

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



1 **Q. Please state your name and business address.**

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

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

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

8 **Q. Please describe your educational background and professional experience.**

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

15

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

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

8

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

14

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

22

23 My resume is attached to this document as Exhibit \_\_\_DS-1.

1 **Q. On whose behalf was this testimony prepared?**

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

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

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

17

18 This testimony deals specifically with updates made to the project as provided by  
19 Keystone on the Tracking Table of Changes, specifically as they relate to 49 CFR Part  
20 195 Subpart H.

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

1 **where an adjacent foreign utility interfered with the cathodic protection system.**

2 **Do requirements set forth in 49 CFR Part 195 and / or the safety measures set**  
3 **forth in the DOS Final SEIS adequately address interference currents?**

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

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

12 A. The phenomenon of AC stray current interference is becoming a more prominent  
13 concern within the industry; especially, but not exclusively, associated with FBE and/or  
14 Epoxy ARO (Abrasion Resistant Overcoat) protectively coated pipeline systems. This  
15 issue is addressed and prescribed under Table 4, Special Conditions as recommended  
16 by PHMSA, page 80, item 21. The program stipulated by PHMSA should address the  
17 detection and mitigation of stray AC current effects. As interpreted, the PHMSA  
18 program requirements stipulate that control of induced AC from parallel electric  
19 transmission lines and other interference issues (e.g., crossings, substations,  
20 transpositions or capacitive or conductive coupling (fault)) are to be incorporated into  
21 pipeline design and addressed during the construction phase. This program  
22 recommendation is also consistent with the notice contained in the DOT/OPS Advisory:  
23 68FR64189 – 11/12/2003. If not already provided, a copy of the construction

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

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

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

13 **Q. Does the update made to Finding 68 violate any requirements set forth in**  
14 **49 CFR Part 195 Subpart H?**

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

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

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

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

8 A. No they do not.

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

12 A. No they do not.

13 **Q. Does this conclude your testimony?**

14 A. Yes.

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, underground 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 indirect 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 Managers
- 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.
- 51<sup>st</sup>. Annual Underground Corrosion Short Course: Speaker and presentation on AC issues on Pipelines presented under the System Integrity section, Purdue University, 2012
- 51<sup>st</sup>. Annual Underground Corrosion Short Course: Pipeline Casing Presentation, 2012
- 51<sup>st</sup>. Annual Underground Corrosion Short Course: Station Assessment Procedures, 2012
- EPR/Southwest Research: June 2010, Copper Grounding Presentation
- China International Oil and Gas Pipeline Conference, Langfang, Hebei, China, November-2009: Safety and Operability Assessment Report and HAZOP Study Report (PetroChina).
- China International Oil and Gas Pipeline Conference, Langfang, Hebei, 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