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.