BEFORE THE
PUBLIC UTILITIES COMMISSION
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

PREFILED TESTIMONY OF JENNY HUDSON
ON BEHALF OF THE COMMISSION STAFF
APRIL 2, 2015

Q. Please state your name and business address.

A. My name is Jenny Hudson. My business address is 28100 Torch Parkway, Warrenville, Illinois, 60555.

Q. By whom are you employed and in what capacity?

A. I am employed as a Vice President-Senior Project Manager by EN Engineering, an engineering and consulting firm specializing in pipeline design, codes compliance, integrity and automation services for the oil and gas industry.

Q. Please describe your educational background and professional experience.

A. I hold a B.S. degree in Geological Engineering from the University of Missouri-Rolla. Additionally, I am a registered Professional Engineer in the State of Illinois as well as a registered NACE Cathodic Protection Technologist.

My professional experience consists of employment in the pipeline industry with EN Engineering and previously with Nicor Gas. While at Nicor Gas I had roles in the Storage Department as well as in the Corrosion Control Department. At EN Engineering, my responsibilities have been focused in the areas of pipeline integrity, codes compliance and corrosion control. Additionally, I am a member of several industry technical committees. My resume is included in Exhibit___JH-1.

Q. On whose behalf was this testimony prepared?

A. This testimony was prepared on behalf of the Staff of the South Dakota Public Utilities Commission (Staff).

Q. Please state the purpose of your testimony in this proceeding.

A. There are three main objectives of the Staff in this testimony. First, to ensure that the proposed changes to the Findings of Fact in the Decision, as identified by TransCanada Keystone Pipeline's (the Applicant) Tracking Table of Changes, comply with the Federal Pipeline Safety Regulations 49CFR 195, Transportation of Hazardous Liquids by Pipeline. Secondly, the objective is to ensure that the Applicant has met any new requirements imposed by the Federal Pipeline Safety Regulations 49CFR 195 since the Amended Final Decision and Order was issued on June 29, 2010 with respect to the application for a permit (Permit) to construct and operate a crude oil pipeline in South Dakota. Lastly, the objective is to ensure that the amended permit conditions, and any project changes, are still able to meet the conditions upon which the permit was issued, specifically focusing on pipeline design, integrity management and compliance with PHMSA regulations (49CFR 195).

This testimony deals specifically with changes to Federal Pipeline Safety Regulations 49CFR 195 since the Amended Final Decision and Order was issued and project changes specific to the area of Integrity Management (§195.452).

Q. Please describe any changes to federal pipeline safety regulations since the Amended Final Decision and Order was issued on June 29, 2010.

A. Since the proposed Keystone Pipeline is a hazardous liquid pipeline, I will describe any changes to Part 195 – Transportation of Hazardous Liquids by Pipeline.

As part of Amendment 195-94, which went into effect October 1, 2010, section 195.207 was added as a new section covering the transportation of pipe by railroad, ship or barge. This amendment also revised sections 195.3, 195.116, 195.264, 195.307, 195.401, 195.432, 195.452, 195.571, 195.573, and 195.588. Per the Federal Register notice, these amendments did not require pipeline operators to take on any significant new pipeline safety initiatives.

On January 1, 2011, changes to Part 195 went into effect as part of Amendment 195-95. These changes addressed the National Registry of Pipeline and LNG Operators and reporting requirements. As part of the changes, new section 195.64 was added, section 195.62 was removed, and updates were made to sections 195.48, 195.49, 195.52, 195.58 and 195.63. The intent of these changes was to enhance the Pipeline and Hazardous Materials Safety Administration's (PHMSA) ability to understand, measure and assess the performance of individual operators and the industry in its entirety, as well as to expand and simplify the electronic reporting required of operators.

As part of Amendments 195-96 and 195-96C, changes were made to apply safety regulations to rural low stress hazardous liquid pipelines that were not previously covered by safety regulations. Section 195.12 was rewritten to address these new requirements. Changes were also made to sections 195.1 and 195.48. These changes went into effect October 11, 2011 and were made in

order to comply with a mandate provided in the Pipeline Inspection, Protection, Enforcement, and Safety Act of 2006.

Amendment 195-97 expedited certain implementation dates pertaining to the Control Room Management regulations contained in section 195.446. The rule went into effect August 15, 2011.

Amendment 195-98, which went into effect October 25, 2013, updated the administrative civil penalty maximums for violation of the safety standards and made technical corrections and updates to certain administrative procedures. This amendment made changes to section 195.402.

Amendment 195-99, which went into effect March 6, 2015, incorporated by reference new, updated or reaffirmed editions of applicable consensus standards subject to the regulations, and also made non-substantive editorial corrections clarifying code language in certain sections. This amendment added new section 195.207 addressing requirements for the transportation of pipe by truck. Additionally, changes to the following sections were made: 195.5, 195.406, 195.3, 195.106, 195.116, 195.118, 195.124, 195.132, 195.134, 195.205, 195.214, 195.222, 195.228, 195.264, 195.307, 195.405, 195.432, 195.444, 195.452, 195.565, 195.573, 195.579 and 195.587. Per the Federal Register notice, these amendments did not require pipeline operators to take on any significant new pipeline safety initiatives.

Of additional note is Amendment 195-93. This amendment added a new section to Part 195 addressing Control Room Management. While the effective date of this ruling was February 1, 2010, which was prior to the Amended Final Decision and Order being issued, the regulation did not require operators to have Control Room Management procedures developed until August 1, 2011. As a result, Control Room Management was not directly discussed during the prior proceedings.

Q. Numerous sections of code were referenced previously as being modified. Were these changes significant?

A. The majority of the changes were clarifications in code language, editorial corrections, modifications to the way industry standards are referenced in the regulation and incorporating by reference updated or reaffirmed versions of industry standards. As an example, prior to Amendment 195-99, section 195.132 used the term "API Standard 620". After the amendment, section 195.132 read "API Std 620". However, there were some changes that could be considered more substantive, which I will discuss below.

Changes to section 195.1, made as part of Amendment 195-96, provided for a complete rewrite of the section. This section identifies which pipelines are covered by Part 195. The primary impact was the inclusion of all rural onshore hazardous liquid low stress and certain gathering pipelines under the regulation.

Changes to 195.12, made as part of Amendment 195-96, address changes to the requirements for rural low stress pipelines.

Changes to 195.64, made as part of Amendment 195-95 added reporting requirements to operators as they relate to the National Registry of Pipeline and LNG Operators.

Changes to 195.207, as made by Amendment 195-94, added this section covering the transportation of pipe by railroad, ship or barge. Amendment 195-99 added requirements for the transportation of pipe by truck.

Changes to 195.432, made as part of Amendment 195-99 added significant detail to paragraph (b) regarding internal inspection interval of in-service breakout tanks.

Amendments 93 and 97 added requirements pertaining to Control Room Management.

Q. Please describe how the changes to Part 195, described previously, will have an effect on the proposed Keystone Pipeline?

A. As mentioned previously, the majority of the changes were not substantive in nature and as a result, have minimal impact on the requirements for the design, integrity management and implementation of Part 195 requirements, as they

relate to the proposed Keystone pipeline. However, there are some changes that will.

Since the Amended Final Decision and Order was issued on June 29, 2010, changes to 49 CFR Part 195 have required operators to develop and implement a Control Room Management Plan. Control Room Management requirements were not specifically addressed in the prior proceedings. The Control Room Management Regulations will be described in more detail by Mr. Chris Hughes.

Through use of the National Registry of Pipeline and LNG Operators, Keystone will be required to notify PHMSA no later than 60 days before construction on the pipeline begins. This is addressed in 195.64(c)(1)(ii).

Transportation of pipe will need to be per the mandates set forth in section 195.207.

Significant changes relative to rural low stress pipelines were made to the federal pipeline code; however, since the proposed Keystone pipeline is not a rural low stress rural line, those regulatory changes do not have an impact on this proceeding.

Changes related to breakout tanks were made to the federal pipeline code; however, Keystone has stated there will be no tank facilities constructed in South Dakota. As a result, there is no impact relevant to these proceedings.

Q. Keystone updated project specifications as they relate to Finding 50 in the Amended Final Decision and Order to state 19.9 miles of the proposed pipe in South Dakota have the potential to impact a High Consequence Area. Previously Keystone had stated a spill had the potential to impact 34.3 miles of HCA. Can you please describe the impact this change has?

A. As a result of the change, less pipe in the state of South Dakota will be subject to integrity management regulations (195.452) due to less pipe having the potential to impact a High Consequence Area in the event of a pipeline release.

Q. Does this change violate any requirements set forth in 49 CFR Part 195?

A. Presuming the revised HCA analysis was performed in accordance with Part 195, it does not.

Q. Does this change violate any mandates set forth in the original or amended permit conditions?

A. Presuming the revised HCA analysis was performed in accordance with Part 195, it does not.

Q. Do any of the other project changes identified in the Tracking Table of Changes provided by Keystone violate the mandates set forth in 49 CFR 195.452?

A. No they do not.

Q. As they relate to 49 CFR 195.452, do any other project changes identified in the Tracking Table of Changes provided by Keystone violate the mandates set forth in the original or the amended Permit Conditions?

A. No they do not.

Q. Does this conclude your testimony?

A. Yes.

Jenny Hudson, PE
Vice President – Integrity

Key Relevance
Integrity Management
Compliance and Best Practice Audits
Risk Assessment and Prioritization
MAOP / MOP Verification
Integrity Assessments

Job Title:
Vice President
Integrity

Years with EN Engineering: 13

Total Years of Experience: 15+

Primary Office Location:
Warrenville, IL

Education:

- B.S., Geological Engineering, University of Missouri, Rolla, Missouri, 1997

Professional Registration:

- IL

Overview: Ms. Hudson has over fifteen (15) years of pipeline integrity, codes compliance, and corrosion control experience with natural gas and hazardous liquid pipeline systems. Experience includes developing pipeline integrity procedures, participating in and providing assistance with jurisdictional audits, providing expert testimony, implementing External Corrosion Direct Assessment (ECDA) and Internal Corrosion Direct Assessment (ICDA) methodologies, developing Control Room Management plans and procedures and records verification.

Relevant Projects:

Southern Star Central Gas Pipeline – Integrity Management
Develop written integrity management plan procedures and supporting documentation to meet the requirements of Subpart O. Facilitate operator committee meetings to review, finalize and implement procedures within the organization. Develop and provide training to operator personnel on new plans and procedures.

Southern Star Central Gas Pipeline – Integrity Management
Facilitate operator preparation for PHMSA jurisdictional integrity management audit. Actively participate in jurisdictional audit as client representative.

Vectren Energy Delivery – Integrity Management
Develop and modify written integrity management plan procedures and supporting documentation. Facilitate operator committee meetings to review, finalize and implement procedures within the organization. Develop and provide training to operator personnel on modified and new processes and procedures.

Vectren Energy Delivery – Integrity Management
Provide support on pipeline integrity issues as well as External Corrosion Direct Assessment and Internal Corrosion Direct Assessment.

Southwest Gas – Integrity Management
Manage team and perform audit of integrity management program to identify code compliance and best practice issues. Review included manual and procedure review, personnel interviews and documentation review.

South Dakota Public Utilities Commission - Integrity Management
Provide expert testimony on integrity management issues related to hazardous liquid pipelines on two occasions.

United States Gypsum - Integrity Management
Manage and oversee integrity management program including HCA identification, threat analysis and integrity assessment. Actively participate in jurisdictional integrity management audit as client representative.

DTE/MichCon - Integrity Management
Perform jurisdictional review of integrity management program including code compliance and best practice recommendations. Make modifications to ECDA plan.

Professional Organizations & Affiliations:

- ASME B31.8 Corrosion / O&M Subgroup
- AGA Transmission Pipeline Operations
- AGA Corrosion Control

Publications & Patents:

- Co-Author of "Cathodic Protection of a Large-Diameter Distribution System: Corrosion Monitoring and Testing", American Water Works 2004 DSS Conference
- Co-Author of "New Distribution Regulations Promote Risk Analysis", American Public Gas Association, 2008
- Presentation for NACE Central Area Conference, 2008
- Presentation for Kentucky Gas Association, 2008
- Presentation for Illinois American Water Works Association, 2010
- Presentation for AGA Operations Conference, 2012

Professional Certifications:

- NACE – International Cathodic Protection Technologist (CP Level 3)

Relevant Projects (Cont'd):

Northern Natural Gas - Integrity Management
Facilitate mock integrity management audit. Evaluated oral responses as well as written documentation and provided feedback in order to help operator prepare for jurisdictional audit.

Aux Sable Liquids Products - Integrity Management
Oversee development of liquid integrity management plan.

Oklahoma Natural Gas - Integrity Management
Perform gap analysis of written integrity management plan. Furnish documented feedback on plan including recommended modifications.

NIPSCO – Integrity Management
Oversee modifications to Transmission Integrity Management Program. Facilitate mock audit and participate in state jurisdictional audit.

Tesoro – Pipeline Safety
Perform pipeline risk management, procedure and management practice audit. Audit included review of written plans, personnel interviews and review of documentation. Formal close-out presentation given to upper management.

NIPSCO – Pipeline Safety
Perform audit of pipeline safety programs, including evaluation of written procedures, personnel interviews and documentation review.

Confidential Client - Due Diligence
Perform data research and integrity evaluation for potential buyer of pipeline assets.

NIPSCO – System Risk and Prioritization
Provide technical support for rate recovery filing including review of methodology used to select projects to reduce system risk and independent review of project cost estimating methodologies. Interact with legal counsel and state jurisdictional agencies.

Vectren – System Risk and Prioritization
Provide technical support for rate recovery filing including review of methodology used to select projects to reduce system risk and independent review of project cost estimating methodologies.

American Gas Association (AGA) – Integrity Management
Organized a study of the potential impact of increased testing requirements on AGA member companies as well as industry as a whole. Analyzed cost, timelines, configuration, inspectability, resource availability, and other barriers. Utilized PHMSA Transmission Annual Report data further substantiated through detailed interviews with subset of AGA member companies.

Ameren – MAOP Verification
Oversee team performing records research, gap analysis and data evaluation related to MAOP verification.

Relevant Projects (Cont'd):

Pacific Gas and Electric - ASV/RCVs
Performed a review of the use of Automatic Shut-off Valves (ASV) and Remote Control Valves (RCV) including industry best practice, survey of natural gas transmission and distribution companies regarding their experiences with ASVs and RCVs, alternatives and merits of available technologies, pertinent industry literature and regulations. Identified individual valve segments within the transmission system and prioritized based on risk factors.

Southern Star Central Gas Pipeline - Training
Administer training related to corrosion control field testing.

Duke - Distribution Integrity Management
Oversee development of Distribution Integrity Management Plan.

Peoples Natural Gas - Distribution Integrity Management
Oversee development of Distribution Integrity Management Plan Procedures.

PECO – Distribution Integrity Management
Perform review of Distribution Integrity Management Program.

Southern Star Central Gas Pipeline - External Corrosion Direct Assessment Manage implementation of External Corrosion Direct Assessment methodology as well as review and analyze data. Provide support for Long Range Ultrasonic Testing including procedure development and notification to PHMSA.

Nicor Gas – ECDA / ICDA
Management and implementation of External Corrosion Direct Assessment and Internal Corrosion Direct Assessment projects. Provide support for Long Range Ultrasonic Testing including procedure development and notification to PHMSA.

Nicor Gas - ECDA
Perform direct examinations as part of ECDA process.

DTE/Michcon - ECDA / ICDA
Management and implementation of External Corrosion Direct Assessment and Internal Direct Assessment projects. Provide support for Long Range Ultrasonic Testing.

United States Gypsum - ECDA / ICDA
Manage External Corrosion Direct Assessment and Internal Corrosion Direct Assessment projects to meet federal mandates.

United States Gypsum - Pipeline Operations
Develop jurisdictional manuals including Integrity Management Plan, Operation and Maintenance, Emergency Response.

Dominion - Audit / Review
Participate on team reviewing various client station assets. Focus was on corrosion control codes compliance and best practice issues.

Relevant Projects (Cont'd):

United States Gypsum - Audit / Review
Participate on team reviewing various client pipeline assets. Focus was on corrosion control codes compliance and best practice issues.

Duke - Control Room Management
Oversee modifications to existing control room management plan.

Integrys - Control Room Management
Oversee development of control room management plans.

DTE/Michcon - Control Room Management
Oversee development of control room management plan.

Northern Natural Gas - AC Mitigation
Develop plan and procedures related to AC corrosion and AC mitigation.

Nicor Gas - Corrosion Control
Perform annual cathodic protection surveys. Obtain rectifier readings and bond readings.

Nicor Gas - Corrosion Control
Perform close-interval survey and direct current voltage gradient survey.

Du Page Water Commission - Corrosion Control
Develop and assist with corrosion control program. Activities include establish monitoring program, cathodic protection design, data review, data analysis and corrosion control consulting. Field testing for steel and PCCP water transmission mains including structure-to-electrolyte readings, AC readings, isolation flange testing, Panhandle Eastern Testing, stray current interference testing and close-interval survey.

Northwest Suburban Municipal Joint Action Water Agency - Corrosion Control Evaluation of cathodically-protected PCCP water transmission main. Testing included close-interval survey (on, instant off and depolarized), isolation flange testing and cathodic protection test point readings. Project also included analysis of data and recommendations.

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IN THE MATTER OF THE PETITION OF TRANSCANADA KEYSTONE PIPELINE, LP FOR ORDER ACCEPTING CERTIFICATION OF PERMIT ISSUED IN DOCKET HP09-001 TO CONSTRUCT THE KEYSTONE XL PIPELINE

DOCKET HP14-001

PREFILED TESTIMONY OF DAVID SCHRAMM
ON BEHALF OF THE COMMISSION STAFF
APRIL 2, 2015

Q. Please state your name and business address.

A. My name is David Schramm. My business address is 28100 Torch Parkway, Warrenville, Illinois, 60555.

Q. By whom are you employed and in what capacity?

A. I am employed as a Vice President-Senior Project Manager by EN Engineering, an engineering and consulting firm specializing in pipeline design, codes compliance, integrity, and automation services for the oil and gas industry.

Q. Please describe your educational background and professional experience.

A. I hold a B.S. degree from Iowa State University (Ames, Iowa) and I am a NACE Institute No. 3178 Certified Cathodic Protection Specialist and Certified Corrosion Technologist (confirm certification at www.naceinstitute.org). My professional experience consists of employment in the pipeline industry with EN Engineering, NICOR Technologies, NICOR Gas (Northern Illinois Gas), Corrpro Companies, Inc., and Harco Corporation.

My responsibilities in these positions includes nearly 35-years of extensive experience in the assessment and application of pipeline integrity and corrosion control programs including: corrosion control engineering, analysis and design, process control and measurement, internal "smart" tooling, cathodic protection design, installation and maintenance, computerized close interval potential survey, direct current voltage gradient survey, telluric current monitoring, measurement and investigation, stray DC and AC interference testing and mitigation, coating selection and inspection and material selection and purchasing.

I am currently responsible for the technical support of the Corrosion Control and Integrity Field service offerings including: the technical oversight of project performance and standards, the development and maintenance of technical guidelines, standards and procedures, quality assurance (ISO 9001) for corrosion control, cathodic protection, field failure and integrity management projects and proposals, and the qualification and training of corrosion control field failure, and system integrity personnel.

Within the corrosion control and cathodic protection industry, I have served in a Chair position for NACE T-10-A-11: Gas Industry Corrosion Problems (1995 through 2001), NACE International Certification Committee (2001 through 2005), Chair and Vice-Chair for the NACE International Professional Activities Committee (PAC), and currently serving as the Chair of the NACE Institute Certification Commission.

In addition, I am a certified Craft Instructor for the National Center for Construction Education (NCCER) as it relates to the American Petroleum Institute (API) Operator Qualification Program, a Veriforce Operator Qualification Evaluator, and served as a member of numerous NACE task or industry groups including the NACE Cathodic Protection Training and Certification Program task group, the Chicago Region Committee on Underground Corrosion (CRCUC) and the Michigan Electrolysis Committee (MEC).

My resume is attached to this document as Exhibit___DS-1.

Q. On whose behalf was this testimony prepared?

A. This testimony was prepared on behalf of the Staff of the South Dakota Public Utilities Commission (Staff).

Q. Please state the purpose of your testimony in this proceeding.

A. There are three main objectives of the Staff in this testimony. First, to ensure that the proposed changes to the Findings of Fact in the Decision, as identified by TransCanada Keystone Pipeline's (the Applicant) Tracking Table of Changes, comply with the Federal Pipeline Safety Regulations 49CFR 195, Transportation of Hazardous Liquids by Pipeline. Secondly, the objective is to ensure that the Applicant has met any new requirements imposed by the Federal Pipeline Safety Regulations 49CFR 195 since the Amended Final Decision and Order was issued on June 29, 2010 with respect to the application for a permit (Permit) to construct and operate a crude oil pipeline in South Dakota. Lastly, the objective is to ensure that the amended permit conditions, and any project changes, are still able to meet the conditions upon which the permit was issued, specifically focusing on pipeline design, integrity management and compliance with PHMSA regulations (49CFR 195).

This testimony deals specifically with updates made to the project as provided by Keystone on the Tracking Table of Changes, specifically as they relate to 49 CFR Part 195 Subpart H.

Q. Keystone updated project specifications as they relate to Finding 68 in the Amended Final Decision and Order to indicate that TransCanada has experienced no evidence of corrosion on fusion bonded epoxy lines except for one instance

where an adjacent foreign utility interfered with the cathodic protection system. Do requirements set forth in 49 CFR Part 195 and / or the safety measures set forth in the DOS Final SEIS adequately address interference currents?

A. Stray DC corrosion interference testing, assessment, and mitigation is prescribed under Table 4, Special Conditions as recommended by PHMSA, page 87, item 36. The program stipulated by PHMSA should address the detection and mitigation of stray DC current effects. As interpreted, the PHMSA program requirements are considered more stringent than Part 195, Subpart H – as additional timing requirements have been established.

Q. Are there any other interference conditions that might lead to the development of corrosion on fusion bonded epoxy coated pipelines?

A. The phenomenon of AC stray current interference is becoming a more prominent concern within the industry; especially, but not exclusively, associated with FBE and/or Epoxy ARO (Abrasion Resistant Overcoat) protectively coated pipeline systems. This issue is addressed and prescribed under Table 4, Special Conditions as recommended by PHMSA, page 80, item 21. The program stipulated by PHMSA should address the detection and mitigation of stray AC current effects. As interpreted, the PHMSA program requirements stipulate that control of induced AC from parallel electric transmission lines and other interference issues (e.g., crossings, substations, transpositions or capacitive or conductive coupling (fault)) are to be incorporated into pipeline design and addressed during the construction phase. This program recommendation is also consistent with the notice contained in the DOT/OPS Advisory: 68FR64189 – 11/12/2003. If not already provided, a copy of the construction

techniques for the mitigation of AC stray current, the testing for, engineering analysis, modeling, and mitigation design for AC interference should be made available to SDPUC for record.

Q. Are there any other operational conditions that might lead to the development of corrosion on fusion bonded epoxy coated pipelines?

A. Pipeline coating requirements are prescribed under Table 4, Special Conditions as recommended by PHMSA, page 73, item 9 and on page 74, item 10 and 11. These are considered more stringent than 195, Subpart H – as additional inspection and inspection voltages are required at both the coating mill and when coating is applied at field locations. Item 15 on page 75 addresses the impact from higher operating temperatures (120-degrees F or above) and prescribes requirements for notification and operational response and follow-up testing should this occur under defined durations.

Q. Does the update made to Finding 68 violate any requirements set forth in 49 CFR Part 195 Subpart H?

A. 195.577 and 195.575 requires pipelines exposed to stray current to have a program in place to identify, test for, and minimize the detrimental effects of such currents. In addition, the design and installation of any impressed current or galvanic anode cathodic protection system must be designed to minimize any adverse effects on existing adjacent metallic structures. As such this update does not violate any requirements set forth in 49 CFR Part 195 Subpart H and does not violate the DOT/OPS Advisory: 68FR64189 – 11/12/2003 issued.

Q. Does the update made to Finding 68 violate any mandates set forth in the original or amended permit conditions?

A. As noted above, the update made to Finding 68 is adequately addressed by the incorporation of all PHMSA recommendations into the original or amended permit conditions. As such, this update does not violate any requirements set forth in the original or amended permit condition.

Q. Do any of the other project changes identified in the Tracking Table of Changes provided by Keystone violate the mandates set forth in 49 CFR Part 195 Subpart H?

A. No they do not.

Q. As they relate to 49 CFR Part 195 Subpart H, do any other project changes identified in the Tracking Table of Changes provided by Keystone violate the mandates set forth in the original or the amended Permit Conditions?

A. No they do not.

Q. Does this conclude your testimony?

A. Yes.

David A. Schramm
VP, Corrosion Control and Integrity Field Services, Integrity

Key Relevance
SME - Cathodic Protection Design
SME - Corrosion Control Field Assessments
SME - Cathodic Protection Trouble Shooting
SME - AC Mitigation Design and Analysis
SME -Atmospheric Corrosion Inspection
SME -Internal Corrosion
SME – Wall Loss Assessment (Corrosion)
SME – Coating Condition Assessment

Job Title:
VP Corrosion Control and Integrity Field Services Integrity

Years with EN Engineering: 13

Total Years of Experience: 35

Primary Office Location:
Warrenville, IL, USA

Education:

B.S., Resource Management, Iowa State University, Ames, Iowa

Professional Certifications:

- NACE Institute No. 3178 Certified Cathodic Protection Specialist
- NACE Institute No. 3178 Certified Corrosion Technologist

Overview: Mr. Schramm has over thirty-five (35) years of extensive experience in the direct and practical application of corrosion control methods, cathodic protection assessment and design, and system integrity management and field services.

Direct experience with external, internal, and atmospheric corrosion control on natural gas and liquid transmission and distribution pipeline systems, under-ground natural gas storage, under-ground storage tanks, above-grade storage tanks, power plant structures, condenser/chiller/heat exchange equipment, production and injection/withdrawal wells, lead sheath cable, underground electric cable, water transmission systems, and fresh-water marine structures

Responsible for the technical performance, quality, and operation service offerings that provide:

- Corrosion engineering analysis and design
- Cathodic protection monitoring and assessment
- Process control and measurement
- Correlation of internal "smart" tool to indirection inspection survey data
- Cathodic protection design, installation and maintenance
- AC safety and AC corrosion assessment, modeling, and mitigative design
- Computerized close interval potential survey
- Direct current and alternating current voltage gradient survey
- Stray DC interference and telluric current monitoring, measurement, and mitigation
- Coating selection and inspection
- Material selection, specification and procurement
- Technical specification and procedure
- OQ qualification and training
- Corrosion related field failure, wall loss assessment, and remaining strength evaluation
- Indirect and direct inspection program support
- Field installation oversight and inspection
- Project management and commission services
- Operational support including:
  - Leak detection
  - Purge operations
  - Watch and protect and rights-of-way inspection
  - Locating
  - High Consequence Assessment and Class Survey

Professional Organizations & Affiliations

NACE International Institute (NII)

- Chairman, Certification Committee (Board) (2012-2016)

NACE International (NACE)

- Professional Activities Director (PDAC) (Board) (2011 to 2014)
- Professional Activities (PDAC) Chair (2011 to 2014)
- Professional Activities (PDAC) Vice-Chair (2008 to 2011)
- Certification Committee Chair (2003 to 2006)
- Certification Committee Vice-Chair (2000 to 2002)
- T-10A-11: Gas Distribution Industry Corrosion Problems Chair (1997 to 2001)
- T-10A-11: Gas Distribution Industry Corrosion Problems Vice-Chair (1995 to 1997)
- SME Department of Defense (DoD) Panel on Training and Certification
- CP Interference Course Development Task Group: Cathodic Protection Interference (2006)
- Cathodic Protection Sub-Committee: Cathodic Protection Technologist (2004)
- Cathodic Protection Training and Certification Program Task Group: Cathodic Protection Level 1 (2000) and Cathodic Protection Level 2 (2000)
- Cathodic Protection Task Group: Cathodic Protection Training Program (1999 – 2000)
- Chicago Section – Special Events Chairman (1985-1986)
- Chicago Section – Membership Chairman (1986-1987)
- Chicago Regional Committee on Underground Corrosion (CRCUC) Chair and Vice-Chair
- Michigan Electrolysis Committee Chair and Vice-Chair

Corporate program support:

- ENE Health, Safety, and Environmental Committee – member
- OSHA Safety Training Programs
  - Development and documentation of program safety documents.
  - Initial creation and training of Level 0 OSHA training presentations (PowerPoint)
- Vision Accounting and Project Documentation:
  - Part of management team charged with the development of project management and project set-up (2014/2015) Vision EWMS project.
  - Developed IN proposal documentation and procedures under Opportunity section of Vision
  - Automation of reports and training of Vision to departmental Project Mangers
- Operator Qualification and Safety Records
  - Administrator for ISNETWORLD software and NCCER program audit and oversight.
  - Initial development and submittal of safety programs for RAV review
  - Initial support for Client response and safety program update.
  - Set-up and established support for Veriforce OQ programs.
- ISO 9001: 2000 Certification
  - Part of team tasked with the initial development and completion of ISO 9001 policy and procedures within EN Engineering; leading to, ISO9001: 2000 certification for the corporate office.

Relevant Projects:

Tallgrass Development
SME project direction for excavation analysis of coating and pipeline wall assessment and conductance, evaluation, and assessment if in-situ pipeline coating assessment to TMO102-2002 Standards. Direct analysis of data obtained from field and laboratory testing, written report and recommendations.

Valero Energy Corporation
SME project direction for AC Threat Assessment on 150-mile pipeline as an "active" high level management approach to evaluate both present "threat area" and future AC "threat" risk. Project included the gathering of AC voltages on the pipeline and soil resistivity at intervals not exceeding 1000-ft. AC Threat calculation, research and inclusion of historic data obtained from other sources (DFOS), generation of plots and graphs, scenario or sensitivity analysis, report, observations and recommendations.

Professional Organizations & Affiliations, cont.

National Center for Construction Education and Research (NCCER)

- Certified Master Trainer (2010)
- Certified Administrator (2010)
- Certified Craft Trainer/Evaluator: Core Curricula, Gas Pipeline Operations, Liquid Pipeline Control Center Operations, Liquid Pipeline Field Operations, Pipeline Core, Pipeline Corrosion Control, Pipeline Electrical and Instrumentation (E&I), Pipeline Maintenance, Pipeline Mechanical, Specialty Craft

Veriforce

- Authorized Evaluator

Midwest Energy Association (MEA)

- Administrator

The Society for Protective Coatings (SSPC)

- Member

Additional

- API 1161 – Task Group on Operator Qualification, Pipeline Segment – Resolution of Appreciation for contributions to the Task Group
- OSHA 510 Certified "Occupational Safety & Health Standards for the Construction Industry"
- TWIC (Transportation Workers Identification Credential)
- Clockspring Trainer/Installer Certified (2002)
- Administration Training: Assessor Training (Nicor Gas- 1994)
- Quality Awareness Training (Nicor Gas- 1993)
- Basic Corrosion Course (NACE- 1983)

Southern Star Gas Central
SME project support for 20-inch diameter natural gas pipeline damaged by 12kV AC power line arc near Joplin, Missouri including: assessment of condition, documentation of event, wall loss discovery, assessment and written report, and Client support with regulatory oversight and questions

Exxon Mobil Refinery
SME technical project support assessment of condition (cathodic protection systems), annual survey, remediation, and recommendation.

United States Gypsum
Develop, perform training, assessment and evaluation for operator qualification of Client employee resources, assess natural gas pipeline system and plant facilities, and develop initial pipeline normal operation system drawing format.

United States Gypsum
SME level support for isolation flange failure in Washington, PA including: assessment of condition, purge out of product, oversight of repairs, purge in of product, and restoration of service.

Corrosion Control Operations
Managed and directed the Corrosion Control Service Group for Nicor Technologies and Nicor Gas providing corrosion control consulting services to distribution and transmission pipelines, municipal and utility organizations, and commercial and industrial customers. Responsible for the performance of all operating corrosion control programs (internal, external and atmospheric) on the Nicor Gas pipeline system including specification, performance and day-to-day operation. As a member of the Nicor Gas welding and joining, system integrity, and code committee operating task groups provided technical expertise in pipeline integrity, research and testing, corrosion control and cathodic protection issues. Having responsibility for the due diligence corrosion control and cathodic protection evaluations on acquisition projects in Argentina and Tennessee. Developed risk, quality, and integrity management programs related to corrosion control and cathodic protection operations. Location: IL

Additional, Cont.

- Goodall Rectifier School: Goodall Electric, Inc. (1982 –
- Managing Cultural Diversity (Coleman Management Consultants (1994)
- Control, West Virginia, University (1985)
- Corrosion Prevention by Cathodic Protection (NACE– 1983)
- Effective Business Communication (IWCC – 1990)
- Appalachian Underground Course: Advanced Corrosion

Expert Witness Testimony:

- South Dakota Public Utility Commission - Testimony
  - Keystone Pipeline, October 2007- Corrosion and Protective Coating Sections and Related Code
  - Keystone XL, September 2009 – Corrosion and Protective Coating Sections and Related Code
  - Keystone XL, March, 2015 – Corrosion Protective Coating Sections and Related Code
- State of Iowa Utilities Board
  - 2002, Testimony related to AC Interference, assessment, and mitigation as it relates to: proposed pipeline construction beneath overhead AC transmission systems, Iowa.

Corrosion Control Services
Directed and coordinated the Nicor Gas corrosion control programs for distribution, transmission, and storage facilities. Directly supervision responsibility for the completion of annual corrosion control and corrosion control activities which include: annual reading programs, close interval survey, stray current interference, and impressed current rectifier system replacement.

Research Services
Managed and directed the research lab for Nicor Gas and was responsible for day-to-day operation, quality performance, testing, recommendation and approval, including the performance and analysis ASTM and ANSI test standards and methods. Directly responsible for the purge routine process for all large-diameter high- pressure pipelines. Conducted, analyzed and developed corrosion control action and recommendation for all wall loss and field failure events. Locations: IL

Lakehead Pipeline Company
Directed the completion of all annual cathodic protection reading programs, close interval survey, stray current interference, impressed current rectifier system replacement, and field failure investigations for the Lakehead Pipe Line Company over a six (6) year period on facilities that include pipeline, compression, substation, and storage facilities. Locations: ND, MN, WI, IL, MI, NY.

Portal Pipeline Company
Supervised and completed the annual cathodic protection reading program for the Portal Pipe Line Company including pipeline, gathering and wellhead systems. Location: ND

Alyeska Pipeline Service Company
In-state direction, supervision and related to the process of conducting, analyzing and performing telluric based close interval surveys for the Trans-Alaska Pipeline System (TAPS) over a four (4) year period. Direct responsible for the performance, provision, data quality, data analysis and report recommendations. Location: AK

Technical Presentations:

- PG&E – February, 2015 Technical Presentation on AC Interference and Mitigation
- NACE International, January-2015 Northern Plains Corrosion Control Short Course, Omaha, Nebraska – Speaker and presentation on AC interference and Mitigation and case examples
- USG – January, 2015 – Technical Presentation on Plant Audit Inspections
- NACE San Antonio Section Meeting, May-2014 – Speaker and presentation on AC interference and mitigation and case examples
- NACE International, January-2014 Plains Short Course (Omaha), Nebraska – Speaker and presentation on AC interference and Mitigation and case example
- NACE Wisconsin Short Course, September, 2013 – Cathodic Protection Design and Practical
- NACE Wisconsin Short Course, September, 2013 – Casings: Design and Regulations
- NACE International, August – 2013 Central Area Conference, Little Rock – Speaker and presentation on AC interference and Mitigation and case example
- Northern Natural Gas (NNG) Spring Corrosion Round Table – 2013: AC Interference and Mitigation Training (Minneapolis, Des Moines, El Paso)
- Northern Natural Gas (NNG) Spring Corrosion Round Table – 2013: CIS/ECDA Defect and Interpretation
- AGA/SPE, March 2012 – Identification and Prevention of Corrosion in Gas Storage Gathering Facilities

Desert Generation and Transmission Company
Supervised, conducted and performed the design and testing services for the Deseret Generation and Transmission Company. Planned and performed a wide variety of duties involving the evaluation, design, and installation of cathodic protection systems to inhibit corrosion on pipelines, tanks, and similar underground and submerged structures including electrical continuity and protection of concrete steel cylinder pipe. Locations: UT

Mobil Oil
Conducted and analyzed all underground facilities for the potential application of cathodic protection for the Mobil-Joliet Refinery. Operational and performance responsibilities related to installation of new and existing cathodic protection systems: design, redesign, and installation of impressed current systems for tank bottoms. Location: IL

Montana Power
Conducted, analyzed and performed close interval and leak detection surveys on large diameter - high pressure – natural gas transmission pipelines owned and operated by Montana Power near Helena, Montana. Location: MT

Northern Natural Gas
Conducted, analyzed and performed close interval surveys on large diameter - high pressure – natural gas transmission pipelines owned and operated by Northern Natural Gas (NNG) in the Upper Peninsula of Michigan. Location: MI

Mountain Bell Telephone
Supervised, conducted, analyzed and performed the corrosion control and cathodic protection analysis of the Mountain Bell Telephone lead sheath cable running between Evanston and Cheyenne. Locations: WY

Coffeen Power Plant
Supervised, conducted, analyzed, designed and installed cathodic protection systems for the Coffeen Power Plant Facilities operated by the Central Illinois Light Company (CILCO). Location: IL

Technical Presentations, cont.

- NACE Wisconsin Section – Annual Short Course – 2013: Speaker and presentation on Cathodic Protection Design and Practical's and Casings: Design and Regulations
- NACE Wisconsin Section – 2012: Speaker and presentation on AC interference and Mitigation and a case example related to a 12-inch and 20-inch pipeline system.
- 51st. Annual Underground Corrosion Short Course: Speaker and presentation on AC issues on Pipelines presented under the System Integrity section, Purdue University, 2012
- 51st. Annual Underground Corrosion Short Course: Pipeline Casing Presentation, 2012
- 51st. Annual Underground Corrosion Short Course: Station Assessment Procedures, 2012
- EPRI/Southwest Research: June 2010, Copper Grounding Presentation
- China International Oil and Gas Pipeline Conference, Langfang, Hebel, China, November-2009: Safety and Operability Assessment Report and HAZOP Study Report (PetroChina),
- China International Oil and Gas Pipeline Conference, Langfang, Hebel, China, November-2009: ECDA Implementation Case Study – Pipeline Integrity and Corrosion Control Technology
- NACE International, March, 1991 – The Development and Conversion to an "On-line" Corrosion Control Records System Using a Burroughs Mainframe Computer, Corrosion 91, Paper Number 346, NACE International

LaGrange Hospital
Designed, analyzed and supervised the installation of galvanic anode systems designed to protect the interior water box of condenser/chiller units operated by the LaGrange Hospital. Location: IL

Union 76
Supervised, conducted and analyzed the cathodic protection systems installed on over 250 underground gasoline and waste oil storage tanks systems owned and operated by Union 76. Locations: IL, KY, IN

O'Hare Airport
Designed and supervised the installation of galvanic anode protection systems for aviation fuel pipelines related to jet-way expansions. Responsible for the cathodic protection assessment, design, and mitigation on jet-way expansions of the G & H terminals as well as field supervision on the United Airlines terminal 1 construction project. Locations: IL

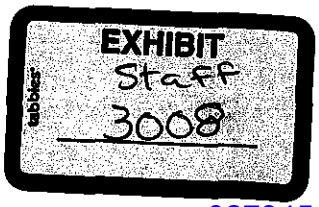
City of Viburnum
Designed and supervised the installation of down-hole impressed current systems for the City of Viburnum including the protection of water well casing, column and bowls. Location: MO

BEFORE THE
PUBLIC UTILITIES COMMISSION
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

PREFILED TESTIMONY OF CHRISTOPHER HUGHES
ON BEHALF OF THE COMMISSION STAFF
APRIL 2, 2015



Q. Please state your name and business address.

A. My name is Christopher Hughes. My business address is 28100 Torch Parkway, Warrenville, Illinois, 60555.

Q. By whom are you employed and in what capacity?

A. I am employed as a Senior Project Manager by EN Engineering, an engineering and consulting firm specializing in pipeline design, codes compliance, integrity and automation services for the oil and gas industry.

Q. Please describe your educational background and professional experience.

A. I hold a M.S. degree in Welding Engineering from The Ohio State University in Columbus, Ohio. In addition, I hold a B.S. degree in Mathematics from the Ohio Dominican University in Columbus, Ohio.

My professional experience consists of employment in the pipeline industry with EN Engineering and previously with the U.S. Army, Columbia Gas, CC Technologies / DNV and Enterprise Products. My responsibilities in the Army included operation and management of storage facilities and the design and construction of temporary pipelines. At Columbia Gas my responsibilities included natural gas pipeline operations via SCADA, statistical and forecast analysis, and cost analysis. My responsibilities at CC Technologies / DNV included material testing, failure analysis, stress corrosion cracking analysis, pipeline repair research and presentation as well as report, plan and procedure writing. At Enterprise Products my responsibilities included integrity assessment type determination, Information Analysis, annual reporting, evaluate defects and recommend appropriate repairs and other implementation of the Integrity

Management Program for hazardous liquids. My responsibilities at EN Engineering have been focused in the areas of control room management and pipeline integrity.

My resume is included in Exhibit___CH-1.

Q. On whose behalf was this testimony prepared?

A. This testimony was prepared on behalf of the Staff of the South Dakota Public Utilities Commission (Staff).

Q. Please state the purpose of your testimony in this proceeding.

A. There are three main objectives of the Staff in this testimony. First, to ensure that the proposed changes to the Findings of Fact in the Decision, as identified by TransCanada Keystone Pipeline's (the Applicant) Tracking Table of Changes, comply with the Federal Pipeline Safety Regulations 49CFR 195, Transportation of Hazardous Liquids by Pipeline. Secondly, the objective is to ensure that the Applicant has met any new requirements imposed by the Federal Pipeline Safety Regulations 49CFR 195 since the Amended Final Decision and Order was issued on June 29, 2010 with respect to the application for a permit (Permit) to construct and operate a crude oil pipeline in South Dakota. Lastly, the objective is to ensure that the amended permit conditions, and any project changes, are still able to meet the conditions upon which the permit was issued, specifically focusing on pipeline design, integrity management and compliance with PHMSA regulations (49CFR 195).

This testimony deals specifically with changes to Federal Pipeline Safety Regulations 49CFR 195 since the Amended Final Decision and Order was issued in the area of Control Room Management (§195.446). Additionally, this testimony addresses updates made by Keystone in the Tracking Table of on two specific Findings of Fact.

Q. **Control Room Management regulations went into effect February 1, 2010 which required operators to have a Control Room Management Plan and procedures developed by August 1, 2011. An additional Control Room Management / Human Factors rule effective August 15, 2011 required operators to implement the procedures for roles and responsibilities, shift change, change management, and operating experience, fatigue mitigation education and training by October 1, 2011 and the other procedures for adequate information, shift lengths, maximum hours-of service, and alarm management by August 1, 2012. Please describe the Control Room Management regulations.**

A. The Control Room Management regulations prescribe safety requirements for controllers, control rooms, and SCADA systems used to remotely monitor and control pipeline operations. The regulations address human factors, engineering and management solutions for the purpose of enhancing the performance reliability of operator personnel that control pipeline operations. Each operator must have and follow written control room management procedures that implement the requirements of §195.446 including (a) roles and responsibilities of CRM staff, (b) implement API RP 1165, (c) point to point verification between

SCADA and field equipment, (d) testing of back-up systems, (e) personnel fatigue mitigation, (f) alarm management plan and procedures, (g) change management procedures, and (h) incorporation of operator experience and training.

Q. How do these regulations compare to requirements set forth in the DOS final SEIS, Appendix Z, which Keystone has stated they will comply with?

A. The requirements set forth in the DOS final SEIS, Appendix Z comply with these regulations.

Q. Have you reviewed a copy of the Keystone Control Room Management Plan or Alarm Management Plan?

A. No I did not. However, these plans are subject to review by the Pipeline and Hazardous Materials Safety Administration (PHMSA) during a jurisdictional audit.

Q. Keystone updated project specifications as they relate to Finding 18 in the Amended Final Decision and Order to utilize API 5L X70M high-strength steel. Previously Keystone was planning on utilizing API 5L X70 or X80 high strength steel. Does this change violate any requirements set forth in 49 CFR Part 195?

A. 49 CFR Part 195 requires pipe be manufactured per the requirements of API Standard 5L, 44th edition. The most current edition of the API standard uses the suffix M to indicate Thermomechanical Rolled or Formed pipe. Assuming the pipe is manufactured per the requirements of the 44th edition, this change does not violate 49 CFR Part 195.

Q. Does this change violate any mandates set forth in the original or amended permit conditions?

A. Assuming the pipe is manufactured per the requirements of the 44th edition, it does not.

Q. Keystone updated project specifications as they relate to Finding 20 in the Amended Final Decision and Order to include twenty (20) mainline valves in the state of South Dakota, all of which will be remotely controlled. Previously, the design included sixteen (16) mainline valves, seven (7) of which were to be remotely controlled. Please describe the differences, if any, these changes have on pipeline safety.

A. This decision enhances pipeline safety as the decision to have all valves remotely controlled decreases the time to close the valves in the event of a rupture and the increased number of valves reduces the potential spill volume.

Q. Does this change violate any requirements set forth in 49 CFR Part 195?

A. No.

Q. Does this change violate any mandates set forth in the original or amended permit conditions?

A. No.

Q. Does this conclude your testimony?

A. Yes.

Christopher Hughes
Senior Project Manager – Integrity

Key Relevance
Liquids Integrity Management
Control Room Management
Information Analysis
Integrity Assessments
Fitness for Service
MAOP/MOP Verification
Regulatory Compliance
Project Management

Job Title:
Senior Project Manager
Integrity

Years with EN Engineering: 3

Total Years of Experience: 25

Primary Office Location:
Warrenville, IL / Houston, TX

Education:

- MS, Welding Engineering
  The Ohio State University
- BS, Mathematics
  Ohio Dominican University

Professional Organizations & Affiliations:

- American Petroleum Institute
- American Society of Mechanical Engineers
- NACE

Overview: Mr. Hughes has twenty five (25) years of experience in engineering, management, operations, sales, and education. He has fourteen (14) years of experience in asset integrity and operations specific to the energy industry. Experienced in pipeline analysis, CRM, FFS, and RCA as well as regulatory compliance.

Relevant Projects:

Control Room Management
Project Manager
Implemented and managed multiple CRM projects involving plan audits, gap analysis, plan development and alarm rationalization for multiple natural gas distribution companies.

Integrity Management Program
Project Manager
Implemented and managed multiple IMP projects involving gap analysis, plan audits and procedure & plan development for multiple companies for both hazardous liquid and natural gas assets.

Fitness for Service
Project Manager, Engineer
Manage a multi-disciplinary approach to evaluate structural components to determine if they are fit for continued service due to flaws, damage or severe operating conditions at defined maximum operating pressures for natural gas and hazardous liquid pipelines.

MAOP / MOP Verifications
Project Manager
Implemented and managed a multi-million dollar MAOP/MOP Standardization projects involving multiple teams in multiple locations to document and ensure compliance of natural gas transmission systems and hazardous liquid pipelines. Performed due diligence of pipeline material, pump location and pressure testing records, performed calculations, and determined appropriate MOP / MAOP per 49 CFR 192 and 49 CFR 195.

Information Analysis
Project Manager, Engineer
Managed and performed comprehensive review of pipeline information regarding potential impact of release, HCAs, historical data, age, product type, pipeline characteristics, terrain, response times, coating and other available information to accurately recommend assessments, program reviews and revisions, remediation and other risk factors for both natural gas and hazardous liquid pipelines.

Regulatory Compliance
Project Manager, Engineer
Spearheaded multi-departmental diagnostic review of regulatory status of company assets and implementation of changes resulting in the most comprehensive regulatory status inventory to date. Coordinated and implemented PHMSA and API annual reports.
Review of regulatory status and physical properties of client onshore and offshore assets to provide third party opinions regarding jurisdiction and applicable assessments.

Relevant Projects (Cont'd):

Operating Procedure / Qualification
Project Manager
Procedure and OQ development and maturation including welding, operator qualification and liquids Integrity Management Program procedures.

Material Testing
Engineer
Supervised destructive testing of pipe and weld samples including physical and chemical analysis for various clients. Performed metallography of samples and provided full analysis of results and recommendations.

ECDA / ICDA
Project Manager
Management and implementation of External Corrosion and Internal Corrosion Direct Assessment projects for both natural gas and hazardous liquid operators.

Workshops
Engineer
Coordinated national association's training in Pipeline Repair facilitating all schedules and the acquisition of speakers / demonstrators and caterers ensuring a successful two day experience. Delivered presentations on pipeline repair methods.

National Manuals
Engineer
Part of team that developed the DOT Pipeline Repair Manual and TTO5 as well as a contributing author.

Acquisition Due Diligence
Engineer
Coordinated with Commercial Engineering departments to develop acquisition valuation of potential pipeline acquisitions. Performed document due diligence.

Stress Corrosion Cracking Analysis
Engineer
Analyzed the factors contributing to SCC found on line pipe, determining likely causes and areas of risk for hazardous liquid pipelines.

Previous Employment

Enterprise Products Partners - Houston, TX
Pipeline Integrity Engineer
Led pipeline integrity efforts and programs in pipeline risk management and analysis. Implemented and matured the written Integrity Management Programs, standards and procedures improving efficiency. Coordinated and implemented PHMSA and API annual reports helping improve industry knowledge and safety. Matured and strengthened the assessment method selection process improving assessment data quality.
Recommended preventive and mitigative measures; determined re-assessment interval and methods through informational analysis of pipelines while maintaining system safety and regulatory compliance. Provided Engineering support including welding calculations, material selection, sizing, test pressure, MOP/MAOP/Set Point calculations, evaluation of defects and recommend appropriate repairs improving overall pipeline safety. Provided input to new construction of pipelines and due diligence supporting Pipeline Integrity safety and regulation efforts.

DNV – Columbus (formerly CC Technologies) - Dublin, OH
Staff Engineer
Developed, managed, and implemented projects for oil and gas companies resulting in successful completion on time and within budget. Directed engineers to perform applicable testing / research providing clients with detailed analysis. Analyzed pipeline designs, noted areas of concern, and recommended changes maintaining regulatory compliance. Managed and organized national association's training in Pipeline Repair facilitating all schedules and the acquisition of speakers / demonstrators and caterers.
Tested physical and chemical properties of welds, materials, and coatings providing recommendations to clients. Employed Engineering Critical Assessment methods, calculated remaining life and fatigue, determined corrosion high-risk areas, proposed solutions, and verified code compliance improving compliance and safety of client pipelines.
Developed repair, material testing, and welding manuals and procedures used by the U.S. government and various pipeline companies. Delivered presentations on pipeline stress, corrosion, and repair to clients and students

Columbia Gas - Columbus, OH
Gas Controller
Calculated cost and benefit analyses of operating strategies optimizing profitability. Performed statistical, trend, and forecast analysis for pipeline operations ensuring safe delivery of sufficient supply. Coordinated pipeline flow via SCADA ensuring uninterrupted natural gas supply to commercial markets. Trained new Gas Controllers. Established and maintained SCADA alarms. Created CADD drawings for new SCADA system. Responsible for day to day operations of the Columbia Gas System.

U.S. Army & U.S Army Reserve
Petroleum Specialist / Combat Engineer
Managed facility personnel maintaining integrity of storage tanks and pipelines as section leader and squad leader. Analyzed and managed purchasing and inventory, ensuring combat ready supplies. Constructed and managed mobile pipelines to maintain fuel supplies in the field. Operated heavy machinery as part of construction, demolition of structures, earth movement and fuel transportation.

BEFORE THE SOUTH DAKOTA PUBLIC UTILITIES COMMISSION

DOCKET NO. HP14-001

IN THE MATTER OF THE PETITION OF TRANSCANADA KEYSTONE PIPELINE, LP FOR ORDER ACCEPTING CERTIFICATION OF PERMIT ISSUEDIN DOCKET HP09-001 TO CONSTRUCT THE KEYSTONE XL PIPELINE

Direct Testimony of Daniel Flo on Behalf of the Staff of the South Dakota Public Utilities Commission

April 2, 2015

Q: Please state your name and business address.

A: Daniel Flo, Natural Resource Group, LLC (NRG), 1500 Southwest First Avenue, Suite 885, Portland, OR, 97201; 1000 IDS Center, 80 South 8th Street, Minneapolis, MN, 55402 (Corporate Office).

Q: Describe your educational background.

A: I received my Bachelor of Science Degree in 1996 from Minnesota State University, Mankato with a Major in Geography. I then received my Juris Doctor degree from Northwestern School of Law of Lew & Clark College in 2002. My educational and professional specialties are in environmental law and land use.

Q: By whom are you now employed?

A: I have been employed by Natural Resource Group, LLC from 2005 to 2010, and from 2013 to present. I currently hold the position of Senior Consultant.

Q: What work experience have you had that is relevant to your involvement on this project?

A: From 2005 to present, my responsibilities have been to provide clients in the energy and mining industries with environmental permitting services, including the preparation of Environmental Assessments and Environmental Impact Statements (EISs) under the National Environmental Policy Act and/or relevant state programs. My environmental permitting experience also includes the preparation of permit applications under Sections 404 and 401 of the Clean Water Act, the preparation of routing and siting applications to state utility commissions, and various other local, state, and federal environmental permits and approvals. I also provide project management services wherein I lead multi-disciplinary teams in performing route and site analysis, environmental field surveys, environmental permitting, construction compliance inspections, and post-construction restoration monitoring. A copy of my resume is appended to this testimony as Exhibit___DF-1.

Q: What Professional Credentials do you hold?

A: None.

Q: What is the purpose of your testimony?

A: In 2009, NRG provided environmental consulting services in support of PUC Staff's review of Keystone's original permit application. The scope of NRG's original review included a summary of the Department of State environmental review, a review of Keystone's application to the PUC, and an evaluation of the adequacy of Keystone's state permit application with respect to alternatives, paleontology, cultural resources, soils, erosion and sedimentation, and restoration methods described in the project's Construction, Mitigation, and Reclamation Plan (CMRP). Based on this review, NRG provided hearing support to PUC Staff including the preparation of prefiled testimony and expert testimony during the PUC hearing. The purpose of this testimony is to summarize NRG's review of Keystone's September 2014 Petition for Order Accepting Certification under SDCL § 49-41B-27 and associated supporting documentation, specifically our evaluation as to whether any of the changes identified by Keystone result in a change to our original testimony.

Q: What methodology did you employ?

A: I evaluated materials submitted to the South Dakota Public Utilities Commission (PUC) by TransCanada Keystone Pipeline, LP (Keystone), including Keystone's Petition for Order Accepting Certification under SDCL § 49-41B-27 and associated supporting documentation. Primarily, I evaluated the Findings of Fact from the PUC's Amended Final Decision and Order that have changed since 2010 as detailed in Keystone's table in Appendix C, and compared those changes to NRG's original testimony prepared in 2009. I also evaluated the red-line changes to Keystone's CMRP (dated April 2012) to determine whether the changes in that document result in changes to NRG's original testimony.

Q: With respect to the changes identified by Keystone in Appendix C, South Dakota PUC Amended Final Decision and Order, Tracking Table of Changes, please summarize your review by Finding Number. Findings 14 through 18:

A: The updated project information provided by Keystone for Findings 14 through 18 has been reviewed and results in no change to NRG's original (2009) testimony.

Q: Findings 19, 20, 22, 23:

A: The updated project information provided by Keystone for Findings 19, 20, 22 and 23 is outside the scope of NRG's 2009 review and testimony, and therefore results in no change to NRG's original testimony.

Q: Findings 24 through 29:

A: The updated project information provided by Keystone for Findings 24 through 29 is outside the scope of NRG's 2009 review and testimony, and therefore results in no change to NRG's original testimony.

Q: Finding 32:

A: I reviewed the red-line changes to Keystone's CMRP (dated April 2012) and compared those changes to NRG's original testimony from Ross Hargrove and Dr. James Arndt. My findings are summarized in Exhibit____DF-2. This table lists all CMRP sections with redline changes where NRG also provided recommendations in 2009, and provides my evaluation of Keystone's change with respect to NRG's 2009 testimony. None of the redline changes to Keystone's CMRP result in a change to NRG's 2009 testimony.

Q: Finding 33:

A: The updated project information provided by Keystone for Finding 33 has been reviewed and results in no change to NRG's original testimony.

Q: Finding 41:

A: I reviewed the additional site-specific crossing plans for the HDD crossings of Bad River and Bridger Creek, and reviewed NRG's original testimony. The addition of these two waterbodies as HDD crossings, and the supporting site-specific crossing drawings, result in no change to NRG's original testimony.

Q: Finding 50:

A: The updated project information provided by Keystone for Finding 50 has been reviewed and results in no change to NRG's original testimony.

Q: Finding 54:

A: The updated project information provided by Keystone for Finding 54 has been reviewed and results in no change to NRG's original testimony.

Q: Findings 60 through 63, and 68:

A: The updated project information provided by Keystone for Findings 60 through 63 and 68 is outside the scope of NRG's 2009 review and testimony, and therefore results in no change to NRG's original testimony.

Q: Finding 73:

A: See the response to Finding Number 32 above and my summarized findings in Attachment 2.

Q: Finding 80:

A: NRG's original recommendations included that Keystone be required to provide the final Construction/Reclamation (Con/Rec) Units and associated construction, restoration and mitigation procedures and corresponding pipeline milepost references to the PUC prior to construction. NRG also recommended that the Con/Rec classification system be developed in consultation with Natural Resources Conservation Service (NRCS) staff. NRG's recommendations were based in part on an understanding that Keystone would include Badlands (sodium bentonite) soils as a Con/Rec Unit. NRG also evaluated Keystone's examples of specific reclamation measures that may be used in areas where saline, sodic, and saline-sodic soils are encountered during construction and found the sample procedures to be adequate.

Keystone's update to Finding 80 indicates that Con/Rec mapping was completed in consultation with area NRCS staff. Keystone's Response to Commission Staff's First Set of Interrogatories (#18) indicates that Con/Rec Units are not part of the updated CMRP but that the results are included with the Department of State's FSEIS in Appendix R.

I reviewed Appendix R of the FSEIS on the Department of State's website and confirmed that Con/Rec Units were developed and are included as an appendix to that federal NEPA document. I also confirmed, based on the documentation provided in Appendix R including records of correspondence, that NRCS staff and other professional resources were consulted during the development of the Con/Rec classification system. Appendix R does not, however, include pipeline milepost references for the Con/Rec Units.

Keystone's update appears largely to satisfy NRG's original recommendation in that Con/Rec Units have been developed, that NRCS staff was consulted during the Con/Rec Unit development process, and that the Con/Rec classification system is available to the PUC prior to project construction.

To the extent that the Con/Rec Units do not specifically include a Badlands soils unit, NRG originally found that Keystone's construction, reclamation, and mitigation measures for dealing with this soil type, as discussed in the application, were appropriate and represented the tools that are typically used during construction in similar soils. The absence of a Badlands soils unit does not specifically represent a change to NRG's original testimony.

Finally, although the Con/Rec Units do not appear to specifically address construction or reclamation procedures in saline, sodic, or saline-sodic soils or saline seeps, there is no change to NRG's original testimony finding that the reclamation measures discussed in the application were adequate and appropriate for those soil types.

Q: Finding 83:

A: See the response to Finding Number 41 above. The updated project information provided by Keystone for Finding 83 results in no change to NRG's original testimony.

Q: Finding 90:

A: The updated project information provided by Keystone for Finding 90 is outside the scope of NRG's 2009 review and testimony, and therefore results in no change to NRG's original testimony.

Q: Finding 107:

A: The updated project information provided by Keystone for Finding 107 is outside the scope of NRG's 2009 review and testimony, and therefore results in no change to NRG's original testimony.

Q: Does this conclude your testimony?

A: Yes.

Daniel S. Flo
Email: daniel.flo@NRG-LLC.com

Daniel Flo is a Senior Regulatory Specialist in Natural Resource Group, LLC's (NRG) Portland office. Daniel has over 12 years of environmental assessment and permitting experience and specializes in project management for liquids pipelines, electric transmission and wind energy projects. Daniel is an experienced environmental project manager and is adept at overseeing all stages of project development including agency coordination, environmental surveys, major permitting, environmental review, construction, and restoration. Daniel is also NRG's Business Development Lead for the Construction Compliance practice group and is responsible for supporting and promoting NRG's Environmental Inspection, Third Party Compliance and related service areas.

Selected Project Experience

- Enbridge Energy, Inc., 2014 Wisconsin and Illinois Environmental Surveys Initiative Project, 2013 to Present, 470 miles of environmental surveys along Enbridge's existing Line 61 utility corridor: Project Manager responsible for overseeing preparation of field deployment, initial agency consultations, field training program, and environmental surveys including wetlands and waterbodies, cultural resources, sensitive habitats and protected species.
- Enbridge Energy, Inc., Line 3 Maintenance and Flexibility Project, May 2014 to November 2014, 16-mile-long 34-inch-diameter crude oil pipeline segment replacement project in North Dakota: Project Manager for environmental inspection, compliance management and daily reporting during construction of the maintenance replacement project.
- Enbridge Energy, Inc., Line 3 Maintenance and Flexibility Project, January 2014 to May 2014, 16-mile-long 34-inch-diameter crude oil pipeline segment replacement project in North Dakota: Project Manager responsible for environmental support activities for a high-priority maintenance replacement project, including desktop analysis, risk assessment, construction planning, and environmental permitting.
- Quanta Pipeline Services, Bluegrass Memphis Pipeline Project, 2013 to 2014, 91-mile-long natural gas liquids pipeline in Tennessee, Arkansas, and Mississippi: Project Manager responsible for environmental and cultural resources surveys and permitting, including U.S. Army Corps of Engineers (COE) Nationwide Permit 12 and levee crossing permits, water appropriation permits, stormwater discharge and hydrostatic testwater discharge permits, and protected species consultations.
- Enbridge Energy, Inc., Line 79 Pipeline Project, 2011 to 2012, 35-mile-long crude oil pipeline in Michigan: Project Manager responsible for environmental surveys and permitting, as well as preparation of a Michigan Environmental Impact Report and Joint Permit Applications under Michigan administrative rules Section 301 and 303, and multiple local drain crossing and soil erosion and sediment control permits.
- Preferred Sands of Minnesota, Kasota Mine Project, 2010 to 2012, non-metallic mineral mining and processing project in Minnesota: Project Manager responsible for successful completion of a Scoping Environmental Assessment Worksheet, local permitting and zoning, environmental surveys, and hydrogeological studies and modeling.
- Preferred Sands of Minnesota, 2010 to 2012, various non-metallic mineral mining and processing project sites in Wisconsin: Project Manager responsible for overseeing changes in zoning, conditional use permits, mine reclamation plans, and state and local permits.

- ALLETE Clean Energy, North Dakota One Wind Project, 2012, 100-megawatt (MW) wind energy project in North Dakota: Project Manager responsible for managing environmental survey and permitting and energy facility siting activities including obtaining site approval from the North Dakota Public Service Commission.
- Minnesota Power, Bison 2 and Bison 3 Wind Energy Facility Projects, 2011 to 2012, two 105-MW wind projects in North Dakota: Project Manager responsible for cultural and environmental field surveys and team preparation of energy facility siting applications and other documents necessary for site approval from the North Dakota Public Service Commission.
- CapX2020, Hampton to La Crosse 345 kV Transmission Line Project, 2011, 125-mile-long electric transmission project in Minnesota and Wisconsin: Author of the Land Use section of the State of Minnesota Draft Environmental Impact Statement (EIS).
- Rangeland Energy, COLT Connector Pipeline Project, 2010 to 2012, 20-mile-long crude oil pipeline in North Dakota: Project Manager responsible for environmental permitting and review and post-construction environmental inspections, including a facility siting / route permit from the North Dakota Public Service Commission.
- CapX2020, Fargo to Monticello 345 kV Transmission Line Project, 2010, the construction of major electric transmission lines from Fargo, North Dakota to Monticello, Minnesota: Co-Project Manager responsible for overseeing technical specialists involved with environmental and cultural resources field surveys and permit applications for the COE and the Minnesota Department of Natural Resources, as well as contributing to the environmental routing analysis process supporting route permitting and state utility commission certification.
- Enbridge Energy, Alberta Clipper Pipeline Project, 2006 to 2010, 300-mile-long, 36-inch-diameter crude oil pipeline between the United States – Canada border in North Dakota and Superior, Wisconsin: Deputy Project Manager responsible for managing environmental surveys and federal and state permitting including an EIS from the U.S. Department of State, National Forest Service crossing permits, North Dakota Public Service Commission route permit, and Minnesota Department of Natural Resources land and waterbody crossing permits.
- Enbridge Energy, Southern Lights Diluent Pipeline Project, 2006 to 2009, 190-mile-long, 20-inch-diameter refined product pipeline from Superior, Wisconsin to Clearbrook, Minnesota: Project Manager responsible for managing environmental surveys and federal and state permitting.
- South Dakota Public Utilities Commission, 2009: Presented expert testimony to the South Dakota Public Utilities Commission regarding the National Environmental Policy Act (NEPA) process and federal environmental review for interstate liquids pipelines.
- Enbridge Energy, LSr Pipeline Project, 2006 to 2008, 105-mile-long, 20-inch-diameter crude oil pipeline from the United States – Canada border at Neche, North Dakota to Clearbrook, Minnesota: Supervised environmental permitting and compliance and contributed to the development and submittal of numerous federal, state, and local permit applications as well as contributed to preparing an Environmental Assessment (EA) for the U.S. Department of State.
- El Paso, Continental Connector Natural Gas Pipeline Project, 2006, 384-mile-long natural gas pipeline in Texas, Oklahoma, Arkansas, and Louisiana: Authored the Land Use section of the Federal Energy Regulatory Commission (FERC) environmental report (Resource Report 8).

- Phoenix Expansion Pipeline Project, 2006, 259-mile-long natural gas pipeline in Arizona and 25 miles of additional loops in New Mexico: Authored the socioeconomics section and co-authored the land use section of the FERC EIS.

Education and Training

- J.D., Northwestern School of Law of Lewis & Clark College, Oregon, 2002
- B.S., Geography, Minnesota State University, Minnesota, 1996
- FERC Environmental Review & Compliance for Natural Gas Facilities seminar, Denver, 2009
- University of Minnesota Certified Erosion/Sediment Control Specialist; Certified Inspector / Installer; Certified Designer of Stormwater Pollution Prevention Plans, 2009

Finding Number	NRG Response
	The Project
14	The updated information provided by Keystone for Finding Number 14 has been reviewed and results in no change to NRG's original (2009) testimony.
15	Updated information has been reviewed and results in no change to NRG's original testimony.
16	Updated information has been reviewed and results in no change to NRG's original testimony.
17	Updated information has been reviewed and results in no change to NRG's original testimony.
18	Updated information has been reviewed and results in no change to NRG's original testimony.
19	The updated information provided by Keystone for Finding Number 19 is outside the scope of NRG's 2009 review and testimony, and therefore results in no change to NRG's original testimony.
20	Updated information is outside the scope of NRG's original review and results in no change to our original testimony.
22	Updated information is outside the scope of NRG's original review and results in no change to our original testimony.
23	Updated information is outside the scope of NRG's original review and results in no change to our original testimony.
	Demand for the Facility
24	The updated information provided by Keystone for Finding Number 24 is outside of the scope of NRG's original (2009) review and testimony, and therefore results in no change to NRG's original testimony.
25	Updated information is outside the scope of NRG's original review and results in no change to our original testimony.
26	Updated information is outside the scope of NRG's original review and results in no change to our original testimony.
27	Updated information is outside the scope of NRG's original review and results in no change to our original testimony.
28	Updated information is outside the scope of NRG's original review and results in no change to our original testimony.
29	Updated information is outside the scope of NRG's original review and results in no change to our original testimony.
	Environmental
32	I reviewed the redline changes to Keystone's CMRP (dated April 2012) and compared those changes to NRG's original testimony from Ross Hargrove and Dr. James Arndt. My findings are summarized in Attachment 2. This table lists all CMRP sections with redline changes where NRG also provided recommendations in 2009, and provides my evaluation of Keystone's change with respect to NRG's 2009 testimony. None of the redline changes to Keystone's CMRP result in a change to NRG's original testimony.

33	Updated information has been reviewed and results in no change to NRG's original testimony.
41	I reviewed the additional site-specific crossing plans for the HDD crossings of Bad River and Bridger Creek, and reviewed NRG's original testimony. The addition of these two waterbodies as HDD crossings, and the supporting site-specific crossing drawings, result in no change to NRG's original testimony.
50	No change to original testimony.
54	No change to original testimony.
	Design and Construction
60	The updated information provided by Keystone for Finding Number 60 is outside of the scope of NRG's original (2009) review and testimony, and therefore results in no change to NRG's original testimony.
61	Updated information is outside the scope of NRG's original review and results in no change to our original testimony.
62	Updated information is outside the scope of NRG's original review and results in no change to our original testimony.
63	Updated information is outside the scope of NRG's original review and results in no change to our original testimony.
68	Updated information is outside the scope of NRG's original review and results in no change to our original testimony.
73	See response to Finding Number 32 above. I reviewed the redline changes to Keystone's CMRP (dated April 2012) and compared those changes to NRG's original testimony from Ross Hargrove and Dr. James Arndt. My findings are summarized in Attachment 2. This table lists all CMRP sections with redline changes where NRG also provided recommendations in 2009, and provides my evaluation of Keystone's change with respect to NRG's 2009 testimony. None of the redline changes to Keystone's CMRP result in a change to NRG's 2009 testimony.
80	NRG's original recommendation was that Keystone provide the final Construction/Reclamation Units and associated restoration and mitigation procedures and corresponding pipeline milepost references to the PUC prior to construction. Keystone's update indicates that Con/Rec Unit mapping in consultation with area NRCS offices has been completed and that the results are included with the Department of State's FSEIS in Appendix R. This update appears to satisfy NRG's original recommendation.
83	Refer to Finding Number 41. No change to NRG's original testimony.
	Operation and Maintenance
90	The updated information provided by Keystone for Finding Number 90 is outside of the scope of NRG's original (2009) review and testimony, and therefore results in no change to NRG's original testimony.
	Socio-Economic Factors
107	The updated information provided by Keystone for Finding Number 107 is outside of the scope of NRG's original (2009) review and testimony, and therefore results in no change to NRG's original testimony.