Finding or Condition No.: Condition 30]*

49. All documents containing information regarding compliance by shippers with crude oil specifications. *[Applicable Finding or Condition No.: Condition 31]*

50. All documents containing information regarding assessments performed in connection with your activities in "high consequence areas", including but not limited to documents referencing efforts by you to comply with 49 C.F.R. Part 195, and any communications or consultations with the South Dakota Geological Survey, the Department of Game Fish and Parks

("SDGFP"), affected landowners and government officials. *[Applicable Finding or Condition No.: Condition 34]*

51. All documents where you have identified hydrologically sensitive areas as required by Condition Number 35. *[Applicable Finding or Condition No.: Condition 35]*

52. All documents containing information regarding noise-producing facilities in connection with the Project, including but not limited to any studies conducted regarding noise levels, and any noise mitigation measures. *[Applicable Finding or Condition No.: Condition 39]*

53. All documents containing information regarding TransCanada's or its Affiliates' efforts to comply with protection and mitigation requirements of the US Fish and Wildlife Service ("USFWS") and SDGFP with respect to any endangered species. *[Applicable Finding or Condition No.: Condition 41]*

54. All documents containing information or details regarding location of drain tiles, including but not limited to all documents containing information regarding the potential for drain tiles to operate as conduits for contaminants in connection with construction or operation of the Project. *[Applicable Finding or Condition No.: Condition 42]*

55. All documents referencing or containing information concerning cultural or paleontological resources along the Project route, including but not limited to all documents identifying cultural and paleontological resources, consultations and communications with the Bureau of Land Management and Museum of Geology at the South Dakota School of Mines and Technology. *[Applicable Finding or Condition No.: Condition 44]*

56. The incident reports for each and every spill or leak related to a pipeline operated by TransCanada and its Affiliates since January 1, 2010. *[Applicable Finding or Condition No.: Findings 12(2)-(3), 41-45, 47, 103; Conditions 32-38]*

Dated this 6th day of January, 2015.

Respectfully submitted,

/s/ Bruce Ellison

Bruce Ellison
518 6th Street #6
Rapid City, South Dakota 57701
Telephone: (605) 348-1117
Email: belli4law@aol.com

and

MARTINEZ MADRIGAL & MACHICAO, LLC

By: */s/ Robin S. Martinez*

Robin S. Martinez, MO #36557/KS #23816
616 West 26th Street
Kansas City, Missouri 64108
816.979.1620 phone
888.398.7665 fax
Email: robin.martinez@martinezlaw.net

Attorneys for Dakota Rural Action

CERTIFICATE OF SERVICE

I hereby certify that on this 7th day of April 2015, the foregoing document on behalf of Dakota Rural Action in Case Number HP 14-001, was filed on the Public Utilities Commission of the State of South Dakota e-filing website. Also on this day, a true and accurate copy of the foregoing was transmitted via email to the following:

Patricia Van Gerpen
Executive Director
South Dakota Public Utilities Commission
500 E. Capitol Ave.
Pierre, SD 57501
patty.vangerpen@state.sd.us

Kristen Edwards
Staff Attorney
South Dakota Public Utilities Commission
500 E. Capitol Ave.
Pierre, SD 57501
Kristen.edwards@state.sd.us

Brian Rounds
Staff Analyst
South Dakota Public Utilities Commission
500 E. Capitol Ave.
Pierre, SD 57501
brian.rounds@state.sd.us

Darren Kearney
Staff Analyst
South Dakota Public Utilities Commission
500 E. Capitol Ave.
Pierre, SD 57501
darren.kearney@state.sd.us

James E. Moore
Woods, Fuller, Shultz and Smith P.C.
PO Box 5027
Sioux Falls, SD 57117
james.moore@woodsfuller.com
Attorney for TransCanada Keystone Pipeline, LP

Bill G. Taylor
Woods, Fuller, Shultz and Smith P.C.
PO Box 5027
Sioux Falls, SD 57117
bill.taylor@woodsfuller.com
Attorney for TransCanada Keystone Pipeline, LP

Paul F. Seamans
27893 249th St.
Draper, SD 57531
jacknife@goldenwest.net

John H. Harter
28125 307th Ave.
Winner, SD 57580
johnharter11@yahoo.com

Elizabeth Lone Eagle
PO Box 160
Howes, SD 57748
bethcbest@gmail.com

Tony Rogers
Rosebud Sioux Tribe - Tribal Utility Commission
153 S. Main St.
Mission, SD 57555
tuc@rosebudsiouxtribe-nsn.gov

Viola Waln
PO Box 937
Rosebud, SD 57570
walnranch@goldenwest.net

Jane Kleeb
Bold Nebraska
1010 N. Denver Ave.
Hastings, NE 68901
jane@boldnebraska.org

Benjamin D. Gotschall
Bold Nebraska
6505 W. Davey Rd.
Raymond, NE 68428
ben@boldnebraska.org

Byron T. Steskal & Diana L. Steskal
707 E. 2nd St.
Stuart NE 68780
prairierose@nntc.net

Cindy Myers, R.N.
PO Box 104
Stuart, NE 68780
csmyers77@hotmail.com

Arthur R. Tanderup
52343 857th Rd.
Neligh, NE 68756
atanderu@gmail.com

Lewis GrassRope
PO Box 61
Lower Brule, SD 57548
wisestar8@msn.com

Carolyn P. Smith
305 N. 3rd St.
Plainview, NE 68769
peachie_1234@yahoo.com

Robert G. Allpress
46165 Badger Rd.
Naper, NE 68755
bobandnan2008@hotmail.com

Jeff Jensen
14376 Laflin Rd.
Newell, SD 57760
jensen@sdplains.com

Louis T. Genung
902 E. 7th St.
Hastings, NE 68901
tg64152@windstream.net

Peter Capossela, P.C.
Attorney at Law
PO Box 10643
Eugene, OR 97440
pcapossela@nu-world.com
Attorney for Standing Rock Sioux Tribe

Nancy Hilding
6300 W. Elm
Black Hawk, SD 57718
nhilshat@rapidnet.com

Gary F. Dorr
27853 292nd
Winner, SD 57580
gfdorr@gmail.com

Bruce & RoxAnn Boettcher
Boettcher Organics
86061 Edgewater Ave.
Bassett, NE 68714
boettcherann@abbnebraska.com

Wrexie Lainson Bardaglio
9748 Arden Rd.
Trumansburg, NY 14886
wrexie.bardaglio@gmail.com

Cyril Scott
President
Rosebud Sioux Tribe
PO Box 430
Rosebud, SD 57570
cscott@gwtc.net

Eric Antoine
Attorney
Rosebud Sioux Tribe
PO Box 430
Rosebud, SD 57570
ejantoine@hotmail.com

Paula Antoine
Sicangu Oyate Land Office Coordinator
Rosebud Sioux Tribe
PO Box 658
Rosebud, SD 57570

Chris Hesla
South Dakota Wildlife Federation
PO Box 7075
Pierre, SD 57501
sdwf@mncomm.com

wopila@gwtc.net
paula.antoine@rosebudsiouxtribe-nsn.gov

Harold C. Frazier
Chairman
Cheyenne River Sioux Tribe
PO Box 590
Eagle Butte, SD 57625
haroldcfrazier@yahoo.com

Amy Schaffer
PO Box 114
Louisville, NE 68037
amyannschaffer@gmail.com

Debbie J. Trapp
24952 US HWY 14
Midland, SD 57552
mtdt@goldenwest.net

Gena M. Parkhurst
2825 Minnewasta Place
Rapid City, SD 57702
gmp66@hotmail.com

Joye Braun
PO Box 484
Eagle Butte, SD 57625
jmbraun57625@gmail.com

Robert Flying Hawk, Chairman
Yankton Sioux Tribe
PO Box 1153
Wagner, SD 57380
Robertflyinghawk@gmail.com

Thomasina Real Bird
Fredericks Peebles & Morgan LLP
1900 Plaza Dr.
Louisville, CO 80027
trealbird@ndnlaw.com
Attorney for Yankton Sioux Tribe

Chastity Jewett
1321 Woodridge Dr.
Rapid City, SD 57701
chasjewett@gmail.com

Douglas Hayes
Sierra Club
Ste. 102W
1650 38th St.
Boulder, CO 80301
doug.hayes@sierraclub.org

Duncan Meisel
350.org
20 Jay St. #1010
Brooklyn, NY 11201
duncan@350.org

Tom BK Goldtooth
Indigenous Environmental Network (IEN)
PO Box 485
Bemidji, MN 56619
ien@igc.org

Dallas Goldtooth
38371 Res. HWY 1
Morton, MN 56270
goldtoothdallas@gmail.com

Robert P. Gough, Secretary
Intertribal Council on Utility Policy
PO Box 25
Rosebud, SD 57570
bobgough@intertribalCOUP.org

Terry & Cheryl Frisch
47591 875th Rd.
Atkinson, NE 68713
tcfrisch@q.com

Tracey Zephier
Fredericks Peebles & Morgan LLP
910 5th Street, Suite 104
Rapid City, SD 57701
tzephier@ndnlaw.com
Attorney for Cheyenne River Sioux Tribe

Matthew L. Rappold
Rappold Law Office
816 Sixth Street
PO Box 873
Rapid City, SD 57709
Matt.rappold01@gmail.com
Attorney for Rosebud Sioux Tribe, Intervenor

Ms. Mary Turgeon Wynne, Esq.
Rosebud Sioux Tribe - Tribal Utility Commission
153 S. Main St
Mission, SD 57555
tuc@rosebudsiouxtribe-nsn.gov

Ms. Kimberly E. Craven
3560 Catalpa Way
Bouleder, CO 80304
kimcraven@gmail.com

Bonny Kilmurry
47798 888 Rd.
Atkinson, NE 68713
jackiekilmurry@yahoo.com

And on April 7, 2015, a true and accurate copy of the foregoing was mailed via U.S. Mail, first class postage prepaid, to the following:

Jerry Jones
22584 US HWY 14
Midland SD 57552

Ronald Fees
17401 Fox Ridge Rd.
Opal, SD 57758

Elizabeth Lone Eagle
PO Box 160
Howes, SD 57748

/s/ *Robin S. Martinez*
Attorney for Dakota Rural Action