BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

IN THE MATTER OF THE APPLICATION BY TRANSCANADA KEYSTONE PIPELINE, LP FOR A PERMIT UNDER THE SOUTH DAKOTA ENERGY CONVERSION AND TRANSMISSION FACILITIES ACT TO CONSTRUCT THE KEYSTONE PIPELINE PROJECT	)	HP 07-001 **DIRECT TESTIMONY OF MEERA KOTHARI**

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

Answer: Meera Kothari, 450 1st Street SW Calgary Alberta T2P 5H1 Canada.

2. Are you an employee of TransCanada Keystone?

Answer: Yes I am.

3. Please state your professional qualifications.

Answer: I am a professional engineer with TransCanada; I am responsible for pipeline design and integrity management. I have over 10 years of oil and gas industry experience, six of which focus on the design, construction technologies and integrity management of liquid and natural gas pipelines in North and South America.

4. Have you provided a resume?

Answer: Yes, my resume is attached as Exhibit A.

5. Are you responsible for portions of the application which Keystone has filed with the South Dakota Public Utilities Commission seeking a siting permit for the Keystone Pipeline?

Answer: Yes.

6. Are you responsible for the information provided in Section 2.2.1 of the application?

EXHIBIT
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Answer: Yes

7. Will you please summarize the information in that part of the application?

Answer: Yes. As shown in the application, the pipeline will be designed, constructed, tested and operated in accordance with all applicable requirements, including but not limited to US DOT regulations at 49 CFR Part 195. These regulations, administered by the Pipeline Hazardous Materials and Safety Administration (PHMSA), are intended to ensure adequate protection for the public and the environment and to prevent crude oil pipeline accidents and failures. Exhibit 3 is a mechanical flow diagram for the first 600 miles of pipeline in the U.S. Approximately 220 miles are located in South Dakota. No lateral lines will be constructed in South Dakota. The pipeline will be constructed at a maximum flow rate of 591,000 bpd. The maximum operating pressure is 1440 pounds per square inch.

8. Are you responsible for the information provided in Section 2.2.2 of the application?

Answer: Yes.

9. Will you please summarize the information in that part of the application?

Answer: Yes. The four pump stations in South Dakota will be in Day, Beadle, Miner and Hutchinson counties. The stations and the pumps are electrically driven and will be required to pump the crude oil through the line. Pump units will be installed to meet the nominal design flow rate of 591,000 bpd.

10. Are you responsible for the information provided in Section 2.2.3 of the application?

Answer: Yes

11. Will you please summarize the information in that part of the application?

Answer: Yes. Fourteen mainline valves will be installed in South Dakota. This is an update from Keystone's application, which stated that there would be 15 valves in South Dakota. Seven valves will be remotely controlled, to isolate sections of line in the event of an emergency to minimize impacts or for operational or maintenance reasons (these are along the pipeline or at the pump station), four valves are check sets which are comprised of one manual valve and one check valve. Check sets are installed downstream of water bodies which meet a specific design criteria (e.g. Logan/Fordham Dam and Wolf Creek).

12. Are you responsible for the information provided in Section 2.3.1 of the application?

Answer: Yes.

13. Will you please summarize the information in that part of the application?

Answer: Yes. The pipeline will be inspected aerially 26 times per year, not to exceed three weeks, in accordance with Federal regulations, found at 49 CFR Part 195. The ROW will be maintained to allow for accessibility, free of trees and woody growth extending a minimum of 10-15 feet on either side of the pipeline centerline, but cultivated crops and grass will be allowed to grow on the permanent ROW. Keystone will continually monitor the pipeline to identify any potential integrity concerns. Operation and maintenance records are required to be kept in accordance with US DOT regulations. Keystone will comply with those regulations. A Supervisory Control and Data Acquisition (SCADA) system will be used to monitor the pipeline at all times, as outlined in other testimony. In addition, the last sentence of this section should state that "Serious abnormal situations that are not investigated will initiate automatic pipeline shutdown systems at the affected pipeline segments."

14. Are you responsible for the information provided in Section 6.4.2 of the application?

Answer: Yes, in part.

15. Are you responsible for Section 6.4.2 of the application?

Answer: I am responsible in part for that section. Pipeline safety is administered by the federal government through the Pipeline Hazardous Materials Safety Administration, an agency of the United States Department of Transportation. There are a number of federal regulations which have been instituted to insure public and environmental protection and to prevent accidents and failures. Keystone will comply with all regulations which are not superseded by the special permit, addressed later in my testimony, authorizing Keystone to operate using a 0.8 design factor. I adopt as my testimony the information found in 6.4.2 at pages 64 and 65 of the application.

16. Are you responsible for the information provided in Exhibit 3 of the application?

Answer: Yes, this exhibit shows the pipeline's mechanical flow schematic.

17. Are you responsible for the information provided in Exhibit 4 of the application?

Answer: Yes, this exhibit shows a typical pump station layout.

18. At the public hearing there was some testimony about a TransCanada website that reported 576 spills in the past six years. Can you explain the context of the posted spill information?

Answer: TransCanada sets industry-leading targets that provide a focus to monitor and improve our programs and continually improve our performance. As part of this effort,

TransCanada tracks all spills of any size or type, or near-spills, even though they are cleaned up with no net impact to the environment. We include third-party spills affecting TransCanada property or work. TransCanada then reports and posts all of these spills, as well as any and environmental non compliance events, as part of our annual social/corporate responsibility report posted on our corporate website. Most of these spills are of a nature that they are not required to be reported under the applicable regulations.

19. Tell me specifically about the 576 spills posted on TransCanada's website?

Answer: Most importantly, none of these spills represent pipeline operational leaks. Nearly 80 percent of the reported spills were due to equipment-related leaks of hydraulic oil, lube oil, glycol and fuel typically of low volume (<1.3 gallons). The threshold reportable spill volume to US DOT is five barrels or 158 gallons.

Our internal incident management process defines spills as follows:

> Minor - A spill/release, onsite, that poses no adverse affect to the environment nor impact neither to a water body nor to groundwater. The spill may or may not be reportable to a regulatory agency
>
> Serious - A spill/release, onsite or off-site/off-right-of-way, that poses an adverse affect to the environment but no impact to a water body nor to groundwater. Serious spills are reportable to a regulatory agency
>
> Major - A spill/release, onsite or off-site/off ROW, that poses an adverse affect to the environment including an impact to a water body or to groundwater. Major spills are reportable to a regulatory agency

Critical - Emergency response for containment or clean up is required. A spill/release, onsite or off-site/off ROW, that poses an adverse affect to the environment including an impact to a water body or to groundwater. Critical spills are reportable to a regulatory agency and require invoking the Emergency Response Plan.

Under TransCanada's spill classification system, between 2000-2005, there were 576 spills. Of the 576 spills, 20 were near misses, 523 spills were classified as Minor, 28 were classified as Serious, four spills were classified as Major and one as Critical. In the case of all four "major" spills, less than 20 gallons in total were spilled. The "critical" spill involved the release of approximately 100 gallons of various liquids such as lube oils.

20. Can you please describe the nature of the 183 "non-compliance events" that are posted on TransCanada's website?

Answer: The non-compliance environmental reports were typically administrative in nature or self reporting non-compliance with TransCanada procedures during construction. None of the non-compliance reports resulted in any danger to the pipeline integrity or any substantive pipeline operational problems.

21. Has TransCanada ever had a failure on a crude oil pipeline?

Answer: Yes, in 1996 a failure occurred on the Platte Pipeline at a pump station. The failure was due to corrosion. TransCanada was a 50% (Joint Venture) owner with Alberta Energy Corporation (now EnCana), although TransCanada was not the operator at that time. Approximately 220 barrels of oil were released within a pump station; none recovered. No habitat, resources, or people were affected.

22. How many known miles of hydrocarbon pipeline are there in South Dakota?

Answer: There is known to be 6,364 miles of hydrocarbon pipeline in South Dakota, of which 420 miles are liquid pipelines which carry refined oil products. There are no crude oil pipelines currently operating in South Dakota.

23. How many pipeline failures have occurred in South Dakota in the last 10 years?

Answer: Five failures have occurred in the last 10 years, according to PHMSA statistics. two in 1998 and one in 2004, on pipelines carrying refined products. Two have been on natural gas distribution pipelines.

24. What are the causes of the failures on the liquid pipelines?

Answer: One was caused by corrosion and two were caused by third-party excavation.

25. Has TransCanada adopted safeguards and measures to protect against threats to the integrity of the Keystone pipeline?

Answer: Yes, Keystone conducted a pipeline threat analysis as part of the requirements for the NEPA process, using the pipeline industry published list of threats under ASME B31.8S and PHMSA to determine the applicable threats to the Keystone pipeline. Keystone then developed safeguards to protect against these potential threats.

The potential threats to this pipeline are:

Manufacturing Defects – flaws in the seam of the pipeline created during the manufacturing process

Construction Damage – flaws such as dents, cracks, nicks in the coating which are as a result of transport, or construction

Corrosion – internal and external – defects that develop over time during operation

Mechanical Damage – contact with the pipeline

Hydraulic Event – overpressure of the pipeline.

26. Has Keystone reacted to this analysis?

Answer: Yes it has. Keystone has developed safeguards for this specific pipeline project.

27. What safeguards have been developed and put in place specifically for this pipeline to mitigate manufacturing defects?

Answer: Safeguards have been implemented during design, and will be implemented during construction and operations of the pipeline. Steel suppliers, mills and coating plants are pre-qualified using a formal qualification process consistent with ISO standards. The pipe is engineered with stringent chemistry for such compounds as carbon to ensure weldability during construction. Each batch of pipe is mechanically tested to prove strength, fracture control and fracture propagation properties. The pipe is hydrostatically tested. The pipe seams are visually and manually inspected and also inspected using ultrasonic instruments. Each piece of pipe is traceable; each pipe joint is traceable to the steel supplier and pipe mill shift during production. The coating is inspected in the plant with stringent tolerances on roundness, nominal wall thickness. A formal quality surveillance program is in place at the steel mill and coating plant.

28. What construction damage safeguards are in place specifically for this pipeline?

Answer: Construction Damage can be flaws such as dents, cracks, nicks in the coating which are as a result of transport, or construction. Pipe joints which are susceptible to transportation fatigue (joints that stacked on the bottom) are examined for cracks in the seam, using ultrasonic inspection, once it is offloaded from rail cars prior to transport to the stock pile site. All pipe welds are examined 100% of the circumference using ultrasonic or radiographic

inspection. The coating is inspected and repaired if required prior to lowering into the trench. After construction, the pipeline is hydro-tested in the field to 125% of its maximum operating pressure. After the hydro test, a caliper tool is run to check for dents and ovality.

29. What safeguards are in place specifically for this pipeline to mitigate corrosion?

Answer: Corrosion can be both internal and external. Corrosion defects are defects which develop over time during operation. Fusion bonded epoxy (FBE) is a protective coating that is applied to external surface of the pipe to prevent corrosion. A cathodic protection system is installed, comprised of engineered metal alloys or anodes, which are connected to the pipeline. A low voltage direct current is applied to the pipeline, the process corrodes the anodes rather than the pipeline. The two combined mitigate external corrosion.

A tariff specification of 0.5% solids and water by volume is contained in Keystone's transportation agreement with its shippers. This specification is lower than the industry standard of 1% to minimize the potential for internal corrosion. The pipeline is designed to operate in turbulent flow to minimize water drop out, which is also a potential cause of internal corrosion. During operations, the pipeline is cleaned using in-line inspection tools. The pipeline is inspected with a smart in-line inspection tool, which measures and records internal and external metal loss.

30. What is TransCanada's experience with the pipe, coating, and corrosion protections that will be used in the Keystone pipeline project?

Answer: TransCanada has thousands of miles of this particular grade of pipeline steel installed and in operation. TransCanada pioneered the use of FBE, which has been in use on our system for over 28 years. There have been no leaks on this type of pipe installed by

TransCanada with the FBE coating and cathodic protection system during that time. When TransCanada has excavated pipe to validate FBE coating performance, there has been no evidence of external corrosion.

31. What safeguards are in place specifically for this pipeline to mitigate mechanical damage?

Answer: Mechanical Damage is damage caused by contact with the pipeline. The Keystone pipeline will be buried with four feet of cover. This reduces the likelihood of mechanical damage, according to pipeline industry research, by 80% in undeveloped areas and 41% in developed areas. The steel specified for the pipeline is high strength steel with engineered puncture resistance of approximately 51 tons of force. According to pipeline industry research, 99% of excavators in the United States do not have a digging force capable of exceeding 40 tons. Bi-weekly aerial patrols, TransCanada's public awareness programs, pipeline marker signage and participation in the State's One Call program are all additional safeguards against mechanical damage.

32. What safeguards are in place specifically for this pipeline to mitigate against hydraulic damage?

Answer: A Hydraulic Event is characterized by overpressure of the pipeline. This is avoided by the systems in place to monitor the pipeline, known as the SCADA system. The SCADA system is the subject of other testimony. Keystone will also rely on operator training - operators are trained using a transient model which emulates the pipeline operation this will occur prior to the pipeline being in service. This allows for simulation of a number of operational conditions to train the operator. Operators must train periodically in accordance with US DOT and industry recommended practices.

33. Are you aware of any studies performed on the impact of petroleum based hydrocarbons on PVC pipe and gaskets?

Answer: Yes I am aware of one study currently underway by the American Water Works Association (AWWA). The study is not complete as per my conversation with the AWWA project manager but two papers have been published on the topic.

34. Could you describe your understanding of these projects/papers?

Answer: The first paper describes the experimental method used to derive an equation which can be used to predict the external concentration which will result in exceeding the maximum concentration limit for benzene or toluene in PVC pipe water after a period of contamination exposure. The product used in the experiment was premium gasoline, which is a refined oil product and not the same commodity which is being transported by Keystone.

In the second paper, a study was performed where statistical information was gathered on existing water transportation infrastructure. One hundred fifty one utilities across Western Canada and the entire United States were surveyed. The total was 83,600 miles of water mains, of which only 0.54% was considered at risk. Of the total 5,444,218 PE/PVC service connections only 0.31% were considered at risk. Permeation incidents were reported at a frequency of one per 14,000 miles of mains and one per 1,000,000 PE/PVC service connections. Of the total six reported permeation incidents on water mains, three were gasoline, one chlorinated solvent and two unknown for the water pipelines. Of the 44 permeation incidents reported on service connections, 36 involved polybutelyne from gasoline, the rest were chlorinated solvents and asphalt solvents for the service connections. The study also reported successful use of water mains and service connections in contaminated areas at one per 1,800 miles of mains and one per 2,500,000 service connections.

The study in the lab showed that PVC is highly resistant to gasoline and water saturated gasoline. PVC pipe exposed to gasoline showed no permeation to BTEX during the first 10 months of exposure. PVC pipe exposed to pure solvents showed permeation within 6.5 days for pure trichloroethylene and 16 days for pure toluene. No permeation was shown in the first 4.5 months to saturated aqueous solutions of benzene, toluene and trichloroethylene. Saturated solutions of benzene or TCE permeated after 8 months and toluene after 12 months.

The technical conclusion is that PVC can be safely used in soils contaminated with gasoline, regardless of contamination levels, and PVC is highly resistant to permeation by benzene, toluene and TCE in all but the most extreme conditions. Applying this conclusion to crude oil, with lower relative concentrations of these compounds, demonstrates an even lower likelihood of harm to PVC.

35. Could you please describe the special permit granted to Keystone by PHMSA?

Answer: Yes, Keystone applied for a permit to design the pipeline using an 0.8 design factor which is above the current pipeline code design factor of 0.72. Physically this would translate into a change in the wall thickness of 0.043". However, to implement this, many technical requirements have been engineered into the steel specification, construction and integrity management plan to meet or exceed safety standards. Keystone's application for the special permit included measures Keystone would implement above and beyond those required by regulations to ensure the safety of the pipeline. In addition, the permit specified more than 50 conditions for the design and operation of Keystone that also are above and beyond the normal requirements for a pipeline. In granting the permit, PHMSA found that these measures "provide

a level of safety equal to, or greater than, that which would be provided if the pipelines were operated under existing regulations."

36. Why did Keystone apply for this permit?

Answer: Keystone applied for this permit for several reasons. The Canadian portion of the Keystone pipeline (approximately 760 miles) is designed to operate at 0.8 design factor in accordance with CSA-Z662-03 Canadian pipeline code. The US pipeline industry and the USDOT has moved to adopt this design factor for new and existing U.S. natural gas pipelines as of 2006, as evidenced by the Alliance Pipeline and the Kinder Morgan Rockies Express Pipeline. As a new crude oil pipeline, Keystone is confident it can meet or exceed all design and safety requirements for hazardous liquid pipelines. Lastly, there is an economic benefit to the project which is passed on to the shippers and ultimately the consumer as Keystone is a regulated utility.

37. Does the permit allow Keystone to operate at a higher pressure?

Answer: No. The pipeline's maximum operating pressure is 1440 psi. The engineering equation used to calculate the pipeline's pressure (Barllow's Equation) is a function of the design factor, wall thickness, grade of steel and operating pressure. All variables are fixed except for the design factor to determine the new wall thickness. Federal regulation allows the pipeline to exceed the MOP by 10% as a result of an abnormal operation event and such would be a reportable event.

38. Does thinner wall pipe make it unsafe?

Answer: No. The pipe is engineered with puncture resistance, fracture control that exceeds the requirements of current codes and standards for crude oil pipelines. The pipeline safety factor does not decrease as a result of the 0.8 design factor. The pipe is hydrostatically tested in the mill to a pressure which represents a 0.95 design factor in order to operate at 0.8.

For pipelines that operate using a 0.72 design factor, the current code requirement is to hydrostatically test to a pressure in the mill equivalent to 0.9 design factor. In addition, proactive integrity management programs such as in-line inspection and repairs, cathodic protection monitoring and public awareness programs mitigate any issues.

39. Does TransCanada currently operate any pipelines with the same .8 design factor?

Answer: TransCanada currently operates about 11,000 miles of pipeline at this design factor.

40. Are there any provisions made when crossing foreign pipelines?

Answer: Federal pipeline regulations require pipelines to have a minimum clearance of 12 inches from foreign utilities. Typical industry practice is to under cross an existing utility.

41. Would casing the pipeline when crossing a foreign pipeline be an appropriate safeguard?

Answer: No, casings have been proven to be a significant risk for the development of corrosion. TransCanada, along with the rest of the pipeline industry, has moved away from designing and building pipelines that are cased.

42. Would thicker pipe at foreign pipeline crossings be an appropriate safeguard?

Answer: No, the pipe is designed with a great number of safety factors inherently built in. Thicker pipe is only required at crossing locations such as railways, roads and rivers where the construction boring method requires thicker pipe in order to avoid buckling the pipe due to any stress exerted during the horizontal directional drilling operation.

43. Are you responsible for providing the information requested in Data Request 1-12?

Answer: Yes I am.

44. Please summarize your response to Data Request 1-12.

Answer: I provided the requested mechanical flow diagram.

45. Are you responsible for providing portions of the information requested in Data Request 2-14?

Answer: Yes I am.

46. Please summarize your response to Data Request 2-14.

Answer: Full details of the spill assessment study methodology and environmental consequences can be found within Exhibit C that was submitted as part of the Application. It is contained in the "3 risk assessment 03-30-07.pdf" and "4 DNV Report RA Appendix A deliverable.pdf" files found in the "ExhibitC_DOS filing\5 March 2007 filing\Risk Assessment" folder.

With respect to the State of South Dakota, Figure 1 and Figure 2 below provide both the calculated risk profile of the pipeline due to potential excavation damage, as well as the potential spill volumes associated with such an event. Excavation damage was identified within the spill assessment study as the leading pipeline threat and is discussed further in this response.

Spill volumes were calculated based upon the potential leak rate, time to isolate the pipeline and draindown occurring within the isolated pipeline segment. The assessment does not take in to account any reduction in spill volume due to actions to control the source aside from pipeline shutdown and closure of isolation valves. Consequently, procedures to reduce spill volume involving depressurization and draindown are not estimated or included.

In assessing the distribution of damage sizes, the failure mechanism and pipe material properties were also considered. The size of the damage is a function of many factors.

47. Do you adopt the referenced portions of Keystone's application and the referenced data responses as part of your testimony in this proceeding?

Answer, Yes, I do.

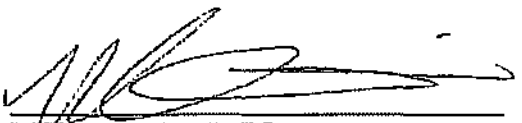
48. Do the portions of the application for which you are responsible support the granting of a permit by the Commission for the Keystone Pipeline Project?

Answer: Yes they do.

49. Does this conclude your testimony?

Answer: Yes it does.

Dated this 21st day of September, 2007.



MEERA KOTHARI

Meera Kothari P.Eng.
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Employment History

Project Engineer, Keystone Pipeline Project

Project Engineer ~3000 km pipeline project

October 2, 2005 – Present, TransCanada PipeLines Ltd, Calgary, Alberta

Technical Responsibilities

- Plan, review and ensure timely completion of regulatory baseline technical data, engineering design, permit application preparation and submittal in Canada and the US Federal and State level
- Develop and review specifications, standards, procedures & DBM for new construction, pipeline conversion and above ground facilities
- Pipeline route planning, facilities siting, development of emergency response plan, pipeline risk and integrity assessments and oil spill analysis
- Manage engineering service contractors
- Prepare and analyze project budgets & expansion cases
- Develop scope of work, bid analysis and award of project RFP
- Technical spokesperson at public consultation project open houses

Project Engineer, Cogeneration Power Plan Project

Project Engineer ~500 MW combined cycle power plant

May 1, 2005 – October 1, 2005 Energie TransCanada, Trois Rivières, Québec

Technical Responsibilities

- Developed & implemented inside battery limit plant construction quality plan
- Conducted witness point inspections and audit of equipment fabrication & equipment installation
- Conducted plant hazard assessment recommendation close out
- Validated work package estimates for outside battery limit pipeline system project bid award
- Developed hazardous material philosophy
- Prepared RFP scope for gas and chemical supply contracts
- Developed community investment risk matrix
- Provided French guided plant tours for various stakeholders

Project Controls Responsibilities

- Prepared monthly project status report, management presentations and HS&E statistics
- Analyzed and validated cost and schedule for various work packages
- Developed management operating system compliance tracking report

Operations & Engineering Technical Support & Technology Manager, Asset Reliability

Pipeline Integrity & Operations Engineer for rehabilitation programs, management of small projects

July 1, 2003 – April 30, 2005 TransCanada PipeLines Ltd, Calgary, Alberta

Technical Responsibilities

- Conducted engineering critical assessment for pipeline defect assessment, maintenance repair, pipeline pressure derating, unsupported pipe lengths, blasting/explosives, coating systems
- Managed urban development encroachments, foreign utility, road and vehicle crossing application review focused in the areas of integrity verification, stress analysis, population growth tracking for the purpose of code compliance and conflicts with facilities that may impact the ability to maintain integrity, access for maintenance, emergency response accessibility and compatible land uses
- Conducted failure analysis of in service pipe body leaks, pipeline ruptures and hydrostatic test failures

EXHIBIT A

- Conducted R&D in the areas of SCC & MFL In-Line Inspection, NDT techniques, pipeline repair techniques, mainline and joint coating systems, welding of new materials
- Conducted risk analysis for new pipeline construction projects
- Developed engineering & integrity budget and programs for due diligence and acquisitions
- Developed commercial agreements with Provincial Governments, private developers and construction contracts for pipeline upgrade/rehabilitation project
- Coordinated Facilities Integrity R&D Program reviews and budgeting cycles
- Liaised with Regulators (National Energy Board, Transportation Safety Board and Alberta Energy and Utilities Board) with respect to integrity management issues and incidents
- Provided direction during emergency maintenance activities to various groups within the organization

Pipeline Integrity Program Developer, Asset Reliability

Pipeline Integrity Engineer In Training developing risk based maintenance programs

July 1, 2001 – June 30, 2003 TransCanada PipeLines Ltd, Calgary, Alberta

Technical Responsibilities

- Developed annual integrity maintenance program using quantitative risk modeling software
- Coordinated research & development projects for risk management, corrosion and SCC threats
- Coordinated peer review team for evaluation of projects feasibility and cost management
- Performed value/benefit analysis for integrity projects
- Directed contractors & field technicians to perform technical tasks

Engineering Support Information Services Analyst

Full Summers & Part Time (20 hrs/week) during University

June 1, 1998- June 30, 2001, Petro-Canada Oil & Gas Ltd, Calgary, Alberta

Technical Responsibilities

- Developed data and Technology architecture for Bitumen Recovery Scheme, De-sulferization Upgrade Facility, Transportation Developments and Natural Gas Liquids (NGL) facilities

Education

Industry Courses

- Pipeline Pump Fundamentals
- Design of Gas Turbine Combined Cycle & Cogeneration Systems
- Pipeline Design & Construction, Pipeline Defect Assessment & Repair Methods
- Tools & Techniques of Project Management
- ASM Fundamentals of Non Destructive Testing, Principles of Failure Analysis

Post Secondary

- University of Calgary Bachelor of Science – Engineering Mechanical/Manufacturing
  09/97 – 06/01

Publications & Industry

- Member of the Association of Professional Engineers, Geologists, and Geophysicists of Alberta
- Chair Person: In-Line Inspection Session, Banff Pipeline Integrity Workshop, Banff, 2005
- M. Kothari, S. Tappert, U. Strohmeier, J. Larios and D. Ronsky, "Validation of EMAT In-Line Inspection Technology for SCC Management," Proceedings of the International Pipeline Conference, Calgary, 2004.
- R. Worthingham, M. Cetiner, M. Kothari, "Field Trial of Coating Systems for Artic Pipelines," Proceedings of the International Pipeline Conference, Calgary, 2004.
- Oil & Gas Journal "Two coating systems pass tests for arctic use" November 15, 2004
- Pipeline and Gas Technology Magazine "Using Emat for Crack Detection" June 2005